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Proceedings of SportsBizEdu

A national research conference organised by the International Institute of Sports & Management in collaboration with the Garware Institute of Career Education and Development (GICED), University of Mumbai.



Conference Theme: “Transforming Indian Landscape of Business, Education & Sports: The National Education Policy (NEP).”

Conference Details:

- **Date:** 31st August 2024
- **Location:** International Institute of Sports & Management (IISM) Campus, Fleet Building, Chimat Pada Rd, Gamdevi, Marol, Andheri East, Mumbai, Maharashtra 400059.

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Editorial

It is with great pride and optimism that we present the proceedings of SportzBizEdu 2024, IISM's national-level research conference dedicated to exploring the evolving confluence of Sports, Business, and Education in the context of the National Education Policy (NEP).

When we founded the International Institute of Sports & Management, our vision was to create a platform that not only nurtures future leaders in the sports ecosystem but also serves as a think tank that inspires research, innovation, and dialogue. SportzBizEdu is a natural extension of that vision—an initiative that allows academia and industry to collaboratively engage with ideas that shape the future.

The introduction of NEP has opened unprecedented possibilities for reimagining how sports can be embedded into the education system and linked with entrepreneurship, policy, and business. This conference is a timely response to that shift, inviting scholars, professionals, and students to contribute evidence-based insights that inform practice and policymaking.

The diversity and depth of papers presented this year reaffirm the growing recognition that sports is not merely a co-curricular activity, but a domain rich with economic, scientific, and social potential. From performance analytics and coaching science to athlete management and governance, the contributions compiled here represent a step forward in our collective effort to build an integrated and research-driven sports landscape in India.

We extend my sincere thanks to all contributors, advisory board members, session chairs, and the entire academic and organizing team at IISM. Your passion and dedication are what made SportzBizEdu 2024 a resounding success.

Let us continue to champion the cause of sports research and education with the same spirit of curiosity and commitment.

With Regards,

Mr. Nilesh Kulkarni and Mrs. Rasika Kulkarni

Founder Director

International Institute of Sports & Management (IISM).

A Good Athlete Manager Helps to Create Brand Value of an Athlete

Ms. Avanti Desai: Program Head-IISM.
Avanti.desai@iismworld.com

Abstract:

This research explores the significance of accurately representing athletes in the modern world, a topic of growing importance given the dual roles athletes play as both sports figures and influential cultural icons. By examining how athlete managers shape and manage these public personas, the study aims to provide valuable insights into the evolving dynamics of sports marketing and celebrity endorsements. Additionally, with the National Education Policy's emphasis on practical skills and hands-on training, there is an opportunity to develop programs or courses designed to train future athlete managers. Such programs could equip aspiring managers with the essential skills and knowledge needed to navigate the complex landscape of sports representation, branding, and endorsements. Understanding the role of athlete managers not only highlights the symbiotic relationship between athletes and their representation but also reveals broader implications for marketing strategies, consumer behavior, and the changing nature of celebrity culture.

Keywords: Athlete, Brand, Career, Education, Sports.

Introduction:

Background: Overview of the increasing importance of athletes as brand ambassadors and cultural icons.- In recent decades, the role of athletes has transcended beyond their performance on the field, court, or track. Today, athletes are not just competitors; they have evolved into powerful brand ambassadors and cultural icons. This transformation reflects broader shifts in media, marketing, and consumer behavior, with athletes becoming central figures in branding and cultural discourse. The evolving role of athlete managers in shaping public personas and enhancing brand value.- Historically, athletes were primarily known for their sporting achievements. For instance, early sports stars like Babe Ruth or Muhammad Ali were celebrated for their athletic talent and charisma but had limited roles outside their respective sports. However, the advent of mass media, particularly television, and later, the internet, began expanding the public's exposure to athletes, allowing them to reach and influence broader audiences.

Research Objectives:

- A. To investigate the significance of effective athlete representation in building brand value.
- B. To understand how athlete managers influence marketing, endorsements, and public perception.
- C. To explore opportunities for developing educational programs for aspiring athlete managers.

Literature Review:

The establishment and sustenance of a mainstream media presence require athletes to extend their reach beyond traditional sports audiences. Mainstream media is often reluctant to feature sports stars if it first needs to introduce and educate its audience about them. To overcome this barrier, athletes must proactively seek opportunities to increase their visibility among non-sports fans. A strategic approach to enhancing an athlete's public profile is by associating with well-known personalities or emerging stars in the entertainment industry.

Rein et al. (2005) highlight that different industries possess varying degrees of mainstream visibility, with the entertainment sector offering the greatest potential. By forming connections with celebrities and influential figures in entertainment, athletes who are otherwise confined to sports circles can significantly expand their appeal to a broader audience (Parmentier et al., 2012).

The admiration of star athletes such as Serena Williams and Stephen Curry extends beyond their athletic accomplishments. Sport consumers value these athletes for embodying the ideals and values of their communities (Sailes, 2001). This strong consumer-athlete connection is a critical component of the athlete's brand, with increased popularity often leading to lucrative endorsement deals. The development and solidification of an athlete's personal brand are key to strengthening market presence, a process frequently managed by brand managers at sports marketing agencies (Darlow, 2018; Smith et al., 2022). The distinctiveness of athlete brands presents brand managers with the opportunity to enhance their clients' earning potential and visibility by leveraging consumer perceptions of the athlete's performance, appearance, and lifestyle (Arai et al., 2014). The on-court image of an athlete plays a significant role in shaping sponsor preferences, making it a critical factor in securing sponsorships (Kunkel et al., 2019). Given that professional athletes are often seen as influential role models, it is crucial for them to reinforce their image through socially responsible actions off the field (Babiak & Wolfe, 2009; Guest & Cox, 2009). Additionally, meaningful and authentic interactions with fans are vital, as they satisfy the consumers' desire for a personal connection (Thomson, 2006). In this context, athlete brand managers and sports agents play a key role in evaluating the strengths and weaknesses of an athlete's brand. They are tasked with building and sustaining a positive brand image, which is essential to the athlete's market value (Arai et al., 2013). Managing and enhancing an athlete's brand value requires a deep understanding of both the athlete's public persona and the broader market environment (Arai et al., 2014b).

This literature underscores the vital role that athlete managers play in creating and sustaining brand value. By effectively managing the athlete's public image, fostering strategic associations, and ensuring alignment with consumer values, athlete managers can significantly elevate their client's market presence and commercial success.

Role of Athlete Managers:

Athlete managers play a crucial role in the careers of professional athletes, handling a range of responsibilities to ensure their clients' success and well-being. As per Esei (2024), here's a broad overview of their key roles:

1. **Contract Negotiation:** They negotiate contracts with teams, sponsors, and other partners, aiming to secure the best possible terms for their clients. This includes salaries, bonuses, and other compensation.
2. **Marketing and Endorsements:** They help athletes build and maintain their public image, seek out endorsement deals, and manage marketing opportunities. This often involves coordinating with advertising agencies and public relations firms.
3. **Career Planning:** They assist in long-term career planning, including decisions about which teams to join, retirement planning, and post-career opportunities.
4. **Financial Management:** Although they might not handle all financial matters directly, they often work with financial advisors to ensure their clients' money is managed wisely, including investments, savings, and tax planning.
5. **Legal Advice:** They may provide or coordinate legal advice on contracts, disputes, and other legal matters that arise.
6. **Personal Support:** They often act as a personal support system for athletes, helping them manage personal issues that might impact their professional lives, such as media scrutiny or family matters.

7. **Public Relations:** They manage relationships with the media and handle press releases, interviews, and public appearances to maintain a positive public image for their clients.
8. **Scheduling and Logistics:** They coordinate travel, training schedules, and appearances, ensuring that athletes are in the right place at the right time.

Overall, athlete managers are vital in helping athletes focus on their performance by managing the off-field aspects of their careers.

Sport Management Programs: Many countries have introduced specialized sport management programs in higher education institutions (Govindasamy et al., 2020). These programs often include coursework in sports marketing, event management, contract negotiation, and athlete management, providing a blend of theoretical knowledge and practical skills.

Experiential Learning: Programs increasingly incorporate internships, cooperative education, and hands-on projects with sports teams or management agencies. This practical experience helps students apply their learning in real-world contexts.

In India, the influence of sports celebrities like cricketers (e.g., Sachin Tendulkar, Virat Kohli) is particularly pronounced due to the country's cricket obsession. The effectiveness of sports marketing strategies often hinges on:

- **Cultural Relevance:** Aligning with cultural values and local preferences.
- **Celebrity Impact:** Leveraging the high visibility and fan following of sports celebrities to drive brand engagement.
- **Media Influence:** Utilizing both traditional and digital media to maximize the reach and impact of endorsements.

Analysis of Successful Endorsement Deals of Indian Athlete and their Impact on Athlete Brand Value:

Analyzing successful endorsement deals of Indian athletes can provide valuable insights into how these agreements impact the athletes' brand value. In India, where sports celebrities—particularly cricketers—enjoy immense popularity, endorsement deals can significantly enhance an athlete's personal brand. Here's an in-depth analysis of some notable endorsement deals and their effects:

A. Sachin Tendulkar Endorsement Deals:

- **Pepsi:** Sachin Tendulkar's endorsement with Pepsi in the 1990s helped the brand tap into the cricket-obsessed market.
- **BMW:** Tendulkar's association with BMW positioned him as a symbol of luxury and success.
- **Luminous:** His long-standing partnership with Luminous, a battery and inverter company, reinforced his image as a reliable and trustworthy figure.

Impact on Athlete Brand Value:

- **Iconic Status:** Tendulkar's endorsements solidified his status as a cricket icon and a symbol of excellence.
- **Brand Affinity:** His associations with premium brands enhanced his appeal among affluent consumers, reinforcing his image as a successful and aspirational figure.
- **Longevity:** His endorsements have often been long-term, suggesting enduring brand value and trustworthiness.

B. Virat Kohli**Endorsement Deals:**

- **Puma:** Kohli's deal with Puma, including launching his own line of sportswear, has been highly successful in positioning him as a youthful and dynamic athlete.
- **Myntra:** Kohli's association with Myntra, an online fashion retailer, has leveraged his influence to boost the brand's image in the fashion segment.
- **Audi:** The endorsement with Audi aligns Kohli with luxury and performance, enhancing his image as a modern and successful athlete.

Impact on Athlete Brand Value:

- **Youth Appeal:** Kohli's endorsements have successfully targeted the younger demographic, enhancing his appeal as a modern and trendy icon.
- **Market Penetration:** His involvement in a range of products from fashion to luxury vehicles has diversified his brand value, making him a versatile endorser.
- **Engagement:** Kohli's active social media presence amplifies the reach of his endorsements, increasing his influence over a broad audience.

C. MS Dhoni**Endorsement Deals:**

- **Reebok:** Dhoni's endorsement with Reebok positioned him as a leading figure in sportswear, especially appealing to cricket fans.
- **Exide Batteries:** His long-term association with Exide Batteries highlighted his image of reliability and endurance.
- **Dove:** Dhoni's endorsement with Dove connected with a more personal and emotional appeal, focusing on his leadership and calm demeanor.

Impact on Athlete Brand Value:

- **Reliability:** Dhoni's endorsements have reinforced his image of being dependable and steady, traits that resonate well with Indian consumers.
- **Versatility:** His associations span a range of products, from sports gear to personal care, showcasing his broad appeal and versatility.
- **Leadership Image:** Dhoni's endorsement deals often emphasize his leadership qualities, enhancing his brand as a respected and influential figure.

D. PV Sindhu**Endorsement Deals:**

- **Gatorade:** Sindhu's endorsement with Gatorade highlights her athletic prowess and fits well with her image as a top badminton player.
- **Visa:** Her association with Visa has positioned her as a role model for aspiring athletes and a global figure.
- **Puma:** Similar to Kohli, Sindhu's deal with Puma has elevated her status in the sportswear segment.

Impact on Athlete Brand Value:

- **Global Recognition:** Endorsements with international brands have helped elevate Sindhu's brand value on a global scale, highlighting her success and appeal beyond Indian borders.
- **Inspirational Image:** Her deals often emphasize her achievements and inspirational story, enhancing her status as a role model.
- **Market Reach:** Her endorsements across various sectors, from sports drinks to financial services, showcase her diverse appeal and brand versatility.

General Observations on Endorsement Impact:

1. **Enhanced Visibility:** Successful endorsements significantly increase an athlete's visibility and public profile. The more high-profile endorsements an athlete secures, the greater their reach and influence.
 2. **Increased Brand Equity:** Effective endorsements often enhance an athlete's brand equity by associating them with positive brand attributes such as success, reliability, or luxury.
 3. **Diverse Appeal:** Endorsements across different product categories help athletes build a multi-dimensional brand that appeals to various segments of consumers.
 4. **Financial Benefits:** High-value endorsement deals contribute substantially to an athlete's financial success, often outstripping earnings from their primary sport.
 5. **Longevity and Loyalty:** Long-term endorsement deals often indicate sustained brand value and consumer loyalty, reflecting the enduring appeal of the athlete.
- By leveraging their personal brand and public image, Indian athletes have successfully used endorsements to enhance their market presence and value, making them influential figures not just in sports but in various consumer sectors.

Role of an Athlete Manager

In the endorsement deals mentioned above for Indian athletes, the role of the athlete manager is crucial for negotiating, managing, and maximizing the benefits of these partnerships. Here's a detailed breakdown of the athlete manager's responsibilities and impact:

Negotiation of Endorsement Deals**Role:**

- **Representation:** The athlete manager acts as the primary representative for the athlete in negotiations with brands and companies.
- **Contract Terms:** They negotiate the terms of the endorsement deal, including financial compensation, duration, and specific obligations or deliverables.
- **Strategic Value:** Managers use their industry knowledge to secure deals that align with the athlete's brand and career goals, ensuring the endorsement fits well with the athlete's public image and market positioning.

Impact:

- **Optimal Terms:** Successful negotiation ensures that the athlete secures favorable terms that reflect their market value and align with their career strategy.
- **Brand Fit:** The manager helps in selecting endorsements that complement the athlete's personal brand and public image, enhancing overall brand coherence.

Strategic Planning and Brand Alignment**Role:**

- **Brand Strategy:** The manager helps develop and implement a brand strategy that aligns with the athlete's values, strengths, and career aspirations.
- **Partnership Selection:** They identify and recommend suitable brands and products for endorsement deals, ensuring they align with the athlete's personal image and public persona.
- **Market Trends:** Managers keep abreast of market trends and consumer preferences to guide endorsement choices that will maximize impact and relevance.

Impact:

- **Brand Consistency:** Ensures that all endorsement deals are strategically aligned with the athlete's long-term brand objectives, maintaining consistency in their public image.

- **Enhanced Appeal:** Proper alignment with reputable brands enhances the athlete's marketability and appeal, leading to more successful endorsements.

Contract Management and Compliance

Role:

- **Contract Oversight:** The manager oversees the execution of the endorsement contract, ensuring that all parties meet their obligations and that the terms are adhered to.
- **Conflict Resolution:** They handle any issues or disputes that arise during the contract period, working to resolve them efficiently and professionally.
- **Monitoring Performance:** Ensures that the endorsement activities are carried out as agreed, including appearances, promotional events, and social media engagements.

Impact:

- **Smooth Execution:** Efficient contract management helps avoid legal or operational issues, ensuring that the endorsement campaign runs smoothly and effectively.
- **Brand Integrity:** Proper oversight maintains the athlete's professional reputation and ensures that the brand's image is not adversely affected by contractual issues.

Public Relations and Media Management

Role:

- **Media Interaction:** Manages interactions with the media related to endorsement deals, including interviews, press releases, and promotional events.
- **Public Image:** Helps shape and maintain the athlete's public image through strategic media appearances and positive public relations efforts.
- **Crisis Management:** Addresses any negative publicity or issues that may arise from endorsement deals, working to protect and manage the athlete's reputation.

Impact:

- **Positive Exposure:** Effective media management ensures that endorsement deals receive positive coverage, enhancing the athlete's visibility and brand image.
- **Reputation Protection:** Handles potential crises to protect the athlete's reputation, ensuring that negative situations do not undermine the endorsement's success.

Financial and Legal Advisory

Role:

- **Financial Management:** Advises on financial matters related to endorsement deals, including compensation, taxes, and investment opportunities.
- **Legal Counsel:** Works with legal advisors to ensure that contracts are legally sound and that the athlete's interests are protected.
- **Income Maximization:** Assists in managing and maximizing the financial benefits of endorsement deals, including negotiation of performance bonuses and royalties.

Impact:

- **Financial Security:** Ensures that the athlete receives fair compensation and manages their earnings effectively, contributing to long-term financial stability.
- **Legal Protection:** Provides legal security by ensuring that all contracts and agreements are properly vetted and that the athlete's rights are protected.

Examples of Athlete Manager Impact:

- **Sachin Tendulkar:** His managers played a pivotal role in securing high-profile endorsements with brands like Pepsi and BMW. Their strategic approach helped solidify Tendulkar's position as a leading sports icon and contributed to his long-term success.
- **Virat Kohli:** Kohli's managers have successfully negotiated deals with brands such as Puma and Audi, aligning with his youthful and dynamic public persona. This has not only enhanced his market presence but also diversified his brand endorsements across various sectors.
- **MS Dhoni:** Dhoni's endorsements, including deals with Reebok and Exide, were facilitated by his managers who ensured that his image as a reliable and steady figure was reflected in his brand associations.

The athlete manager plays a crucial role in securing, managing, and maximizing endorsement deals, ensuring that they align with the athlete's brand strategy and contribute positively to their market value and public image. In India, several sports celebrities are widely recognized for their achievements and endorsement deals. Each of these athletes typically works with a professional athlete manager or agency to handle their endorsements, public relations, and other career aspects. Here are some prominent Indian sports celebrities along with their known athlete managers or agencies:

Sports Celebrities and Athlete Manager Success Story:**Sachin Tendulkar**

- **Athlete Manager:** Tendulkar's management has been handled by his long-time business partner and friend, Mark Mascarenhas, who was also the founder of WorldTel, the company that managed Tendulkar's endorsements. After Mascarenhas's passing, Tendulkar's brand and endorsements are now managed by Tendulkar's own brand management firm, which oversees his endorsement deals and public appearances.

Virat Kohli

- **Athlete Manager:** Cornerstone Sport & Entertainment, an agency led by Baba Ramachandran and Sandeep Khosla, manages Virat Kohli's endorsements and public relations. Cornerstone is well-known for handling various high-profile sports personalities and celebrities in India.

MS Dhoni

- **Athlete Manager:** Rhiti Sports Management, led by Mr. Arun Pandey, manages MS Dhoni's endorsements and public relations. Rhiti Sports is a prominent sports management agency that has worked closely with Dhoni for several years, handling his endorsements and other commercial interests.

PV Sindhu

- **Athlete Manager:** PV Sindhu is managed by Baseline Ventures, an agency led by Tuhin Mishra and Vikram Kharbanda. Baseline Ventures specializes in sports management and has been instrumental in handling Sindhu's endorsement deals and brand partnerships.

Saina Nehwal

- **Athlete Manager:** Baseline Ventures, which also manages PV Sindhu, handles Saina Nehwal's endorsements and public relations. The agency has been involved in promoting Saina's brand image and managing her endorsements.

Rohit Sharma

- **Athlete Manager:** Rohit Sharma's endorsements and brand management are handled by Wiz Khalifa Management, which is led by Faisal Malik. The agency manages various aspects of Sharma's professional and endorsement activities.

Yuvraj Singh

- **Athlete Manager:** Yuvraj Singh's brand endorsements and public relations are managed by Wiz Khalifa Management, similar to Rohit Sharma. Faisal Malik and his team are responsible for handling Yuvraj Singh's endorsements and other commercial interests.

Hima Das

- **Athlete Manager:** Saregama India Ltd., under the leadership of Siddhartha Roy, has been involved in managing Hima Das's endorsements and public appearances. Saregama India is known for its involvement in the entertainment and sports management sectors.

Gagan Narang

- **Athlete Manager:** Percept Limited, a well-known sports and entertainment agency led by Shailendra Singh, manages Gagan Narang's endorsements and public relations. Percept is involved in various aspects of sports management and promotion.

Abhinav Bindra

- **Athlete Manager:** Sports Excellence, an agency led by Bharat B. and Ashok S., has handled Abhinav Bindra's endorsements and career management. The agency focuses on promoting sports talent and managing endorsements.

The role of athlete managers and agencies is crucial in managing the complex aspects of endorsement deals, public relations, and overall brand strategy for sports celebrities. These professionals help athletes maximize their market value, manage their public image, and handle various commercial activities.

Limitations:

While the current research highlights the importance of athlete management and formal education, it is not without limitations. The rapidly evolving nature of the sports industry means that new challenges and opportunities frequently arise, which may not be fully captured in existing curricula. Additionally, the study's focus on established best practices might overlook emerging, innovative approaches that could significantly impact athlete management. The relationship between different cultural, economic, and technological contexts in various regions also presents a limitation, as strategies that work in one area might not be directly applicable in another.

Future Scope:

Future research can explore these limitations by examining the impact of emerging technologies such as artificial intelligence and data analytics on athlete management. Additionally, expanding the scope to include a comparative analysis of athlete management strategies across different cultural and economic contexts could provide deeper insights. Another promising area of research is the development of specialized training programs that integrate traditional sports management education with new, innovative practices tailored to the dynamic nature of the sports industry. This would help in equipping future sports managers with the tools and knowledge necessary to adapt to and thrive in an ever-changing environment.

Conclusion:

A skilled athlete manager leverages their expertise to guide and support athletes throughout their careers, navigating the complexities and challenges that arise. Formal sports management education provides the essential knowledge and skills needed to excel in this field, including an understanding of industry dynamics, legal frameworks, and marketing strategies. The combination of these elements ensures effective management and growth for both athletes and sports organizations, paving the way for long-term success and sustainability in the sports industry. The synergy between a proficient athlete manager and a solid foundation in sports management education creates a strong framework for effectively managing and developing athletes and sports organizations. This collaboration is crucial for ensuring enduring success and sustainability. The national education policy (nep) promotes an interdisciplinary approach to education, which can incorporate sports management into a broader curriculum. The nep supports the integration of sports management education with related fields such as health, wellness, and sports business. Additionally, the nep emphasizes lifelong learning and continuous professional development, which is particularly relevant for sports management professionals who must stay abreast of the latest trends, technologies, and best practices in athlete management.

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Implementation of Piezoelectric Tiles in Cricket Stadiums to Generate Electricity in a Sustainable Manner

Tanmay Kulkarni: Department of Management, International Institute of Hotel Management, Pune.
tanmay.kulkarni@iihmpune.com

Abstract:

Investigating cutting-edge technologies to capture renewable energy sources has become necessary due to the growing need for sustainable energy solutions. This project focuses on the sustainable electricity generation potential of piezoelectric tiles installed in cricket stadiums. Special materials known as piezoelectric materials are able to transform mechanical stress into electrical energy. In cricket stadiums, considerable amounts of energy can be captured from the movement of fans by placing these tiles strategically in high foot traffic regions.

This study's main goal is to assess piezoelectric tiles' viability, effectiveness, and potential energy output as an integrated part of cricket stadium infrastructure. The study includes the best tile placement strategies to optimize energy generation, a thorough examination of the kinds of piezoelectric materials appropriate for this use, and the integration of the generated electricity into the stadium's power system.

The primary research shows that piezoelectric tiles can efficiently transform the kinetic energy of foot movement into electrical energy that can be used, which helps meet the stadium's overall energy requirements. In addition to encouraging sustainability, the use of this technology also increases viewers' awareness of renewable energy sources. Less reliance on traditional energy sources is also possible because the electricity produced can be used to power stadium features such as lighting and electronic displays.

There are suggestions for prospective improvements and solutions to problems including the initial installation cost, tile durability, and energy conversion efficiency. Despite being a relatively new technology, the study indicates that piezoelectric tiles have great potential for producing sustainable energy in public areas such as cricket stadiums.

Keywords: Awareness, Electricity Generation, Energy Conversion, Innovative Technology, Kinetic Energy, Mechanical Stress, Piezoelectric Tiles, Power Grid, Sustainable Energy.

Introduction:

The term "sustainable energy generation" describes the energy produced using methods that do not damage the environment or deplete resources. Sustainable energy is now essential to guaranteeing a safe and ecologically friendly energy future due to growing worries about pollution, climate change, and the depletion of fossil fuels. As stated by Rayhan (2023) due to the fast-paced urbanization and industrialization, the world's energy demand is still growing dramatically. The world is turning its attention to sustainable energy sources as traditional fossil fuels run out and their effects on the environment become more apparent. The paper examines the potential of sustainable energy to fulfil rising energy demands while reducing climate change and fostering environmental stewardship. There are multiple options to generate the electricity which is the most common demand in today's time like solar, wind, hydroelectric, geothermal, and biomass. Along with all these there is one more option which is miracle in its own that is Piezoelectric Tiles. These tiles are scientific magic created by Pierre Curie and Jacques Curie in the year 1880 when they first demonstrated the workings.

In India, cricket is something that everyone is aware of. Looking at this, the government is also supporting the cricket lovers by building big stadiums with higher number of seating capacities. In India, there are around 80+ stadiums that have hosted international

cricket tournaments as of December 2023. The idea of this research is to utilize the Piezoelectric Tiles in such a way that more amount of electricity can be generated in a sustainable manner through these stadiums. There are big stadiums with huge seating capacity like Narendra Modi Stadium, Ahmedabad (1,50,000 capacity), Eden Garden Stadium, Kolkata (70,000 capacity), Bharat Ratna Shri Atal Bihari Vajpayee Ekana Stadium, Lucknow (50,000 capacity), Barabati Stadium, Cuttack (45,000 capacity), where these tiles can be installed and electricity can be generated in a much sustainable manner.

Sustainable Electricity Sources

1. **Solar Energy:** Solar energy uses solar thermal or photovoltaic technologies to capture solar radiation. Whereas solar thermal systems use the heat of the sun to create steam, which powers turbines to produce energy, photovoltaic cells directly convert sunlight into electricity. When used, solar energy emits no greenhouse gases and is plentiful and renewable.
2. **Wind Energy:** Wind energy uses turbines to harness the kinetic energy of the wind. The wind powers a generator to generate electricity by rotating the blades of a turbine. One of the renewable energy sources with the quickest rate of growth is wind power, which has the potential to significantly lower carbon emissions and dependency on fossil fuels.
3. **Hydropower:** Using the flow of water to spin turbines connected to generators, hydropower, also known as hydroelectric power, produces energy. Particularly in areas with an abundance of water resources, it is a very dependable and efficient energy source. On the other hand, extensive hydropower projects may have detrimental effects on the environment and society, such as community dislocation and habitat destruction.
4. **Biomass Energy:** Organic resources like plant and animal waste are used to make biomass energy. Biomass can be transformed into energy, heat, or biofuels by means of procedures such as gasification, combustion, and anaerobic digestion. Although it must be handled sustainably to prevent detrimental effects on land use and food security, biomass energy can help reduce waste and greenhouse gas emissions.
5. **Geothermal Energy:** Geothermal energy uses heat from the Earth's interior to provide direct heating or electricity. It entails drawing steam or hot water from subterranean reservoirs and using it to heat buildings or run turbines. When used appropriately, geothermal energy can be a dependable and consistent power source with little effect on the environment.

In addition to these sustainable resources, piezoelectric tiles can also be one of the sources through which electricity can be generated without hampering the environment.

What are Piezoelectric Tiles?

‘Piezoelectric tiles are normal floor tiles built using specific crystals and ceramics which generate mild electric currents when mechanical stress is applied on them. Certain crystals have the ability to generate and store an electric charge when mechanical stress is applied on them. Such crystals are referred to as Piezoelectric crystals.’ (Ketkar, 2023).

Piezoelectric tiles are cutting-edge flooring options that use mechanical stress to produce electrical energy. These tiles transform kinetic energy into electrical energy when pressure is applied, such as during walking or running. The piezoelectric effect, which occurs when some materials generate an electric charge in reaction to mechanical stress, is used by this technology.

How Piezoelectric Tiles Work?

Materials: Materials with piezoelectric qualities, such as quartz, ceramics, or certain polymers, are often used to create piezoelectric tiles.

Mechanism: The tile gently distorts when force is applied to it. An electric voltage is produced by the internal realignment of electrical charges within the material as a result of this deformation.

Energy Harvesting: The electrical energy produced is gathered by embedded electrodes and can be utilized directly to power low-energy gadgets like wireless transmitters, LED lights, and sensors, or it can be stored in batteries.

Application:

- **Cricket Stadiums:** All the physical activities that are carried out at the cricket stadium can be utilised or converted into electricity. The tiles can be placed strategically where there is ample amount of movement carried out by the spectators. Areas like stands, food areas, stadium entrance gates can be few of the locations where these tiles can be installed.
- **Sports Facilities:** Energy from intense physical activity can be captured by piezoelectric tiles in athletic fields, gyms, and running tracks. This energy can be later utilized to power the equipment or other electric functions within the sports facility.
- **Public Spaces:** To harvest energy from pedestrian movement, piezoelectric tiles can be put in high-traffic places such as airports, shopping centres, and train stations.
- **Smart Buildings:** By supplying electricity to sensors or lighting systems, smart building flooring made of these tiles can reduce energy consumption.
- **Urban Infrastructure:** Incorporating piezoelectric tiles into public parks, walkways, and plazas allows for the sustainable production of electricity from foot circulation.

Benefits:

- **Sustainable Source:** Without relying on outside energy sources, piezoelectric tiles offer a sustainable and renewable method of producing electricity from human activity.
- **Reduced Carbon Footprint:** Piezoelectric tiles contribute to cut greenhouse gas emissions by producing sustainable energy and reducing the need for fossil fuels.
- **Versatility:** They are a flexible energy generation solution since they may be employed in a variety of settings, including both indoor and outdoor public areas. Due to the nature of the material utilized in the tiles it makes them one of the best sustainable electricity generation options.
- **Public Awareness:** Piezoelectric tiles are one example of a visible and interactive sustainable technology that can be used to increase public understanding of sustainability and renewable energy.

Challenges:

- **Efficiency:** Since piezoelectric tiles only provide a lower amount of energy, they must be optimized and integrated with other renewable energy sources to have a greater effect or should be installed in a good large quantity.
- **Cost:** Though piezoelectric tiles can be expensive to manufacture and install initially, as technology progresses and their use increases, costs may eventually come down. At the moment, in India the cost for the tile ranges between Rs.12,000 to Rs. 45,000 depending on the size selection.
- **Durability:** Piezoelectric tiles must be long-lasting and durable in order to be viable and economical, particularly in high-traffic areas. Maintenance of the same is crucial for the tiles to perform at their best.

- **Knowledge**: As the concept and the product is relatively new in the market, there is still less amount of knowledge amongst people.
- **Skilled Manpower**: Due to lack of awareness about the product along with less utilization of the same in market, there is still lack of skilled manpower for the same.

Future Prospects:

Enhanced Efficiency through Advanced Materials

- **High Performance Piezoelectric Material Development**: In materials science, there is constant research aimed at finding and creating novel piezoelectric materials with increased energy conversion efficiency. To improve their piezoelectric qualities—such as increased sensitivity to mechanical stress and increased electrical output—advanced ceramics, polymers, and composites are being created. By using these materials, piezoelectric tiles can function much better and capture more energy from human movement.
- **Nanotechnology**: By arranging materials at the nanoscale, nanotechnology presents the possibility of improving the piezoelectric effect. When considering mechanical and electrical qualities, nanostructured piezoelectric materials—like nanowires and nanoparticles—can perform better than their bulk counterparts. These materials can expand the area available for converting energy, which raises each tile's efficiency and output of energy.

Integration with Advanced Energy Storage Solutions

- **Efficient Energy Harvesting Circuits**: Energy harvesting circuits that are effective are necessary to maximize the energy produced by piezoelectric tiles. By reducing energy losses throughout the conversion and storage operations, these circuits can increase the electrical output. Enhancing the overall system efficiency can ensure that more of the captured energy is available for practical use. This can be achieved through innovations in low-power electronics and energy-efficient circuits.
- **Improved Battery Technology**: It is necessary to store the energy produced by piezoelectric tiles effectively for later usage. Modern battery technologies provide longer lifespans, faster charging times, and greater energy densities. Examples of these technologies include lithium-ion batteries, solid-state batteries, and supercapacitors. With these enhancements, the energy collected from piezoelectric tiles may be consistently stored and used to power a variety of applications.

Integration with Smart Grids and IoT

- **Smart Grids**: Through integration, piezoelectric tiles can provide energy that is fed into a broader network of renewable energy sources within smart grid systems. To ensure that the energy produced by piezoelectric tiles is used effectively and efficiently, smart grids improve energy distribution and utilization through sophisticated monitoring and management systems.
- **Internet of Things (IoT)**: Piezoelectric tiles can be integrated into the Internet of Things (IoT) network by adding sensors and networking functionalities. By gathering information on foot traffic, energy generation, and consumption patterns, these smart tiles can offer insightful data that can be used to improve energy management. Buildings and public areas can become more energy-efficient by using the data to make real-time adjustments to the lighting, heating, and cooling systems.

Applications in Sustainable Urban Design and Architecture

- **Smart Cities:** In smart cities, where renewable energy solutions are included into the urban infrastructure, piezoelectric tiles can be vital to the development of the city. Cities may reduce carbon emissions and improve energy efficiency by putting piezoelectric tiles in sidewalks, shopping complexes, and other public places, which will harness the regular pedestrian flow to generate renewable energy.
- **Green Building:** Green building certifications, like LEED (Leadership in Energy and Environmental Design), can be attained in part by using piezoelectric tiles into the design. These tiles can lower the building's overall energy consumption and environmental effect by offering a renewable energy source for HVAC systems, lighting, and other building services.

Conclusion:

The incorporation of piezoelectric tiles into cricket stadiums presents a distinctive and inventive method for utilizing renewable energy. These tiles have the ability to transform fan motion—such as strolling, jumping, and cheering—into electrical energy by capturing that kinetic energy. By providing electricity for scoreboards, lighting systems, and other electronic equipment, this sustainable energy option can considerably help the stadium meet its energy needs.

By lowering dependency on non-renewable energy sources, the installation of piezoelectric tiles in cricket stadiums improves the venue's sustainability rating while simultaneously having a positive environmental impact. In addition to assisting stadiums in becoming certified green buildings, it can raise public awareness of renewable energy technologies.

Moreover, this technology can be used as a teaching tool to illustrate the usefulness of sustainable energy solutions by being visibly applied in high-traffic places like sidewalks, seating areas, and entrances. Piezoelectric tiles installed in cricket stadiums can serve as a model for other public spaces and sporting facilities, encouraging a wider shift towards sustainable practices.

In conclusion, the use of piezoelectric tiles in cricket stadiums is a progressive tactic that supports the objectives of global sustainability. It lowers the venue's carbon footprint, increases public awareness of the value of renewable energy, and takes advantage of the large crowds that athletic events attract to produce clean energy. This creative solution for modern sports infrastructure improves the fan experience while also helping the environment, making it a win-win situation.

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Understanding Consumer Adoption of Quick Commerce: A Multifaceted Analysis

Rahil Dosani: Assistant Professor, Atlas SkillTech University.

Abstract:

Quick commerce (QC), which is defined as the incredibly quick delivery of convenience and grocery goods, has grown rapidly in the last several years. This study explored the variables that influence consumers' choice to use QC services. Using a multidisciplinary framework that includes marketing, consumer psychology, and the technological acceptance model, this study seeks to clarify the intricate interactions between barriers and motives that influence customer behavior in the context of quality control.

This study examines various individual characteristics that impact adoption, including perceived benefits, such as convenience, time savings, and product variety, and potential drawbacks, such as delivery time, costs, platform reliability, and product quality concerns. It also explores societal influences such as social media buzz, online reviews, and word-of-mouth recommendations. This study investigates how situational factors impact QC adoption by considering the user interface, ordering/payment ease, and delivery reliability. It also explores how demographics, such as age, income, and urban/suburban residence, influence QC usage.

This study employs a mixed-methods approach to understand consumer adoption of quick commerce (QC) services. A survey gathers quantitative data from a representative sample, while in-depth interviews provide qualitative insights into user experiences and motivations. The statistical analysis identifies the key relationships between the proposed factors and consumer adoption patterns. This study aimed to identify the key factors driving QC adoption, benefiting both organizations and customers. These findings can guide consumers in making informed decisions about QC use and help companies tailor marketing strategies to attract and retain QC users, fostering the sector's growth and sustainability. This study contributes to the understanding of customer behavior in digital retail, offering insights into navigating the rapidly changing market by unravelling factors influencing QC adoption.

Keywords: Quick commerce (Q-commerce), Consumer adoption, Consumer psychology, Repurchase intention, Sentiment analysis.

Introduction:

Quick commerce, or "q-commerce," Often referred to as the "next generation of e-commerce," this distinct business model has a very limited order window and delivery window has become a disruptive force in the retail industry by providing extremely quick product delivery. The one-day delivery window was replaced with a 10-to 30-minute window, as millennial Z dominates the digital ecosystem. Owing to the rise in on-demand services, shifting customer tastes, and rising smartphone usage, this convenience-driven business has become popular in recent years.

A rapid order fulfilment procedure known as "Quick Commerce" is used to handle small orders for a variety of food products, including groceries, stationery, pharmaceuticals, and many more. Businesses must comprehend the elements driving q-commerce customer acceptance to tailor their approaches and serve this dynamic market niche. Many organizations have embraced the concept wholeheartedly in an effort to accomplish the astounding product-fit concept in the current Internet marketplaces. Therefore, when creating the value proposition of any organization, the shift from the old good model to the rapid commerce model must take several factors into account.

The pandemic has caused a significant disturbance in supply chain logistics. As a result, the e-commerce industry now has a new variation known as Quick Commerce. The main goal is to meet the needs of micro- and small-sized goods. Micro-warehouses that are close to potential customers have replaced large, well-stocked warehouses as a result of consumers' increased focus on online buying behaviourism.

Literature Review:

Faraz Ahmed and Najla Shafighi (2022) discussed the growth of the Q-commerce industry in South Asia. This highlights the convenience and speed that Q-commerce provides to customers. This study also explored the challenges and opportunities faced by this industry. Some of the important points of this study are that pricing, convenience, and security are important factors in consumer decisions. Additionally, the quick commerce model is likely to remain because it is convenient for consumers.

Harshal Pandurang Gund and Jay Daniel (2023) discussed the greenhouse gas emissions associated with e-commerce and Q-commerce. It discusses how last-mile deliveries of both purchasing techniques affect the environment. E-commerce provides more reasonably priced solutions, whereas Q-commerce concentrates on quick deliveries. Both employ logistics and technology networks to complete the orders. However, Q-commerce puts ease and speed above all others, which frequently leads to higher emissions.

Mayukh Mukhopadhyay (2023) discussed rapid commerce (QC) and the variables that prompt customers to move from traditional e-commerce (EC) to QC. These aspects can be analysed using push-pull-mooring (PPM) and Construal Level Theory (CLT) frameworks. A Fuzzy Cognitive Mapping (FCM) framework is also suggested in this study to investigate the factors that influence QC. A few key takeaways include customers being more inclined to transition from EC to QC if reduced efficiency, simplicity of use, cash on delivery, and forgiving return policies are offered. Furthermore, individuals who follow trends more closely and those who have previously used QC services are more inclined to switch.

Alice Harter, Lucas Stich and Martin Spann (2024) discussed how delivery times affect consumers' propensity to make repeat purchases in fast commerce. The significance of rapid commerce, which provides goods in minutes to satisfy urgent needs, is covered. Promised delivery window deviations may have a detrimental effect on repurchase intention. Using a sizable customer transaction dataset and a carefully monitored online experiment, the authors investigated the consequences of delivery-time discrepancies. They discovered that whereas early delivery results in shorter intervals between purchases, late deliveries cause longer intervals. Delivery time variance has a greater impact on late deliveries than on early deliveries. Customer satisfaction mediates the impact of delivery time discrepancies on repurchase behavior.

Hoang Linh Dang, Nguyen Van Bao, Yoon Cheong Cho (2023) discussed how consumers are using e-commerce in the wake of the COVID-19 pandemic. It discusses the elements that influence Vietnamese online shoppers' choices. The study discovered that favourable factors influencing customers' buying decisions include trust, attitude, satisfaction, and the calibration of a website's design. Additionally, elements that positively affect purchasers' trust include perceived reputation and size as well as system assurance. Nonetheless, the inclination towards trust had little effect.

Heleen Buldeo Rai, Joséphine Mariquivoi, Matthieu Schorung, Laetitia Dablan (2023) discussed how rapid business in Paris has affected geography and transportation. It discusses the growth of fast commerce, which offers a 20-minute grocery delivery. Dark stores are tiny warehouses that are used by quick commerce enterprises to facilitate quick deliveries. The writers examined Paris' rapid commerce's geographical characteristics, transportation, and supply chains. They discovered that the majority of electric two-wheelers used by dark businesses occupy space in public areas and cause traffic. Compared to conventional grocery stores, rapid commerce networks are generally smaller.

Dr. P Madhan Kumar, Jeswanth A R, Joseph Vishwah J, Dhanush Babu M, & Jinal Manani. (2022) discussed sentiment analysis of client evaluations from fast commerce in more detail. It examines consumer satisfaction with fast shopping by examining Google Play Store evaluations. The authors found six main client feelings: unnecessary, uncertain, negative, litigious, restrictive, and positive. They collected reviews from 3,027 fast-commerce users using web scraping. This study highlights the importance of SA for companies.

Shivom Gupta (2024) discussed how fast commerce has emerged in India. The study discusses the COVID-19 pandemic and rising smartphone use as key drivers of the rapid expansion of Q-commerce. The difficulties faced by companies engaged in rapid commerce were also examined, including competition from traditional grocers and the high cost of delivery. The article's conclusion discusses the prospects for rapid commerce in India, and makes the case that, despite certain obstacles, it will continue to expand.

Objectives of the Study:

The purpose of this study is to present a comprehensive examination of q-commerce customer uptake. The precise goals are as follows:

- Determine the major variables that impact customers' choice to use q-commerce services.
- To investigate the alleged advantages and difficulties of using q-commerce.
- To have a thorough grasp of the factors influencing adoption of q-commerce, including decision-making processes and motives.

Methodology:

An approval from the SME (Subject matter expert) after which 13 Questions were finalised and the survey was distributed. The primary data collection was done through Google forms which was floated to around 80 respondents out of which 40 responded, which brings the response rate to an approximate 50%.

Research Design:

Descriptive Research: In order to give a thorough explanation of understanding consumer adoption of Q-commerce (QC), this study uses a descriptive research design.

Source/s of Data:

Primary Source of Data: To guarantee accuracy and relevance to the research aims, the study is dependent on primary data that is directly obtained from respondents.

Data Collection Method:

Questionnaire in Google Form: A systematic questionnaire distributed using Google Forms was used to collect data, enabling effective and standardised procedures.

Population:

Citizens of Mumbai Suburban region: The study's target market is the Mumbai suburban population, which was chosen for its wide range of demographics and high density of fast commerce services.

Sampling Method:

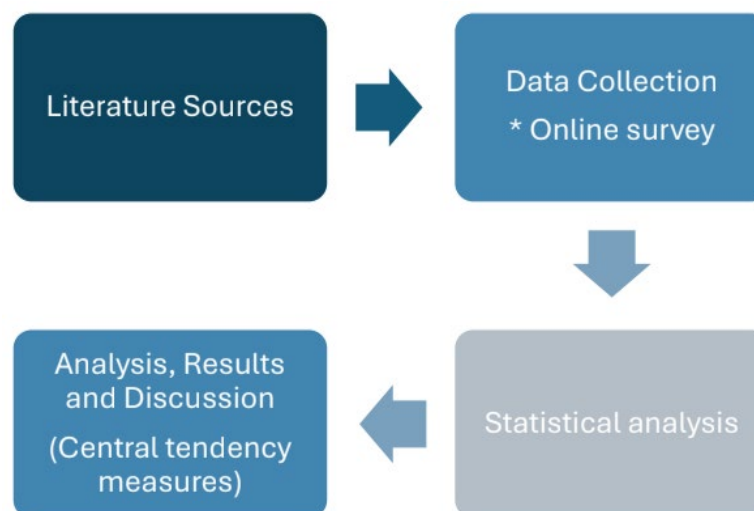
Convenient Sampling Method: In order to provide a manageable sample size for data collection, the study employs a practical selection strategy to select participants based on accessibility and willingness to participate.

Sampling Frame:

The study's sample frame consists of people who have recently made purchases in Mumbai Suburban region using fast commerce platforms.

Date Collection Instrument:

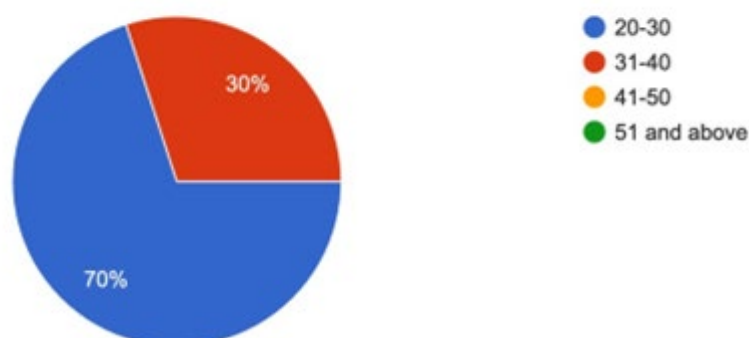
Google Form: This study's structured questionnaire was administered using Google Forms, which provides an easy-to-use and effective platform for administering surveys and collecting data.

**Statistical Analysis:**

The tool used to complete the statistical analysis was Microsoft Excel 365.

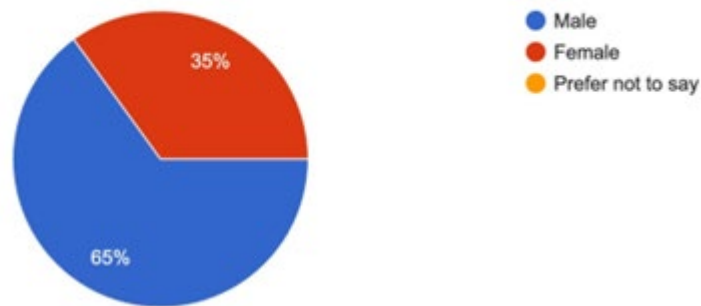
Data Analysis and Interpretation

Age



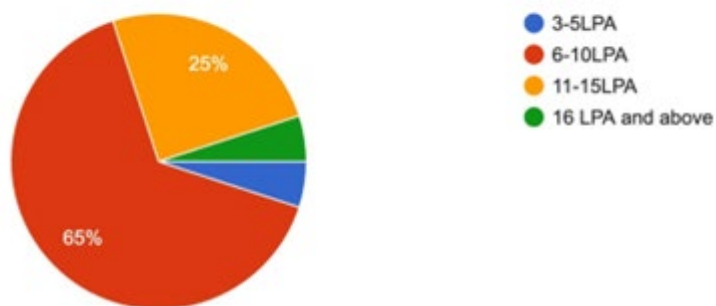
According to the statistics, 70% of the respondents are between the age of 20-30, 30% of the respondents are between the age of 31-40.

Gender



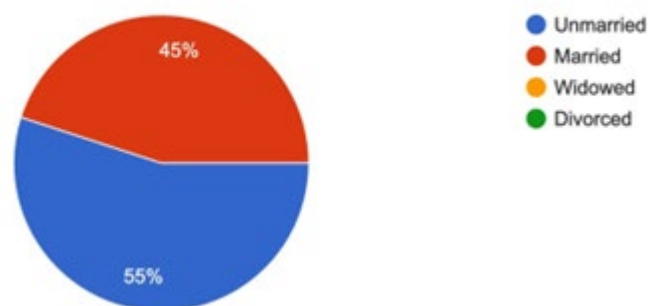
According to the statistics, 65% of the respondents are Male, 35% of the respondents are Female.

Income Level



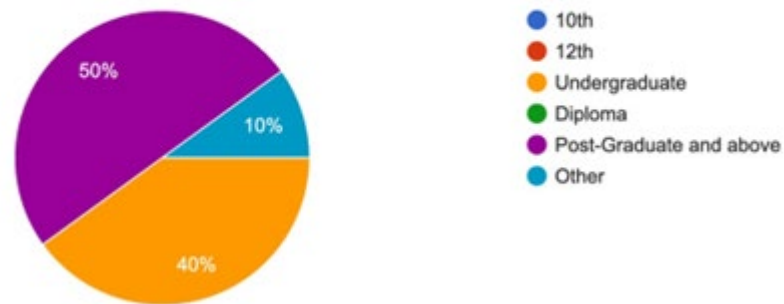
According to the statistics, 65% of the respondents have an income level between 6-10LPA, 25% of the respondents have an income level between 11-15LPA. 5% of the respondents have an income level between 3-5LPA and 5% of the respondents have an income level of 16LPA and above.

Marital status



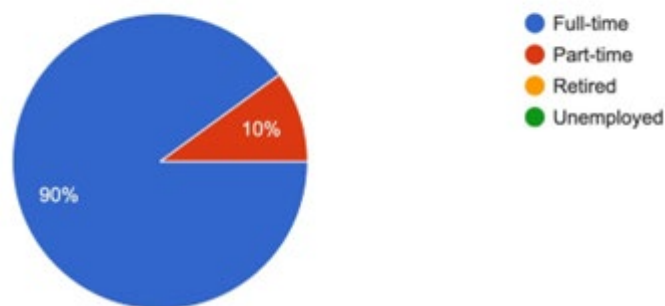
According to the statistics, 55% of the respondents are unmarried and 45% of the respondents are married.

Education



According to the statistics, 50% of the respondents are Post-Graduate and above, 40% of the respondents are Undergraduate and 10% of the respondents fall in the category of others.

Employment



According to the statistics, 90% of the respondents are working in a Full-time job and 10% of the respondents are working in a Part-time job.

Variables Pertaining to Understand the Behaviour of the Consumer and their Coding

Table No. 1

Sr. no.	Questions	Coding
1	How important are the following factors when considering using a QC service? (Rate on a scale of 1-5, with 1 being not important and 5 being very important) [Convenience of getting items delivered quickly]	Q1
2	How important are the following factors when considering using a QC service? (Rate on a scale of 1-5, with 1 being not important and 5 being very important) [Time savings compared to traditional shopping]	Q2
3	How important are the following factors when considering using a QC service? (Rate on a scale of 1-5, with 1 being not important and 5 being very important) [Wider variety of products available]	Q3
4	How important are the following factors when considering using a QC service? (Rate on a scale of 1-5, with 1 being not important and 5 being very important) [Ability to track orders in real-time]	Q4
5	How important are the following factors when considering using a QC service? (Rate on a scale of 1-5, with 1 being not important and 5 being very important) [Cost of delivery fees]	Q5

6	How important are the following factors when considering using a QC service? (Rate on a scale of 1-5, with 1 being not important and 5 being very important) [Minimum order amount required]	Q6
7	How important are the following factors when considering using a QC service? (Rate on a scale of 1-5, with 1 being not important and 5 being very important) [Reliability of on-time delivery]	Q7
8	How important are the following factors when considering using a QC service? (Rate on a scale of 1-5, with 1 being not important and 5 being very important) [Quality of fresh products (fruits, vegetables, etc.)]	Q8

Variables Pertaining to Understand the Behaviour of the Consumer and their Ranking
Table No. 2

Coding	1	2	3	4	5	Mean	Median	Mode	Ranking
Q1	0	0	0	15	25	4.625	5	5	1
Q2	0	0	0	20	20	4.5	4.5	4	2
Q3	2	0	8	17	13	3.975	4	4	6
Q4	8	7	13	9	3	2.8	3	3	8
Q5	2	0	4	16	18	4.2	4	5	5
Q6	2	11	8	11	8	3.3	3	4	7
Q7	2	0	0	18	20	4.35	4.5	5	4
Q8	2	0	0	14	24	4.45	5	5	3

How much do you rely on the following sources for information about QC services?
Table No. 3

Question(s)		1	2	3	4	5	Mean	Median	Mode	Ranking
Social media recommendations and reviews	Rate on a scale of 1-5, with 1 being not at all and 5 being a great deal	1	13	7	10	9	3.325	3	2	3
Online reviews on QC platforms		5	1	2	12	20	4.025	4.5	5	2
Word-of-mouth recommendation from friends and family		0	0	0	8	32	4.8	5	5	1

How important is the user interface (ease of use) of the QC app/website when choosing a service?

Table No. 4

Question(s)	1	2	3	4	5	Mean	Median	Mode
(Rate on a scale of 1-5, with 1 being not important and 5 being very important)	3	4	15	10	8	3.4	3	3

Based on Table no.4 the respondents find the User Interface (Ease of Use) Neutral motivator for inclination towards using Q-Commerce apps/websites.

How easy is it to place orders and make payments through QC apps/websites?

Table No. 5

Question(s)	1	2	3	4	5	Mean	Median	Mode
(Rate on a scale of 1-5, with 1 being difficult and 5 being very easy)	2	0	0	14	24	4.45	5	5

Based on Table no.5 the respondents find the place orders and make payments, Easy as a motivator for inclination towards using Q-Commerce apps/websites.

Conclusion:

The purpose of this study was to examine the variables that affect consumers' adoption of rapid commerce (QC) services. A survey and in-depth interviews were used in a mixed-methods approach to investigate the reasons and obstacles influencing user behaviour. Convenience, especially quick delivery times, turned out to be the main factor behind QC acceptance. Customers also placed a high emphasis on time savings over traditional shopping. Recommendations from friends and family were the most reliable source of information regarding quality control services. The platform of choice ought to have an intuitive user interface and seamless ordering and payment procedures.

The 40 responders in the sample size could restrict how broadly the results can be applied. Mumbai-only attention restricts regional representativeness. Self-reported information could be biased. Increased generalizability may result from a larger, more geographically diversified sample. Including surveys with objective measurements could help to minimise bias. It is necessary to investigate how QC affects the environment in comparison to conventional e-commerce. This study provides insightful information to QC companies as well as consumers. These results can be used by consumers to make well-informed decisions on QC services by taking information sources and convenience into account. Companies can utilise this information to customise their marketing plans, emphasising quick turnaround times, intuitive user experiences, and fostering favourable word-of-mouth to establish credibility. Enhancing customer satisfaction and promoting sustainable growth can be achieved by the QC industry through comprehension of consumer preferences and resolution of any barriers.

Limitations of the Research:

Sample Size: The study's sample size might not be sufficient to fairly represent the total population. Results that are more dependable may arise from increasing the sample size.

Regional Focus: Because the survey only included respondents from Mumbai Suburban region, the findings might not accurately represent the beliefs and practices of the general public. Including people from different areas might result in a more thorough knowledge.

Self-Reporting Bias: Because self-reported questionnaires were used to gather the data, it's possible that respondents gave false or biased information. Using extra techniques, such observational research or interviews, could lessen this bias.

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Leadership Redefined: The Emergence of Emotional Intelligence as a Pillar of Corporate Success

Mundhe Sonal: mundhesonal@gmail.com

Abstract:

Emotional Intelligence (EI) which was once overlooked and undervalued plays an integral role in today's leadership dynamics. This paper emphasizes on how EI is transforming traditional notions of leadership and influencing critical aspects of corporate leadership, such as decision-making processes, team dynamics, and organizational culture. EI has become a fundamental element in corporate success that contributes to the overall growth of the Organization. Through an in-depth analysis employing a diverse range of research methods, including qualitative approaches such as interviews and quantitative methodologies like surveys, this paper sheds light on effective leadership practices. These practices are crucial not only for existing leaders but also for emerging leaders in achieving corporate success. The findings reveal that EI not only enhances leaders' ability to make decisions in complex scenarios but also highlights its impact on employee engagement, team dynamics, and overall organizational growth. By recognizing and nurturing EI as a core competency, organizations can empower their leaders to foster an inclusive culture and inspire high-performance teams. Emotional Intelligence stands out as a timeless attribute that distinguishes exceptional leaders and resilient organizations.

Keywords: Emotional intelligence, Leadership, Employee engagement, Organizational growth, Corporate success

Introduction:

In the contemporary business world, the concept of leadership is being redefined. Traditional notions of leadership are no longer enough to meet the demands of modern business. Today's leaders are expected to navigate unprecedented challenges including globalization, technological advancements, and a dynamic workforce. Among these, EI has gained importance and turned out to be a crucial element for effective leadership. In the 1995s, based on various research results from Psychology and Neurology experts, Daniel Goleman popularized the concept of Emotional Intelligence or popularly known as EQ (Goleman, 2005; Zizzi et al., 2003). This concept states that EI is as important as rational or intellectual intelligence, even in social life. EQ can play a more important role than Intelligence Quotient

(IQ). Emotional Intelligence is defined as the ability to recognize, understand, perceive, manage, and regulate emotions- both one's own and those of others. This concept gained popularity after the publication of Daniel Goleman's book "Emotional Intelligence: Why It Can Matter More Than IQ" in 1995. This skill comprises of four components: Self Awareness, Self- Management, Social Awareness, and Relationship Management. These characteristics help in identifying and managing emotional data in two ways: Interpersonal and Intrapersonal. According to Cooper (1997), research attests that people with high levels of EI experience more career success and build stronger personal relationships. The National Education Policy 2020 highlights EI as crucial for academic, professional, and personal development. Leaders with high EI build empathetic relationships, foster collaborative and inclusive work cultures, and drive organizational success. Effective emotional management in leadership contributes to motivating employees and creating a positive work environment (Goleman, 1998b). Organizations that prioritize EI are more likely to attract and retain top talent, ensuring long- term success.

Methodology:

The objectives of this study are to assess the status of EI in achieving corporate success and to evaluate its impact on leadership effectiveness. Additionally, the study aims to identify the challenges leaders face in developing Emotional Intelligence and to provide recommendations for integrating EI into leadership development programs. This research comprises both quantitative and qualitative methods to understand the role of EI in corporate success. The mixed method design allows for an extensive analysis by integrating broad insights from surveys and interviews.

Survey: The target population for the survey consists of middle to senior-level leaders from the corporate sector. A sample size of 100 participants was collected for this analysis. A structured questionnaire was developed and distributed, covering various dimensions of EI including self-awareness, self-regulation, motivation, empathy, social skills, and the overall impact of EI on corporate success.

Interview: To provide an in-depth understanding of how EI acts as a crucial element for corporate success, 20 participants were selected from the survey respondents for interviews. The selection ensured diversity in terms of industry, gender, and managerial level. A structured interview guide was developed, focusing on personal experiences with EI in the workplace, specific instances, and challenges where EI contributed to corporate success. These research methods aim to offer a comprehensive understanding of the significance of EI in the corporate world.

Results and Discussion:

The survey results indicate a strong recognition of EI in leadership. Quantitative data shows that most respondents value EI, associating it with better team performance, higher engagement, and improved conflict resolution. Qualitative data emphasizes real-life benefits, with self-awareness and empathy identified as key EI components. These qualities enable leaders to manage their own and their team's emotions effectively, promoting collaboration, understanding, and resilience.

Quantitative Analysis:

The survey results provide a comprehensive overview of how various components of EI are perceived in the context of leadership effectiveness.

Self-Awareness:

These results indicate that a combined total of 73% of participants either strongly agree or agree that self-awareness is crucial for leadership success. Meanwhile, 18% remain neutral, and a minimal 9% disagree or strongly disagree. This data highlights that social awareness is an important aspect of EI that helps in changing the traditional nuances of leadership.

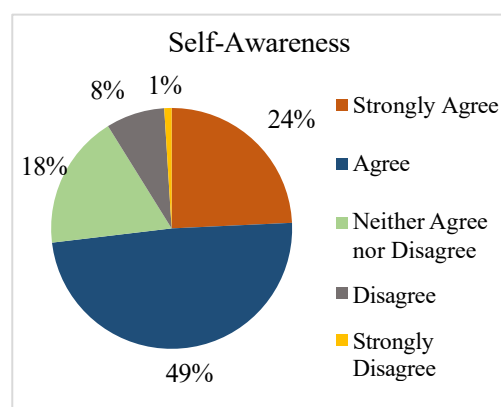


Figure 1: Survey results of Self-Awareness

This data acknowledges that self-management plays a crucial role in EI and that leads to overall corporate success.

Self-Management:

The data indicates that a substantial majority, 81%, of respondents either strongly agree or agree that self-management is vital for effective leadership. In contrast, 11% of participants remain neutral, and only 6% disagree or strongly disagree with the statement.

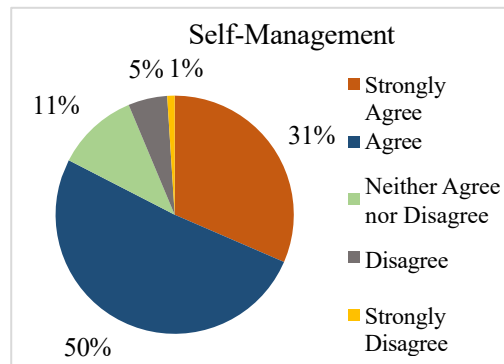


Figure 2: Survey results of Self-Management

Social Awareness:

An overwhelming majority of respondents, 90%, either strongly agree or agree that social awareness is critical for effective leadership. Only 7% remain neutral, and a minimal 3% disagree or strongly disagree. This data shows that social awareness is widely recognized as a key element of EI that helps leadership effectiveness.

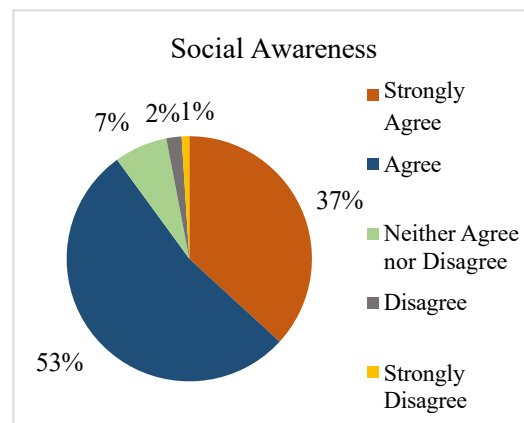


Figure 3: Survey results of Social Awareness

Relationship Management:

A substantial majority, comprising 79% of respondents, either strongly agree or agree that relationship management is indispensable for effective leadership. Conversely, only 5% express disagreement, with 16% adopting a neutral stance. These findings underscore the broad acknowledgment of relationship management as a core component of EI, crucial for fostering collaborative and inclusive culture in the organization leading to overall corporate success.

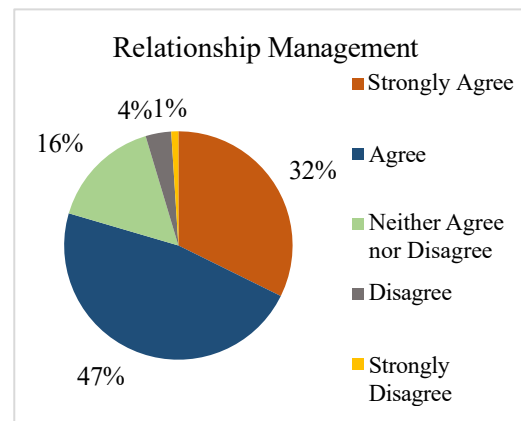


Figure 4: Survey results of Relationship Management

Qualitative Analysis:

The data collected from interviews reveals leaders' awareness of EI as encompassing self-awareness, motivation, empathy, self-regulation, and social skills. EI enhances positive and empathetic interactions, effective communication, and emotionally attuned information sharing. Leaders incorporate EI in decision-making, leading to balanced, ethical, and positive outcomes. Examples shared indicate measurable improvements in productivity, employee satisfaction, and customer satisfaction. A training manager noted that adapting training content to align with specific cultural contexts improved acceptance, assimilation, and application, leading to higher training attendance and better client/vendor/customer interactions. Leaders faced challenges in balancing logic and emotion, but practice helped them achieve it.

Understanding the root cause of an issue, whether it affects individuals, teams, or the entire business, is crucial. Immediate, fact-based actions may sometimes be necessary to meet short-term goals, despite EI suggesting better long-term approaches. Navigating EI in diverse teams is challenging due to cultural differences and resistance, and receiving feedback on one's EI can be difficult. Furthermore, the respondents also recommended various approaches to incorporate EI in achieving corporate success.

Training and Development: Organizations should invest in comprehensive EI training to develop the essential skills such as self-awareness, empathy, and social skills in current and future leaders. Provide one-on-one coaching to help leaders develop EI competencies.

Open Communication: Foster an environment that encourages open communication and psychological safety, where employees feel comfortable sharing creative ideas and taking risks without fear of negative repercussions.

Inclusivity practices: Conduct diversity and inclusion audits. Organize team-building activities that foster trust, communication, and empathy among team members. Provide training on cultural competency to enhance understanding and respect for diverse perspectives.

Feedback culture: Evaluate feedback frequency and quality via 360-degree reviews and analyse performance review insights.

Emotional support: Conduct well-being surveys on peer and management support, measure mental health resource utilization, encourage sharing, and create a psychologically safe space for emotions for everyone. Offer mindfulness and stress reduction programs to help employees manage emotions effectively.

Risk tolerance: Analyse new initiatives and accepted failure rates. Establish organizational values that prioritize transparency, empathy, and ethical considerations in risk-taking.

Team collaboration: Evaluate project outcomes and peer collaboration and assess the use of collaborative tools through various collaborative activities.

Conflict Resolution: Track frequency, nature, and resolution of conflicts, and gather feedback on conflict management effectiveness. Train managers and human resources professionals in mediation techniques that emphasize EI.

Decision-making: Build diverse teams to bring multiple perspectives and emotional insights into the decision-making process.

Work-life balance: Organizations should recognize the importance of work-life balance and strive to create a supportive environment. This leads to higher employee well-being, reducing burnout and enhancing overall productivity. EI helps in identifying employees' strengths and developmental needs, providing appropriate support and growth opportunities, which leads to higher retention rates and a stronger talent pipeline.

Conclusion:

Research highlights the crucial role of EI in leadership and corporate success. Surveys show a strong awareness of EI's impact on team dynamics, engagement, conflict resolution, and performance. Leaders with high EI—especially in self-awareness, empathy, and self-regulation—enhance team performance, employee satisfaction, conflict management, and productivity while reducing turnover and boosting customer satisfaction. However, there's a gap in EI training programs in organizations, presenting an opportunity to invest in EI development. This strategic focus can equip leaders to better handle business complexities and drive long-term success. Companies prioritizing EI training are likely to see significant improvements in key performance metrics. In conclusion, EI is fundamental to effective leadership and corporate success. As the business landscape evolves, fostering EI at all leadership levels will help create more resilient and successful organizations.

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Assessing the Viability of Social Entrepreneurship Models for the Advancements in the Healthcare Sector

Arya AT: Research Scholar, Department of Commerce, Government College for Women, Thiruvananthapuram.

aryamulamoodu@gmail.com

Drisya Das. A.S.: Research Scholar, Departments of Commerce, Government College, Attingal, Thiruvananthapuram

dasdrisya1@gmail.com

Dr. Lissy Bennet: Assistant Professor, Department of Commerce, All Saints College, Thiruvananthapuram

lissy.com@allsaintscollege.ac.in

Dr. Sreeja Devi. V.M: Assistant Professor, Department of Commerce, MSM College, Kayamkulam.

sreejadevi@msmcollege.in

Abstract:

Social entrepreneurship is the establishment of a business around specific social and environmental objectives, which can include nonprofit organizations, charities, and for-profit social businesses. Social entrepreneurship is widely seen as a critical component in tackling social challenges in novel ways. It serves as a solution to address community-based issues and make a difference in the world. The practice of social entrepreneurship in healthcare has quickly acquired popularity as a method of addressing acute healthcare issues while also providing long-term solutions that benefit society. They are making a major contribution towards altering the healthcare environment in rural India by combining business acumen with humanitarian goals. In recent years, social entrepreneurship in health care has expanded dramatically, with a variety of innovative models emerging to address the sector's complex challenges. As the healthcare industry struggles with concerns including access to inexpensive medical services, infrastructure improvement, and preventative care promotion, social entrepreneurs have arisen to promote positive change and have a significant influence on healthcare results. Furthermore, the incorporation of technology, such as telemedicine services for remote places, is playing an important role in promoting social enterprise in healthcare. Social entrepreneurs have helped to develop long-term, meaningful business models that prioritize community well-being over profit margins. The purpose of this article is to highlight the implementation of social entrepreneurship in India's healthcare industry by investigating several facets.

Keywords: Social entrepreneurship, Healthcare, Technology, Models.

Introduction:

Entrepreneurship is typically connected with businesses, technology, and goods. A commercial entrepreneur analyses success in terms of profit and return, whereas a social entrepreneur measures the positive benefits to society. The primary purpose of social entrepreneurs is to expand social, cultural, and environmental objectives. Social entrepreneurs are distinguished by their use of commercial and entrepreneurial techniques to address social problems in underserved communities. Social entrepreneurs are changemakers who use the power of markets to accomplish social impact by combining service and profit. They use for-profit social businesses to have a long-term, sustainable effect in areas such as financial inclusion, livelihoods, education, affordable housing, renewable energy, waste management, water and sanitation, and healthcare. Social entrepreneurs play an important role in healthcare development since government efforts are typically insufficient to achieve equal healthcare.

They collaborate with both government and non-governmental organizations (NGOs) to better healthcare. However, unlike NGOs, social entrepreneurs do not rely on charity to fund their business operations; instead, they work to become self-sufficient by building viable business models and taking financial risks. Where governments and markets have failed to satisfy fundamental health requirements, social entrepreneurs have stepped in. They address a wide range of healthcare issues, including individual healthcare requirements, population health, healthcare professional capacity building, and environmental health hazards. Several healthcare organizations that engage in social entrepreneurship develop health technologies for developing countries, improve child and maternal health, restore broken health systems, and fight infectious diseases like tuberculosis, malaria, and HIV/AIDS worldwide using cost-effective tools to benefit poor and underprivileged communities.

Statement of the Problem:

Despite the six decades of independence, huge economic growth, and healthcare given top priority in India, the sector continues to be in the greatest predicament in the country today. While the government has succeeded in developing healthcare services, its accessibility continues to be in a debatable state. Recognizing this pressing need for innovative solutions in the healthcare industry and the role that technology can play, India has seen a considerable rise in the number of health tech businesses that use social entrepreneurship to address healthcare concerns, especially in rural India. These firms use cutting-edge technology to close the access gap to excellent healthcare services and enhance the overall health outcomes for the underserved population. They are playing a critical role in reshaping the healthcare environment in rural India by combining economic acumen with a humanitarian goal, making a profound difference in the lives of millions of people.

Improving healthcare quality is critical for a variety of reasons, including improving accountability, resource efficiency, effective care, improving outcomes, and aligning care to what users or patients want in addition to what they need. The healthcare business confronts particular issues, such as the requirement to provide high-quality treatment while being cost-effective and timely.

Objectives:

1. To analyse the role of social entrepreneurship in health sector.
2. To study the working of social entrepreneurship models in health sector.

Methodology:

This study uses a comprehensive review technique to synthesize current research on social entrepreneurship and its application in the healthcare industry. To gain insight into the theory and practice of social entrepreneurship models, relevant academic publications, conference proceedings, and industry reports are reviewed. Case studies and examples are examined to demonstrate the practical use of these models.

Review of Literature:

Priyadarshi Mohapatra (2023) evaluates the issues that rural India faces, including a lack of healthcare facilities, a paucity of medical experts, a lack of access to important drugs, and a high prevalence of avoidable illnesses. These issues contribute to insufficient healthcare supply, resulting in a large imbalance between rural and urban regions. The report analyses how healthtech startups can leverage social entrepreneurship in rural India recognising the need for innovative solutions in the healthcare industry. India has seen a considerable rise in the number of healthtech businesses that use social entrepreneurship to address healthcare concerns, especially in rural India.

Purushothama Bhat, N, 2019 identified health care as one of the largest sector in terms of revenue and employment. Health care is provided by public and private institutions. Even

the role of government is very much limited, private sector enterprises play a major role in health care. The concept of entrepreneurship is closely associated with business, technology and products. Social entrepreneurs are those who combine business practices with social service with the combined motives and they play a great role in health care development and improvement. Social entrepreneurship can be considered as a key to unlock the potential in health care sector to ensure huge benefits to underprivileged. This paper is an attempt to analyse the opportunities for social entrepreneurship in health care development and examine existing social entrepreneur models in health care delivery at global level and national level.

Swissnex India, (2015), created and published a report stating India's social entrepreneurship ecosystem as one of the most sophisticated in the world, giving multiple possibilities to connect with local partners, to learn and to pursue innovative solutions to one of India's numerous social challenges in the fields of education, agriculture, healthcare, renewable energy, manufacturing and skills development. The report also highlights India's challenges like poverty as the main reasons for social stakeholders to focus on the Indian market.

Analysis:

- **Social Entrepreneurship:**

Social entrepreneurship is a new, innovative business venture that influences change. Social entrepreneurs have a specific cause they care about, and they develop a business model around making a positive impact. The main goal is to create lasting social change through business. Social entrepreneurship can operate as a non-profit, for-profit, or hybrid business, depending on your preferred business model and the funding availability. Some key areas of interest for social entrepreneurs include: Economic development, Education, Gender equality, Healthcare, Agriculture, Environmental sustainability, Renewable energy, Community development etc.

Social entrepreneurs differ from traditional entrepreneurs in that their main drive is to make a difference in the world or in their communities. They often have personal experience with the causes they support, which inspires their business's mission.

- **Social Enterprise:**

A social enterprise is a business designed around a core altruistic mission, which in turn influences how it's managed, from product development to branding, from supply chain management to financial planning. Instead of a single bottom line focused on earnings, many social enterprises measure success based on a triple bottom line.

1. **People:** The human impact of your business, and your ability to affect social change, improve lives, and develop a community in a sustainable way.
2. **Planet:** Your environmental impact—how you contribute to a sustainable planet or reduce the carbon footprint (CO2 emissions) of your business and customers.
3. **Profit:** Like traditional businesses, social enterprises need to make money in order to sustain themselves, pay workers, and grow as an enterprise.

Unlike a traditional business where profit is reinvested into the business for the sake of its own growth, a social enterprise allocates a large portion of its profits to create positive change in the world. Social enterprises are not necessarily the same as companies with corporate social responsibility (CSR) policies. "Doing good" isn't a value-add for social enterprises. It's the core value prop and the mission they organize themselves around. While social enterprises can be for profit or not for profit, there are also hybrid organizations that combine elements of both models.

- **Social Entrepreneurship Models:**

1. **Non-profit:** A tax-exempt, non-business entity that invests excess funds back into the mission.

2. **Cooperative:** A business organized by and for its members. Credit unions and community grocery stores are some examples of co-ops.
3. **Social Purpose Business:** These businesses start on the foundation of addressing a social mission.
4. **Social Firm:** Social firms employ those in the community who need jobs, such as at-risk youth.
5. **Socially Responsible Business:** These companies support social missions as a part of their day-to-day business operations.
6. **For-profit:** Perhaps the vaguest category, these businesses are profit-first but donate funds, raise awareness, or otherwise support causes.

- **Health Care Sector:**

Right to health is a fundamental right. Physical and mental well-being are synonymous with economic development. Six of the eight broad targets for the Millennium Development Goals and most of the Sustainable Development Goals are directly related to health. Millennium Development Goals (2015) stated that —millions of poor people still live-in poverty and hunger without access to basic services. The new Sustainable Development Goals adopted by the United Nations for 2016-2030 aim to eradicate poverty; improve health and well-being.

Health care is one of the largest sectors in terms of revenue and employment. It comprises hospitals, medical devices, tele medicine, medical tourism, health insurance and medical equipment. Health care is provided by public and private institutions. As the role of government is very much limited, private sector enterprises play a major role in health care. To ensure —'Health for All', government authorities confront various challenges due to the large size of the country and diversity of its population in social-economic, regional and cultural terms.

Social entrepreneurs play a crucial role in health care development as government efforts alone are usually insufficient to ensure equitable health care for all. To improve health care, social entrepreneurs are working along with government and Non- government Organization (NGO).

- **Examples of Social Entrepreneurship Models in Health Care Sector:**

1. **Path:** It is an international non-profit health organization, with more than 70 offices around the world. It is known for developing and adapting latest technologies, such as improved vaccination devices and new tools to prevent cancer, to address health needs of developing countries. In addition to this it works in partnership with governments and businesses to solve the health issues.
2. **Unite for Sight:** It is a non-profit organization founded by Jenifer Staple –Clark in 2000 conducts programs in India, Honduras and Ghana performed over 99000 surgeries to those have vision impairment. It also conducts training programmes to educate local communities to eradicate preventable blindness.
3. **Basic Needs:** It is an international organisation started in 2000 to serve people suffering from mental illness or epilepsy. It provides medication and psychological support in partnership with local governments.
4. **Medic Mobile:** It is a non-profit tech company started by Josh Nesbit in 2009. It works in more than 23 countries like Africa, Asia, Latin America facilitate quality health care with the use of mobile and web tools. It trained health workers with mobile technology and able to reduce substantially maternal mortality in poor populations.
5. **Riders for Health:** Riders for Health started their service of transport infrastructure in rural Africa for providing services to those suffering from infectious diseases and women after child birth.

6. **One World Health:** It is a pharmaceutical company and medical research organisation that develops medicines for poor patients in developing countries.
7. **Yashaswini Co-operative Farmers Health Care Scheme:** It is a micro insurance health scheme launched in 2002, for millions of farmers and their families in Karnataka, belonging to various state cooperative societies by government of Karnataka, pioneered by a reputed social entrepreneur Dr. Devi Prasad Shetty and his team at Narayana Hridrogalaya Bangalore is a typical example to social entrepreneurship in health care. It is a Wal-Mart of cardiac care where up to 25 heart surgeries are conducted in a single day and 70 % of treatment is given below cost or almost free.
8. **Feeding India:** started by Ankit Kawatra is a not-for-profit social organization working to solve hunger, malnutrition and food wastage in the country. It channelizes extra food from individuals, weddings, restaurants, corporate offices to the people who really need it and have no means or access to food. It also serves freshly cooked food or raw grains to our partnered shelter homes and beneficiaries.

Findings:

- Health care is one of the most sought-after sectors for impact investing with funds being channelled into a variety of areas, from hospitals and clinics to innovative diagnostic tools and medical devices.
- Lack of financial source is the major challenge faced by social entrepreneurs. Generally, they have run their business by investing their own funds or from borrowings at high interest rates.
- Lack of government support is a major hindrance to the development of social entrepreneurs. Policies and regulations of government are rigid and complex, with no tax incentives or subsidies.

Suggestions:

- Improve accessibility to information with offline and on-line database to improve health delivery system.
- Standardizing diagnostic procedures, building rural clinics for improving efficiency.
- Basic infrastructure, especially in rural areas is still lacking, with respect to health sector which is to be addressed.

Conclusion:

Social entrepreneurs are change makers who create long lasting impact on society. They are not only addressing social and health related issues but also educate and assist various groups to setup fully functioning health services and enable long term solutions to keep communities healthy. Our connected world has brought about a new era of awareness, where we can find problems to solve and lives to improve across the street or across the world if we choose. People from all over are deciding to make change in whatever way they can, whether it's by being more conscious of what they buy as consumers or building an engine for social and environmental good by becoming entrepreneurs.

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An Analysis of Impact of Virat Kohli on PUMA in India

Kinjal Mehta: Assistant Professor, International Institute of Sports and Management, Mumbai.

Karan Mange: Assistant Professor, International Institute of Sports and Management, Mumbai.

Abstract:

The presented study is a comprehensive analysis of the impact of Virat Kohli, one of India's most celebrated cricketers, on the brand value and revenue flow of Puma in India. Since signing Kohli as their brand endorser in 2017 with a landmark deal valued at 110 crores, Puma has experienced a significant surge in its market presence, becoming India's biggest sports and athleisure brand, surpassing giants like Adidas and Nike in India. This paper probes into the specifics of the revenue flow of Puma through meticulous examination of financial data, marketing strategies and consumer sentiment analysis post the endorsement, highlighting the correlation between Kohli's endorsement and the brand's financial performance. Furthermore, it explores consumer perceptions through a detailed survey and focus group discussions, the research probes into consumers' attitudes, preferences, and purchasing behavior concerning Puma products endorsed by Virat Kohli. The analysis primarily focuses on the revenue trajectory of Puma following the endorsement deal with Virat Kohli. This survey aims to understand the depth of influence celebrity endorsements, particularly by figures like Virat Kohli, have on consumer brand perception and purchase behavior in the Indian market. Through this analysis, the paper aims to provide insights into the dynamic interplay between celebrity endorsements and brand performance in the competitive Indian athleisure market. The findings of this research are expected to offer valuable insights for marketers, brand managers, and industry practitioners seeking to grasp celebrity endorsements effectively in the Indian market.

Keywords: Celebrity Endorsement, Consumer perception, Financial Data, PUMA, Virat Kohli.

Introduction:

The convergence of sports, celebrity, and brand marketing is a powerful force, especially in markets where athletes significantly influence consumer behavior. In India, cricket transcends sport, becoming a cultural phenomenon. Virat Kohli, a cricket superstar, exemplifies this influence through his 2017 endorsement deal with Puma, valued at 110 crores. This partnership has dramatically boosted Puma's market presence in India, allowing it to surpass competitors like Adidas and Nike. (Times, 2024)

While celebrity endorsements are known to shape brand perception and consumer behavior, their specific impact in emerging markets like India requires further study. This research aims to fill that gap by examining how Kohli's endorsement has affected Puma's brand value and revenue.

The study conducts a thorough analysis of Puma's financial data, marketing strategies, and consumer sentiment before and after the Kohli deal. It also explores consumer perceptions of Puma in India through surveys and financial analysis, investigating how Kohli's association has influenced attitudes, preferences, and purchasing behavior.

By scrutinizing these aspects, the research seeks to:

1. Illuminate the correlation between Kohli's endorsement and Puma's financial performance.
2. Offer insights into the broader implications of celebrity endorsements in the sports and athleisure industry.

3. Provide a nuanced perspective on the impact of celebrity endorsement on brand performance and consumer behavior in the Indian market.

The findings are expected to be valuable for marketers, brand managers, and industry practitioners, contributing to a deeper understanding of how celebrity endorsements can enhance brand performance and consumer engagement in the evolving Indian athleisure market. (Patel, 2014)

Objectives:

- To evaluate the impact of Virat Kohli's endorsement on PUMA's brand perception and market performance in India.
- To assess how Kohli's association with PUMA has influenced consumer behavior and brand loyalty within the Indian sports and lifestyle segments.

Literature Review:

Celebrity endorsement is a widely used advertising and marketing approach (Knoll and Matthes, 2017). A celebrity endorser is described as 'someone who enjoys public awareness and exploits this recognition on favor of a consumer commodity by appearing with it in an advertisement' (McCracken, 1989). As a result, the meaning connected with the celebrity can be linked to the brand through endorsement (Miller & Allen, 2012). A celebrity can be a well-known figure in a range of professions, including science, politics, athletics, and entertainment (Chia & Poo, 2009). Celebrities have now become the face or image of the brands that they promote. Celebrity endorsers can help to start a brand, maintain and strengthen a brand's competitive position, and reposition a brand (Pringle, 2004).

According to Creswell's (2008) report, celebrities appeared in approximately 14% of advertisements, with India having a higher rate of 24%. Keeping this in mind, it is critical for marketers and advertisers to understand how celebrity endorsement works and what criteria must be considered in order to have a successful commercial campaign using a celebrity.

The literature on celebrity endorsement is substantial, and it encompasses three primary hypotheses (Erdogan, 1999) i.e Source attractiveness, credibility models & the congruence or match up model. The source attractiveness model describes how physically appealing the source is to the audience (Ohanian, 1991).

Marketers chose celebrities based on their attractiveness, which leads to consumers developing positive stereotypes about celebrities. Additionally, some research has shown that physically attractive communicators are more successful in changing beliefs and generating purchase intentions (Baker & Churchill, 1977; Erdogan, 1999).

The concept of source credibility originated in psychology (Jain & Roy, 2016), where researchers define perceived competence and trustworthiness as factors influencing the credibility of a message delivered (Erdogan 1999). The credibility of the communicator, like physical attractiveness, is predicted to have a favorable influence on the consumer's attitude and behavior toward the recommended product (Priester & Petty, 2003).

Grace A. Feder Southeastern University - Lakeland in their research paper titled - "THE EFFECT OF ATHLETE ENDORSEMENTS ON BRAND EQUITY" conducted a survey on 117 students where she discovered that 4 out of 10 participants said that a physically attractive athlete would make them more likely to buy the endorsed product, and almost the same number of participants perceived a correlation 46 between high performance athletes and high-quality products. This shows that attractive and highly skilled athletes may make better endorsers.

Sivaranjan Murugesan, in a study titled "Sentiment Analysis of Celebrity-endorsed Advertisements" conducted a sentiment analysis by computing the sentiment score for the congruent/in congruent endorser and high-/low frequency endorser through sentiment. The sentiment score was analyzed, and the result showed that the high sentiment score was present

in congruent and high-frequency endorsers. By this, the study revealed that the congruent endorser performs better than the in congruent endorser and the high-frequency endorser performs better than the low-frequency endorser.

Fleck et al. (2012) discovered in their research that congruence had a greater impact than attitude toward the celebrity. It indicates that buyers consider the match between the endorser and the product before making an effective review of the advertisement. The campaign featuring Virat Kohli (an endorser who represents multiple brands) had a greater impact than the advertisement featuring Rohit Sharma, a low-frequency endorser.

Yunheui Jeon, the effect of athlete celebrity endorsement on attitude toward brand and purchase intention in the study indicated that the high celebrity-product congruence led to the highest level of brand attitude. Therefore, the level of congruence between celebrity and product may favorably impact the attitude toward brand when they match. Most importantly, the current study suggests that the degree of congruence between celebrity and product has the potential to be a more important factor than others in advertising strategy.

According to a GroupM report on India Sports Sponsorship-2023, growth of athlete endorsement in 2023 showed a trend similar to that of sponsorship - the increase over the previous year was 24%, at a total value of INR 927 Cr (\$Mn 112). Cricketer endorsements accounted for 87% of total endorsements across all sports in 2023, up from 85% the previous year. Last year, 536 commercial endorsement deals included sports superstars, with over 380 of them including cricket players. Former captain and generational talent Virat Kohli remained the primary attraction for companies, matching his batting performances with his trademark free-scoring ways in the finance department. (Karnik, 2023)

Methodology:

The research adopts a mixed-methodology approach, combining quantitative analysis of financial revenue data (secondary research) from PUMA before and after Kohli's endorsement deal and qualitative insights gathered through consumer survey (primary research).

1. **Financial Analysis (Secondary Data):** The financial records of PUMA have undergone evaluation by collecting information on the revenue generated by PUMA in India from 2012 to 2024. This examination has specifically concentrated on the development of revenue, market share, and promotional expenditures during the years around the signing of Virat Kohli.
2. **Survey Design (Primary Data):** A structured questionnaire was circulated targeting consumers aged 18 to 35, to assess their perception of PUMA and the impact of Kohli's endorsement on their purchasing decisions.

Results

Financial Analysis: The table represents the revenue figures for Puma over the years from 2012 to 2022 in billion Rupees. Here's an interpretation of the data:

Years	Revenue (INR Billion)	YoY Percentage Change (%)
2012	5.23	—
2013	6.69	27.15
2014	7.66	14.48
2015	8.77	14.49
2016	9.21	5.02
2017	9.58	4.02

2018	11.57	20.75
2019	14.13	22.13
2020	12.15	-14.02
2021	20.44	68.23
2023	29.8	45.82

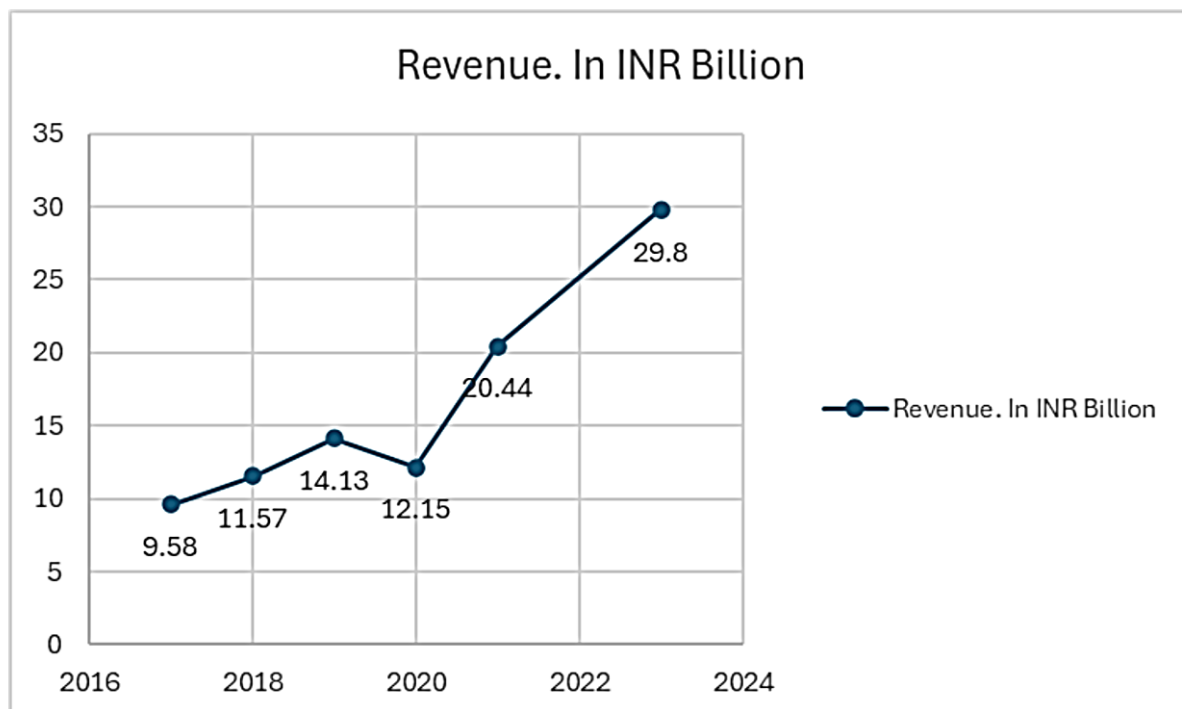
Interpretation: Puma's revenue shows a generally upward trend over the years, with notable growth periods particularly from 2018 onwards. The years 2021 and 2022 stand out with exceptionally high revenue figures, suggesting successful market strategies, increased consumer demand, or possibly both. The fluctuations in revenue from year to year also indicate the influence of market conditions, economic factors, and strategic decisions made by the company. Overall, the data portrays Puma as a company that has experienced significant revenue growth and expansion over the past decade.

The financial interpretation of Puma's revenue data, with Virat Kohli signing as a brand endorsement in 2017, can be viewed through the following lens:

Pre-2017 Growth and Stability (2012-2016):

Before Virat Kohli's endorsement in 2017, Puma experienced steady revenue growth from 5.23 billion Rupees in 2012 to 9.58 billion Rupees in 2017. This period indicates consistent performance and market positioning prior to any significant impact from new endorsements.

Impact of Virat Kohli Endorsement (2017 and Beyond):



Virat Kohli, one of India's most popular and influential cricket stars, signed with Puma in 2017. His endorsement likely contributed to enhancing Puma's brand visibility and appeal, especially in cricket-loving regions like India and globally among cricket enthusiasts.

Post-2017, Puma's revenue continued to grow significantly. From 2017 (9.58 billion Rupees), revenue increased to 14.13 billion Rupees in 2019, showcasing a period of accelerated growth. This growth phase could partly be attributed to the positive impact of Virat Kohli's endorsement, which bolstered Puma's brand recognition and consumer engagement. (Tyagi, 2017)

Accelerated Growth and Market Expansion (2020-2022):

Following the endorsement deal, Puma experienced remarkable revenue spikes in 2021 (20.44 billion Rupees) and 2022 (29.8 billion Rupees). These years saw exponential growth, indicating effective utilization of the endorsement to drive sales and market expansion.

The sharp revenue increases suggest that Virat Kohli's endorsement helped Puma capitalize on new consumer segments, strengthen its brand image, and potentially expand into new markets, both domestically in India and internationally. (Mani, 2023)

Survey Analysis:

Survey Demographics: The researcher ensured that the respondents had a certain level of understanding related to sports and sports business.

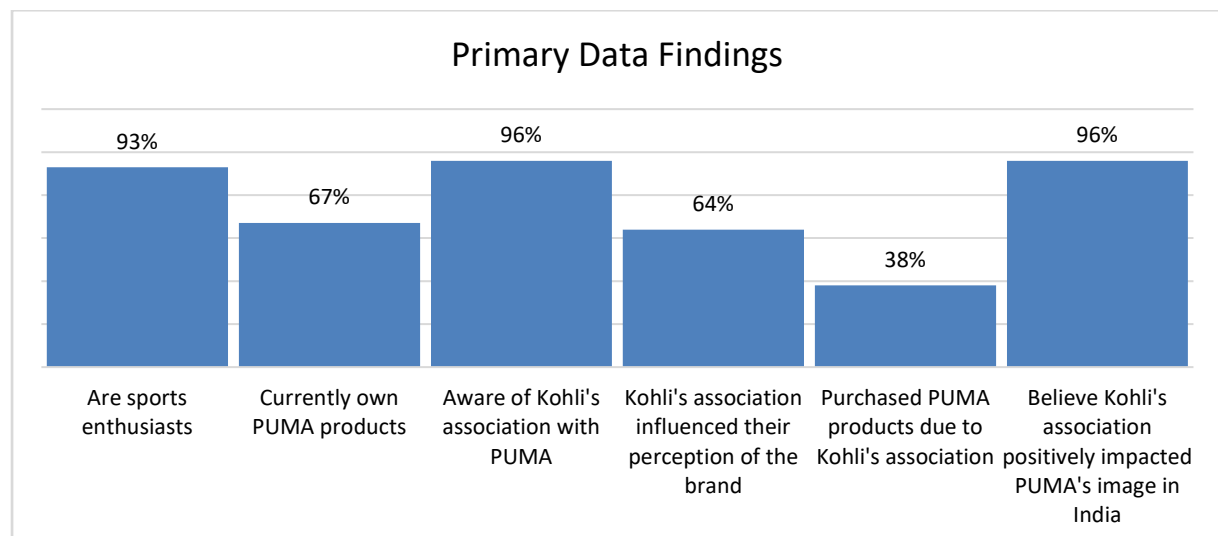
- 216 respondents, majority aged 18-30
- 93% are sports enthusiasts
- 67% currently own PUMA products

Virat Kohli's Association with PUMA: While a celebrity athlete endorses a brand's products, brands lend the athlete credibility. The endorsements also assist the athlete get more revenue and attract in additional brands.

- 96% aware of Kohli's association with PUMA
- 64% said Kohli's association influenced their perception of the brand
- 38% purchased PUMA products due to Kohli's association

Impact on PUMA's Brand Image: Although choosing a celebrity to endorse their brand and represent its face can have a significant impact on its success, brands exercise extreme caution when selecting their brand ambassador.

- 96% believe Kohli's association positively impacted PUMA's image in India
- PUMA is leading in India, surpassing Nike and Adidas
- Factors contributing to PUMA's success: Good quality, affordable pricing, and Kohli's endorsement



Endorsement Deal: Endorsement deals are dealt between a brand and an influential person where the person publicly expresses their support for the company's product which will bring brand recognition and increase revenue generation.

- Signed in 2017 for Rs. 110 Crores (8-year deal)
- One of the most expensive celebrity endorsement deals in India

Importance of Celebrity Athlete Endorsements: Celebrity athlete endorsements is an effective approach when it comes to marketing the brand and pulling the consumer towards the brand, the respondents states the level of importance of an athlete endorsement on a brand.

- 27% consider it Important
- 30% consider it Very Important
- 19% consider it Extremely Important

Consumer Behavior: Under this segment the researcher is aiming to identify the level of Influence Virat Kohli has on Consumer buying behaviour along with the features that contribute to a purchase of PUMA Product.

- 41% likely to consider PUMA products due to Kohli's endorsement
- Top attractive features of PUMA shoes: Comfort, style, and durability
- Top influencing qualities: Athletic inspiration, role model, and style icon

Competitive Advantage: Brands have an extensive reach across every demographic in the age of globalization. To stay ahead of the competition, they develop innovative products and services, recognize their brands, provide excellent customer service, enhanced celebrity endorsement, etc.

- PUMA's rivals (Adidas and Nike) lack a similarly iconic sports celebrity endorsement in India.

In conclusion, the survey demonstrates that Virat Kohli's endorsement has significantly boosted PUMA's brand image, influenced consumer perceptions, and driven sales in India. The partnership appears to be a successful strategy for PUMA in the Indian market.

Strategic Benefits and Future Prospects:

Virat Kohli's endorsement likely played a crucial role in enhancing Puma's competitive position in the sportswear and lifestyle markets. It not only boosted revenue directly through increased sales but also indirectly by enhancing brand loyalty and market share.

Looking forward, Puma's association with Virat Kohli positions it favorably for sustained growth, provided the endorsement remains effective in resonating with target audiences and driving sales.

This analysis depicts Virat Kohli's endorsement in 2017 appears to have had a significant positive impact on Puma's revenue growth trajectory, particularly evident in the accelerated revenue increases from 2018 onwards. This endorsement likely contributed to expanding Puma's market presence and strengthening its brand equity, demonstrating the strategic importance of celebrity endorsements in driving business success in the sports and lifestyle industries.

Some future prospects to the current study are mentioned below:

- **Impact on Competitors:** Assess how Puma's market position and competitive dynamics have shifted due to Kohli's endorsement. This could provide insights into the broader competitive landscape in the sportswear industry, an impact on Kohli's brand endorsement with PUMA and leading repercussion on other sports brands like Adidas, Nike.

- Impact of Virat Kohli's PUMA Brand Endorsement & its Contribution to the change in Consumer behavior from a AIDA model lens.
- **Financial Performance Correlation:** Examine the correlation between the timing of Kohli's endorsement activities and Puma's financial performance metrics, such as revenue growth, market share, and profitability.

Discussions:

The research findings will be discussed against the backdrop of existing literature on celebrity endorsement and consumer behavior. The implications of Kohli's presence within PUMA's marketing strategy will be evaluated, demonstrating how the brand has capitalized on the cricketer's influence to reshape its market positioning.

- **Impacts on Brand Equity:** An exploration of how Kohli enhances PUMA's brand equity through increased visibility, favorable consumer attitudes, and shared values aligns with the findings of previous studies.
- **Future Recommendations:** Based on the findings, recommendations will be provided for PUMA and similar brands regarding strategic investments in celebrity endorsements and establishing brand partnerships with personalities who align with their corporate ethos.

Limitations:

A number of barriers exist in the path of research on Virat Kohli's impact on PUMA in India. The survey was focused more on the respondents who had average to very good knowledge about sports brands which could have led to a bias in their responses. This project had to be taken in specific time duration which does not permit extensive research report. A Sample of only 218 respondents are selected from the population. There is a Potential of Data Mistakes by using secondary sources while a restriction access to Proprietary data.

Conclusion:

According to the study PUMA's success in India has been significantly and favorably impacted by Virat Kohli's endorsement. According to the survey findings, a sizable majority of respondents are aware of Kohli's affiliation with PUMA and believe it has a significant effect on how they perceive the brand. In addition to strengthening PUMA's brand, Kohli's association with the brand as a brand ambassador has encourage customers buy more of the company's products—38% of respondents said they chose PUMA because of his influence. From a financial standpoint, PUMA's revenue growth, especially from 2018 onward, indicates that the endorsement of a contract, which commenced in 2017, was a major factor in the company's significant sales growth and market expansion. The considerable increase in revenue, particularly in 2021 and 2022, highlights the accomplishments. The considerable increase in revenue, particularly in 2021 and 2022, highlights this strategic partnership's success. With Kohli's support, PUMA looks to have strengthened its position in the market, setting it apart from competitors like Nike and Adidas and demonstrating the importance of celebrity endorsements for commercial success. Considering, the endorsement has shown to be a strategic asset, greatly bolstering PUMA's market position in India and advancing its growth.

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Case Study: Sports Law

Mr. (Adv). Rohit Walavalkar: Assistant Professor & Batch in-charge, International Institute of Sports & Management.

Mr. Truce Fernandes: Student, TYBSM., International Institute of Sports & Management.

Abstract:

Football is often considered as a game of the west. Football has always been watched, played, and followed by most sports fans across the globe. It is safe to say that football is the most followed sport over the years. Football fans always have a favorite team, and a favorite player. A professional football club would want the best players to play for their football club, and to acquire the player's services, clubs are even willing to shell millions of dollars for the transfer of a player from one club to another.

As per FIFA rules, a player is allowed to be transferred from one club to another only during a transfer window. A transfer window is a period during the year in which a football club can add players to their squad who were previously under a valid professional contract with another club. This transfer window is open twice a year. The first transfer window is from 9th June to 31st August, and the second transfer window is from 1st January to 31st January, which is usually called a mid-season transfer window.

Speaking of Indian football, the Indian Super League and the I-League are the two professional leagues, where players are transferred from one club to another during the transfer window is open. To date, all the player transfers have been within the stipulated transfer window, and rightly approved by the AIFF, and as per the FIFA regulations.

However, there occurred an exception to the transfer window, when a professional football player named Mr. Gurmeet Singh, who earlier player for Hyderabad FC was "legally" transferred to another ISL club, NorthEast United, "outside" the transfer window. The player was transferred on 3rd March 2024, whereas the transfer window was closed long ago on 31st January 2024 itself. The AIFF rightly "accepted" the transfer of the player, and the player was allowed to play and represent a new club during the ongoing season.

This research paper aims to find out the reasons and findings of this player transfer exception, which has happened for the first time in the history of Indian football. This research paper also aims to find out what are the exceptions to FIFA's transfer regulations, and the legality of a player to be transferred outside the transfer window.

Introduction:

Football is universally called the "game for all." It is one sport that is watched, played, and loved by most sport lovers in the world, irrespective of the age groups. Football brings communities together, Football spreads joy amongst people. Football is a beautiful game that is celebrated by people across the world.

People from all strata of society, and of all age groups have kicked a football at least once in their lifetime. This means – it is safe to say that Football is a household name. There is no such country that does not have a football team, or people who do not play or are not familiar to Football. Maybe the skills might differ, but the passion and love for the game is right up there (Nag, 2024).

As we complete 10 years of the Indian Super League (ISL), let's dive deep as to how football in India has grown exponentially since the league's inception. From historic milestones to aspiring the youth, India's football journey is one inclusive of determination, ambition, and passion.

India's relationship with Football goes deep down the memory lane. However, with a population of more than 1.7 billion people, and majority of its population in its youth, Football is still considered as a "growing" or "emerging" sport in India.

India is a country, which has abundance of sports loving youth. Majority population in the north-eastern, eastern region of India, along with southern region of India are football fanatics. People in India are passionate about Football, especially the Football that is played in the west. Furthermore, during the period between 1951 and 1962, India has won 2 gold medals at the Asian Games and has finished 4th at the 1956 summer Olympics. (Sarma, 2023)

In the early 90's, the All-India Football Federation (AIFF) took efforts to start a professional league. In 1996, the National Football League was introduced, however, it did last for a short term until 2006, when it was re-named and re-branded to I-League. The I-League was introduced in compliance with the FIFA rules and regulations, followed all the laws in accordance with the FIFA set of laws and regulations.

While the I-league provided a platform for the budding footballers in the country to showcase their skills, and make it to the National and State teams, it wasn't enough till the big corporates started to show interest in Indian Football, and where the big bucks were involved. Subsequently, the Indian Super League (ISL) was introduced and launched by IMG Reliance, now RISE, to take Indian Football to newer heights, and give an opportunity to thousands of footballers to be a part of the ISL and make it large on the big stage.

History of the ISL:

In the initial 3 seasons of the ISL, FIFA as well as the Asian Football Confederation (AFC) did not confer an official recognition to the Indian Super League. For competing in the AFC Champions League, and the Asian club competitions, it is mandatory for a league to be recognized by FIFA and the AFC. Also, as per the laws of the FIFA and AFC, it is suggested, but not mandatory, to have a relegation/promotion system, that gives an added motivation to the teams to thrive well in the league. Till 2022/23 Indian football season, the Indian Super League and the I-League operated as two different leagues, thus there was no promotion/relegation system.

It is only after the feedback and consultation of the AFC and AIFF, that the ISL and I-League were merged to form a completely new football system in the country. This merger gave the ISL the tag of being the premier football league in the country, as well as a permit to participate in the prestigious AFC Champions League – considered as the biggest football league in Asia (Sogul, 2023).

Emphasis on Football Development:

The ISL has continued to strengthen its position amongst the Indian sports fans, as well as carried the tag of being the country's premier football league. The league has seen a strategic transformation that goes beyond the field of play. Most of the teams in the league have shifted their focus of signing foreign players to nurture and develop local homegrown talent. This shift has aligned with the Premier One Licensing Criteria- which mandates the clubs to ascend to the premier tier, offering them enticing financial incentives and increased exposure.

Speaking about the Premier One Licensing criteria – the All-India Football Federation, in collaboration with the Football Sports and Development Limited (FSDL), has a unique licensing criterion, which is mandatory to be fulfilled to compete in the league, and not face any sanction or penalties. The Premier One Licensing has 5 mandatory criteria to be fulfilled–

- Financial Criteria
- Legal Criteria
- Personnel Criteria
- Infrastructure Criteria
- Sporting Criteria

It is only when the criteria are fulfilled, the teams are allowed to participate in the league without any sanction. One of the most important criteria to be fulfilled is the legal criteria. The legal criteria include numerous factors which need to be fulfilled, without which

the AIFF would not grant a valid license to the professional teams to participate in the upcoming season.

The legal criteria include in its purview –

- the professional player contracts of the players
- the NOC of the players who have been transferred to another club, or who have been sold to other club.

The Mutual termination agreements of the club and a player before termination of a specific contracted player

All the valid documents necessary to transfer a player from one club to another.

Along with the Legal criteria, another important criteria that needs to be fulfilled is the 'Financial Criteria.' The Financial Criteria includes in its purview the proof of the salary slips paid to the players and the staff, the balance sheet of the Club, as well as all the financial information as and when required. (AIFF, 2023)

The Curious Case of Gurmeet Singh:

Mr. Gurmeet Singh Chahal, an Indian resident, is a professional football player who plays professional football for Indian Super League side, NorthEast United Football Club. Gurmeet Singh made his professional debut in 2019, when he first signed for NorthEast United Football Club, and then later moved to Hyderabad FC before the start of the 2021-2022 football season. Gurmeet's signed a professional contract with Hyderabad FC for 3 years, from 2021 to 2024. He did make his professional debut for the club during the 2021-2022 ISL season against Jamshedpur FC. Gurmeet Singh & Hyderabad FC made history that very season, when they were crowned as ISL Champions for the first time in the club history, beating Kerala Blasters FC in an epic finale.

However, things did not go as planned for Hyderabad FC for the next couple of seasons – 2022-2023 & 2023-2024, where the Club faced severe financial crises. This often led to non-payment of the fees to the players, technical staff, and everyone associated with the club. Gurmeet continued to play for Hyderabad FC for the 2023-2024 season of the Indian Super League, irrespective of the prevailing severe financial crises at the club. However, it was on 2nd March 2024, when Gurmeet Singh decided to quit Hyderabad FC during the ongoing season and make a move to NorthEast United FC again (Transfermarkt.co.in, n.d.).

What is a Transfer window?

Every football club is looking to make suitable changes to their team combination every season. Every team tries to get better with each season, and this is when there is a need to buy certain players from other teams, and/or sell certain players to other teams. This transfer of players during a set period of time in a year is called a transfer window (Sheldon, 2022).

As per the FIFA rules and regulations, the international transfer window opens twice a year – first transfer window of the year opens from 1st June and ends on 30th August every year, whereas the second transfer window opens from 1st January and ends on 31st January.

The primary reason for these transfer windows to be during this period is – usually a football season begins from mid-August each year, and end in May. This is the sole reason for the first transfer window to end on 31st August, as the season is underway. The 2nd transfer window of the year is midway of the season, which begins from 1st January and ends on 31st January. The reason for this transfer window is if any team wishes to make any changes to their current squad for the betterment of the remainder of the season, the teams have that option, too. Also, from the players point of view, if any player is not getting enough game time during the season with one club, the player may request the team management for a transfer to another club.

However, it is important to note that the player cannot be transferred from one club to another outside of the transfer window, and any such act shall lead to serious sanctions to both, the clubs and the player.

Having said that, the player can be transferred from one club to another outside the transfer window, if there is a “just cause”. The concept of “just cause” means that a player contract usually includes a reference where the employee can terminate the contract with the employer, if the reason for the termination is just and fair (Mohamadi, 2024).

What is “Just Cause”?

As per Article 13 of the Regulation on the status and transfer of players (RSTP), a professional football contract cannot be terminated unilaterally by any of the parties. The only instances when the contract stands terminated are–

- The contract expires
- When both parties mutually agree to terminate the contract

However, apart from the above 2 instances, the only exception where either party may unilaterally terminate a contract without facing consequence is where there is a JUST CAUSE.

The term “just cause” denotes to the exceptions or instances recognised under the FIFA regulations and previous decisions, which might allow either the club or the player to terminate the employment contract, while it is currently prevailing, without any punishment or consequence. If there is any termination outside the “just cause”, then the defaulting party may face penalty or monetary fine (Mohamadi, 2024).

In football, it is mandatory to have a strong reason for involving “just cause” as a factor for termination of an employment contract by either party. In Gurmeet Singh’s case, the player was not paid by Hyderabad FC for a very long time, before he decided to move on from Hyderabad FC, and join NorthEast United Football Club on 4th March 2024, “outside the transfer window. (Mergulhao, 2024)”

Some of the other reasons which fall under “just cause” include –

- Poor performance
- Injuries
- Absence of a player for a long duration

Free Transfer in Football:

In today’s sporting structure, it is very common to see a professional player switch from one club to another once their contract with their current club expires. What makes them take this switch? There can be numerous reasons attached to it. One of which can be non-payment of the dues. This free transfer from one club to another is now being taken granted by players, but the rule book had to be re-written in order to make this possible.

Also, Free transfers usually happen when the contract is about to end between a player and a club, and no new fresh terms are agreed upon. At such a stage, with no prevailing legal bond between the two parties, decisions can be made to take on a new challenge.

Players then become free agents, thus giving them a chance to discuss and negotiate new deals with new clubs, which usually is called as pre-contract agreements. With no transfer fee involved in such moves between two clubs, lucrative contracts and signing bonuses are common, with the recruiting sides able to invest more in the new player, as fees (Burton, 2022).

All of this is possible only because of one “Bosman Ruling.”

What is Bosman Ruling?

Bosman ruling is the reason which changed the face of football transfers forever. In 1990, Belgian side RFC Liege had a player in their squad named ‘Jean-Marc Bosman’, who was nearing the end of his professional contract term with RFC Liege.

He wished to leave his current club, for a French club 'Dunkerque', however, the former team refused to meet Liege's transfer demands, and the transfer was halted.

In return, Belgian side RFC Liege decided to reduce the wages of Bosman by 70%, as he was no longer a registered first-team member. Bosman took this personally and decided to take RFC Liege in the European court of Justice, where he sued his current employer for restraint of trade.

In 1995, the court passed the decision regarding free movement of labour for professional footballers, with restrictions lifted on players in the EU when it came to transfer fees being paid for those working without a contract (Foster, 2000).

How is the Bosman ruling associated with the Gurmeet Singh x Hyderabad FC case?

For the first time in the history of Indian Football, the player status committee of the All-India Football Federation (AIFF) gave Gurmeet Singh the green light to leave Hyderabad FC, and join NorthEast United FC, outside the transfer window, and on a "just cause" basis.

The ex-Hyderabad FC goalkeeper had filed an official complaint with the AIFF about the unpaid dues and sought immediate relief, after the club failed to pay the salary to the player for multiple months.

As mentioned above, non-payment of the dues is one of the factors under the "just cause" clause, under which the player may leave or terminate the contract with the club unilaterally, without facing any sanctions or penalties.

According to the FIFA's regulations on the status and transfer of players, "players may only be registered during one of the two annual registration periods fixed by the relevant association."

As mentioned at the beginning, the 2 transfer windows for Indian football leagues are 9th June to 31st August, and 1st January to 31st January. The 2nd transfer window in India ends on 31st January. However, Gurmeet Singh sought a unilateral termination from Hyderabad FC, and completed his transfer to NorthEast United FC on 4th March 2024, which is way beyond the transfer window timeline.

As per Article 6.3.A of the transfer rules, players who have unilaterally terminated their contracts with a "just cause" or whose contract has been unilaterally terminated without just cause by the club, can be registered outside a registration period.

Gurmeet Singh had played and featured in the games played by Hyderabad FC during the 2023-24 ISL season, as much as, even after the January transfer window got over (31st January). But, since he wasn't being paid, and it was a matter of his livelihood, the AIFF couldn't turn a blind eye. There was a "just cause" for termination. After termination, he couldn't have been left unemployed, even after no fault of his (Rajaraman, 2024).

Further, the AIFF Player Status Committee 2023 also supports FIFA's rule of transfer of a player only during the stipulated transfer window. However, the AIFF Player Status Committee had failed to incorporate the provision in the FIFA rules, which allowed the members to 'exceptionally' register players outside a registration period, especially those who unilaterally terminate the contract.

Conclusion:

It is safe to say that the AIFF Player Status Committee fell back on the International Football Federation (FIFA) provision to deliver an unprecedented ruling, asking the AIFF to grant goalkeeper Gurmeet Singh a No Objection Certificate to allow him to leave Hyderabad FC, and play for NorthEast United FC, even after the transfer window got over, and allow him to play for the new club for the remainder of the 2023-2024 ISL season.

The Committee, comprising of Goa FA secretary, Mr. Savio Messais, and Supreme Court lawyer Mr. Lzafeer Ahmed and Sujesh Ranjan requested the AIFF Player Status Department to approve any transfer raised by Gurmeet Singh, as per the provisions under AIFF RSTP 2023, or any other relevant FIFA statutes.

When consulted with Adv. Aahana Mehrotra, the lawyer who represented Gurmeet Singh before the AIFF Committee, said that she made her validations upon the FIFA regulations on the status and transfer of players. As per Adv. Aahana Mehrotra, “The AIFF had failed to incorporate the provisions from the FIFA rules, that allowed the members to exceptionally register players outside the transfer window, especially those who unilaterally terminate contracts with a ‘just cause.’”

Since the AIFF Player Status Committee did not have such a provision, the litigating counsel of Gurmeet Singh, had to refer to the FIFA regulations to convince the former to deliver a landmark decision. Since the whole principle is based on the Bosman ruling, the AIFF had to amend its rules for the same.

It was clear from the facts and evidences provided, that Hyderabad FC had not paid Gurmeet Singh his monthly dues since May 2023, while the player was contracted with the Club, as well as the bonus amount from the 2022-23 season, as mentioned in the contract. Still, the player had managed to train with the squad and deliver his duties and obligations towards the club during his tenure.

Also, to Gurmeet Singh realization, Hyderabad FC had defaulted in paying the Tax Deduction at Source (TDS) to the relevant authorities for 2 successive seasons. Since Gurmeet was not paid by the Club for a long time now, he had no option but to issue a notice to the Club to clear all his dues by the end of February 2024. Even after all of this, when Hyderabad FC could not pay his dues, Gurmeet Singh, on 21st February 2024, served a notice to Hyderabad FC for unilateral termination of the contract.

Gurmeet Singh’s fight with 2021-2022 season winners Hyderabad FC to recover his dues as per his professional contract may continue for the time being, but for the moment, Gurmeet Singh has become the pioneer in opening doors for more professional players like him in the future.

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Alkaligenic Food

Durgadas Savant: Vice-Chairman, YVN.

Human body residue constitutes 80% alkaline : 20% acidic. Hence any food which increases acid is fundamentally detrimental to the health. Generally we talk about acidity as additional acid in the gastric juice. But just as various body parameters like temperature, blood pressure, blood glucose, particular hormone etc., pH of the body is a basic parameter and is very vital. pH refers to the measure of acid-alkali. Although pH is defined as negative logarithm of hydrogen ion concentration, a commoner can understand pH 7.0 as neutral, below 7.0 as acidic and above 7.0 as alkaline. pH of human blood is 7.4, it means slightly alkaline, but actually it fluctuates between 7.36 to 7.44, which is a sign of living, life is dynamic indeed. pH fluctuates between such a narrow range because if it goes beyond that, patient would have collapsed, so sensitive and vital is this parameter. Thus even if one happens to dump acidigenic food, body can't just afford to allow the pH of the blood to fall below 7.36, it means by hook or crook body tries to maintain it by compromising elsewhere. By creating acidic medium in other tissues body manage this, which leads to various diseases, thus increased acid through wrong diet is the fundamental cause for almost all the diseases.

For example, excessively spicy, fried, sugary, fermented food, all food items prepared in refined oil and Vegetable Ghee, junk food like 'Kurkure', 'Chips', 'Burger', 'Chinese Food' etc. produce more than 90% acids and hence these items are fundamentally harmful. This issue is not about the acid produced in stomach but basically related to the acids created at the cell level during their metabolic process. On the contrary, the acid from the gastric juice is the excellent means of disposal of internal acids.

A continuous balancing act is going on within body to bring down the pH of blood if it shoots above 7.4 and to bring it up if it drops below 7.4. Internal chemicals in body like Bi-carbonates, Bi-phosphates, Citrates ions etc are balancing these fluctuations easily. This chemical buffer system remains healthy due to natural mild acids and alkali from fruits and vegetables, whereas it collapses due to concentrated acids and alkali from synthetic and processed food items. Bodily waste matters are mainly acids, therefore once the chemical buffer system of blood collapses then there are more chances of pH of blood lowering down, means becoming acidic. pH of blood becomes excessively alkaline only in exceptional cases like snake bite of some venomous species. Hence it is very important from health point of view to avoid the food items that tilt the pH of blood towards acidic.

White (Refined) Sugar:

The natural sweetness from the sugarcane (Sucrose) is extracted in crystalline form called sugar by treatment of certain chemicals. In this process, harmful chemicals like formic acids, phosphoric acids are used to make this sugar white. Needless to remind that tea, coffee, biscuits, chocolates, cakes, cold drinks, ice cream and various sweets too contain sugar. No doubt abnormal cholesterol has roll in clot formation and disorders like HBP, Diabetes, Heart problem, Strokes etc. But recent research in this field reveals that the sugar is the main culprit in this regards and the roll of cholesterol if at all is only secondary. That is why sugar is labeled as white poison number 1.

Plain Yellow Jaggery:

In order to make the jaggery plain yellow, instead of natural, black or dark brown, chemicals like sulphur, lime, ammonium chloride, hydros (Sodium Hydro Sulphate) etc. are used. Therefore such jaggery and food items prepared from it must be avoided. If there is some craving to eat some sweet items other than fruits then items made from organic jaggery, dates or organic sugar should be eaten.

Vegetable Fat or Hydrogenated Oil:

The Ghee (especially from Desi Cow milk), if consumed in limited quantity, is beneficial to health because it is naturally rich in saturated fatty acids.

Obviously cheese, butter (salted) etc. are not good for health and are more harmful because of salt content in it. Oil which is fluid at room temperature is good for health since it has unsaturated fatty acids in large quantity.

Vegetable fat is prepared by artificially converting unsaturated fatty acids into saturated ones using Caustic Soda and Nickel. Basically such trans saturated fatty acids are harmful for health. Presence of hazardous metal Nickel and more importantly that of unreacted soda alkali is responsible for destroying the chemical buffer system of pH balancing; hence such hydrogenated oil or vegetable fat should not be used at all for cooking at home. Not only that but food items in the market which are prepared in such hydrogenated oil e.g. Khari, toast, patties, biscuits, nankhatai, cake, now a days even ice creams and most of the sweets must be avoided.

Refined Oil:

Filtered oil obtained from oil press is of dark yellow colour and has strong natural odour. Moreover this oil decomposes fast because it is nutritious. However from commercial point of view to preserve it longer (for increased shelf value), it is treated with hydrochloric acid and washed with caustic soda for reducing its odour and colour and so that it lasts longer.

Obviously it follows that it has less nutritional value. Such processed oil is more costly. This means we are buying trash by paying more and most importantly invite harmful effects of caustic.

Manufacturers and their supporters may claim that the caustic soda is being washed off in such processed products but 100% removal is not possible and the remaining traces of impurities are sufficient to act as toxins. Therefore, the chemical buffer system which itself is mildly acidic is used on large scale to remove the traces of highly alkaline Caustic Soda and hence there is a danger of this system itself getting destroyed in the process. Therefore under any circumstances this Refined Oil should not be brought at home. Obviously the filtered oil too shall be used in limited quantity because frying and tempering itself is basically harmful for health.

White sugar, vegetable fat (Vanaspati ghee), Refined Oil and homemade or ready-made food items prepared using these items destroy pH buffer system and disturb the pH of blood. We have already seen that the pH tilted towards acidic nature is main reason for various diseases and hence such food items must be avoided consciously. Acidigenic diet or recipes have already been mentioned earlier. The detrimental effects of white salt, sticky Maida, fermentation process that increases stickiness and acidigenic nature is well known now. It is also mentioned that food having more or dead calories is responsible for weight gain and is therefore harmful for health.

We are often tempted to eat such food items having one or more harmful properties listed above whether homemade or readymade. However, they are multiple times more harmful for health for different reasons.

Soft Drinks:

High content of sugar present in soft drinks not only produces acids but also leads to obesity due to dead calories and poses risk of cardiac diseases because of increase in cholesterol. Sugar, caffeine and coke have addictive property. At the same time artificial colours, preservatives in them have harmful effects on urinary bladder, thyroid glands, pancreas, liver, bones and joints. Phosphorus in soft drinks withdraws calcium from bones making them weaker. Moreover, because of phosphoric acid, carbon dioxide gets absorbed on large scale leading to increase in acidic nature and therefore calcium from bones and teeth gets absorbed in blood and discharged through urine making bones and teeth weaker. Therefore chances of disorders like joint pains, urine stone, hardening of arteries increases. Due to phosphoric acid, proportion of potassium, magnesium, calcium in body is disturbed. It results in loss of appetite. Presence of pesticides in these soft drinks is another independent subject for discussion. Multinationals claim that water table itself in India has large amounts of pesticides present in it and government ministers justify saying pesticides are found in mother's milk too. Obviously, because of wrong planning by government the fertile land of our Nation has been polluted and even if we keep aside this issue for time being, there is no doubt that soft drinks are nothing but poisonous water. The answer to how a product whose manufacturing cost is almost negligible sold at multiple times its manufacturing cost lies in the huge expenditures incurred on its marketing. General awareness about adverse effects of soft drinks is remarkably growing in American society and the earlier Bush government declared a ban on the sale of soft drinks in canteens of educational institutions. However the leading brands in soft drinks market, Pepsi and Coke being American, for their survival are still allowed to entice young generations from third world countries through advertising media. Obviously it is our decision whether we should fall prey to them or not.

Leading film celebrities and sportsperson (especially cricketers) are being used very cleverly for advertising soft drinks and they too, may be because they are getting money or may be due to ignorance, are promoting it. In this regards, the sole honorable exception was badminton player Gopichand who denied firmly allowing use of his image to promote such harmful products that are detrimental to health of society. Otherwise all other 'heroes' in their respective fields are unfortunately 'zero' here. Actually these are all respectful personalities for their skill and competence in their respective fields with extraordinary careers. However, they must either be ignorant about the adverse consequences of soft drinks and biscuits or might not be aware of their harmful effects. It is not known whether these celebrities do only advertising or consume such items in large quantities in their daily lives. If they are consuming such items then they too would not be spared from their harmful effects. It is a fact that more the movement of any part of the body, more is the blood circulation over there and as a result toxins will be discarded increasing supply of nutrients in that part, thus helping development of that organ. Hence, it is obvious that if instead of nutrients, toxic items like acids are consumed then that organ which is used most will suffer pain. Thus all sports persons should take this warning seriously. Earlier in one of the commercials it was shown that a leading actress is consuming 48th bottle of soft drink after consuming 47 bottles (2 crates) while watching cricket on television at home. This is unbelievable. Actually it is

exaggerated commercial. In a real incident that happened in a college canteen in Delhi some 45 years ago, during a bet amongst students about drinking maximum bottles of soft drinks, one of the students finished 11 bottles and became restless while drinking 12th one. He was rushed to the hospital but doctor could not save him. Such is the effect of poison in these soft drinks.

Another point of prime importance is temperature; Soft drink, ice-cream or even drinking cold water from the refrigerator over meal, immediately coagulate/ precipitate/ solidify the fat in food, and makes it difficult to digest. More dangerous effect is that it can cause even cancers.

Therefore drinking a glass of warm water about an hour after meal is recommended. Anything cold must be avoided. Plastic bottle is another dangerous issue, chemicals in it interferes with our hormones, hence Thyroid issue, PCOD and even up to diseases like cancers are addressed with plastic use. Biscuits due to Maida (sticky), Tea-Coffee (addiction, various alkaloids, Papad (salt effect supporting Diabetes), Pickles (additional salt), Tomato sauce (higher salt, artificial colors, spoiling natural taste of children), Noodles and Chinese (Maida, Aginomoto) are additionally bad for health along with being acidigenic, hence should be avoided by sports persons.

Effects of Higher Acid:

Once the pH of blood starts tilting towards acidic nature due to consumption of synthetic and processed food then it leads first to Kapha, later Pitta, followed by Vata disorders. In short, 'KaphaVikar' means respiratory disorders, 'Pitta Vikar' means hyperacidity in stomach, ulcers in stomach and mouth, liver disorders etc. whereas 'VataVikar' means disorders of joints.

In various viral infections too, the accumulation of acidic toxins has the main role and the viruses play only secondary role. In other words, the acidic medium or the medium with low alkalinity is highly conducive for harboring of viruses and other parasite microorganisms. Acidity only is the reason behind the degeneration of bones (osteoporosis) and decaying of teeth. The buried dead body decomposes completely with exception of bones and teeth. Then why in case of a living person the teeth decay? The answer is very clear; it is the repercussion of huge amount of acids produced due to incorrect diet habits. By Nature, even if the roots of teeth become loose due to old age, teeth remain solid. Therefore teeth can be plucked effortlessly by self or a dentist can remove them easily. In contrast, due to excessive acids, teeth decompose untimely and break into pieces and finally only the roots remain and to remove them becomes very complicated for dentists and when removed forcibly, the harmful effects are seen on other parts. There are instances of jaw being dislocated while removing the roots of teeth forcibly. Since it is a tendency of the body to maintain alkalinity (blood pH 7.4), whenever there is increase in acid levels in body, calcium from bones is withdrawn to increase alkalinity. Therefore to prevent bones from getting brittle (osteoporosis) basically the percentage of production of acids in body should be controlled. Otherwise it will be fruitless to take calcium rich food or calcium tablets on one side and continue acid producing diet on the other side. This underscores the importance of having alkali producing diet and avoiding or limiting acid producing diet. Excessive acid producing diet impairs kidneys and leads to disorders like kidney stones. It has been proved that higher acid in the tissue supports most of the diseases like Diabetes (Insulin secretion decreases by Beta cells of I.L. in Pancreas), Thyroid issues, even Cancer cells grow better in that medium.

Alkaligenic Food:

Lemon consumed on empty stomach, all fruits on empty stomach, raw vegetables (salads), raw vegetable juices are alkaligenic food, hence at least 40% of our food needs to be raw. Mosambi (sweet lime) juice even if sour will prove alkaligenic, but if sugar is added in it shall turn acidigenic. Similarly plain sugarcane juice is alkaligenic, but moment lemon is squeezed into it, turns acidigenic. Lemon is sour and contains mainly citric acid. Moreover the vitamin 'C' in it is also an acid (chemical name Ascorbic Acid). However if lemon is taken on empty stomach, large amounts of alkali is produced after it reaches at cell levels. In other words 'citrate' ions are powerful pH Chemical Buffer. Therefore it is most important to know whether a food item, after its consumption is acidigenic or alkaligenic at the cell levels; rather than to see its acidic or alkaline nature. All fruits, raw vegetables (salads) are alkaligenic whereas all nonveg items like meat, fish, egg as well as milk, pulses, cooked vegetables with spices and tempered, fried foods, fermented food items like Idli, food containing sugar (biscuits, chocolate, ice cream, tea, coffee, soft drinks etc.), pizza, burger, Chinese food are acidigenic on large scale. Pulses lose their acid producing nature to a great extent after sprouting; whereas, tubers, cereals and dry fruits are very less acidigenic in their natural form but on cooking for longer time, cereals and tubers start turning acidigenic.

We have earlier seen that lemon is acidic but when taken on empty stomach it produces alkali on large scale at cell levels; however, by adding sugar or eating in combination with other carbohydrates (rice, poha, upama, bhel) it produces acids on large scale. Juice of one lemon after squeezing should be taken every morning on empty stomach by pouring directly in throat and as far as possible without touching the teeth. Then mouth should be thoroughly cleaned by rinsing with water so that teeth do not turn sour. At the end may flush throat with just a sip of water.

After having lemon juice, nothing should be eaten or drunk for next one or one and half hour. Guidelines for taking lemon at other times are as follows - nothing should be eaten for at least one hour before and after taking lemon, however, after a diet containing carbohydrates, lemon shouldn't be taken with at least three hours gap.

Thus it will be beneficial to take lemon 2 to 3 times in a day, for those suffering from acidity, arthritis. However this should be adopted gradually. It should begin with one lemon a day. If suffered from cold then should discontinue for three days and again continue with a lemon a day. If one doesn't suffer from cold continuously for 10-12 days, then only to start with second lemon. Like that even 3-4 lemons can be taken at a shot gradually.

From Naturopathy point of view, cold is not merely a viral infection but it is a process of getting rid of internal toxins. It is advisable to fast or at least avoid cooked food for one to two days, take rest, take hot decoction of Tulsi and Ginger, drink hot water every hour and take vegetable juice or soup only if required. Medicines must be strictly avoided. Phlegm dries off due to black pepper and hence should be avoided in decoction or soups. Same thing is applicable to lemon grass. As such there is no appetite for eating fruits during the first two three days of cold bout and hence fruits and fruit juices should be avoided during this period. Next week would be the time of cough era during which fruits like bananas, guava, custard apples should be avoided; instead fruits like sweet lime, oranges, pomegranate or their juices should be taken deliberately so that phlegm becomes thin and thus it helps to discharge it. During this period coconut water, tomatoes, cucumbers, curd, milk, tempered and other oily food items shall be avoided, so that it gets cured without any ill effects or complications. If 'VamanDhouthi' is performed during this period it helps a lot to thin down the phlegm.

The statement 'Milk is Non-vegetarian' can be shocking for some people. Basically the classification 'Vegetarian and Non-vegetarian' has come from Western countries and this division is dependent upon the source of diet. In contrast, as per tradition of Ayurveda, which has taken birth in Indian soil, the classification of diet is not two tier but three tier and its base is not source of diet but of the effects. 'Satvik', 'Rajas' and 'Tamas' is the triple virtue division of diet made by our Rishis and Munis.

It is not necessary that Satvik diet has to be vegetarian or Tamas diet has to be non-vegetarian. Milk is Satvik though it is non-vegetarian and list of vegetable based food items which are Tamasik is very long viz. from onion, garlic to chilies, hot spices, tea, tobacco, opium – heroin, liquor, brown sugar etc. Chemically milk and blood have lot of similarities; rather milk is produced in mammary glands from blood. It is clear that both being animal based fall in non-vegetarian category. When tiger strangulates the deer, the feelings experienced by deer is creating the emotion 'Tamas'; whereas when the cow or deer feed their calves or when mother feeds her baby, the emotions developed in their minds at such times create 'Satvik' quality in the milk. Obviously the milk produced by cow for its calf is Satvik, but it is left to readers to imagine what emotions and qualities the milk known as dairy milk must be bearing which reaches our doorstep. Fundamental issue is that milk is non-vegetarian and is acidigenic.

Actually the acid produced in metabolism process is discharged through gastric juice, urine and carbon dioxide during exhalation; thereby body tries to stabilize internal alkaline medium, but stress and acidigenic diet increase acid in the body. The acid discharged through gastric juice is useful for digestion of proteins. In this way, the Nature being very economical makes best use of the excess toxins even while discharging it. However the excessive acid from unnatural diet gives rise to hyper acidity and the allopathic medicines suppressing it can further adversely affect the kidneys because the acids otherwise discharged through relatively safer route of gastric juice are forced to get discharged through kidneys which is harmful. Therefore the importance of alkaligenic diet must be understood as preventative measure for various diseases.

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Natural Living during Acute Diseases

Durgadas Savant: Vice-Chairman, YVN & IYA-Maharashtra.

Poison accumulation is the sole reason for all the diseases, germs if at all in some diseases (infectious) are only the secondary cause. It is poison which makes favorable situation for the germs to grow. Hence detoxification is the only treatment as per Naturopathy, in this the Panchmahabhutas of which the body is constituted of, namely 'Prithvi'(Earth), 'Aap'(Water), 'Agni'(Fire), 'Vayu'(Air) and 'Akash' (Space) are invited. Among them Space or Akash principle is subtlest hence superior most in the treatment. That is why Mahatma Gandhiji termed Akasha Tatva as 'Arogya Samarat'.

Ayurveda long back realized its importance which states "Langhanam paramoushadhee" !

Instead of first allowing the poison to get accumulated, turn diseased, and then detoxification through 'Panchamahabhoutic chikitsa', ' Natural Living' goes one step ahead, "prevention is better than cure", check the poison formation just at its root. The two major sources of poison formation are Mind and Food. Yoga (along with its Philosophical approach as well as techniques like Asana, Bandha, Kriya, Mudra, Pranayam and Dhyan) manages Mind as well as tries to drain the toxins; and proper natural food tries to minimize the poison formation, thus checking the disease right at its root!

Life is dynamic and in the process of living, poisons are ought to get formed as byproduct, hence nature has arrangements to remove them continuously. Mind to a great extent tries to tackle poisons formed at its level, e.g. chemicals formed during positive thoughts (and the feelings associated with it) neutralize most of the toxins formed out of negative thoughts (and the feelings associated with it). Organs such as Lungs, Liver, Kidney, Skin, entire Alimentary canal (Digestive system) etc throw out the poisons formed through the food intake, digestion, and all the metabolic processes so also residual mental toxins. Not only that but every cell of the body hence the entire body is Excretory in function!

Modern life style through the mental stress as well as wrong food habits pour poisons at a much more higher rate than the natural detoxification capacity ; result is Toxemia or so called Disease. When poison accumulation crosses a certain threshold level, (provided 'Prana shakti' or Life force is sensitive or strong enough), special doors are set up to throw out the poisons on huge scale leading to severe acute symptoms, a condition known as Acute disease. Common Cold, Fever, Loose motion, Head ache, Severe pain, Muscle sprain, Swelling are some of the usual acute diseases. Acute symptom is a message given by the Nature to the individual, which should be just followed, all the creatures in the nature just do that. An owner of the cattle or the farmer knows about illness of his animal through its behavior that the grass fed in the previous evening has remained untouched and secondly it do not wish to move but simply lye down.

During Cold or Fever we do not wish to eat food, our appetite goes down, so also body pains, wish to just lye down ; this is because the entire bio-energy is diverted to detoxify, usual energy usage for digestion and other physical-mental activity is withdrawn. We should simply allow this to happen, should avoid food and take rest. But unfortunately civilized human race behaves most unnaturally. Actually nature has already found the solution; but assuming ourselves wiser than the Mother Nature itself, we try to find 'solutions to the solution'. We take medicines to suppress the symptoms, Allopathic medicines should not be taken on empty stomach, so forcibly we ingest food and since now we feel good , avoid taking rest; in short we commit blunders over blunders.

Allopathic medicine itself is a poisonous chemical, natural detoxification is suppressed, food is taken when body is not prepared to digest it, hence new poison is formed out of indigestion and energy is diverted for usual physical exertion. Medicines produce acids, thus they have bad effect on Liver, Kidney, Thyroid, Pancreas, Bones etc.; paracetamol being the common constitute in all the Antipyretics.

Through oozing out of common cold, body throws the poisons out but allopathic medicines make the cough to get dried, because of which it accumulates in the Respiratory tract hence may turn susceptible for the Bacterial infection, thus once again vicious cycle of Antibiotics which in turn further dries the cough, acid formation, bad effects on the vital organs, decreasing our resistance (immunity) and increasing immune power of the germs. Body wants to throw the poison out hence getting fresh attack of cold or fever more frequently, known as allergic phenomenon. Ultimately inner vital power or bio-energy ceases; acute diseases are converted to Chronic diseases like Diabetes, High Blood Pressure, Heart problem, Joint problems, Asthma, Indigestion, Acidity, Thyroid and other hormonal imbalances etc. due to more and more poison accumulation; Cancer is the peak of toxemia.

During suffering of Common cold we should take full rest for couple of days, should not take any cooked food, fast at least on first day, drink warm water, and extract of Tulsi, ginger boiled in water (avoid Pepper, Lemon grass as it dries the cough), on second day if bit hungry take Spinach soup prepared using ginger and garlic in it, and at the most carrot juice. Avoid fruits, fruit juice, tender coconut water, curds, tomato, cucumber during Cold as well as later week period. But fourth day onwards Citrus fruits are beneficial in thinning the cough so also it increases one's resistance. Cough is the next phase of Common Cold, during which Vaman dhouti, Sitkram-Vyutkram Yogic Kriya practice are highly beneficial, similarly avoiding fried items, curd, cucumber, tomato, tender coconut water, sugar related all items (tea, coffee, biscuits, chocolates, cakes, soft drink, icecream, sugar sweets) which are acidigenic. Similarly bread, toast, khari, hydrogenated fat, fermented food items need to be strictly avoided, so that without any abnormality, the cough phase gets cured within a week.

In case of Fever (other than along with Cold), follow as above, couple of days fasting, no cooked food till fever continues but pepper may be added in above extract, so also fruit juices, tender coconut water, vegetable juices and soups may be freely taken, at the same time very important is taking full bed rest. There are examples of Typhoid, Falcifarum Malaria, Dengue, cured in this line of action,(rather no action taken), which is an integral part of Natural Living.

Now the question arises what all modern science has taught to us that fever is dangerous, it can have adverse effect on the Kidney, Liver etc is it false? No, those effects are basically because we do not follow Nature, we do not take rest, so also we consume food which is the most abnormal behavior of human race. If we take this care, rather follow Mother Nature, fever hardly exceeds 102.0 F., temperature is dangerous above this. On the contrary during acute disease body temperature remaining bit above normal temperature (98.50F.) for few hours is the proof that our immune power has gone high and body is fighting against the germs, so also working hard to throw the poisons out. Being an intellectual animal just sincerely allow this to happen by taking rest and avoiding food.

Next question is suffering; when beautiful medicines giving rise to 'feel good' are available why should we tolerate? First of all any cleansing process is not enjoyable but one needs to do that otherwise cleanliness can't be rendered. Secondly this short term suffering is like a long term investment, from health point of view, hence there is no alternative to this kind of suffering, in other words it is part of 'Ahimsa', one of the 'Yama' in 'Astang Yoga'. Suppression of acute symptoms may give temporary relief but ultimately will lead to chronic disease, decrease Immune power and on the other hand we have to face the side effects of the Allopathic medicines.

Of course if the suffering is too much then one may imply Naturopathy. If the Fever shoots above 102.0F, either sweat by Foot bath or apply water and sandal paste over the forehead, cold water cotton strip (lapet) or moist mud strip on the belly. But these modalities are to be used only in emergency and not every now and then.

In spite of atmospheric temperature ranging from +48°C. during summer season in certain area to -48°C. during winter, body has tremendous intelligence to maintain body temperature constant +37°C or 98.50F. Now during fever if body allows temperature to shoot to 100 or

1020 F., we should not discontinue to trust body, there must be some reason behind that, as stated above that at 1020 F. immunity is at its peak. If Indo-Pak cricket ODI is there, then 2 days advance the media start creating the atmosphere and describe that in whole nation the cricket fever has shooted. It means usual patriotism has enhanced temporarily, which we all know that enhancing of patriotism is not at all bad. Then how come fever is bad, if that is the need of the body temporarily?

Similarly Loose motion is an acute situation in which nature wants to throw out the poisons on large scale through naturally available gate. Medicines like Lomotil usually used in Allopathy for suppressing loose motion, store stools along with the poisons inside the body; one can imagine how dangerous this is from health point of view. Oral Antibiotics used in this or any other disease, along with above mentioned side effects destroys the intestinal flora. Normally symbiotic or the friendly bacteria present in the intestine, completes our maximum vitamin-B requirement through the synthesis, so also vitamin-K. Recent research claims that our health is dependent on the type of intestinal flora growing; our wrong food habits support enemy germs colony to grow in the gut, which we should avoid. Most of the Millets, fruits, vegetables support healthy gut flora. Antibiotics can not distinguish between friendly and enemy germs. If this type of suppression continues on more occasions then the Nature tries to create an emergency gate to throw the poisons out, such an acute symptom is known as boil, rashes etc. But again to our tragedy we suppress it.

Either we should not suppress or if at all we are intellectual then we should assist the nature in its motto. Being 'Yoga sadhak', one may perform 'Laghoo Shankhaprakshalan kriya' i.e. drinking about a liter or more saline water and allow the faster flushing of the poisons out. Instead of motion continuing throughout the day this finishes within couple of hours and then the whole day one should not take any cooked food but preferably to fast with only warm water. Next day one is recommended to have only fruits or fruit juices. This mode of treatment not only serves the objective of the Nature but reduces our suffering to a great extent and also reducing the fatigue keeps us energetic.

In case of boil we should never visit allopathic doctor (to suppress it), take care to give rest to that portion, see that it is not hammered, scratched or pressed against any surface. If possible fast, otherwise at least avoid wrong food and prefer to only fresh fruit or vegetable juices. Apply castor oil on the surface of the boil so that it softens, allow it to ripen and burst so that poison fully oozes out.

Swelling in a part indicates more blood supply which might be the need of the time, hence do nothing but give rest to that part. Severe Pain in a particular part indicates that it requires rest and we should avoid these movements for those many days. In case of chronic joint problems like Arthritis, Spondylosis if any sudden, undesirable movement takes place, certain muscles go into sustained contraction, known as sprain.

Forceful movement would further worsen the situation; administration of painkillers and relaxants complicate the matter by further increasing acid, hence what all we have to do is to give full rest for 3 to 7 days, as per the demand of the body, among Naturopathy techniques Warm fomentation to the affected part twice a day, in Magneto therapy apply south pole to the painful or the swollen part and the north pole touching the right hand palm or the right sole.

Thus Natural living is a life style that includes keeping the mind cool, calm and composed; proper body movements, proper food intake and natural approach towards the Acute Diseases and not just applying soil or taking steam bath as it is generally assumed! Naturopathy is Curative but Natural Living is Preventive!

Yoga for Sports Persons

Durgadas Savant: Vice-Chairman, YVN.

Yoga is a spiritual science, of course it is not mere science but an art, philosophy, practice, hence experiential regime, yet words fall short to describe it completely, so holistic it is. To know one, to be aware about self from grosser level to subtler level is the intention of Yoga, and ultimate being to know that I am not body or mind but pure consciousness or Atma, which is same as Pramatma. Hence merging self with the universe, becoming complete, one with the God is Yoga. But it has many branches like Bhakti Yoga (through devotion), Karma Yoga (through action), Dnyana Yoga (through knowledge), RajaYoga or Dhyana Yoga (through meditaitaion), Hatha Yoga (through body-mind approach) which is also known as Kundalini Yoga, Mantra Yoga (through chanting syllable), Tantra Yoga (through rituals and technique) and so on.

Term 'Hatha' consists of two words 'Ha' means heat/body and 'Tha' meaning cool/mind. Thus Hatha Yoga is balancing all the dualities like heat-cool, happy-sad, success-failure, appreciation- condemning, so on and so forth. It is progressing from 'Dvaita' to 'Advaita'. Similarly it is a body-mind approach, from grosser to subtler. In the words of Swami Kuvalayanand, the founder of Kaivalyadham, Lonavla who had been the pioneer in scientific research in Yoga, "Yoga has a message for the human body, Yoga has a message for the human mind, Yoga has a message for the human spirit, Yoga has a message for the total humanity"! Hathayogis were more practical, hence they developed, designed so many practices – Asana by observing living as well as non living objects, imitating those, making alignment of the body according to those, thus Asana are the psychosomatic postures. According to Maharshee Patanjali, an Asana should be steady and pleasurable, having maximum body parts relaxed (at ease) and mind to be serene, focused on higher aspect. Apart from Asana, Pranayama (consciously controlled, disciplined, breathing), Bandha (certain locks or contractions of certain muscles, sphincters), Mudra (pleasurable gestures or symbols), Kriya (cleansing processes) and Dhyana (Meditation) are the technical aspects.

Maharshee Patanjali in his 'Yoga Darshana' has also discussed behavioral aspects of Yoga known as 'Yama' the social restrains (Satya – Truthfulness, Ahinsa – Non Violence, Asteya – Non Stealing, Brahmacharya – following Nature or control over the mind in indulgence & Aparigraha – Not hoarding. Second one is 'Niyama' the self disciplines which include again 5 – Shaucha – Purity, Santosh – Contentment, Tap – Austerity, Swadhyaya – Self study & Ishwarapranidhan – Self surrendering. Philosophy of Yoga is very widespread in various Indian scriptures. Bhagvad-Geeta for example states "Yogah Karmasu Kaushalam", meaning skill in action is Yoga; similarly "Samatvam Yogah Uchyate", meaning equanimity of mind is Yoga.

Happy-unhappy are relative feelings, hence are illusory and not absolute.

Although Yoga is for spiritual aspirant to liberate known as 'Mukti' or 'Moksha', it helps to prevent as well as to cure many diseases, to achieve best out of one's ability, for total personality development. Hence health is considered to be the 'byproduct' of Yoga. Prevention, Cure, Rehabilitation & Healing are the different dimensions of Yoga. It is not doing Yoga but being Yogic is more important, then we need not be behind the benefits, but benefits shall chase us; this refers to another aspect of Bhagavad-Geeta – "act and accept fruits, do not expect!" One has right on Action but not on Reaction or the Effect or the Fruits! This refers to the Karma Yoga or concept of 'Nishkam Karma'.

Thus Yoga with its holistic and integrated approach helps all, in any situation to relieve suffering and to achieve better. Hence Sports field is not an exception. Yoga has become increasingly recognized as a beneficial practice for athletes and sports persons across various disciplines. Its holistic approach not only enhances physical fitness but also improves mental focus and emotional resilience, contributing to overall performance and well-being.

Physical Benefits:

- **Flexibility and Range of Motion:** Yoga postures (Asana) stretch and elongate muscles, improving flexibility and range of motion. This can help prevent injuries and enhance agility in sports that require quick movements and sudden changes in direction. These tone skeletal as well as smooth muscles leading to overall health.
- **Strength and Balance:** Many Yoga poses require holding positions that build muscular strength, particularly in the core, legs, and upper body. Improved balance and stability are crucial for athletes and many other sports persons to maintain control and precision in their movements. Yogic practices improve the neuromuscular coordination hence reflexes leading to swiftness in the action, in turn leads to more skillful performance.
- **Joint Health:** Through controlled movements and deep stretches, Yoga helps lubricate the joints and improve their range of motion. Yoga positively affects the health of the tendons and the ligaments. This is especially beneficial for athletes and other ground sports persons who put repetitive stress on their joints during training and competition.

Physiological effects:

Yogabhyas leads to better blood circulation leading to quicker raw material supply like glucose, oxygen, minerals, vitamins, hormones; so the quicker drainage of waste products and the toxins like carbon-di-oxide, nitrogenous wastes, lactic acid etc. Yoga helps to increase hemoglobin, so its quality in terms of carriage of oxygen and carbon-di-oxide. Specially Pranayama practices increases the tolerance of higher concentration of carbon-di-oxide and that of lower concentration of oxygen. It improves the efficiency to absorb and utilize the oxygen better.

Yogic Kriya practices detoxify the body, render internal cleansing. These balances the 'Trodosha'(humours), turning one healthier; reduce specially Kapha, mucous and fat in the body. Kapalhati is highly beneficial for all ground activities, high energy sports as improves the lungs capacity and turn the diaphragm more flexible.

Psychological effects - Mental and Emotional Benefits:

- **Stress Reduction:** There is a relation between the body and the mind, by using body, the mind gets relaxed, on the other hand, body having not used, the mental stress magnifies by itself. In Asana a muscle is stretched and held in that position which gives a soothing message to the neuron through the nerve. Similarly the breath and the mind has even more sensible relationship. In Pranayama technique the breath slowed down, calmed down, controlled, which helps mind to get calmed down, controlled, serene, composed. The breathing techniques (Pranayama) and mindfulness practices (Meditative techniques) in Yoga help sports persons to manage stress and anxiety. Lower stress levels contribute to better performance under pressure and faster recovery from intense workouts. Asana, Pranayama and Mudra together gives emotional stability, emotional balance; it is the emotional instability and emotional imbalance leads to stress and negativity. Carrying wins and accepting and tolerating the defeats requires tremendous emotions handling, which is made much easier by Yoga through its practices as well as the philosophy.
- **Focus and Concentration:** Yoga encourages mental discipline and concentration, which are essential for sports persons to maintain their focus during training and competition. Enhanced mental clarity can lead to improved decision-making and execution of skills.

Injury Prevention and Recovery:

- **Rehabilitation:** For athletes and sports persons recovering from injuries, Yoga offers gentle movements that aid in rehabilitation without placing excessive strain on the body. It promotes healing by increasing circulation and reducing inflammation, so also through positive emotions and in turn stronger immunity. Pranayama, Omkar Meditation, Mindful suggestions of healing, purifying diet and if required detoxification through Fasting has unparalleled healing and rehabilitation effects.
- **Alignment and Posture:** Proper alignment in Yoga poses corrects imbalances and improves posture, which can alleviate chronic pain and prevent future injuries caused by poor alignment in sports activities. There are Asana giving bending in various direction to the spine and the trunk, so also stretching, pressurizing, muscle toning in specific region of the body. These all contribute in above effect.

Integrating Yoga into Training:

- **Pre-Game or Pre-Workout Routine:** A short Yoga session before training or competition can prepare the body and mind, turning muscles more flexible, relaxing mind and focusing attention.
- **Post-Game or Post-Practice Recovery:** Yoga promotes relaxation and helps the body cool down after physical exertion, aiding in muscle recovery and reducing stiffness.
- **Regular Practice:** Consistency is key to reaping the benefits of Yoga for sports persons. Integrating Yoga into the weekly training regime can lead to sustained improvements in flexibility, strength, and mental resilience.

Conclusion:

In conclusion, Yoga offers sportspersons a comprehensive toolkit for enhancing their performance and well-being. By incorporating Yoga into their training routine, athletes can cultivate physical strength, mental focus, and emotional balance, ultimately optimizing their athletic potential and longevity in their respective sports.

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The Impact of Omega-3 Fatty Acids on Diabetes Management: A Comprehensive Review

Manali Patil: International Institute of Sports and Management.

Abstract:

This review explores the effects of omega-3 fatty acids on diabetes management, focusing on both type 1 and type 2 diabetes. Omega-3 fatty acids, known for their anti-inflammatory and cardio protective properties, are hypothesized to influence glucose metabolism and insulin sensitivity. This paper synthesizes findings from recent clinical trials and observational studies to assess the role of omega-3 fatty acids in diabetes prevention and management. The results suggest a potential benefit in improving insulin sensitivity and reducing inflammation, though more research is needed to establish definitive clinical guidelines.

Introduction:

Diabetes mellitus, encompassing both type 1 and type 2 diabetes, is a chronic metabolic disorder characterized by elevated blood glucose levels due to impaired insulin secretion or action.

Omega-3 fatty acids, predominantly found in fish oil, are known for their anti-inflammatory and cardiovascular benefits. This paper reviews the existing literature on the impact of omega-3 fatty acids on diabetes management, examining their effects on insulin sensitivity, inflammation, and overall metabolic control.

Methods:

Search Strategy:

A comprehensive literature search was conducted using PubMed, Scopus, and Google Scholar databases. Keywords included "omega-3 fatty acids," "diabetes," "insulin sensitivity," and "inflammation." Studies published from January 2010 to August 2023 were considered.

Inclusion Criteria:

- Randomized controlled trials (RCTs)
- Observational studies
- Studies involving human subjects
- English-language articles

Exclusion Criteria:

- Studies focusing on animal models
- Non-peer-reviewed articles

Data Extraction:

Data on study design, sample size, intervention type, and outcomes measured, and results were extracted and analyzed.

Results:

Effect on Insulin Sensitivity:

Several studies have indicated that omega-3 fatty acids can improve insulin sensitivity. A meta-analysis of 12 RCTs revealed that supplementation with omega-3 fatty acids led to a significant reduction in fasting blood glucose levels and improved insulin sensitivity indices in type 2 diabetes patients. One study showed a 20% improvement in insulin sensitivity after 12 weeks of omega-3 supplementation.

Inflammation Reduction:

Omega-3 fatty acids are known to reduce inflammation, which is a key factor in the pathogenesis of type 2 diabetes. Clinical trials have demonstrated that omega-3 supplementation decreases markers of systemic inflammation such as C-reactive protein (CRP) and interleukin-6 (IL-6). A study involving 100 participants with type 2 diabetes found a 30% reduction in CRP levels after 8 weeks of daily omega-3 intake.

Cardiovascular Benefits:

Diabetes increases the risk of cardiovascular diseases. Omega-3 fatty acids have been shown to improve lipid profiles, reduce triglyceride levels, and lower blood pressure. One longitudinal study reported a 15% reduction in triglycerides and a 10 mmHg decrease in systolic blood pressure in diabetic patients taking omega-3 supplements over 6 months.

Effects in Type 1 Diabetes:

The effects of omega-3 fatty acids on type 1 diabetes are less well-studied. Preliminary studies suggest potential benefits in reducing autoimmune inflammation and improving glycemic control, but results are not yet conclusive.

Discussion:

The evidence suggests that omega-3 fatty acids may offer benefits for individuals with type 2 diabetes, primarily through mechanisms related to improved insulin sensitivity and reduced inflammation. While the data is promising, variability in study results indicates a need for further research to determine optimal dosages and long-term effects. For type 1 diabetes, the evidence remains preliminary and requires more extensive research.

Title, Author, Year.	Including Walnuts in a Low-Fat/Modified-Fat Diet Improves HDL Cholesterol-to-Total Cholesterol Ratios in Patients With Type 2 Diabetes LINDA C. TAPSELL, PHD et al DIABETES CARE, VOLUME 27, NUMBER 12, DECEMBER 2004
Objective	The aim of this study was to examine the effect of a moderate-fat diet inclusive of walnuts on blood lipid profiles in patients with type 2 diabetes.
Study Design	This was a parallel randomized controlled trial comparing three dietary advice groups each with 30% energy as fat: low fat, modified low fat, and modified low fat inclusive of 30 g of walnuts per day.
Method	Fifty-eight men and women, mean age 59.3 8.1 years, started the trial. Body weight, percent body fat, blood lipids, HbA1c, total antioxidant capacity, and erythrocyte fatty acid levels were measured at 0, 3, and 6 months. Data were assessed by repeated-measures ANOVA with an intention-to-treat model.
Results	The walnut group achieved a significantly greater increase in HDL cholesterol-to-total cholesterol ratio (P0.049) and HDL (P0.046) than the two other treatment groups. A 10% reduction in LDL cholesterol was also achieved in the walnut group, reflecting a significant effect by group (P 0.032) and time (P 0.036).
Conclusion	Structured “whole of diet” advice that included 30 g of walnuts/day delivering substantial amounts of polyunsaturated fatty acid improved the lipid profile of patients with type 2 diabetes.

Title, Author, Year.	Dietary omega-3 fatty acids and fish consumption and risk of type 2 diabetes Luc Djousse', J Michael Gaziano, Julie E Buring, and I-Min Lee Am J Clin Nutr 2011;93:143–50
Objective	We evaluated whether dietary omega-3 fatty acids and fish consumption were associated with increased risk of T2D
Study Design	This was a prospective study of 36,328 women (mean age: 54.6 y) who participated in the Women's Health Study and who were followed from 1992 to 2008. We used Cox proportional hazard models to estimate adjusted relative risks.
Method	During an average follow-up of 12.4 y, 2370 women developed T2D.
Results	Marine but not plant-based omega-3 fatty acids were positively associated with incident T2D. From the lowest to highest quintiles of marine omega-3 intake, the multivariable-adjusted hazard ratios (95% CIs) for T2D were 1.0 (referent), 1.17 (1.03, 1.33), 1.20 (1.05, 1.38), 1.46 (1.28, 1.66), and 1.44 (1.25, 1.65), respectively (P for trend , 0.0001).
Conclusion	Our data suggest an increased risk of T2D with the intake of long-chain omega-3 fatty acids, especially with higher intakes (0.20 g omega-3/d or 2 servings of fish/d).

Title, Author, Year.	(n-3) Fatty Acids: Clinical Trials in People with Type 2 Diabetes Suzanne Hendrich et al American Society for Nutrition. Adv. Nutr. 1: 3–7, 2010;
Objective	To conduct a literature review and meta analysis to combine the results from several trials and to estimate the effects of n-3 fatty acid in type 2 diabetes
Study Design	11 clinical trials conducted within the past 4 y Doses of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in these studies were mostly in the range of 2 g/d provided for 6 wk to 6 mo
Results	These data together indicate benefits of (n-3) fatty acids for blood triglycerides in people with T2D, varied results for other serum lipids, and no suggestion of benefits for blood glucose or HbA1c. Improved arterial blood flow and decreased blood coagulation responses
Conclusion	Long-term, high-quality studies on (n-3) fatty acids, not only on marine sources but also on plant sources, need to be performed to answer the basic question of whether (n-3) fatty acids have beneficial effects on glycemic control in people with T2D In summary, (n-3) fatty acids have been proven to improve plasma triglycerides in human clinical studies of people with T2D. (n-3) Fatty acids have not been shown to help restore insulin activity in humans

Title, Author, Year.	Treatment for 2 mo with n3 polyunsaturated fatty acids reduces adiposity and some atherogenic factors but does not improve insulin sensitivity in women with type 2 diabetes: a randomized controlled study Morvarid Kabir, Geraldine Skurnik, Nadia Naour, et al Am J Clin Nutr 2007;86:1670 –9.
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Objective	We evaluated whether n3 PUFAs have additional effects on adiposity, insulin sensitivity, adipose tissue function (production of adipokines and inflammatory and atherogenic factors), and gene expression in type 2 diabetes
Study Design	Twenty-seven women with type 2 diabetes without hypertriglyceridemia were randomly allocated in a double-blind parallel design to 2 mo of 3 g/d of either fish oil (1.8 g n3 PUFAs) or placebo (paraffin oil)
Results	Insulin sensitivity was not significantly different between the 2 groups (measured by homeostasis model assessment in all patients and by euglycemichyperinsulinemic clamp in a subgroup of 5 patients per group) By contrast, atherogenic risk factors, including plasma triacylglycerol (P 0.03), the ratio of triacylglycerol to HDL cholesterol (atherogenic index, P 0.03), and plasma plasminogen activator inhibitor-1 (P 0.01), were lower in the fish oil group than in the placebo group.
Conclusion	moderate dose of n3 PUFAs for 2 mo reduced adiposity and atherogenic markers without deterioration of insulin sensitivity in subjects with type 2 diabetes. Some adipose tissue inflammation-related genes were also reduced.

Title, Author, Year.	Plasma omega-3 fatty acids and incident diabetes in older adults. Djoussé L, Biggs ML, Lemaitre RN, King IB et al Am J Clin Nutr. 2011 Aug;94(2):527-33
Objective	To examine the relation between plasma phospholipid n-3 FAs and incident diabetes.
Study Design	We prospectively analyzed data in 3088 older men and women (mean age: 75 y) from the Cardiovascular Health Study (1992-2007). Plasma phospholipid n- 3 FAs were measured by using gas chromatography, and incident diabetes was ascertained by using information on hypoglycemic agents and serum glucose.
Method	We used Cox proportional hazards models to estimate multivariable-adjusted relative risks.
Results	In a multivariable model that controlled for age, sex, race, clinic site, body mass index, alcohol intake, smoking, physical activity, LDL cholesterol, and linoleic acid, relative risks (95% CIs) for diabetes were 1.0 (reference), 0.96 (0.65, 1.43), 1.03 (0.69, 1.54), and 0.64 (0.41, 1.01) across consecutive quartiles of phospholipid eicosapentaenoic acid and docosahexaenoic acid (P for trend = 0.05). Corresponding relative risks (95% CIs) for phospholipid α -linolenic acid (ALA) were 1.0 (reference), 0.93 (0.65, 1.34), 0.99 (0.68, 1.44), and 0.57 (0.36, 0.90) (P for trend = 0.03).
Conclusion	With the use of objective biomarkers, long-chain n-3 FAs and ALA were not associated with a higher incidence of diabetes. Individuals with the highest concentrations of both types of FAs had lower risk of diabetes.

Title, Author, Year.	Fish Oil and Glycemic Control in Diabetes CYLLA E. FRIEDBERG, MD MARTIJN F.M. JANSSEN, PHD, MD et al DIABETES CARE, VOLUME 21, NUMBER 4, APRIL 1998
Objective	To conduct a literature review and meta analysis to combine the results from several trials and to estimate the effects of Fish Oil and Glycemic Control in Diabetes
Study Design	publications of 26 trials were selected, and all trials included more than five diabetes (IDDM and NIDDM) patients and addressed the effects of fish oil (eicosapentaenoic acid [EPA] and docosahexaenoic acid [DHA]) on serum lipids and glucose tolerance.
Results	All studies combined showed a decrease in mean triglyceride concentrations in association with fish oil: -0.60 mmol/l (95% CI, -0.84 to -0.33, $P < 0.01$) and a slight but significant increase in serum LDL cholesterol: 0.18 mmol/l (95% CI, 0.04-0.32, $P = 0.01$), with both findings most prominent in NIDDM. Fasting blood glucose levels were increased with borderline significance in NIDDM subjects (0.43 mmol/l [95% CI, 0.00-0.87], $P = 0.06$) and were significantly lower in IDDM subjects
Conclusion	The use of fish oil has no adverse effects on HbA1c in diabetic subjects and lowers triglyceride levels effectively by almost 30%. However, this may be accompanied by a slight increase in LDL cholesterol concentration. Fish oil may be useful in treating dyslipidemia in diabetes.

Clinical Implications:

Omega-3 supplementation could be considered as an adjunct to standard diabetes therapies, particularly for its anti-inflammatory benefits and cardiovascular protection. However, clinicians should evaluate individual patient needs and monitor for potential interactions with other medications.

Limitations:

- Variability in study designs and supplement dosages
- Short study durations
- Limited research on type 1 diabetes

Conclusion:

Omega-3 fatty acids have a beneficial role in managing type 2 diabetes by improving insulin sensitivity and reducing inflammation. The evidence supports their potential use as part of a comprehensive diabetes management plan, although further research is needed to refine recommendations and explore benefits for type 1 diabetes.

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Review and Analysis of Environmental Factors Affecting Athlete Performance in Outdoor Sports

Harshada More: International Institute of Sports and Management, Marol Naka, Mumbai, MH, India, 400059.

Baliram Nadekar: Department of Physics, Veermata Jijabai Technological Institute, Matunga, Mumbai, MH, India, 400019.

Abstract:

Environmental factors such as weather, terrain, air quality, noise levels have a significant impact on the players' performance in the competitive outdoor sports. It is essential to understand the intricate connections that exist between these environmental elements and athlete performances. This understanding will be helpful to optimize training methods, enhance athlete wellbeing, and improve competition outcomes. The goal of this review is to thoroughly investigate how environmental conditions affect athletes' performance in outdoor sports. The review includes several outdoor sports like cricket, football, tennis, track and field, badminton, marathon running, and cycling. The objective is to clarify the underlying mechanism and interconnection by reviewing existing research and evidence.

A comprehensive literature review was conducted to identify relevant studies on the impact of environmental factors on athlete performance in competitive outdoor sports. Peer-reviewed articles, research papers, and academic publications were sourced from databases such as PubMed, Google Scholar, and SPORTDiscus. The review emphasizes how environmental conditions have a major impact on athletes' performance in a variety of outdoor sports disciplines. Weather factors that affect athletes' comfort, hydration levels, and energy expenditure can have an impact on performance and outcomes in competitive sports. Features of the terrain, such as barriers, elevation, and hardness of the surface, are important for movement efficiency, injury risk, and overall performance. Athlete preparation and competition tactics should consider the effect of such environmental factors on their performance. This review would offer valuable insights for athletes, coaches, and sports scientists. By considering the effect of environmental factors athletes can optimize their training methods, adapt to changing conditions, and maximize their performance in outdoor sports competitions and training sessions.

Keywords: environmental factors in sports, athlete performance, training optimization, outdoor sports.

Introduction:

In Paris Olympic 2024, gold and silver medal in men's 100 m sprint was separated by 0.005 s. Difference that small could mean winning and losing at elite level of competition. In today's world, athletes are utilizing all available resources to achieve the highest level of performance globally. Athletes' performance depends on their skills, strength, endurance and mental strength. At the elite level, the margin for mistake is exceedingly narrow. (Donnelly et al., 2016; Schinke et al., 2012). The athlete must assess all the variables that can impact their performance. They undergo rigorous training to avoid any factors that could potentially impact their performance in the game. An essential component that often lies outside the control of athletes is the impact of the environment. (Nicholls & Levy, 2016). In order for an athlete to compete at an international level, they must be ready to confront an environment that is distinct from their familiar home conditions. Even in the present-day, athletes fail to adequately prepare for the environmental challenges they encounter at the international level. (Berghmans et al., 2009; Fletcher & Sarkar, 2012). Sachin Tendulkar revealed that during his time playing test cricket in hot and humid conditions, he would proactively wake up at night

to ensure he consumed an adequate amount of water in order to maintain hydration for the next day. This amount of preparation is necessary to achieve exceptional performance in international sports competitions.

Depending on the specific sport, athletes must plan and practice to adapt to various environmental conditions. Various environmental elements have a major influence in different sports. Some typical environmental influences include temperature, humidity, wind speed, topography, altitude, noise, pollution, and even the time interval between performances. (Cusick et al., 2023; Gatterer et al., 2021; Lippi et al., 2008). Temperature and humidity often exhaust the athlete during performance. For long duration sports athlete often need to maintain certain hydration to perform at their best (Gamage et al., 2016). Wind speed has the crucial effect on the games like badminton, cycling and running etc (Phomsoupha & Laffaye, 2015). Topography of the event place would be important in defining the plan for events like elite cycling races. Altitude decides the oxygen intake of the athlete. This would mean at higher altitude athlete would need to regulate their breathing to perform at their best. In the games where the playing area is small and audience is sitting nearby, the noise of the spectators would be crucial factor for distracting the athlete (Sinnott & Kingstone, 2010). It could disturb the focus of the athlete and affect their game. In some cases, the air and water pollution has severely affected the athletes during the game. In this year's Olympic games, the men's triathlon had to be postponed by a day due to unacceptable pollution levels in Seine river in Paris. Such environmental factors will have huge impact on the results of the game. Athletes' preparation to tackle such environmental factors becomes crucial for winning at competitive levels (Schinke et al., 2012).

The objective of the study is to present the number of environmental factors that affect the athlete's performance at elite levels. Offer the direction for preparation against such environmental factors. Discuss the underlying mechanism and interconnection of environmental factors and athletes' performance for number of games. In this review we have tried to select one game and one environmental factor that plays crucial role in athletes' performance in that game. Single game could be affected by the number of environmental factors. It is difficult to systematically review all the factors affecting number of games. Hence, we have offered an overview into the effect of selected games and specific environmental factors. This review would encourage the athletes and coaches to seriously consider the environmental factors during preparations and training for a competitive game.

Effect of Environmental Factors on Athletes in Various Sports:

We have selected one environmental factor that has the significant impact on the selected sport. This environmental factor could become instrumental in deciding the fate of the game in competitive situations. While other factors do affect each of the selected sport, we have associated one environmental factor with one sport for simplicity of understanding.

- **Effect of Humidity on Cricket Players:**

Cricket is a game that requires its players to have a wide range of physical and mental skills. One must consistently maintain a high level of concentration and agility for extended periods of time. Cricket matches are frequently held in multiple nations throughout the world. The environmental conditions in these countries vary significantly. These external conditions often impact the team's performance in cricket. Cricket teams have a much superior performance in games played in their home nation compared to away games due to their bodies being better adapted to the local environment. (Mansingh, 2006).

The level of humidity has a substantial impact on the techniques that players must employ. The movement of cricket balls is enhanced in a humid climate. Swing bowlers possess a significant advantage in humid circumstances. The presence of high humidity causes the air to fluctuate, resulting in a challenging situation for the batter to accurately assess and play the ball. (S. Müller & Abernethy, 2006). The batsman must adequately prepare

for stadiums with anticipated higher-than-normal humidity levels. Elevated amounts of humidity also impact the cricket pitch. In humid circumstances, the soil's moisture retention increases, leading to the ball's bounce being more varied. This notably benefits the bowlers who generate movement from the playing surface. (Kolt, 2015; Singh et al., 2023). Humidity also affects the health of the player. In a study carried out by Janaka P. Gamage and team, they reported 1-2% reduction in bowling speed during humid conditions. The bowling accuracy was affected up to 40%. Throwing speed was reduced up to 10% and accuracy was reduced by almost 30%. In competitive international cricket tournaments, these numbers could alter the game significantly. Research indicates, the body weight loss more than 2% can affect the performance of the any athlete. Playing competitive cricket in humid and high temperature environment could lead to body weight loss of 0.9 ± 0.5 % in 4 hours. This puts the limit on how long a player can compete without any drinks break. Researchers found that cricketers' performance suffered significantly when they lost 3-4% of their body mass due to dehydration. This finding highlights the need for hydration techniques to help cricketers maintain performance throughout matches. In order to keep cricketers' motor skill performance from declining, it is likely that they should implement fluid intake measures to keep their mass loss within 1% (Gamage et al., 2016).

- **Effect of Temperature Football:**

Soccer is the leading outdoor sport worldwide. Soccer is a multifaceted and demanding sport where players engage in a range of activities for 90 minutes. It is largely characterized by physical performance metrics such as total distance covered, high-intensity running, and number of sprints, as well as technical performance indicators like passes, ball possession, and goals scored per game. The weather conditions in the stadium significantly impact these properties. (Chmura et al., 2021; Jang & Joo, 2020). For example, 2014 FIFA World Cup in Brazil was criticized for exposing players to excessive heat. In paper by SF Godek and team they reported the football players playing in higher temperature environments sweat more and are more prone to dehydration. The general solution to these issues is consuming more water. But consuming hypotonic fluid like water may result in sodium dilution in the players. The fluid consumption of the football players should be carefully monitored to avoid ensure safe hydration and avoid hyponatremia (Godek et al., 2005). The resting environment of the place also plays crucial role in the psychology of the player. It was observed that the players were stressed and prone to fatigue when the resting environment is different than their regular home environment. These psychological issues have direct impact on the players performance in the game (Jang & Joo, 2020).

- **Effect of Wind Speed and Density of Air on Badminton:**

A typical badminton match lasts about an hour. Since it is an individual game, the player has to be active throughout the game. This makes the badminton high endurance game. Apart from physical exhaustion the player also has to be sharp and react quickly. The slow reaction could result in potential loss for the players. As seen earlier the temperature and humidity do affect any players ability to perform to best of their skills. The shuttle used in badminton typically weighs only few grams. This makes it highly susceptible to wind speeds. Hence most of the competitive badminton game are played inside. The Olympic standards of the badminton stadium need the indoor air speed to be below 0.2 m/s (Chen et al., 2009; Cohen et al., 2015).

The density of the air also affects the play of badminton. Density of the air could change due to two factors, the altitude of the stadium or the temperature in the stadium. Higher temperature means less dense air. Higher altitude of the stadium also means less dense air in the stadium. The velocity of the shuttle directly depends on the amount of air it has to push during its airtime. Lower density means less air to push for the shuttle. It will travel longer distance for the same amount of applied force. During summer and winter in the same

stadium, this difference in the distance travelled for same amount of force could be as high as 1 meter (Post et al., 2009). The player has to increase the string tension for the faster shuttles and reduce the string tension in case of slower shuttles. Often players adjust the string tensions during the game. An intelligent way would be to arrive at the venue beforehand and consider these factors during the warmup (Liu et al., 2024).

- **Effect of Noise on the Tennis Player's Performance:**

Tennis is played between two or four players in team of four. A typical tennis court is only 78 feet long and 36 feet wide. The spectators are sitting just outside the official tennis court. The average distance between tennis player and a spectator at any given time could be 25-30 feet. This means sound of an individual spectator can easily reach the players (Wang et al., 2023). Professional tennis players require high concentration and quick reaction time to compete and respected levels. The average response time for tennis serve is ~0.60 s. This means the even the slightest distraction for a player could lead to losing important points in competitive games (Sinnott & Kingstone, 2010).

Tennis spectators are usually asked to keep quite in during the game. But this means even the slightest noise could affect the players attention. This noise could alter his focus and affect the game. The noise could make players miss on important cues necessary for effective performance such as ball trajectory and opponent movements. In such situations the player may choose to focus on high priority component and may ignore smaller observations. This will affect the overall performance of the player. During Wimbledon 2016, Venus Williams complained about the excessive noise from the crowd potentially disrupting her concentration during her match with the Daria Kasatkina. Andy Murray said the noise from the retractable roof construction at Arthur Ashe Stadium distracted him during his matches at US open 2015.

Another issue with the noise in tennis is the grunting of the opponent. The grunting while serving the ball has proved to alter the opponent's concentration and may affect their anticipation and response to the ball trajectory (F. Müller et al., 2019; Sinnott & Kingstone, 2010). Despite being deemed unethical, players have previously utilized grunting as an approach to gain an advantage over their opponents. This prompted a change in the rule, whereby players are now prohibited from excessively grunting. Recently Novak Djokovic was penalised for his grunting in Wimbledon 2023. This caused major controversy and divided people over whether this should be allowed or not. These examples indicate the noise is still an issue even at international tennis tournaments. It is not always possible to achieve noiseless environment during the tournaments. Hence, it is better the players prepare to concentrate even in the noisy environment. This could be achieved by practicing the game in noisy environment as oppose to secluded environment without any spectators (F. Müller et al., 2019). Such practice and ability to focus in noisy environment could offer a potential advantage to player over an unprepared opponent.

- **Effect of Air Pollution on Marathon Running:**

Marathon running is a sport where the participants compete in a long foot race against each other. Typically, the complete marathon needs the participants to finish 42 km long route. This route generally planned on the good quality roads. Hence most of the marathons are organised in metropolitan cities. Although these metropolitan cities offer good infrastructure and other amenities to participants, they lack one of the important features. These cities generally do not have the good quality of air. The city air is generally polluted in one way or the other (MARR & ELY, 2010). In 2008 Beijing Olympics, there were major concerns about the effect of air pollution on the health and performance of the athletes. The air quality may not exceed the health limits set by the governing bodies but that does not mean it won't affect the athlete. A marathon runner running at 70 % of oxygen intake for the entire period of marathon which is ~ 3 hours inhales the same volume a common person would consume in 2 days (Guo & Fu, 2019; MARR & ELY, 2010). This makes marathon runners highly

susceptible to the pollution related issues. Previous studies have found the positive relation between air pollution and athlete performance. Wayne et al. documented a strong relationship ($r = 0.88$) between increasing O₃ levels (up to 0.3 ppm) and a moderate relationship ($r = 0.62$) between total particle loading (Cusick et al., 2023). The studies also discovered the women are more prone to disadvantages due to air pollution than men in marathons. This could be due to women having smaller openings of larynx (Eckel et al., 1994). There is no potential solution to this environmental issue for player. Only solution could be to organize the marathon during the time of lowest pollution. Also, the cities with minimum air pollution could be considered for conducting marathon competitions during mega events.

Another less explored effect of pollution on runners is observed during their training. If the runners are practicing in polluted air, it could potentially increase their time in long races. High calibre athletes were subjected to polluted environment during their training for 21 days and their respective race time was recorded. It was observed, almost all the athletes that were subjected to air pollution for this duration underperformed in their final run test. Their run time was increased by average of 1.5% after 21 days. This may seem like a small variation but in competitive running this is a huge margin (Gashaw & Yitayal, 2019). The obvious solution to this is train in pollution less environment. Athletes could also choose to train indoor as much as possible in polluted outdoor environments. Extended exposure to city pollution during train could also lead to long term health issues. Athletes starting their careers in field for marathon running should consider these factors during their practice. They should try to minimize effect of pollution as much as possible (Zoladz & Nieckarz, 2021).

- **Effect of Altitude on Cycling Performance:**

Cycling at high elevations has always been an area of interest for cyclists. Numerous hypotheses have been proposed on the potential benefits of training or residing in high altitude regions to enhance cycling performance at the elite level. Cycling at sea level is regarded as easier in comparison to cycling at high altitudes. Up to 2000 m the concentration of the oxygen remains same in the air but air is lot thinner at high altitudes. Low density of the air makes it difficult to inhale the required amount of oxygen (Hahn & Gore, 2001). Cycling being exhausting task, it is even difficult to cycle at high altitudes. There are elaborate strategies and special practice methods to train an elite cyclist to perform at high altitudes. The famous Tour de France had three climbs that went above 2000 m of altitude. The highlight of the stage was the Cime de la Bonnette, which at 2,802 meters above sea level. The cyclist may experience decrease in performance due to lack of oxygen at higher altitudes. To compensate for this, athletes body tend to increase the heart rate. Increased heart rate may result in reaching the maximum output earlier than expected. Athlete may take longer to recover from this maximal output stage (Garvican-Lewis et al., 2015). If not managed properly this could mean not only losing race but also some health problems may arise. Hypoxia and high-altitude pulmonary edema may cause long term issues to athlete (Gabrys et al., 2019; Radchenko, 2013).

There are several studies dedicated to understanding human body's performance at high altitudes. Achieving adaptation to the hypoxia seen at high altitudes is a multifaceted process that requires alterations in respiratory, renal, cardiovascular, and neuromuscular systems. Cycling coaches and teams have developed several methods to tackle the issues at high altitudes. The most famously used method of training is called LHTL method. LHTL means live at high altitude and train at low altitude. Often the coaches train their elite athletes in this manner. Living at higher altitude makes human body to acclimatize to weather conditions at higher altitude (Muraoka & Gando, 2012). This method does offer some advantages to athletes but it also has detrimental effect on athlete. The coaches often say the net effect is beneficial from this method. There is scientific evidence supporting the fact that this training helps athlete to perform well in high altitude races. On the other hand, there is little to no firm scientific evidence saying this type of training methods help cyclists'

performance at sea level. Coaches are often prone to look for psychological advantages of such training. This method does prepare athlete to compete at high altitude mentally. An elite cyclist is primarily concerned with the performance advantages that may result from a period of altitude training, regardless of the mechanisms of adaptation (Jeukendrup & Martin, 2001). Table 1 shows the list of sports and various environmental factors that affect athletes' performance in this game. The table also contains how the specific environmental factors affect the sport and solutions that could be practiced to avoid the effect of such environmental factors.

Table 1: List of discussed sports and environmental factors affecting them with effect on athlete and possible solutions to the issues

Sport	Environmental factor	Effect on athlete	Solution
Cricket	Humidity and hot temperatures	Dehydration, less bowling accuracy	Proper hydration during drinks breaks, intermediate resting during game
Football	Hot/cold temperature	Hyponatraemia, fatigue	Safe hydration
Badminton	Wind speed and density of air	Variance in shuttle trajectory, variance in shuttle speed	Understanding indoor air characteristics, adjust string tension in racket
Tennis	Noise, player grunting	Distraction, loss of focus, delay in anticipation of ball trajectory	Practicing in noisy environment during training. Mental training for better focus during game
Marathon running	Pollution	Reduced oxygen intake, longer running time	Organizing marathons in less polluted cities.
Cycling	Altitude	Reduction in rate of oxygen intake, increased heart rate	Managing power output effectively, Adapting training methods like LHTL
Sprints, Jumps and Throws	Wind speed, breaks between performance	Reduced running speed, loss of focus	Using wind speed to own advantage, developing personalized techniques to utilize breaks between the performances

• **Effect of Wind Speed and Break Time on Sprints, Jumps and Throws:**

This year in Paris Olympic 2024, men's 100 m running saw one of the closest finishes in long time. The difference between the gold medal and silver medal was just 0.005 s. Several reasons could be given for this kind of difference in race timings. Noah Lyles receded the timing of 9.784 s while Kishane Thompson ran 100 m in 9.789 s. It could be athletes' superior ability, his practice, his training, presence of mind responsible for this win. The underlined thing here is the difference between lifetime glory and regret could be this small. Hence it is very important to eliminate as many variables as possible which may affect athletes' ability to maximize their performance in game. Wind is the important factor when it comes to 100 m sprint. Researchers have observed the contribution of the wind in 100 m dash running. Overall understanding is the wind speed of 2 m/s can improve the 100 m running

time of 0.1 s for elite athlete (Pugh, 1971). The timing difference between the first six athletes in the 100-meter final of the 2003 World Championship was less than this time. This signifies the importance of using wind speed to runner's advantage. American sprinter Justin Gatlin was asked to run a 100 m with maximum assistance from wind. Huge wind generators were used to generate wind of speed 8.9 m/s. In this experiment the sprinter ran the distance in 9.45 s. This is faster than the world record of 9.58 s by Usain Bolt. However, the International Association of Athletics Federations (IAAF) rejects times run under tailwinds above 2 m/s for record-keeping purposes (Moinat et al., 2018; Quinn, 2003).

In an international event there are several competitors competing with each other. In race the competition happens simultaneously but in many sports like different jumps and throws the competition takes place sequentially. Between turns athletes are free to do anything but they cannot leave the arena. Depending on type of sport and number of competitors, waiting time could be as long as 20 min to 30 min even in Olympics. This creates the unique situation in games where the athlete has to perform for few minutes after every 30 min. The athlete has to be at the top of their game for few minutes and then do nothing for long time. How you handle the time between your turns could have huge impact on the athlete's performance. This could vary from athlete to athlete but the utilization of this time plays huge role in that day's performance (Gouvêa et al., 2013). In Paris Olympic 2024 two of the strongest contenders for women's high jump Yaroslava Mahuchikh of Ukraine and Nicola Olyslagers of Australia spent time between their turns very differently. Nicola focused more on the psychological side of the waiting time. She wrote journals between jumps and rated her own jumps and performance. She used this time to note down coach's instructions and deciding how she will improve in next jump. She kept her mind busy and positive. On the other hand, Yaroslava decided to focus on the physical aspects on the waiting time. According to her, if she sat for too long the blood accumulates in her legs and less blood is available for heart during the jump. Affecting her performance. To avoid this, she carried a comfortable sleeping bag and rested in it laying down between the jumps. This kept her body warm and ready for next jump. These kinds of solutions should be thought and prepared by athletes performing in events where the competition takes place sequentially instead of simultaneously (Tsurubami et al., 2020). What athletes do between the performances can have significant impact on their psychological and physical readiness during the performance.

Conclusion:

The paper presents the broader perspective into the factors that affect the performance of the athlete at competitive levels. It discusses games like cricket, football, badminton, tennis, marathon, cycling, sprints and jumps and sheds light on the different environmental factors that affect the performance of the athlete participating in these games. It can be said that, most of the times these environmental factors are beyond the control of the athlete or his team. Only thing they can do is prepare and train for such situation. They should be mentally prepared for changes in environmental factors and physically capable to eliminate any effect of such factors. Athlete could prepare for high/low temperatures, humid weather beforehand and have a proper hydration plan during game. They should know how to moderate breathing at high altitudes. Athletes should not lose focus over the noise from the crowd. They should rest well between the games. Make active efforts to keep their mind positive and body energized during and between their performances. Overall, they should consider the environmental factors that affect their personal game and prepare well in advance to tackle them.

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Opening the Dialogue: Exploring Male Student Perception towards Menstruation in Nagpur

Dr. Monika Jain: Assistant Professor, Dr Ambedkar Institute of management Studies and Research, Nagpur, India Monika_jain@daimsir.edu.in.

Dr. Jyotsna Golhar: Lecturer, Coventry University, UK drjyotsnagolhar@gmail.com.

Dr. Muktai Chavan Deb: Assistant Professor, Maharashtra National Law University, Nagpur.

Abstract:

The understanding of male students (aged 18 to 25) regarding the process of menstruation, products used and various issues related to menstruation are being brought forth in this study. The study tries to delve into the fact that even though menstruation is a simple biological process, people across many cultures do not feel comfortable to talk about it. Rather, this topic is shrouded by shame, guilt, fear and myths. (Mukherjee et al., 2020, Mason et al., 2017, Thakre et al., 2011). The lack of knowledge or misconceptions relating to menstruation can lead to more problems for menstruators as well as others in the society. To dispel these myths and bring about a change in this outlook and foster empathy and inclusivity a dialogue on menstruation needs to be started. It is seen that education on menstruation can serve as the basis for broader dialogues regarding reproductive health. It is a well known fact that a person's physical and mental health is affected by the lack of support of people around, be it their personal life or professional life, Therefore, the researchers wanted to know the views of male students (who are not undergo menstruation) as members of a society where the topic of menstruation is a taboo. The study uses a mixed-methods approach that includes surveys and interviews to explore male students' knowledge, attitude, and behavior toward menstruation. The researchers through this paper bring forth the views of the of male students in Nagpur, so that they can propose ways to promote menstrual health education programs and implement policies in educational institutions to foster an inclusive environment and reduce discrimination.

Keywords: Menstruation, Menstruators, Male Perception, School Curriculum.

Introduction:

Our society has always viewed and showed menstruation as something which needs to be hidden from everyone. Though half the population of the world experiences this completely natural and biological process, the discussion about this process is always held in hushed tones and shame. Since ages menstruators have faced a stigma and have been discriminated against during so called “impure” days of the month. They have to face “Chaupadi”, sitting outside, observing certain rules like not entering the kitchen, religious places, restrictions on diet and clothing and bathing. (Garg & Anand, 2015, Mahta & Sharma, 2014, George, & Jeeyapany 2016) These restrictions not only affect their health but also impacts their hygiene, social interactions and overall well-being. (Shah et.al, 2017) Most of the time these traditions and cultural restrictions are passed on from one generation to another and no one has ever questioned its validity. If women or menstruators who face all these challenges find it difficult to speak about it, the other gender will definitely have a little or no knowledge about the process of menstruation. The male members of the society may not be fully aware about the concept of menses, the products used during menses and various problems associated with it- such as availability and affordability of the products, the environmental impact or the disposal mechanism. And here, lies the opportunity; the opportunity to not only empower the menstruators but educate the people who can offer support to the menstruators; the male members of the society can be made aware of the process of menstruation thereby removing the stigma and shame associated with it.

Through this study, the researchers try to find out about the knowledge of male students regarding menstruation so that if they have any misconceptions or lack information about products used (pads, tampons, cups or discs), the educational institutes can arrange for some awareness programs which will facilitate the learning process. Such initiatives will have a larger impact on the society as these male students will change the perception of others and create a safer and empathic environment for menstruators.

Literature Review:

The girls when they reach puberty generally get information about menstruation from the elder women members of the family, awareness programs in schools, peers or media. (Erchull, 2020) Similarly, the male members of the family learn about menstruation either by observing the behavior of elder male/female members or peers or school. But most of the time, it is the family culture, traditional beliefs and practices and norms of the society that affects their perception about menstruation. Their genuine questions about menstruation are often left unanswered by the senior members of the family because of the taboo, stigma and shame associated with the term. This then further results in a lot of misinformation and myths related to menses. (Siegel & Biener, 2004; House et al., 2012) Their behaviour towards their sisters, mothers or menstruating friends is deeply influenced and their behaviour is of silent treatment, embarrassment, and isolation for (Allen & Brooks, 2009).

The research on attitude, beliefs and perceptions of males towards menstruation throughout many countries and cultures have shown a common pattern- negative attitude towards menstruation. (Marván et al. 2006). The research also brings forth the do's and don'ts during menses is found to be strongly instilled in men than women of various countries (Cheng, Yang, and Liou 2007). This attitude has a far reaching impact on not the lives of these men but also on the lives of menstruators who would come into their lives as spouses, co-workers, seniors and friends. Therefore it is very important to come up with comprehensive solutions or action plans to positively influence the attitude, behaviour and perceptions of these young males. (Kirby, 2007). This plan will not only include educational institutions, but will also focus on creating and educating the parents to have clear, open and positive dialogues with children about the topic of menstruation. (Ballard & Gross, 2009).

Another important part of the research is on the knowledge and comfortability of males towards menstrual products and problems faced by menstruators. Many male members were not aware of the various products like pads, tampons, menstrual cups or cloth used during menstruation, nor were they aware about the pre menstrual syndrome or pain associated with bleeding. (Mane et al., 2024, Mason et al., 2017, Zablock & Fei, 2024)

The answer to the questions raised above lies in educating these young males about the process of menstruation by expert gynecologists, social workers, and school counselors. Parents need to be involved at this step to ensure that there is no shame, fear, embarrassment when the topic is discussed at home. (Blake et al., 2001; Rose and Dilley, 2010). Social media can play an important role in education and spreading awareness among teens and young adults so that they can dispel their doubts about menses. NGO's can also play their part by organizing workshops for parents to help their children (irrespective of genders) understand menstruation in the right manner. (Singh et al. 2020, Weiss and Ferraro, 2008).

Research Gap:

There is not enough research on how male students view menstruation in relation to matters of perception and unconscious biases or hidden assumptions about menstruation especially in the cultural context of Nagpur in India. Most research in this field concentrates on experiences, knowledge, and problems faced by people who menstruate and interventions for public health on a larger scale and ignores what young males perceive the same. However, the truth behind how young males understand about menstruation remains undetermined, if we consider such issues as portrayal of menstruation on digital media, access to information

regarding menstruation online or amongst themselves vis à vis their friends' influence alongside the society as well as their formal schooling experience. This creates a gap in knowing how young men can play a role in breaking the silence around menstruation and spreading awareness. Researchers understand how this gap is crucial for creating guidelines that advocate for compassion, reduce stigma and create a nurturing atmosphere for menstrual health and inclusive educational programs that involve not just girls.

The Significance of Research:

Understanding issues and opinions related to periods in the Nagpur region is specifically important. Nagpur is one of the biggest cities in Central India with a population of over 3 million (Census 2011). It is becoming a hub for education and attracts many students from nearby areas for higher studies. A large number of students from nearby districts and various regions of India come to Nagpur for education because of institutions like IIM Nagpur, AIMS, IIIT Nagpur, Maharashtra Law University, Symbiosis and Rastrasant Tukadoji Maharaj Nagpur University. This study deals with what young men in Nagpur have perception about menstruation, and findings may be useful not just for the city but also for larger regions because of the diverse population residing here for education.

It is important to focus on the lack of menstrual education among male students. Our study focused on how teaching, cultural beliefs and awareness programs can help change how young men think about menstruation. This study can help in building better understanding and acceptance about menstruation. The goal of the study is the better world where periods are not seen as something bad or shameful, but as a normal part of life. This study also wanted to help young boys to become more caring and respectful. So all students irrespective of their gender feel supported and included.

Research Question:

What are the perceptions, attitudes, and behaviors of male students aged 18 to 25 in higher education institutions in Nagpur towards menstruation, menstrual products, and the challenges faced by menstruators?

Aim:

To investigate the perceptions and attitudes of male students aged 18 to 25 in higher education institutions in Nagpur towards menstruation, menstrual products, and the challenges faced by menstruators, to inform the development of inclusive and comprehensive menstrual health education programs and policies.

Objectives:

1. To study male students' knowledge level about the menstrual cycle and menstrual products.
2. To know the male students' level of comfort in discussing menstruation with friends and family members.
3. To study the willingness of male students to support and participate in initiatives for improving menstrual health education and facilities.

Hypotheses:

The integration of menstrual health education, sustainable disposal practices, and gender-inclusive discussions into educational curriculum will significantly improve awareness, reduce stigma, and promote healthier practices among students and the broader community.

Research Methodology:**Research Design:**

This study employs a mixed-methods approach to gain a nuanced understanding of male students' knowledge and perceptions of menstruation in Nagpur, India. By combining quantitative and qualitative data collection methods, the research aims to capture both the breadth and depth of their attitudes, behaviors, and underlying influences.

Primary Data Collection:

An anonymous e-questionnaire was shared with male students between the ages of 18 and 25 who are studying in colleges and Nagpur university. The survey had both closed ended questions like Likert scale and multiple-choice questions as well as open ended ones. It was designed to understand the knowledge, attitudes, sources of information, and how comfortable male students feel talking about menstruation. The objective was to reach around 300 responses to get results that are accurate and meaningful. This helped in knowing how male students think and behave when it comes to menstruation and showed where educational programs or policy changes need to be addressed.

Data Analysis:

The quantitative survey data were analyzed using descriptive statistics to summarize the sample characteristics and inferential statistics to explore relationships and differences between variables such as knowledge, attitudes, and demographic factors. This mixed-methods approach provided a comprehensive understanding of male students' perceptions and attitudes towards menstruation, offering critical insights for enhancing menstrual health education and policies.

Reliability Analysis:

The reliability analysis yielded a Cronbach's Alpha coefficient of 0.625 (Using IBM SPSS Statistics 28.0.0.0) suggesting moderate internal consistency within the instrument used to measure perceptions and attitudes towards menstrual health education which allows for further data analysis.

Demographic Data:

The demographic data about familiarity of male students with the menstruations and associated issues helped in understanding their opinion and attitude towards the topic. The survey included male students between the ages of 18 and 25. Among all, 50% were of age 18 to 20, 44% respondents were between the ages from 21 to 23, and the rest 6% were of the age 24 to 25. The responses showed that they were unfamiliar and not comfortable talking openly about menstruation compared to older respondents. This suggests that male students are more comfortable talking about menstruation as they grow older.

- **Residence areas** also affected attitudes, with urban residents (62%) generally exhibiting greater familiarity and comfort discussing menstruation compared to those from suburban (21%) and rural areas (17%). This disparity highlights the influence of urbanization and access to information on menstrual health awareness and openness.
- **Family type** revealed that students from nuclear families (71% participated in the survey) were more likely to report higher levels of comfort and familiarity with the menstrual cycle compared to those from joint or extended families (29%). This may be attributed to the more private and intimate communication environment often found in nuclear family settings.

- **Level of study** also played a role with 67% are undergraduate, 25% are graduate and 7% are postgraduate students participating in the survey. The higher levels of study show greater knowledge and more progressive attitudes towards menstruation. They also showed higher support for menstrual health education initiatives, suggesting that advanced education contributes to better understanding and acceptance of menstruation-related issues.
- **Familiarity with the menstrual cycle** varied significantly among respondents where 4% students were completely not aware about menstruation and 7% were slightly aware about menstruation and 76% reported high familiarity, more supportive of discussing menstruation openly and participating in educational initiatives. Those with low familiarity (13%) often expressed discomfort and held more stigmatized views, emphasizing the need for comprehensive menstrual health education to bridge knowledge gaps and promote positive attitudes.

Overall, the demographic data and familiarity with the menstrual cycle highlighted the diverse factors influencing male students' perceptions and attitudes towards menstruation. These findings underscore the importance of tailored educational programs that consider age, residence, family background, and educational level to effectively address and improve menstrual health awareness and inclusivity.

Close Ended Questions:

The responses to the question 'Where did you receive most of your information about menstruation' were broad, and showed a comprehensive mix of digital, educational, personal, and social influences in which male students in Nagpur get their information about menstruation. 60% of respondents indicated they use internet and social media for making credible and valid information on menstrual health which is easily accessible. Peer influence is high, with 52% of the respondents saying friends as their major source of information depicting the role of informal social contacts. 48 % of respondents receive information from school education which shows the critical function of formal education systems, although gaps in school-based programs might well indicate a need for enhanced curricular interventions and was evident from open ended questions analyzed ahead. Whereas 34% considered that the information came from their parents and family members, which depicts the role that family dynamics play in explaining the menstrual process though the number is less. Traditional media sources, books, and articles still contributed to the information diffusion at 29%. Other sources in this group were peers/colleagues at 26% and "other" diverse sources at 10%, indicating varied but less common avenues. These findings highlight the need for a multi-channel approach in menstrual health education that mix the digital media, school curricula, family conversations, and peer activities to ensure appropriate coverage of knowledge gaps in ways that foster positive attitudes toward menstruation.

Regression Analysis:

A multiple regression analysis was conducted to examine the extent to which menstrual health education, sustainable disposal practices, and gender-inclusive discussions predict levels of menstrual health awareness, stigma reduction, and health practices among students.

The overall model predicting menstrual health awareness was significant, $F(3, 196) = 25.64$, $p < .001$, $R^2 = 0.281$, indicating that approximately 28.1% of the variance in awareness was explained by the predictors.

Regression Coefficients:

Regression Coefficients	Menstrual Health Education			Sustainable Disposal Practices			Gender-Inclusive Discussions		
	β	t(1.96)	p	β	t(1.96)	p	β	t(1.96)	p
For Menstrual Health Awareness	0.389	6.24	< .001	0.208	3.45	equal to 0.001	0.142	2.29	equal to 0.023
For Stigma Reduction	0.321	5.11	< .001	0.179	2.87	equal to 0.005	0.191	3.02	equal to 0.003
For Health Practices	0.415	7.02	< .001	0.233	4.01	< .001	0.126	2.06	equal to 0.041

Interpretation:

- Menstrual health education emerges to be the biggest factor which influences all the three aspects like awareness, reducing stigma and better health practices. This shows the importance of teaching people about menstrual health.
- It was also found that ecofriendly disposal of menstrual products made a big difference in all the three aspects, which shows the importance of including menstrual education practices.
- Open communication about menstruation also had a positive impact though smaller. This shows that having more inclusive environment can help to reduce stigma and encourages better health habits.

The findings support the hypothesis that comprehensive menstrual health education, along with sustainable disposal practices and gender-inclusive discussions, significantly improve menstrual health awareness, reduce stigma, and enhance health practices among students.

Perception and Awareness Statement Responses:

Perceptions and Awareness	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel knowledgeable about the menstrual cycle.	38%	38%	38%	38%	38%
Menstrual products are easily accessible in Nagpur.	58%	58%	58%	58%	58%
Menstruation should be openly discussed in educational institutions.	74%	74%	74%	74%	74%
I am aware of the challenges menstruators face regarding menstrual hygiene management.	44%	44%	44%	44%	44%
I am comfortable buying menstrual products for a female (friend/ classmate/ peer/ sibling) if needed.	79%	79%	79%	79%	79%
Menstruation is a topic I am comfortable discussing in public.	51%	51%	51%	51%	51%
I support initiatives aimed at improving menstrual health education and facilities.	78%	78%	78%	78%	78%

More should be done to educate male students about menstruation and menstrual health.	74%	74%	74%	74%	74%
I think including men in discussions about menstruation can help reduce stigma.	66%	66%	66%	66%	66%

A study on what males in Nagpur know about periods found that the majority of the respondents were ignorant. They felt that such information should be taught in schools to remove the stigma surrounding menstrual hygiene management. However, they were not willing to have open discussions regarding menstruation with people they know personally even though they were comfortable buying sanitary products. Only a small minor portion of respondents feel.

knowledgeable, highlighting an urgent need for targeted educational programs to bridge this knowledge gap and promote menstrual health awareness among male students.

The answers to the question "Would you support efforts to improve menstrual health education and facilities in your community?" show that young male from Nagpur are in support of such initiative and effort. Among all 60% students said that they "strongly support" these efforts, and another 31% said they "support" them. Among all total of 91% students are in favor of better menstrual health education and facilities. Only 7% students were neutral to the questions and a very small number of 2% students were against this initiative. These findings show that most of the young men from Nagpur are willing to support menstrual health educational programs, which encourages the introduction of such programs in the community.

The responses to the statement "I believe that the disposal of any used menstrual product is a big problem as it can be used for witchcraft" indicate a diverse range of beliefs among male students in Nagpur. A substantial 40% of respondents "strongly disagree" with the statement, suggesting that a significant portion of the cohort does not subscribe to the belief in witchcraft associated with menstrual products. Conversely, 19% "strongly agree" and 14% "agree," reflecting that a combined 33% of respondents hold some level of belief in this superstition. Additionally, 18% of respondents are "neutral," indicating ambivalence or a lack of strong opinion on the matter. Only 9% "disagree," showing a smaller proportion of students who oppose the belief without strong conviction. These findings underscore the persistence of traditional beliefs and taboos surrounding menstruation among a notable minority, while also highlighting a significant portion of the population that either rejects these superstitions or is undecided. This diversity in beliefs emphasizes the need for targeted educational efforts to address and dispel myths and superstitions about menstruation, thereby promoting a more rational and scientifically informed understanding of menstrual health and hygiene.

The responses to the question "How likely are you to educate yourself further about menstruation after this survey?" reveal a positive inclination towards self-education among male students in Nagpur. Specifically, 46% of respondents indicated they are "extremely likely" to seek additional information, while 34% reported they are "likely" to do so, collectively representing an encouraging 80% of participants. This suggests a strong willingness among the majority to engage in further learning about menstruation. Conversely, only 15% remained neutral, and a minimal 5% expressed reluctance ("unlikely" at 4% and "extremely unlikely" at 1%). These findings underscore the potential effectiveness of the survey in stimulating interest and a proactive attitude towards menstrual health education, highlighting the importance of such initiatives in promoting comprehensive understanding and reducing stigma.

Open Ended Questions:**Q.1. In your opinion, what can be done to improve the understanding and acceptance of menstruation among male students.**

Many respondents come out with useful suggestion to understand menstruation better, which can be divided into three categories as follows:

Education and Awareness Programs:

- **School Curriculum:** Many respondents are in favor that menstruation should be included in school curriculum and should be clearly explained. Teachings must include-what the menstrual cycle is, why it happens, and how to manage hygiene during periods.
- **Government Support:** Respondents felt that the government should run awareness campaigns and that schools should include menstruation education in their programs so that more people can learn and understand about it.
- **Teaching both boys and girls together:** They are in favor of menstrual education to boys along with girls so that they will understand it better and support their classmates, sisters and mothers.

Open Discussions and Normalizing the Topic:

- **Talking openly:** Students said that menstruation should be talked about more openly in classrooms and peer groups. Role models and male teachers should also be part of these communications so that everyone can talk about it openly and freely.
- **Removing stigma:** Students felt that continuous communication can help break the shame and silence around periods. People will be more comfortable discussing it, if menstruation is seen as normal like other talks.
- **Creating a safe environment:** Schools and colleges should ensure that students feel safe and supported while having discussions about menstruation, without being judged or laughed at.

Cultural and Social Awareness:

- **Building empathy:** Respondents believe that they should learn about the issues and problems girls face during menstruation. This will help boys become more caring and respectful.
- **Involving families and community:** Parents, teachers, and other respected people in the community also have open and free communication about menstruation... This can help change how society feels about menstruation.
- **Fighting wrong beliefs:** Students feel that wrong ideas should be corrected through awareness programs and education about shame or taboo related to periods that it is unclean and a sign of weakness.

These trends show that we need a multifaceted approach involving education, open communication, and cultural change to create a more understanding and accepting attitude towards menstruation among male students. By combining these strategies, we can create a more informed and supportive environment for everyone.

Q.2. Any additional comments or suggestions regarding menstrual health and education?**Enhancing Menstrual Health Education:**

Respondents feel that there is a lot of talk these days to include more detailed and comprehensive information about periods in school curriculum. This initiative is to make

talking about periods normally like other topics, get rid of any stigma, and create a supportive and inclusive environment. Teaching both the gender about the biology and social aspects of menstruation, schools can make everyone feel included and understandable.

Sustainable and Accessible Period Products:

Male students feel that people are really starting to focus on making period products easier to get hold of and better for the environment. Schools and institutions are taking initiative to provide free or cheaper sanitary pads, and telling students to dispose of them properly. In addition to this, students are informed to promote eco-friendly alternatives like menstrual cups, to reduce the problem of non-biodegradable waste.

Promoting Understanding and Gender Inclusivity:

Respondents feel that more encouragement, empathy and understanding should be there when it comes to menstrual health, no matter what the gender is. This means getting everyone involved in conversations about periods, like men and women, and making sure future dads are trained to support their daughters. It also means teaching everyone about the biology of periods, regardless of traditional gender roles. The aim is to break down barriers, reduce any stigma, and create a super supportive community for people who have periods.

It can be concluded from analysis of data that male students' knowledge of the menstruation and menstrual products, their comfort levels with peers and family discussing about it, and their willingness to support initiatives which improve menstrual health education and facilities. Survey data and Likert scale responses provided a comprehensive understanding of these aspects, highlighting areas for potential educational interventions and community engagement strategies to promote menstrual health awareness among male students. The findings by the researchers indicate that these trends can go a long way in enhancing the education on menstrual health, sustainability and inclusivity thereby encouraging a supportive society that is also knowledgeable and suggests some recommendations.

Recommendations:

This study looks at how teaching, cultural beliefs, and awareness programs can help change how boys think about menstruation. One key step is to include clear information about periods in school lessons on health and the human body. Another is to encourage open talks in schools and local communities, so people can speak freely and clear up wrong ideas.

Enhanced Curriculum Integration:

Colleges and schools should include detailed menstrual health education in their curriculum, covering the biological, emotional and social aspects of menstruation. Students should learn Why menstruation is important, how to maintain good hygiene, and how to challenge myth and taboos. Menstrual education should be inclusive and involve both boys and girls.

Government and Institutional Support:

Asanin et al. (2020) suggested that government awareness programs using different media platforms are important for making menstruation a normal topic and removing cultural taboos. In addition to this, policies should focus on providing free or low cost menstrual products in schools and colleges that can improve students' health, attendance, and overall well-being (APHA, 2023).

Parental and Community Involvement:

Knowledge sharing about menstruation should extend beyond the classrooms. Workshops and seminars can encourage open and honest communication between children and their parents, resulting in better understanding (Bailey et al., 2017). Increasing awareness in collaboration with influences and community leaders can also help (Asanin et al., 2020). Together these efforts can break cultural myths about menstruation and create a better environment for everyone (Manson et al., 2016).

Access to Menstrual Products:

It is important to address period poverty. School, colleges and public toilets should offer free or low cost sanitary napkins so they are easily accessible to the needy ((Asanin et al., 2020). Students should also be given proper knowledge to use and dispose of menstrual products properly as well as they should be given information about the usefulness of using organic and reusable menstrual products like menstrual cups and reusable pads. This information will equip them and help them to choose what is best for their health and the environment (APHA, 2023).

Continuous Professional Development:

Empowering teachers and healthcare workers is necessary to safeguard sustainable development. Regular training programs can help teachers sensitively teach students about menstruation among male and female students (UNESCO, 2017; Asanin et al., 2020). When doctors and health care workers join these sessions students can get better understanding of menstrual information. Also they can discuss their health issues with doctors. (Manson et al., 2016; Jayasinghe et al., 2019). Working together in this way help in building long-lasting foundation for breaking the stigma associated with menstruation.

Conclusion:

The paper presents the broader perspective into the factors that affect the performance of the athlete at competitive levels. It discusses games like cricket, football, badminton, tennis, marathon, cycling, sprints and jumps and sheds light on the different environmental factors that affect the performance of the athlete participating in these games. It can be said that, most of the times these environmental factors are beyond the control of the athlete or his team. Only thing they can do is prepare and train for such situation. They should be mentally prepared for changes in environmental factors and physically capable to eliminate any effect of such factors. Athlete could prepare for high/low temperatures, humid weather beforehand and have a proper hydration plan during game. They should know how to moderate breathing at high altitudes. Athletes should not lose focus over the noise from the crowd. They should rest well between the games. Make active efforts to keep their mind positive and body energized during and between their performances. Overall, they should consider the environmental factors that affect their personal game and prepare well in advance to tackle them.

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Review On – Chronic Kidney Disease, Malnutrition, Inflammation and Functional Capacity in Hemodialysis Patients with Malnutrition

Ayushi Dhakate: Assistant Professor and Co-ordinator International Institute of Sports & Management.

Maitreyee Telang: Student – Bachelor of Sports Science International Institute of Sports & Management.

Abstract:

CKD prevalence is high across the globe with a percentage of 10-13% affecting individuals across various age groups. Similarly, a high prevalence of CKD was observed in the Indian population which is about 17.2 % when studied across 12 cities. CKD is one important cause of mortality and has been shifted from 27th to 18th position as given by Global Burden Disease Study of CKD. A lot of data in the literature is not based on the Indian population and most of the CKD recommendations are extrapolated from the data studied on population other than Indian or Asian. The study of prevalence and data on CKD affected Indian population and related malnutrition, inflammation and functional capacity is scarce. CKD patients do experience reduced functional capacity and had lower skeletal muscle mass (Mean -23.8 ± 5.2) and thus correlated with a lower hand grip strength for males less than 22.5 kg, for females less than 14.5 kg. Study which would assess the malnutrition and inflammation status was carried out on 52 participants in Mumbai, the status of malnutrition was assessed with the help of MIS and SGA score which depicted mild to moderate malnourishment across all the 52 participants. Also, physical inactivity was shown to worsen the progression of CKD, the physical activity of the participants was more than 50% as assessed with the help of a questionnaire, but did not perform any strength training exercise which can be attributed to lower skeletal muscle mass and lower functional capacities. Serum biomarkers which included low level of serum albumin and abnormally high level of serum creatinine were indicative of PEW (Protein Energy Wasting) and considerable damage to the kidneys respectively. Participants also had lower hemoglobin and serum TIBC levels and about 77% of the participants had TIBC levels below the minimum value of 250 μ g/dL which is suggestive that CKD patients may have iron deficiency anemia, a common complication of CKD. 24-Hour Diet recall showed that the energy intake of the participants is less than the recommendation of 35kcal/day which is approximately 23-25kcal/day, also a lower protein intake was assessed which was approximately 0.69 g/kg BW/d from the recommendation of 1.2g-1.4g/kg BW/d as per the ESPEN guidelines. Overall quality of life of participants was above the average quality of life as assessed by the KDQOL scores, simple changes like including physical activity, increasing daily protein intake will improve their current level of fitness and quality of life.

Keywords: Functional capacities, Inflammation, Malnutrition, PEW (Protein-Energy Wasting), Physical activity.

Introduction:

CKD is defined as malfunction of the kidney as a whole organ or the tissue structure of the kidney leading to loss of function present for more than 3 months with adverse effects on overall health and quality of life.[Lv, et al. (2019).] For effective management and planning for CKD patients at the larger population level, it is important to understand the prevalence estimation of CKD. Prevalence of diseases like diabetes, hypertension, obesity is considered as important risk factors whose prevalence should be compared to the prevalence of CKD.

CKD patients on hemodialysis have a higher prevalence of protein energy malnutrition of upto 40% and more, along with which the mortality and morbidity parameters are higher for such patients. Higher oxidative stress may be the reason for inflammatory process, protein energy wasting in such patients. Malnutrition, inflammation and Protein Energy Wasting (PEW) are often concerned with higher mortality and morbidity rates and low quality of life

in patients with CKD and on hemodialysis. Nutritional intervention through oral supplementation may prove to be a beneficial and a cost-effective strategy to reverse certain parametric points of inflammation induced anorexia and also cardiovascular associated risk factors. [Kalantar-Zadeh, et al. (2005, September).]

PEW in CKD patients is majorly due to inadequate protein and nutrient intake. Loss of nutrients because of continuous hemodialysis, accumulation of uremic toxins due to inefficiency of blood filtration by the kidney, metabolic acidosis and or cardiovascular disease (CVD) are few causes which may cause PEW. Increased risk of PEW can be attributed to loss of other nutrients, amino acids, peptides, trace elements, glucose etc. Correct nutritional intervention strategies like increasing the protein and energy intake through food consumption or through oral nutrition supplementation may help alleviate PEW in CKD patients. [Ikizler, et al. (2013).]

A recommendation of dietary protein intake of 0.5-0.6g/kg body weight per day (Low protein diet) or a very low protein diet 0.28-0.43g/kg body weight per day along with supplementation with keto acid/amino acid analogs to meet protein requirement and also energy requirement of 25-35 kcal/kg per body weight per day is required to preserve the protein and energy stores in patients with stage 3-5 CKD not on dialysis.[Ikizler, et al. (2020).]

Patients on maintenance hemodialysis or peritoneal dialysis should consume 1.2g/kg of IBW per day as protein requirement and 30-35 kcal/kg of IBW per day of energy requirement with at least 50% of the protein should be High Biological Value Protein.[Ikizler, et al. (2013).] In addition to meeting the protein requirements, phosphorus intake should also be taken care of. Protein source consumed and other dietary recommendations should be low in phosphorus content.

The assessment of Malnutrition and Inflammation status is done using assessment tools which include scales like Subjective Global Assessment (SGA) [Kalantar-Zadeh, et al. (1999).], Malnutrition Inflammation Scale (MIS) [Kalantar-Zadeh, et al. (2001).]. Oral Nutrition Supplement can be recommended either by increasing protein intake via food consumption or by including protein supplements.[Kalantar-Zadeh, et al. (2011).]. Assessment post supplementation is important to understand the effect protein supplementation has had on the quality of life of the patients.

In India the risk of CKD is high with prevalence was observed about 17.2% and about 6% was for CKD stage 3 or higher stages. Where the individual prevalence rate from stage 1 to stage 5 were 7%, 4.3%, 4.3%, 0.8% and 0.8%, respectively.[Singh, et al. (2013).] Indian population suffering from CKD on dialysis needs to be managed using the Nutritional Intervention Therapy and a recommendation to increase physical activity to improve their quality of life. The data on level of malnutrition in CKD patients in India is scarce. The current study therefore, aims at evaluating the prevalence of malnutrition, inflammation and functional capacity using hand grip dynamometer after nutrition interventions comprising of Oral Nutrition Supplement (ONS) to meet the protein requirement of CKD patients on hemodialysis.

Review of Literature:

Prevalence of Chronic Kidney Disease (CKD):

CKD at the population level can increase demands for the health care services and also proportionally increases health care costs due to increase in the patient number, this is due to the decreased quality of life, decrease in life expectancy as the patient progression to ESRD increases. [Brück, et al. (2015).]

In a meta-analysis study, which included global prevalence of CKD across 44 countries and a total of 33 studies indicated that CKD was more prevalent by sex across the men and women of low to middle income countries. An estimation of CKD prevalence by sex was 10.4% in men and 11.8% in women. This consisted of 8.6% in men (7.3–9.8%) and 9.6%

in women (7.7–11.1%) in high-income countries, and 10.6% in men (9.4–13.1%) and 12.5% in women (11.8–14.0%) in low- and middle-income countries. [Mills, et al. (2015).]

In a period of 20 years, according to the 2010 Global Burden Disease Study CKD shifted from the 27th to the 18th position in the list of the causes of global deaths worldwide. [Mills, et al. (2015).]

The CKD prevalence is high worldwide (10%–13%) [Hallan, et al. (2016).]. Global Burden of Disease Study of 2013 found out that an increase of 17.1% was observed from 2005 to 2013 in the global disability-adjusted life-years caused by CKD. [Murray, et al. (2015).]

Overall prevalence of CKD in India as assessed across 12 cities was 17.2%, where Visakhapatnam, Andhra Pradesh had the highest prevalence of 46.8% and lowest prevalence was observed in Mysore (4.2%) and Bangalore (4%). The study also reported higher prevalence of CKD in males across all stages of CKD. [Singh, et al. (2013).] Prevalence of CKD across two cities Delhi and Chennai was reported as 7.5% where, prevalence of CKD Stage 1 and Stage 2 was 5.9% and Stages 3 to Stage 4 of 1.6%. [Murray, et al. (2015).]

Chronic Kidney Disease:

Kidney Disease: Improving Global Outcomes (KDIGO) defines Chronic Kidney Disease (CKD) as the malfunctioning of the kidney functions and thus leading to overall impact on health of an individual. The markers to assess CKD include albuminuria (albumin in urine), decreased Glomerular Filtration Rate (GFR) of less than 60ml/minute/1.73 m², abnormalities in the histology of the kidney tissues or nephrons (maybe with or without kidney damage) [Lv, et al. (2019).]

Progression of CKD is associated with effect on requirement and utilization of nutrients ingested due to imbalance in the normal kidney function. So, the nutritional requirements of these patients are completely different from that of the normal population due to loss of nutrients through dialysis in such patients. There are several risk factors associated with CKD which involve diabetes, hypertension, family history of kidney failure etc. Diagnosis of CKD includes checking levels of GFR, if they fall below 60ml/minute or there is presence of albumin in the urine (albuminuria) (>30mg/g) it indicates signs of kidney disease. [Ikizler, et al. (2013).]

KDIGO defines Acute Kidney Injury (AKI) and Acute Kidney Disease (AKD), CKD in the following manner-

AKI - Lasting for less than or equal to 7 days with an abrupt decrease in kidney function that is occurring over a period of hours to days. Criteria to determine includes increased Serum Creatinine(sCr) levels greater than or equal to 0.3mg/dL within 48 hours or increase in sCr to greater than or equal to 1.5 times the baseline value which is known to have occurred within the prior 7 days or the urine output volume is less than 0.5ml/kg/hour. [Inker, et al. (2014).]

AKD - Lasting anywhere between 7 days to 3 months in duration. Acute or sub-acute damage and/or loss of kidney function occurring for a duration of between 7 and 90 days after exposure to an AKI initiating event. [Inker, et al. (2014).]

CKD - Lasting for more than 3 months in duration. Abnormalities in kidney structure or function that persist for 90 days with or without decreased eGFR. Criteria to classify as CKD includes structural or functional abnormalities of the kidney, with or without decreased glomerular filtration rate (GFR) or GFR < 60 ml/min/1.73m² for 3 months with or without kidney damage. [Inker, et al. (2014).]

CKD stages are defined into 5 categories based on the Glomerular Filtration Rates. The classification is as given by KDIGO in the table [Inker, et al. (2014).] below

Table 1: 5 categories of CKD based on Glomerular Filtration Rates (GFR)

GFR Category	Definition	GFR ml/min/1.73 m ²
1	Kidney Damage with normal GFR	≥ 90
2	Kidney Damage with mild decrease in GFR	60-89
3A	Mild-to-moderate decrease in GFR	45-59
3B	Moderate-severe decrease in GFR	30-44
4	Severe decrease in GFR	15-29
5	End Stage Renal Disease (ESRD)	-

Oxidative stress induced apoptosis in kidney cells is a process responsible for major loss of functions in the tissues leading to CKD. Nuclear factor kappa B (NF- κ B) is an active transcription factor that is known to regulate genes involved in inflammation, immunity, apoptosis, cell proliferation and differentiation. NF- κ B is activated by ROS which is known to induce kidney disease progression and involved in signaling pathways which initiate renal fibrosis. Oxidative stress biomarkers have a positive correlation with increasing stages of CKD.[Small, et al. (2012).]

Acute Kidney Injury (AKI) affected patients often progress to CKD or End Stage Renal Disease (ESRD). Tubular Epithelial cells injury or damage is responsible for directly contributing to the inflammation of interstitial cells and fibrosis through various different mechanisms mediated by the immune system. So, it's important to protect renal tubules from repeated injury and to make sure that the renal tubular functions are healthily restored as a line of treatment for kidney disease. [Liu, et al. (2018).]

Pathophysiology of CKD patients has been attributed to multiple etiological factors which interact in the uraemic milieu. These factors include i) cellular factors like oxidative stress ii) exogenous factor such as dialysis membranes iii) microbial factors like gut dysbiosis, immune dysfunction iv) tissue factors like sodium overload, hypoxia and v) retention of uraemic toxins like indoxyl sulphate, advanced glycation end products and calciprotein particles. All the above factors seem to reduce the glomerular filtration rates and also interact with the several complications present in these patients. Uraemic retention of solutes is greatly affected by middle molecules which are small proteins or peptides which can cross the glomerular filtration barrier under normal conditions weighing less than 58kDa but most middle molecules have weight more than 10kDa. Some of the few middle molecules which are considered as uraemic toxins include cytokines, β 2-microglobulin, ghrelin and parathyroid hormone etc. These toxins are associated with poor outcomes in CKD patients due to poor metabolic and renal clearance rates which is not compensated by current dialysis procedures. Plausible treatment strategies include reducing the levels by reducing the production of inflammatory molecules using anti-inflammatory drugs or by following a healthy lifestyle accompanied with balanced diet and avoiding smoking completely. It also includes increasing the clearance of such inflammatory middle molecules by using expanded hemodialysis. increasing the dialytic removal of higher molecular weight molecules or clearance of bigger molecules with the use of membranes with larger pore. [Liu, et al. (2018).]

CKD is one of the major health burdens from 1990's, also called a "silent epidemic" affecting about roughly 10-15% of the population. It also suggests that chronic inflammation of low grade is a pathophysiological part of CKD and inflammation due to factors like dysregulation of gut microbiota or alteration of intestinal barrier can negatively impact on progression of CKD and uraemia phenotype complications.[Mihai, et al. (2018).] Adjacent to the traditional risk factor for CKD being cardiovascular risk factors there are non-traditional

risk factors which include inflammation, malnutrition and oxidative stress which may promote atherosclerosis in ESRD patients. Among the many causes of persistent systemic inflammation in ESRD patients it includes decreased renal clearance, increased synthesis of cytokines that lead to hypercytokinemia. Kidney plays an important role in metabolizing advanced glycosylation end- products (AGEs), increased levels of unmetabolized AGEs in ESRD may also contribute to activate mononuclear cells and stimulate a chronic inflammatory response. Interestingly, Yao et al., also suggested that different genotypes in different populations show different inflammatory responses and overall inflammatory status and will have varied response to treatment to dialysis therapy however there is no clinical evidence for the same.[Yao, et al. (2004).]

Medical Nutrition Therapy in CKD patients:

Medical Nutrition Therapy involves an integrated approach of managing primarily the protein and energy requirement to avoid PEW, Malnutrition and Inflammation in CKD patients. Also, other elements or micronutrients needs to be managed to slow the disease progression to ESRD. However only dietary strategies might turn ineffective or fully potent so nutritional management therapies might prove beneficial in reducing the intensity of the disease or slow the progression.[Kalantar-Zadeh, et al. (2018).]

- **Energy Requirement**

Individual caloric needs are ideally assessed by indirect calorimetric technique, which measures the Resting Energy Expenditure (REE) in a non-invasive manner. Indirect calorimetric technique is considered as a gold standard to assess REE in comparison to the formula-based equations to measure REE which either overestimate or underestimate the energy requirement. Energy recommendations are 35 kcal/kg BW/day. However, individual requirements may differ in acute conditions.[Cano, et al. (2006).]

- **Protein Requirement**

Regulating protein content can reduce the intraglomerular pressure on the kidney as well as reduce the urea generated. So, regulating protein intake for CKD patient can be an effective strategy to improve the quality of life and slow the progression to End Stage Renal Disease (ESRD) The recommendation for protein for patients on HD is 1.2–1.4g/kg BW/day (>50% HBV). [Cano, et al. (2006).] Protein requirement is given in Recommendation No 18 of the ESPEN guidelines which is as given below for different conditions, and may be prescribed as follows [Fiaccadori, et al. (2021).]

1. Hospitalized patient with CKD without acute/critical illness: 0.6-0.8 g/kg BW/d
2. Hospitalized patient with CKD and KF on conventional intermittent chronic KRT without acute/critical illness: 1.2 g/kg BW/d
3. Hospitalized patient with AKI, AKI on CKD without acute/ critical illness: 0.8-1.0 g/kg BW/d
4. Hospitalized patients with AKI, AKI on CKD, CKD, with acute/critical illness, not on KRT: start with 1 g/kg BW/day, and gradually increase up to 1.3 g/kg BW/d if tolerated.
5. Critically ill patients with AKI or AKI on CKD or CKD with KF on conventional intermittent KRT: 1.3-1.5 g/kg/d.
6. Critically ill patients with AKI or AKI on CKD or CKD with KF on CKRT (Continuous kidney replacement therapy) or PIKRT (Prolonged intermittent kidney replacement therapies):
1.5 g/kg/d up to 1.7 g/kg/d.

- **Sodium and Fluid Intake:**

Sodium intake needs to be monitored as it leads to water retention in CKD patients which might result in increased blood pressure and increase the risk of CVD in CKD patients. Reduced Sodium Intake helps reduce the intraglomerular pressure which in turn reduces the risk of proteinuria in CKD patients and also slow the progression of the disease. The intake should be less than 3g/day for patients at any stage of CKD. [Kalantar-Zadeh, et al. (2018).] Another recommendation for sodium is 1.8-2.5 g/d given by the ESPEN Guidelines for Enteral Nutrition for patients on hemodialysis. [Cano, et al. (2006).] Fluid recommendations are to be kept below 1.5 liters a day [Cano, et al. (2006).] or Fluid intake is 1000ml + urine volume. [Cano, 2006]

- **Potassium**

Higher potassium intake or CKD patients with increased potassium content in the blood (Hyperkalemia) maybe associated with an increased risk of disease progression to end stage. So, regulating potassium intake as per the progression of the disease is crucial. A patient having higher tendency for hyperkalemia is recommended 3g/day with high fiber intake, where the consumption can go upto 4.7g/day for patients with mild to moderate CKD. [Kalantar-Zadeh, et al. (2018).] Potassium is 2000-2500mg/g as recommended by ESPEN. [Cano, et al. (2006).]

- **Phosphorus**

Hyperphosphatemia is often associated with increased consumption of food containing phosphorus which include consumption of meat-based products, processed food with high phosphorus to protein ratio. So, for CKD patients increased phosphorus content may be directly correlated with worsening disease conditions. Thus, regulating the intake is crucial for these patients which involves a recommendation if 800mg/day, phosphate binders can be added if essentially required to reduce the phosphorus uptake. Similarly, recommendations for Phosphate are 800-1000 mg/day is given by ESPEN guidelines on enteral nutrition. [Cano, et al. (2006).]

Nutritional and Functional Capacity Assessment in CKD patients:

- **SGA**

The first and the conventional SGA is semi quantitative in nature and includes five features of patient history which includes weight loss in the previous 6 months, dietary intake, presence of gastrointestinal symptoms, assessment of functional capacities and history concerns of the metabolic demands of the patients. The physical assessment consists of measuring loss of subcutaneous fat over the triceps, mid-axillary line of the lateral chest wall, presence of ankle oedema and or ascites, muscle wasting in the deltoids and the quadriceps.

Taking reference from the conventional SGA a new modified SGA (mSGA) was used to assess malnutrition in dialysis patients. [Detsky, et al. (1987).]

Mortality increment assessment due to malnutrition being the primary predictor in dialysis patients is assessed using the SGA scale having three severity levels. The SGA score consists of 7 different variables which are used to assess the malnutrition status which includes weight change, gastrointestinal symptoms, dietary intake, comorbidity, subcutaneous fat and signs of muscle wasting. Each variable has a score from 1(normal) to 5(severe). The malnutrition scores range anywhere between 7 (normal) to 35 (severely malnourished). Lower score signifies less severity of malnutrition and higher score denotes more severity of malnutrition leading to protein-energy wasting in such patients. Nutritional status check and dietary intervention is an important aspect to manage CKD patients' health deterioration due to malnutrition. The SGA assessment is divided into Patient's history and Physical assessment. The Patient's history includes co-morbidities, gastrointestinal symptoms like anorexia, nausea, vomiting, diarrhea, dietary food intake, functional capacities and weight loss in the preceding

6 months. The Physical Assessment includes loss of subcutaneous fat over the triceps, mid-axillary line of the lateral chest wall, presence of ankle oedema and or ascites, muscle wasting in the deltoids and the quadriceps. The above features are categorized as normal, mild, moderate and severe with the marking given as 0,1,2,3 respectively. The data from the above scores is weighted and categorizes the patient into three categories A- Well Nourished. B- Moderate Malnutrition and C- Severe malnutrition. The mSGA score correlated with the results of anthropometric measurements and lab assessment of the biochemical parameters and nutritional assessment of the patients. [Kalantar-Zadeh, et al. (1999).]

- **MIS**

The 7 component mSGA system was used to devise a more comprehensive and accurate scale for the assessment of malnutrition in the CKD patients on Maintenance Hemodialysis. (MHD). So, the Malnutrition Inflammation scale (MIS) was devised which consisted of 10 components scored on four severity levels ranging from 0(normal) to 3(severely abnormal). The addition of all the 10 MIS components ranged between 0 to 30 denoting the range from normal to severely malnourished. Higher scores depicting severe malnutrition and inflammation levels in the CKD patients. Body mass index (BMI), serum albumin level, and total iron-binding capacity (TIBC) are the three components which are added extra along with the 5 components from the conventional SGA. The MIS is divided into four sections: nutritional history, physical examination, BMI, and laboratory values comprising a total of 10 components. The nutritional history is devised from the conventional SGA consisting of 5 components: weight loss in the previous 6 months, dietary intake, presence of gastrointestinal symptoms, assessment of functional capacities and history concerns of the metabolic demands of the patients. The physical examination section consists of two components. Body fat stores are scored by assessing subcutaneous fat deposition in four body areas, i.e., below the eyes, triceps and biceps areas, and chest and signs of muscle wasting. Body weight parameter of BMI (Body Mass Index) is also added to this MIS score. The laboratory values include Serum albumin where hypoalbuminemia is indicative of the response to inflammation or low protein intake. Serum TIBC levels correlate with the nutritional state of the dialysis patient. The two laboratory values contribute a total of 20% to the total MIS score. Upon analysis of MIS score in correlation with the other two scales the SGA and mSGA on different parameters, MIS score, mSGA and SGA was not significantly different for both the genders. Amongst the three MIS was the strongest in predicting prospective hospitalization in patients, mid-arm measurements, lean body mass, BMI and laboratory values. Serum creatinine level, hematocrit value, Serum CRP strongly correlated with the MIS scores but not with SGA or mSGA scores. MIS showed the strongest association with prospective mortality. The relative risk for death for each 10-unit increase in MIS was 10.43 ($p=0.002$). MIS is a reliable assessment method to assess the nutritional and inflammatory status of MHD patients. [Kalantar-Zadeh, et al. (2001).]

- **Hand Grip Strength**

Muscular strength and endurance can be safely assessed using isokinetic dynamometers employing angular velocities ranging from 60 degrees to 180 degrees/s is recommended as per the ACSM Guidelines 9th Edition.[American College of Sports Medicine (Ed.). (2013).] KDOQI Clinical Practice Guideline for Nutrition in CKD recommends the Hand Grip Strength (HGS) which may be used to assess muscle function in patients with CKD. It may also be used to assess the protein-energy status and the functional status in CKD patients any stage from Stage 1 to Stage 5. HGS can be applied to MHD, PD and CKD patients not on hemodialysis as a measure of nutritional status where measurement should be obtained on the opposite side of the vascular access. However, it demands more research in terms of the time at which the measurement should be taken either before or after hemodialysis. There should be standard measures with which the values for CKD patients can

be correlated in order to assess their physical function status. The reliability and validity of the instrument also should be tested with respect to a gold standard.

- **KDQOL-S**

Kidney Disease Quality of Life (KDQOL) Instrument (dialysis version) is a self-reported measure to assess the quality of life in patients who are on dialysis. KDQOL consists of Health-related concerns, symptoms/problems which includes 12 items, kidney disease effect on daily life consisting of 8 items, burden of kidney disease consisting of 4 items, work status related questions consisting of 2 items, cognitive function and quality of social interaction involving 3 items each, sexual function including 2 items and sleep involving 4 items. Additional 3 quality of life scales are also involved which include social support, Dialysis staff encouragement and patient satisfaction each involving 2 items, 2 items, 1 item respectively. The generic core of this form consists of Short Form 36 (RAND 36 item health survey or SF-36). [Hays, et al. (1997).] SF-36 covers 8 different concepts which include bodily pain, general health, physical functioning, vitality, emotional role, social functioning, mental health, physical role. Each item is scored between 0 to 100, so that 0 represents the lowest score and 100 represents the highest score.

[Hays, et al. (1993).] The SF-36 is divided into two dimensions which include Physical health and Mental health, also involves one question which is not scored it includes reported health measure in the past year. A study conducted on 65 patients undergoing MHD for 3 months at least and over the age of 18 years observed that SF-36 had high correlation with serum albumin and hemoglobin and a very strong positive association with hospitalization and mortality in MHD patients. It also showed strong correlation between SF-36 scores with BMI and fat percentage of patients which indicated that more obese individuals report lower scores hence representing lower Quality of Life. [Kalantar-Zadeh, et al. (2001).]

- **Anthropometric Assessment**

A comprehensive nutrition assessment includes appetite levels of the patients, dietary recall, body mass index, biochemical data and anthropometric measurements in CKD patients.

Bioelectrical impedance analysis using multiple frequencies is recommended for patients on hemodialysis to assess the body composition i.e., Body fat percentage and fat free mass. The reading should be taken 30 minutes post the dialysis session so as to allow the redistribution of fluids. Frequency of Body Weight/BMI and Body Composition Assessment should be monthly for maintenance hemodialysis patients. [Ikizler, et al. (2020).]

Protein Energy Wasting in CKD patients:

Protein-energy wasting (PEW) is defined as the state of decreased body stores of protein and energy fuels (that is, body protein and fat masses). Cachexia is also defined as a severe form of PEW associated with physiological, metabolic, psychological, and immunological disorders.

PEW is a milder complication of protein-energy stores depletion in comparison to Cachexia. Other synonyms used to describe PEW in CKD patients include uremic malnutrition, protein-energy malnutrition, malnutrition-inflammation atherosclerosis syndrome, and Malnutrition-inflammation complex syndrome (MICS). [Fouque, et al. (2008).] Candidates with a high rate of hospitalization or mortality are concurrently suffering from malnutrition and PEW. These two conditions tend to co-exist leading to poor clinical outcome in CKD patients therefore the term Malnutrition-Inflammation Complex Syndrome (MICS) is used to indicate the combination in CKD patients. [Detsky, et al. (1987).]

The International Society of Renal Nutrition and Metabolism (ISRNM) recommends that a BMI less than 23 kg m² is a marker of PEW. Muscle wasting: reduced muscle mass 5% over 3 months or 10% over 6 months is also indicative of PEW. Reduced muscle mass

appears to be the most valid criterion for the presence of PEW. As BMI is influenced majorly by body fat, they considered using body fat percentage as a criterion of weight as an indicator of PEW. Unintentional weight loss over time: 5% over 3 months or 10% over 6 months and total body fat percentage below 10% is representative of PEW. Serum albumin (< 3.8 g per 100 ml), Serum prealbumin (<30mg per 100 ml) and Serum cholesterol (<100mg per 100 ml) is also used as a nutritional indicator of PEW. An unintentional reduction in dietary protein intake less than about 0.80 g per kg body weight per day in maintenance dialysis patients and dietary energy intake less than about 25 kcal per kg body weight can be associated with PEW. [Fouque, et al. (2008).]

Inflammation is considered secondary to malnutrition in CKD patients which may be rectified by improving nutritional status in CKD patients. Dietary interventions may help mitigate chronic inflammation which includes tube feeding method, Parenteral interventions includes intradialytic parenteral nutrition (IDPN) which is quite costly and cumbersome and can only be used during dialysis treatment and not otherwise. The cost, complexity have not allowed such methods to be used as dietary intervention protocols on a larger scale. Oral interventions, hormonal interventions, anti-oxidants, appetite stimulators are all methods which may show promising results in CKD patients. As Malnutrition is a multifactorial outcome of several factors a single intervention therapy may not be the absolute solution rather combined nutritional treatment strategies with various micronutrient components having antioxidant and anti-inflammatory, hormonal balancing abilities should be tested.[Kalantar-Zadeh, et al. (2005, September).] The above statement is also supported by a review that states that inflammation is a product of multiple factors and requires a number of interventions that target various sources of inflammation in CKD which include lifestyle modifications, reducing pro-inflammatory cytokines, pharmacological therapies, and optimizing the dialysis process.[Yao, et al. (2004).] IL-6 is reported over the years to play a central role in the pathophysiological process causing adverse effects of inflammation in CKD patients. This proinflammatory cytokines may be missing during high oxidative stress when the patient is suffering from Protein Energy Malnutrition (PEM). [Pecoits-Filho, et al. (2002).] [Bologa, et al. (1998).] [Stenvinkel, et al. (2002).]

PEW, malnutrition and inflammation are a manifestation of various causes which includes loss of nutrient during dialysis through the dialyzer membrane, decreased appetite, metabolic acidosis, increased levels of inflammatory cytokines (IL-6), increased oxidative stress, presence of comorbid conditions like that of CVD, aging, diabetes, infection. Combined consequence of PEW, Malnutrition, Inflammation along with increased catabolic effect results in signs like reduced albumin, transerythritin, lipids, weight, BMI, body fat percentage, severe muscle wasting. It also impacts the Quality of Life with a possibility of increased mortality and hospitalization rates, CRP levels (c-reactive protein) which is a marker of inflammatory status. Also, physical activity levels deteriorate due to increased muscle wasting and inadequate protein and energy intakes.

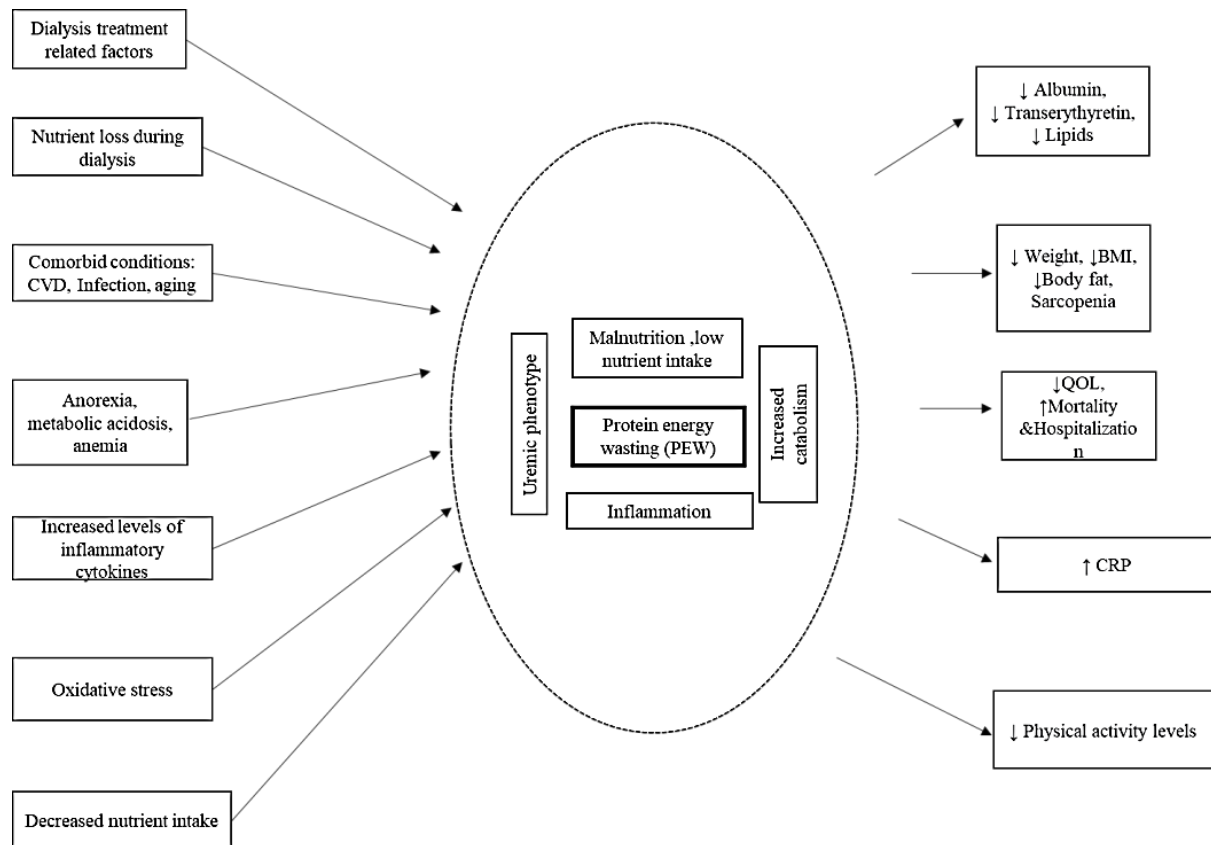


Figure 1: Schematic representation of the causes and manifestations of the protein–energy wasting syndrome in kidney disease. [Fouque, et al. (2008).]

Protein Supplementation in CKD patients:

In CKD patients an integrative multifactorial approach is recommended in order to reduce the protein catabolism which occurs due to metabolic acidosis, inflammation leading to loss of protein and nutrients through the process of dialysis. So, to tackle the problem of PEW in CKD patient's appropriate supplementation of energy and protein is required in order to maintain the muscle mass, muscle strength, avoid muscle wasting, improve quality of life and maintain physical activity in these patients. It can be achieved by nutritional counselling or supplementing with Oral Nutrition Supplementation (ONS) where it may also include supplementing with antioxidants, appetite stimulants, anabolizing hormones or anti-inflammatory drugs. Where supplementation with ONS is shown to increase Serum albumin, prealbumin, transferrin, increase in body weight and LBM [Ikizler, et al. (2013).]

Ikizler TA [Ikizler, et al. (2013).] published in Advances in CKD recommends Oral supplementation includes consumption for two to three times a day, preferably 1 hour after main meals and/or during dialysis for maintenance HD patients. It can also provide extra 7–10 kcal/kg of energy and 0.3–0.4 g/kg of protein per day. It requires a minimum dietary intake of 20 kcal/kg energy and 0.4–0.8 g/kg protein per day in order to meet the dietary energy and protein recommended targets. Ikizler TA [Ikizler, et al. (2013).] also suggests in his review that oral supplementation implementation needs an integrated approach to avoid PEW in CKD patients as stated in the review by Ikizler TA. [Ikizler, et al. (2013).]

High protein intake is associated with increased glomerular filtration rate which leads to something called 'glomerular hyperfiltration' which increases urine albumin concentration and affects the kidney and other organs as well. It also suggests that LPD reduces the amount of protein and albumin excreted in the urine in the patients suffering from CKD. LPD reduces the workload on kidney's by lowering the intraglomerular pressure where the kidney function is affected in CKD patients, it also may reduce the uraemic symptoms and may delay the need of dialysis therapy. However, protein intake in Maintenance Hemodialysis patients

recommend a higher intake of protein which is about 1.2-1.4 g/kg BW/day as per the guidelines, dialysis alone is enough to take care of the metabolic derailments in these patients but high protein is required to avoid PEW due to the extra losses of protein and micronutrients in the dialysis treatment. [Ko, et al. (2017).]

Reducing DPI has been advocated to alleviate these effects and can result in control of hyperparathyroidism, acidosis, hyperphosphatemia and hyperkalemia, reduction in proteinuria, and slower loss of kidney function. It also suggests that Low protein intake may mitigate uremic symptoms and allow conservative management of advanced CKD without the need to transition to dialysis.[Chauveau, et al. (2007).]

A meta-analytical study including 16 RCT's were included which compared LPD (Low Protein Diet) to high protein diet, LPD to VLPD (Very Low Protein Diet) and certain other comparisons which had at least 30 participants for the study. Pooled data of LPD versus High protein diet demonstrated that risk of progression to ESRD is lower in patients following LPD and also risk of all cause death was lower in patients receiving a LPD, where LPD is defined as protein intake of less than 0.8 mg/kg/day. At the same time the studies reported higher serum bicarbonate levels and lower phosphorus levels. The pooled result of VLPD (<0.4 mg/kg/day) versus LPD (0.4-0.8 mg/kg/day) showed that progression to ESRD is lower and the GFR rate for one year is higher in VLPD. The trend also displayed a lower serum urea level and lower decline rate of GFR but the result was not of higher significance. [Rhee, et al. (2018).]

Malnutrition and Inflammation in CKD patients:

Malnutrition signifies under nutrition, protein energy wasting, micronutrient deficiency leading to metabolic derailment in CKD patients. Malnutrition in CKD patients is not only due to decreased intake but is attributed to a variety of other reasons which include hormonal imbalances, decreased appetite and food intake, inflammation, increased catabolism, nutrient losses in dialysate and metabolic derangements predispose chronic kidney disease patients to malnutrition. Correction of metabolic acidosis, hyperparathyroidism, insulin resistance, upregulation of the renin angiotensin aldosterone system and dyslipidemia by providing adequate dialysis strategy and also medical therapies is important in management of malnutrition in CKD patients. Skeletal muscles are the dominant site of insulin resistance in CKD patients leading to increased protein catabolism and muscle wasting. However, supplementation of protein and calories alone cannot alleviate the problems caused by malnutrition, more targeted multifactorial approaches are needed to tackle malnutrition in CKD patients.[orember, et al. (2018).]

A prospective cross-sectional observational study that was conducted at 2 dialysis units in Cairo, Egypt and involved 100 patients above 18 years of age, were assessed for nutritional status using the modified mSGA (Modified Subjective Global Assessment) score. Biological and hematological characters were assessed prior to dialysis at the start of the study which included the parameters Hemoglobin, C-reactive protein, Urea, Creatinine, Albumin, Triglyceride, HDL (High Density Lipoprotein) and LDL (Low Density Lipoprotein). The study demonstrated that the primary cause for End Stage Renal Disease (ESRD) was hypertension and diabetes with the percentage distribution of 45% and 34% respectively. The mSGA score was positively correlated to the age of the patient, the duration of hemodialysis and C- Reactive Protein but at the same time negatively correlated to albumin content. The percentage prevalence of malnutrition as assessed by mSGA was 67% where 50% were mildly-moderately malnourished or severely malnourished 17%. The difference in prevalence rates in different areas of Egypt was due to lower educational level, socioeconomic state, health care facilities, diet prescriptions and environmental diversity. There was also increased CRP levels which is an important inflammatory marker with a proportional increase in the severity of the malnutrition status.[Zaki, et al. (2019).]

Inflammation is often a protective response to various external or internal harmful stimuli, but such persistent systemic inflammation is a major factor involved for CKD patients. Inflammation in such patients becomes uncontrolled, persistent and contributes to uraemic phenotype like protein energy wasting (PEW), cardiovascular diseases, osteoporosis etc. and a strong predictor of poor outcome in dialysis patients. CKD patients are experiencing poor quality of life as well as they are highly exposed to co-morbidity, a very high mortality mainly due to succumbing to premature CVD.[Liu, et al. (2018).] If inflammation becomes prolonged and persistent, it may lead to adverse consequences such as decline in appetite, muscle and fat wasting, hyper catabolism, endothelial damage, atherosclerosis and increased rate of protein depletion in skeletal muscle and other tissues.[Kalantar-Zadeh, et al. (2003).]

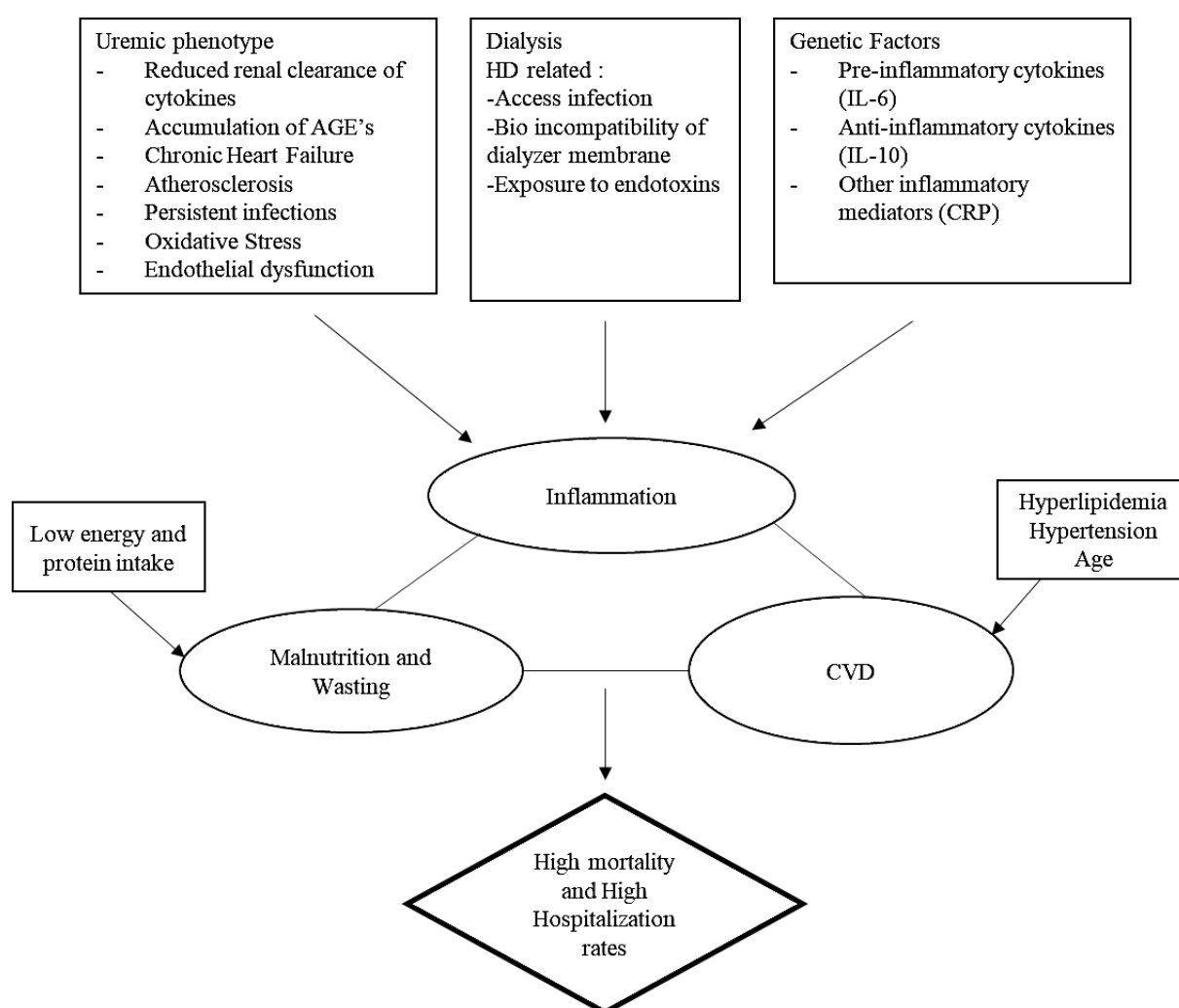


Figure 2: Factors contributing to systemic inflammation and its consequences in dialysis patients (Adapted from Yao et al [Yao, et al. (2004).])

Inflammation in CKD patients is attributed to three broad factors which includes uremic phenotype, dialysis related concerns and genetic factors. Uremic phenotype is an outcome of various sub factors which include reduced renal clearance for cytokines and nutrients, accumulation of advanced glycosylation end products (AGE's), increased oxidative stress etc. Dialysis related factors include exposure to endotoxins produced by bacteria which can cross the dialyzer membrane and enter the blood stream of patients. Back filtration and back diffusion are of concern in patients undergoing hemodialysis. All this leads to increased inflammation in CKD patients and genetic factors which lead to increased cytokine production (hypercytokinemia) which ultimately may or may not result in high mortality,

increased hospitalization in the CKD patients. However, differences across genotype have differential inflammatory status and its effects on the which can affect the dialysis therapy although there is not enough clinical evidence for the same. (Figure 2)

Guidelines for Protein Supplementation in CKD patients:

HD is associated with malnutrition or undernutrition is due to the loss of nutrients through the process of dialysis and also leads to protein catabolism leading to negative nitrogen balance in patients on dialysis days. Even water-soluble Vitamins are lost like Vitamin C, Vitamin D, Folic Acid due to hemodialysis. [Cano, et al. (2006).]

Table 2: Ranges of dietary protein intake [Kistler ., et al 2021]

Dietary protein intake range	Amount of daily protein intake, g/kg/day	Comments
Protein free diet	<0.25	Generally, not recommended for any person including CKD patients
Very low protein diet (VLPD)	0.25- 0.55	Usually supplemented with essential amino acids or their keto acids or hydroxy-acids. KDOQI CPG recommends 0.28 to 0.43 g/kg/day with additional keto acid/amino acid analogues to meet protein requirements (0.55 to 0.60 g/kg body weight/day) for metabolically stable CKD patients without diabetes.
Low protein diet (LPD) or Non-diabetic CKD †	0.55-0.6	Recommended by KDOQI CPG for CKD patients without diabetes.
Diabetic CKD †	0.6-0.8	More consistently recommended for advanced CKD (eGFR,45 ml/min/1.73m ² or substantial proteinuria), usually no supplementation is needed as long as the regimen contains at least 50% high biological value proteins. This range is recommended by KDOQI CPG for CKD patients with diabetes.
Moderately low protein diet	0.8-1.0	Recommended range for adults without CKD but at high risk of CKD including those with a solitary kidney (following nephrectomy), diabetes mellitus, hypertension, and polycystic kidneys.
Moderate protein diet	1.0-1.2	Recommended for patients on maintenance hemodialysis or peritoneal dialysis in metabolically stable condition
Moderately high protein diet	1.2-1.5	Reported protein intake of the average United States adult without CKD.

High to very high protein diet	>1.5	Can be used over a limited period of time for acute conditions such as hypercatabolic AKI, high-grade burns, and PEW.
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AKI, acute kidney injury; CKD, chronic kidney disease; CPG, clinical practice guideline; DKD, diabetic kidney disease; DPI, dietary protein intake; eGFR, estimated glomerular filtration rate; HD, hemodialysis; KDOQI, Kidney Disease Outcomes Quality Initiative; PD, peritoneal dialysis; PEW, protein-energy wasting. Adapted from Supplementary-Appendix Table S3 by Kalantar-Zadeh and Fouque. *KDOQI CPG in Kidney Disease 2020 states it may be reasonable for a Registered Dietitian or Physician to use clinical judgement in determining the method to assess body weight. †Recommended by the KDOQI Clinical Practice Guidelines in Kidney Disease.

This review focuses majorly on the dietary interventions as well as the effects of enteral supplementation in improving outcomes in CKD patients. Oral nutrition supplement given to patients in many studies indicated that there was increase in serum albumin and serum pre-albumin concentrations, these two are important predictor of mortality in CKD patients. The points given below give an overview of the steps that can be followed for providing enteral nutrition support to the patients with CKD [Kalantar-Zadeh, et al. (2011).]

- 1) Nutritional assessment and dietary counselling of patients – This includes recording Weight of the patient, Laboratory values (Albumin, Pre-albumin), Muscle mass, nutritional assessment scores (SGA, MIS), appetite and diet (DEI, DPI, potassium, sodium, fluid intake, vitamins and other micronutrients.
- 2) The reasons for nutritional interventions include- Poor appetite, poor oral intake, unintentional weight loss, sarcopenia, Albumin levels less than 40g/L or prealbumin less than 300mg/L. MIS score of less than 5, SGA score analysis in the malnourished range. Dietary Protein Intake (DPI) is less than 1g/kg BW/day in CKD stage 5 and less than 0.5/kg BW/day for CKD stages between 1 to 4.
- 3) CKD specific oral nutrition supplementation includes 1-2 servings per day. Where, for CKD stages 1-4 and Renal Transplant Recipients (RTR) the Daily protein intake (DPI) target is approximately 0.6 g/kg BW/day (may include amino acids and or ketoanalogues) and for CKD Stage 5, target for protein intake is >1.2g/kg BW/day using ONS at home and in-center meals or ONS during the dialysis treatments.
- 4) Monthly assessment is required which includes monitoring nutritional status for changes in appetite, food intake, weight status, serum albumin and pre-albumin concentrations, MIS and SGA scores.
- 5) If there is improvement noted after the monthly nutritional assessment then, maintenance oral therapy is recommended which is when the Serum albumin levels reach 40g/L, in center meals and ONS are continued with the DPI of >1.2 g/kg BW for CKD Stage 5 and for CKD Stages 1-4 it is 0.6g/kg BW and the Daily Energy Intake (DEI) is maintained at 30-35kcal/kg per day. (Liquid oral supplements are considered with pill intake)
- 6) Additional pharmacological therapies include Appetite stimulators, Anti-depressants, Anti-inflammatory and/or antioxidative, Anabolic and/or muscle enhancing, Dialysis treatment alterations.
- 7) If there is no improvement seen in the monthly assessment results it recommends increasing the quantity of ONS, start tube feeding, parenteral interventions (Intradialytic Parenteral Nutrition (IDPN)) especially if enteral feeding is not possible.

In malnourished non-critically ill hospitalized patients with AKI/AKD or CKD with or without KF and those patients at risk for malnutrition who can safely feed orally but cannot

reach their nutritional requirements with a regular diet alone, ONS shall be offered. For a 70kg patient, energy and protein content should be added of up to 10-12 kcal/kg and 0.3-0.5 g of protein/kg daily and it should be provided two times a day 1 hour after every meal. There is evidence showing that supplementation with ONS improves quality of life, physical activity status and nutritional status. (Fiaccadori, E et al., 2021). A suggestion of a 3-month trial of ONS is recommended for CKD patients between Stage 3 to Stage 5 or post transplantation at a risk of PEW if only dietary counselling is not sufficient to meet the protein and energy requirements. ONS should not be prescribed as a Meal replacement but it should be given 1 hour after meals for 2-3 times in a day to meet the protein energy requirement is also suggested in the KDOQI clinical practice guideline for nutrition in CKD: 2020 update in the American Journal of Kidney Diseases.[Ikizler, et al. (2020).]

Physical Activity on CKD patients:

Even a normal population is suggested to perform daily physical activity in order to maintain health status and also is mandatory as per the ACSM Guidelines of Exercise prescription to prevent and manage lifestyle disorders like that of obesity, diabetes mellitus, CVD and progression of CKD to ESRD. So, an integrated approach which involves nutritional intervention as well as regular physical activity is recommended to avoid PEW in CKD patients as it may also alleviate the Quality of Life in CKD patients along with possible increase in their cardiorespiratory fitness and increased muscle strength. It supports and is backed by evidence that a nutritional intervention along with exercise training may prevent the loss of Lean Body Mass (LBM) by preserving the muscle fiber and not allowing muscle fiber atrophy due to a balance between the protein intake and the effect of exercise training.[Cupisti ., et al 2014]

PEW is one of the major conditions in CKD patients which lead to depleted stores of protein and energy and also increased protein catabolism is seen in patients suffering from PEW. PEW causes muscle loss, loss in strength of the muscles, decreased functional capacity and this is known as sarcopenia in CKD patients. It shows the significance of physical activity in CKD patients in order to maintain muscle mass, muscle strength and also improve quality of life. The ACSM guidelines recommend that all CKD patients (CKD patients not on dialysis, as well as those on hemodialysis and peritoneal dialysis) perform aerobic exercise training at mild to moderate strength (40%–60% of VO₂ peak) for 20–60 minutes/day for 3–5 days/week. These guidelines also recommend resistance exercise training for these patients, at 70%–75% of one- repetition maximum for a minimum one set of 10–15 repetitions for 2–3 days/week. A comparison of exercise on non-dialysis day versus exercise on dialysis days demonstrated an increase in exercise training time and VO₂ peak on non-dialysis days. However appropriate exercise counselling, proper follow up, exercise training, proper management is important to visualize the effect of physical activity on physical activity. The main important factor to take into consideration is that the intensity of exercise should be moderate and the intensity should gradually increase by keeping in mind the clinical status and functional capacity of the individual. Another factor is exercise can be performed on non-dialysis days and should not be done immediately post dialysis and If exercise is done during dialysis, exercise should be attempted during the first half of the treatment to avoid hypotension in patients. [Morishita ., et al 2017]

Physical function is the ability to perform day to day activities whereas Physical Activity (PA) is the movement of skeletal muscles of the body which involves energy expenditure above basal level. A study on clinical outcomes of physical activity and physical function on non-dialysis CKD patients above 18 years of age evaluated 29 trials that were reviewed. The study demonstrated that lower physical function and PA were associated with poorer outcomes for ND patients along with higher association with increased mortality rates. However correct measure for assessing the physical function or physical activity is equally important where more easy methods like Timed up and go test, self-report questionnaires, gait

speed analysis, 6-minute walk test can be used instead of more demanding methods like measuring VO₂ peak, using accelerometer or isokinetic dynamometer which are reliable but it's not feasible to set them up in a clinical setting.[MacKinnon ., et al 2018]

CKD patients are often attributed with low to no physical activity in all the 5 stages of CKD. Physical Activity or Exercise Training is an important modifiable factor like that of nutrition which can reduce the risk of mortality or morbidity in these patients and improve their quality of life. A study carried out to assess the prevalence of physical activity across the population of England of patients suffering from kidney disease. The study demonstrated that prevalence of physical inactivity is same across all stages of CKD and it increased with the increase in progression of CKD. Physical activity was different for Stage 4 and Stage 5, HD and PD patients in comparison to Stage 1 and Stage 2. Stages 1 and 2 being the most active are 34% sufficiently active. People requiring dialysis were only 6% of HD and 8% of PD patients were active.

Physical activity decreased from CKD Stage 3 only 17% active through to Stages 4 and 5 were 11% active, where the physical activity was assessed using General Practice Physical Activity Questionnaire (GPPAQ). Effect of age was also prominent across various CKD stages, Stage 4 and 5 in patients >61 years demonstrated that they were 5.5 times more likely to be physically inactive than patients of age <61 years. Also, females were likely to be more inactive than males. However, the physical activity was lowest in dialysis patients which was noted to be 94% of HD patients and 92% of PD patients 'insufficiently active' due to the increased disease burden due to metabolic acidosis, PEW, Malnutrition and Inflammation. [Wilkinson ., et al 2021] [Morishita ., et al 2017] also discusses that physical activity reduces the risk of mortality in patients suffering from CKD and improves their Quality of Life. Low intensity resistance training also increases the muscle strength of such patients which help maintain muscle mass and avoid PEW in CKD patients and patients on dialysis. The meta-analysis also concluded that aerobic exercise or combination exercise could reduce the mortality risk in CKD patients where all the study included in the analysis were for more than 8 weeks, where the exercise needed to be done from 8 weeks for up to 12 months where exercise was performed by individuals for at least 3 times per week was beneficial to reduce the risk of CVD, improved quality of life and increased exercise capacity in HD patients. [Huang., et al 2019]

The ACSM guidelines recommend that all CKD patients (CKD patients not on dialysis, as well as those on hemodialysis and peritoneal dialysis) perform aerobic exercise for 3–5 days/week and resistance exercise for 2–3 days/week. The intensity of aerobic exercise being of moderate intensity (40%–60% VO₂R, RPE (Borg Rating of Perceived Exertion) :11–13 on a scale of 6–20) and resistance exercise, 70%–75% 1-RM. Aerobic exercise should include 20–60 min of continuous activity, if this amount cannot be tolerated, 3–5 min bouts of intermittent exercise aiming to accumulate 20–60 min/day is recommended. Resistance training, a minimum of 1 set of 10–15 repetitions by choosing 8–10 different exercises to train the major muscle groups.

Flexibility exercise should be performed following the guidelines for healthy adults. The Types of exercise which can be included are walking, cycling, and swimming. For resistance training either machine weights or free weights can be used. [American College of Sports Medicine (Ed.). (2013).]

For Exercise testing prescription and protocols both treadmill and cycle leg ergometry protocols have been used to test individuals with kidney diseases, with the treadmill being more widely used. Treadmill protocols like modified Bruce protocol, Balke, Naughton, or branching protocols are appropriate. If cycle leg ergometry is used, initial warm-up work rates should be 20–25 W with the work rate increased by 10–30 W increments every 1–3 mins. Isotonic strength testing should be done using a 3-RM or higher load (e.g., 10–12-RM) because 1-RM testing is generally thought to be contraindicated in patients with CKD because of the risk of spontaneous fractures. Among the other prescribed tests for physical testing

include the Senior Fitness test which includes seven items: 30 s chair stand, 30 s arm curls, 8 ft up and go, 6-min walk, 2-min step test, sit and reach, and back scratch with normative scales for each test. Short Physical Performance Battery is another test which can be used. It includes a test of lower extremity functioning that combines scores from usual gait speed and timed tests of balance and chair stands. Scores range from 0 to 12 with higher scores indicating better functioning. 6-Min Walk Test Widely used as an indicator of cardiorespiratory endurance. Assessed as the most distance an individual can walk in 6 min. A change of 50 m is considered a substantial change. A cut off value indicative of lower function for the above tests is mentioned in the ACSM guidelines Chapter 8 which includes physical performance tests for older adults.[American College of Sports Medicine (Ed.). (2013).]

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Impact of Consumer Perception on Sports Branding

Nidhi Kothari: Adjunct Faculty and Coordinator
Nidhi.kothari@iismworld.com

Abstract:

The exciting world of sports is a stage where every contest tells a story, and each player plays a vital role, it constitutes the essence of a team's character. This shapes the consumer perception and acceptance of teams by their enthusiasts, patrons, and the wider society. This article delves into the complex role of an understanding of the different types of sport consumers perception today's sports related products and explaining the sport decision-making process with the factors that influence an individual's decision to consume a particular sport or sport-related product, such as situational factors, personal factors, and social factors. It also helps us to analyze the factors that affect the types of sport consumers, including age, gender, income, education level, geographic location, and cultural background. It helps in understanding the role of attitudes in sport marketing, including the tri-component model of attitudes, which includes affective, behavioral, cognitive components and branding in sports management, examining how it impacts a team's on-field achievements and solidifies its legacy off the field. It goes beyond marketing; it's about creating a legacy, an enduring narrative that captivates and endures. Effective sports branding isn't just a business strategy; it's the heartbeat of a team's identity, resonating through every cheer, every game, and every season. The sport decision-making process and the factors that influence an individual's decision to consume a particular sport or sport-related product, such as situational factors, personal factors, and social factors. Analyze the factors that affect the types of sport consumers, including age, gender, income, education level, geographic location, and cultural background is described. The role of attitudes in sport marketing, including the tri-component model of attitudes, which includes affective, behavioral, and cognitive components is evaluated.

Keywords: Avid Consumer, Brand Loyal Consumers, Brand Perception, Casual Consumer, Digital Consumer, Marketing Strategy, Participatory Consumer, Price Sensitive Consumer, Spectator Consumer, Sport Brand.

Introduction:

Sports consumers refer to individuals or groups who purchase products or services related to sports, such as tickets to games, team merchandise, or equipment for participating in a sport. They may also include individuals who regularly watch sports on television or streaming platforms or engage with sports content on social media. These are just a few examples of the many types of sport consumers that exist. It's important to note that individuals may also belong to multiple categories and their behavior may change over time.

- a. Avid Consumer
- b. Brand Loyal Consumers
- c. Casual Consumer
- d. Digital Consumer
- e. Participatory Consumer
- f. Price Sensitive Consumers
- g. Spectator Consumer

Factors that affect what types of “sport” is consumed?

There are many factors that can affect sport consumption, including both internal and external factors. Understanding the factors that affect sport consumption can also help to design policies and programs to promote sport participation, and create a more inclusive and equitable environment for all individuals, regardless of their background or abilities.

- **Cultural Factors:** Culture can shape the way people consume and engage with sports, for example, some cultures may place more emphasis on certain sports than others.
- **Demographics:** Factors such as age, gender, income, and education can influence sport consumption behavior. For example, younger individuals may be more likely to participate in sports, while older individuals may be more likely to watch sports as spectators.
- **Economic Factors:** Economic factors such as income levels, employment, and inflation can influence sport consumption behavior. For example, during a recession, individuals may have less disposable income and be less likely to purchase sport-related products or attend live events.
- **Marketing and Advertising:** The way that products and services related to sports are marketed and advertised can influence sport consumption behavior. For example, an effective advertising campaign for a new sport-related product may increase consumer interest and lead to increased sales.
- **Personal Values and Beliefs:** An individual's personal values and beliefs can influence their sport consumption behavior. For example, an individual who values health and fitness may be more likely to participate in sports and purchase sport-related products such as fitness equipment.
- **Social Influences:** The influence of family, friends, and other social networks can affect sport consumption behavior. For example, an individual may be more likely to watch a certain sport if their friends or family members are also fans of that sport.
- **Technological factors:** Advancements in technology can affect sport consumption behavior by providing new ways for individuals to access and consume sports content, such as streaming platforms or social media.

Difference between a sport fan and sport consumer?

A sports fan is someone who actively follows and supports a particular team or athlete, often attending games or watching them on TV. They may also have an emotional connection to the team or athlete. A sport consumer is someone who purchases goods or services related to sports, such as tickets to games, merchandise, or subscriptions to streaming services that show live games. They may be interested in the sport, but not necessarily emotionally invested in a particular team or athlete.

Literature Review:

The brand is the most valuable status that an organization, product, or place may have. It is proof that consumers value a brand's ability to satisfy a reasonable need as well as the fact that it becomes a source of reference they will adore, frequent, and recommend to others. As a result, it starts to function as a multiplier vector for both market size and customer loyalty. What precisely are brand identities and brands? A name that is instantly identifiable and conveys information about a company in a specific industry is known as branding. People

identify a brand based on its identity. It may be done so through the logo and other related materials. For instance, the "Just Do It" phrase on the Nike logo, despite its simplicity, is instantly recognizable all around the world. Your company's brand image is the perception that consumers have of it. It also establishes what they anticipate from the brand. For instance, the notion of a luxury brand with a clear target audience may have an impact on its image if it were to sell inexpensive goods. Positioning is the way a product is placed on the market (Shaping Brand Personality: Infusing Identity into Your Business | Mailchimp, n.d.).

It essentially specifies the market categories that the brand wishes to focus on. For instance, Virginia Slims are cigarettes specifically designed for ladies. The brand markets themselves to this market by emphasizing the thinness of the cigarette and its packaging. A person's personality and the personality of the brand are same. It involves sentimental or individual characteristics that we identify with a specific brand. Every aspect of branding, such as the name, tone of voice, website, colors, and logo, contributes to his personality. The set of ideals and standards that guide the actions of the brand. The organization and its brand are directly connected through its culture. The brand's long-term relationship with its audience can only be maintained if the company purchases the guiding concepts of the brand's interactions with various audiences have a significant impact on the social spectrum Council, Y. E. (2022, April 14).

The organization's strong commercial contacts need to be clearly represented in the PR. The brand needs to respond to the public's requirements in a non-intrusive manner on virtual social media. How a brand is seen by customers (or partners) is largely determined by how well it builds sincere relationships with the general population. The regularity and intensity with which the brand uses its numerous channels of communication develop strong bonds with the audience and create the associations that are essential for the brand experience in their minds. The public's traits must be reflected in both the items and their brand. Features of a product must clearly meet the needs of the target market. The language used in the brand identification must be representative of the target audience's culture. The public's desire to associate a brand's image with it is determined by how much they identify with the brand's qualities. The image that is perceived is directly influenced by audience reflection. How a customer takes on and applies a brand's identity in its entirety. The public becomes the most effective communication channel when a product genuinely meets requirements that are evident and the brand communicates desired values and personality qualities. A brand's attributes are frequently those that a customer uses to complete his identity. Knowing what makes a consumer associate a brand with itself greatly simplifies the context of long-term brand communication (brand insight).

The vector that fundamentally establishes the public's willingness to pay more for a product than its average worth because of its brand is its perceived image. As such, it is a key metric in the brand's economic assessment and ought to be the primary objective in brand experience management. to investigate the relationship between the variables of corporate image, credibility, trust, and happiness in the setting of a virtual athletic event using structural equation modeling. Finding out which of these factors has the biggest impact on predicting participant satisfaction and whether they have any meaningful correlations with one another is the goal. 385 sports enthusiasts between the ages of 18 and 65 made up the study's sample. Data was gathered using an online poll, which was distributed among sports fans via social media. Akoglu, H. E., & Özbek, O. (2021).

The relationship between customers' perceptions of sports goods, services, and teams When the sport club's marketing initiatives are aimed at a particular demographic and fall under the purview of the sport brand, they can be more effectively highlighted. The consumer can be a brand's greatest ally or its worst enemy depending on their information access, dissemination skills, and obsessive desire to share content online. Personal experiences that are shared on social media platforms become expert knowledge and shape other consumers' attitudes and behaviors toward brands. A significant shift in the brand's communication

strategy is necessary to improve the perception of and trust in the company. It is well known that sports have developed into a business.

The world's biggest clubs bring in hundreds of millions of euros a year from sponsorships, marketing, and television rights. The number of fans who visit the stadium, watch the games on TV for free or through a pay-per-view system, and purchase T-shirts or other promotional products all directly correlates with these revenue streams. The number of people who watch a team's matches closely correlates with its success from a commercial standpoint. The size of the audience that companies are targeting through a sports club is their primary consideration when making this decision. When forming attitudes, a variety of internal and external elements are considered, shaping and forming the attitudes toward an object.

Therefore, direct experience, or the observation of one's own behaviors, is the primary means of acquiring attitudes toward goods and services. The family and peer groups are two other crucial factors in the formation of attitudes. The formation of attitudes is a multifaceted process that involves two sets of factors, according to Brătucu and Dima (2002): social factors (family, school, social and cultural organizations, political and economic conditions) and individual factors (age, sex, intelligence, emotional stability and instability, conative dispositions). The mass media (newspapers, magazines, television, and the internet) and the consumer's personality are significant additional influences on the development of attitudes. In the specialty literature attitude is a multidimensional variable made up of three components:

- The cognitive component (to learn) represents an individual's viewpoint and level of expertise on a product or its attributes.
- A person's feelings, whether positive or negative, pleasurable or unpleasant, regarding a product, are referred to as the affective component (of feeling).
- A person's propensities or intents to act in a particular way are referred to as their behavioral or conative component (to do).
-

Consumers of today rely on the knowledge of friends, coworkers, and even complete strangers with whom they communicate online via social media. As long as the review or comment is pertinent to the buyer's impression of the product, anyone who has bought a product and then shared their experience with it online is recognized as an expert. In most cases, their knowledge is more significant and reliable than the messages promoted by brands in the same communication channels. Before making a purchase, Millennium III customers attentively read reviews, and they are more inclined to provide their own comments later on. Consumer encounters with a brand shape their view of it.

Businesses need to focus on brand perception just as much as they do on marketing plans and new brand development. A brand goes through several phases, from brand awareness to brand loyalty. A consumer's perception of a brand is ultimately shaped by their experiences and interactions with it once they first become aware of it. A lifetime of brand equity could be established if the correct circumstances are met.

Contrarily, perception is described as an impression that arises in the mind from an object's interpretation by the senses. In conjunction with our comprehension of what constitutes a brand, brand perception refers to the way in which customers interpret a brand by means of sensory data acquired from their encounters with it. To put it another way, it's the way that customers feel about, perceive, and respond to a brand as a result of their interactions with it. Numerous encounters can contribute to the formation of a brand's perception. An encounter with a brand may arise via a conversation with family members, browsing social media, or watching an advertisement.

The consumer's view of a brand's quality, value, and reputation are shaped by all of this sensory input, which can be converted into a mental image of the brand. The mood or kind of brand perception that is likely to emerge depends on how a consumer interprets the

information gathered about a brand: Positive: as a result of positive encounters, consumers are more likely to prefer or select a brand, increasing its perception. Negative: a general distaste or avoidance of a brand brought on by an unpleasant encounter. Neutral: An emotional experience of any kind has not transpired, leaving a customer feeling unbiased towards a brand.

A neutral brand image can be just as harmful as an unfavorable one. Any brand wants to build a strong, emotional connection with its customers because only then will they be loyal to the brand. Result is simply one of the factors that help us understand how crucial brand perception is. Though it seems like nothing matters more than what customers think of your brand, there is more to it than that. In actuality, a consumer's choices in the marketplace are greatly influenced by their opinion of a brand. Customers' opinions about your brand and that of your competitors might have a significant impact on their intention to make a purchase. Furthermore, it becomes even more significant in the social media-driven world of today. Fortunately, brand impression is malleable and subject to change over time, just like any relationship. A consumer's perception of a brand is more likely to shift the more interactions and experiences they have with it. Customers may genuinely recognize this attitude, observe the shift, and interact with it. If a consumer's impressions are understood, this may be applied to any brand. However, companies must acknowledge the truth of brand perception and cease assuming, without question, what customers think of their brands.

Despite the significant advancements in sponsorship research, no studies have yet examined the connections between the sponsor, cosponsees, and fans' reactions (cognitive, affective, and conative) in the setting of multiple sponsorship sports events. Thus, the goal of this research was to examine how brand image and brand attachment relate to the influence of commercial sponsorships on consumers' intentions to buy sponsored goods. Additionally, this researcher examined the connections between a team (the French National Soccer Team), an event (the 2006 FIFA Soccer World Cup Germany), a sponsor (adidas), and a star player (Zinédine Zidane). For this study, structural equation modeling was employed. The important findings showed that interactions between the sponsor and the sponsee's brand at the cognitive and emotive phases are produced by a multiple sponsorship structure. The important findings showed that interactions between the sponsor and the sponsee's brand at the cognitive and emotive phases are produced by a multiple sponsorship structure. Second, the model showed that, in accordance with the hierarchy of effects paradigm (Lavidge & Steiner, 1961), multiple sponsorship activates brand behavioral components (i.e., cognitive, affective, and conative). (Chanavat, 2024)

A company's brand image is the perception that consumers have of it. It also establishes what they anticipate from the brand. For instance, the notion of a luxury brand with a clear target audience may have an impact on its image if it were to sell inexpensive goods.

(RĂZVAN, 2019)

"The effect of brand experiences on brand loyalty through perceived quality and brand trust: a study on sports consumers" (Akoglu, 2022)

Previous studies have also shown that country of origin information plays an important role in the consumer's perception of the product, encouraging the consumer to buy the product, and the brand origin country plays a more significant role in the customer's assessment of the product's quality, risk, value and likelihood of purchase than price and brand awareness. (Davood Nasr Esfahani, 2023)

"Sports brand positioning: Positioning congruence and consumer perceptions toward brands" (J. Lucy Lee, Sports brand positioning: Positioning congruence and consumer perceptions toward brands, 2018)

The effect of brand experiences on brand loyalty through perceived quality and brand trust: a study on sports consumers (Halil Erdem Akoglu, 2021)

Four positioning typologies—high-quality equipment, professional equipment, innovation, and tradition—were identified; the perceptual map clearly depicted each brand's positions in consumers' minds; and two brands—Titleist and Ping—showed evidence of congruence between their intended and perceived positions, suggesting they established a high position-congruity.

(J. Lucy Lee, Sports brand positioning: Positioning congruence and consumer perceptions toward brands, 2018) (Vivi Nalindah1, 2022) Kapoor, Namita. (2021). Analytical Study of Consumer Perception towards Brand: A Case of Sports Marketing.

Objectives of the Study:

- To understand of the different types of sport consumers.
- To explain the sport decision-making process and the factors that influence an individual's decision to consume a particular sport or sport-related product, such as situational factors, personal factors, and social factors.
- To analyze the factors that affect the types of sport consumers, including age, gender, income, education level, geographic location, and cultural background.
- To evaluate the role of attitudes in sport marketing, including the tri-component model of attitudes, which includes affective, behavioral, and cognitive components.
- To focus on the complex role of branding in sports management, examining how it impacts a team's on-field achievements and solidifies its legacy off the field.

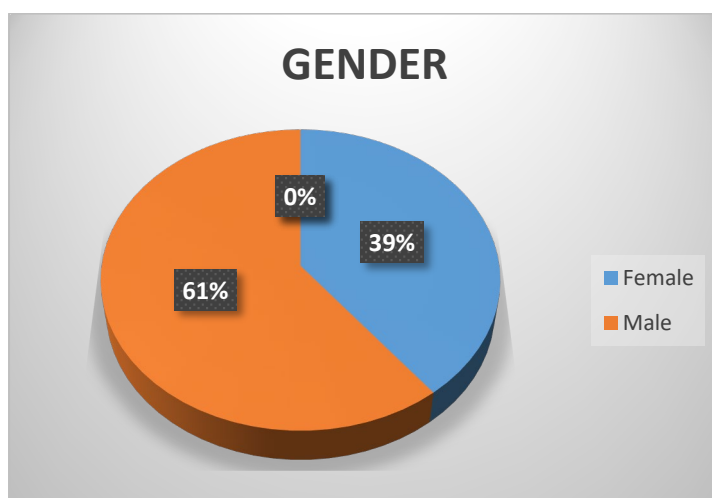
Research Methodology:

- The Research aims to examine the impact of consumer perception on sports branding.
- Data analysis revealed themes related to authenticity, emotional connection, and cultural relevance.
- Data for the study were collected from primary sources and secondary sources.
- Primary data were sourced from the field of study through questionnaire.

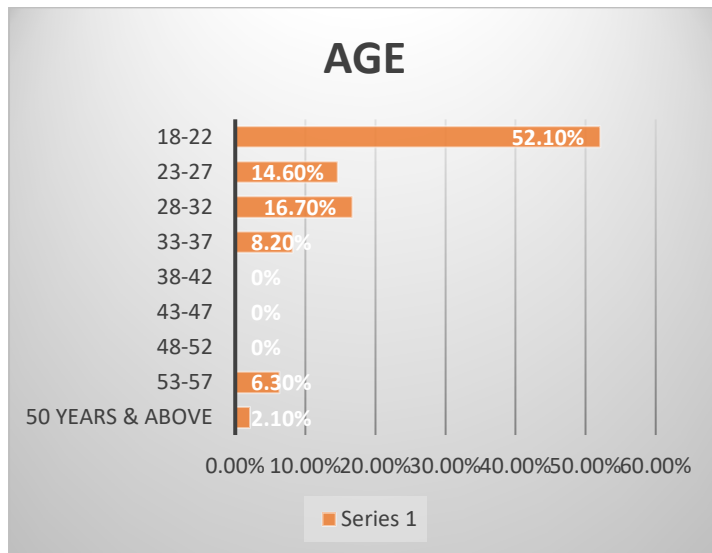
Sampling:

- This study used convenient sampling method when issuing the questionnaire.
- Questionnaire was circulated among consumers and valid filled questionnaire was got from major respondents.

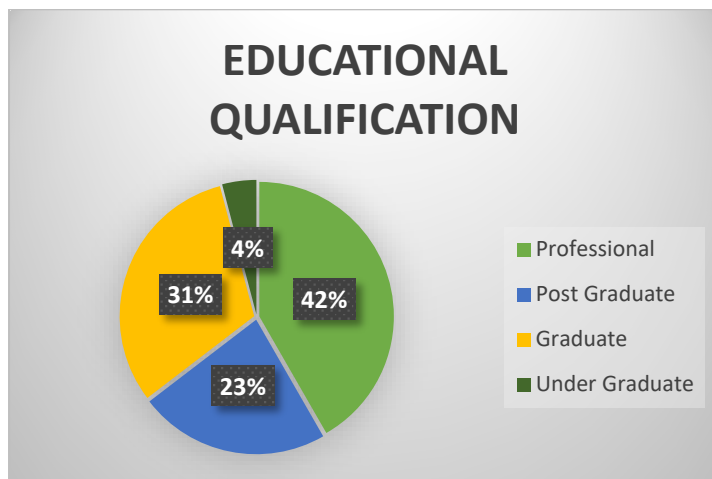
Data Interpretation / Finding:



This Research shows us that 61% of people from whom the data got collected are Male and 39% of people are Female.



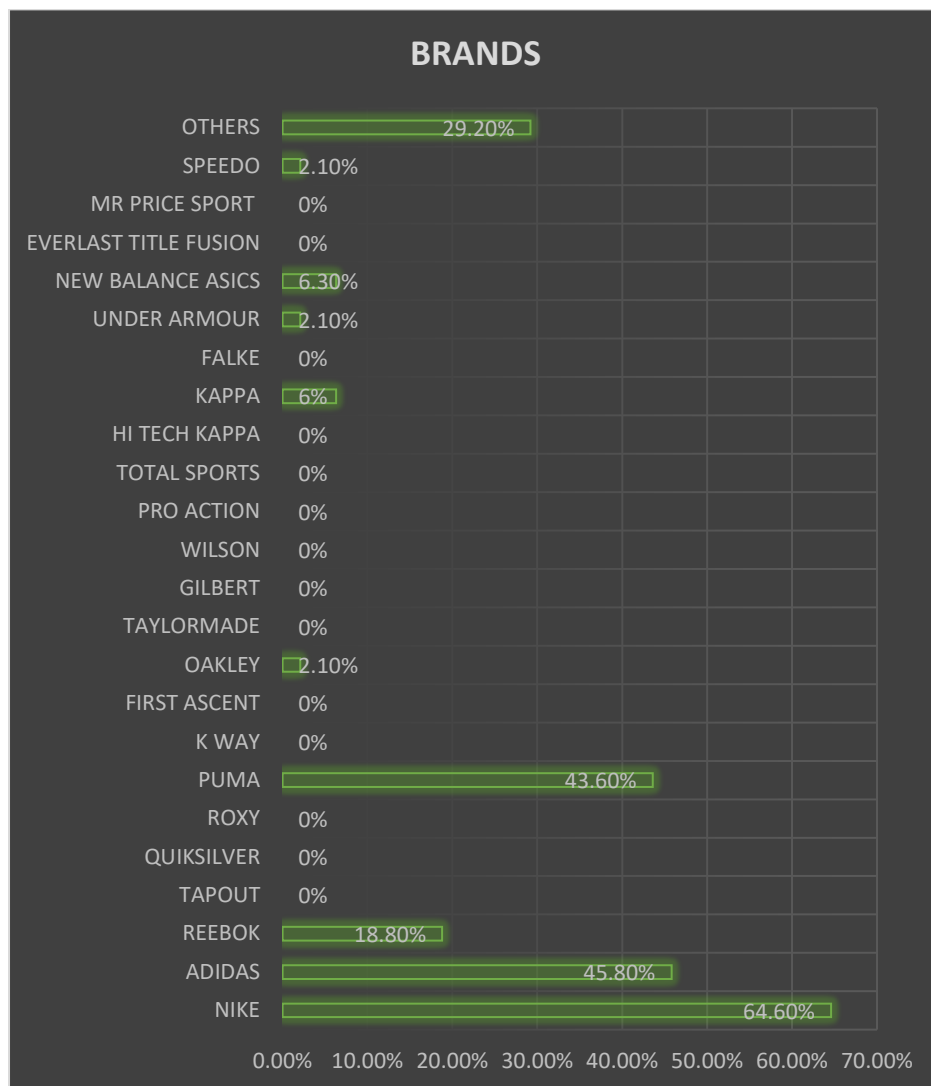
Major AGE group involve in this Research is from 18yrs to 22 years and secondly from 28 years to 32 years.



42% of the people are professional who presented their view whereas 31% are graduate, 23% post graduate and 4% are under graduate.

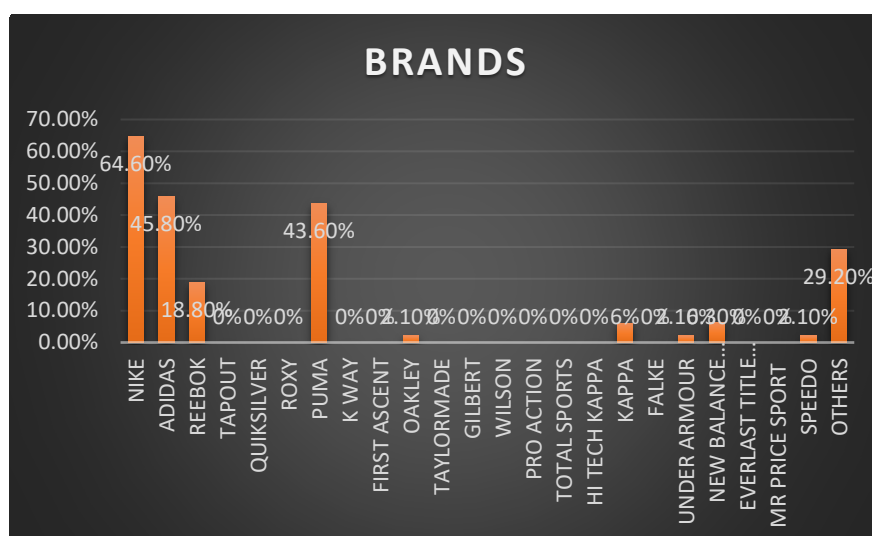
1. Indicate which of the following brands you have purchased recently. Select all that apply:

NIKE	ADIDAS	REEBOK	TAP OUT	QUIKSILVER	ROXY	PUMA	K WAY
FIRST ASCENT	OAKLEY	TAYLORMADE	GILBERT	WILSON	PRO ACTION	TOTALSPORTS	HI TECH
KAPPA	FALKE	UNDER ARMOUR	NEW BALANCE ASICS	EVERLAST TITLE FUSION	MR PRICE SPORT	SPEEDO	



According to this survey majority of the customers use Nike their lovely brand followed by Adidas and puma.

2. Which is your favorite brand from the above table mention?

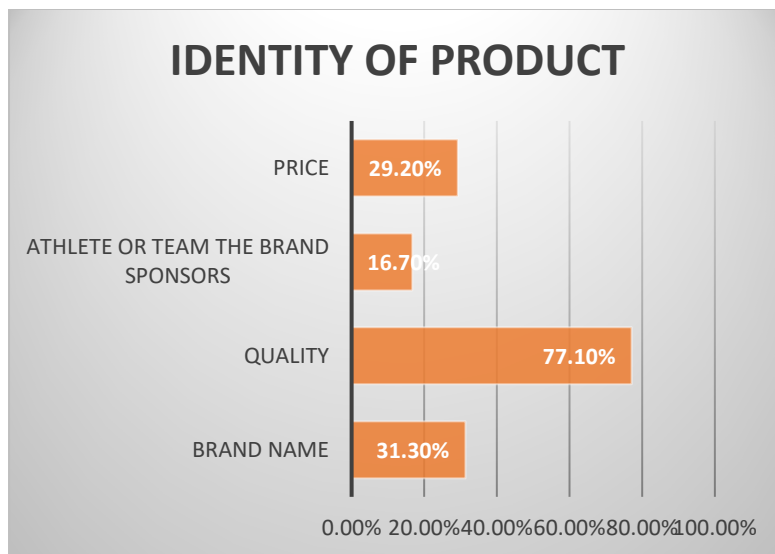


According to the survey Nike is the most preferable brand by the customers where 64.60% says that Nike is most trustworthy brand followed by Adidas and Puma.

3. What's the first thing that comes to mind when you think about [BRAND]?

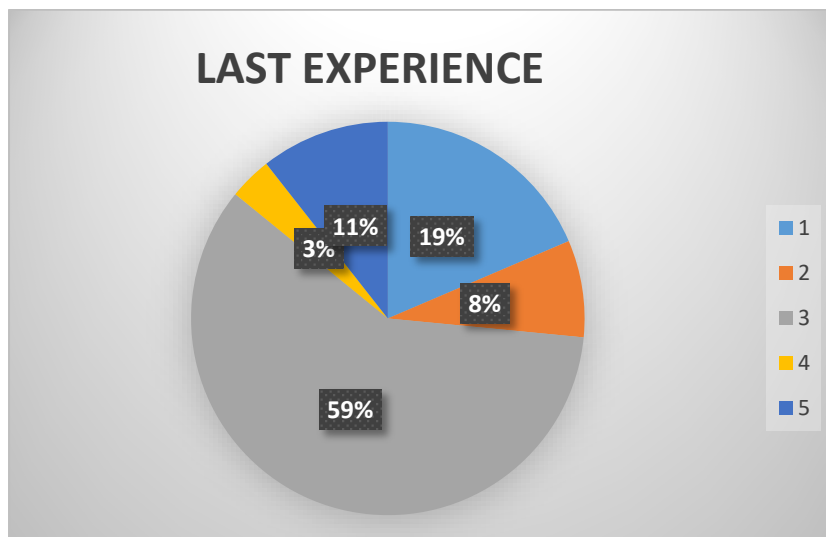
- Brand Name
- Quality
- Athlete or team the brand sponsors

d. Price



When we think about brand first thing that comes to the mind is Quality and Price where customer prefers quality more over brand name or athlete.

4. **Describes your last experience with [BRAND] in only FIVE words?**
Amazing, good satisfactory, quality and affordable, great, comfortable etc...
5. **How would you rate the quality of [BRAND] products/services, 1 being the most important and 5 the least important?**
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. 5



Here this graph shows that 59% of customer rate the products quality as grade 3 and 19% of customer rate the product quality as grade 4 which means that quality of the product matters a lot to the customers at an average of 3 to 4 from 5.

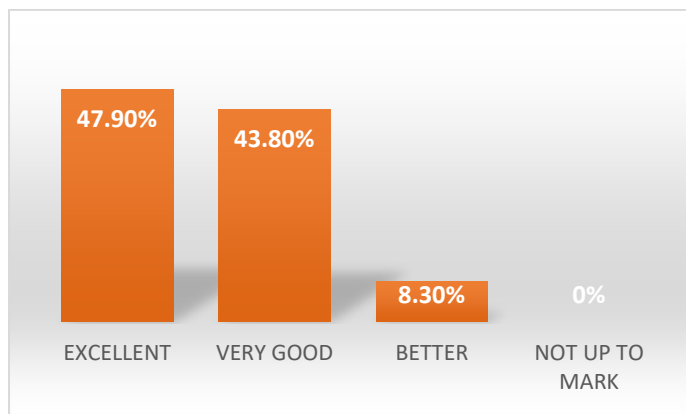
6. **How likely are you to recommend [BRAND]?**
 - a. Very often
 - b. Less often
 - c. sometimes
 - d. I don't recommend



58.30% of the customer usually tends to suggest their loved brands to the others where as 14.60% less often suggest the brands to others. Here we can say that word of mouth plays a vital role.

7. How does [BRAND] make you feel?

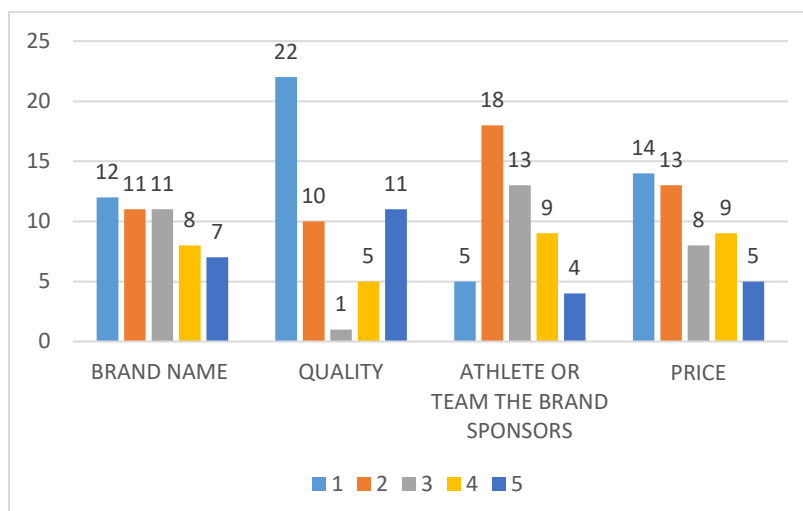
- a. Excellent
- b. Very good
- c. Better
- d. Not up to mark



Brand makes us feel excellent due to its Quality, Price, service which eventually leads to customer satisfaction according to survey it comprises of 47.90% where as 43.80% feels very good.

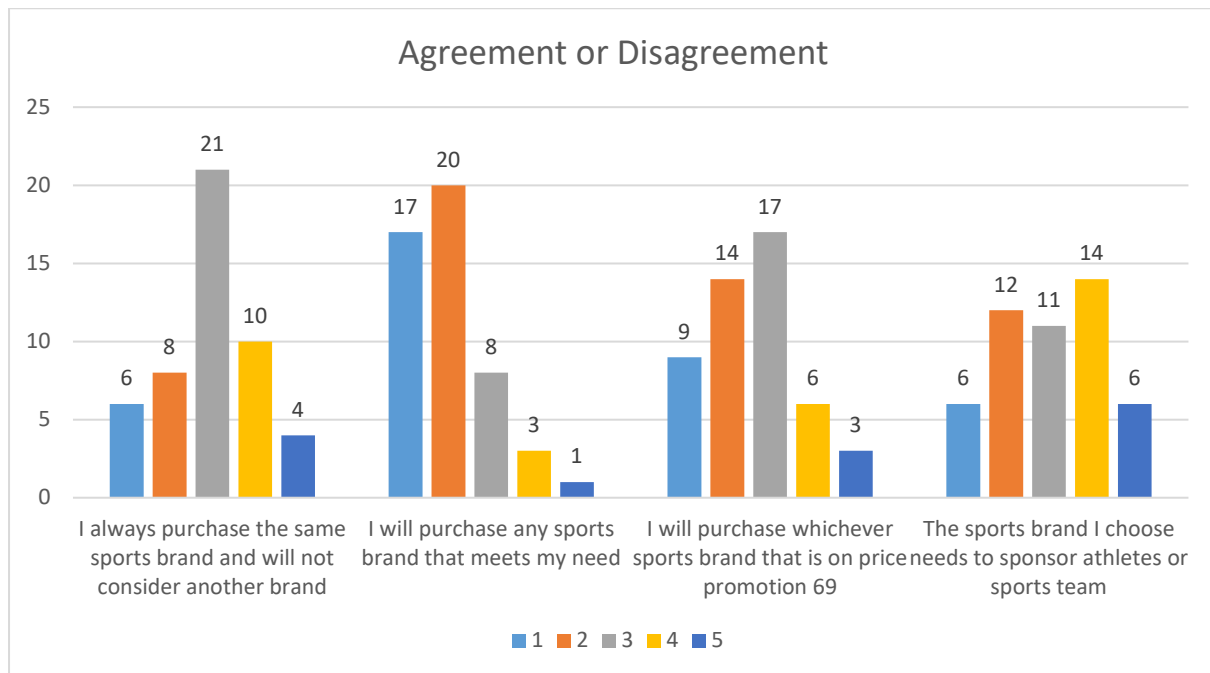
8. When shopping, which of the following factors are important to you when selecting a sports brand? Rank in order of their importance, 1 being the most important and 5 the least important. Each factor should have a different ranking.

- a. Brand Name 1 2 3 4 5
- b. Quality 1 2 3 4 5
- c. Athlete or team the brand sponsors 1 2 3 4 5
- d. Price 1 2 3 4 5



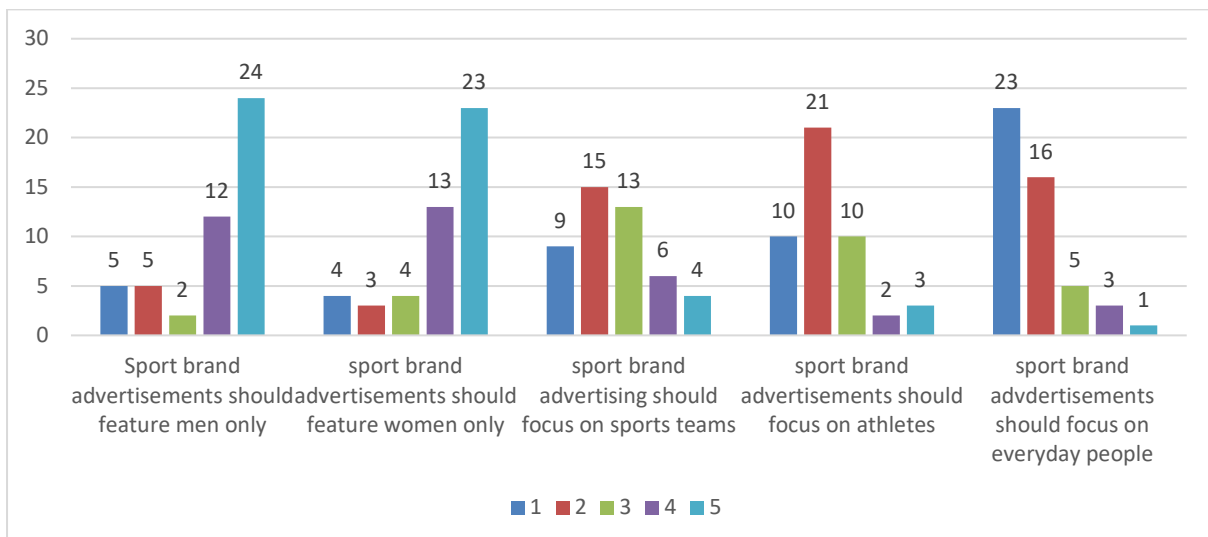
This graph clearly states that major focus of the customer is on quality than price than brand and finally on Athlete or team the brand sponsors.

9. **Indicate your level of agreement or disagreement with the following statements:**
I always purchase the same sports brand and will not consider another brand
I will purchase any sports brand that meets my need
I will purchase whichever sports brand that is on price promotion
The sports brand I choose needs to sponsor athletes or sports team
- 1 = Strongly Agree
 - 2 = Agree
 - 3 = neither Agree nor Disagree
 - 4 = Disagree
 - 5 = Strongly Disagree



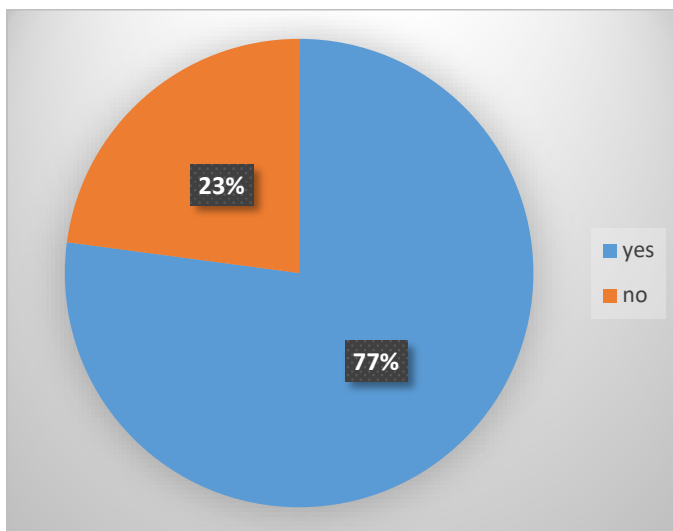
This graph shows the different parameter to different questions such as:
 I always purchase the same sports brand and will not consider another brand says that they neither Agree nor Disagree.
 I will purchase any sports brand that meets my need says that they Agree.
 I will purchase whichever sports brand that is on price promotion says that they neither Agree nor Disagree.
 The sports brand I choose needs to sponsor athletes or sports team says that they Disagree.

10. **Consider your favorite sports brand when answering the following questions.**
Indicate your level of agreement or disagreement with the following statements:
- Sport brand advertisements should feature men only
 - Sport brand advertisements should feature women only
 - Sport brand advertising should focus on sports teams
 - Sport brand advertisements should focus on athletes
 - Sport brand advertisements should focus on everyday people
- 1 = Strongly Agree
 - 2 = Agree
 - 3 = Neither Agree nor Disagree
 - 4 = Disagree
 - 5 = Strongly Disagree



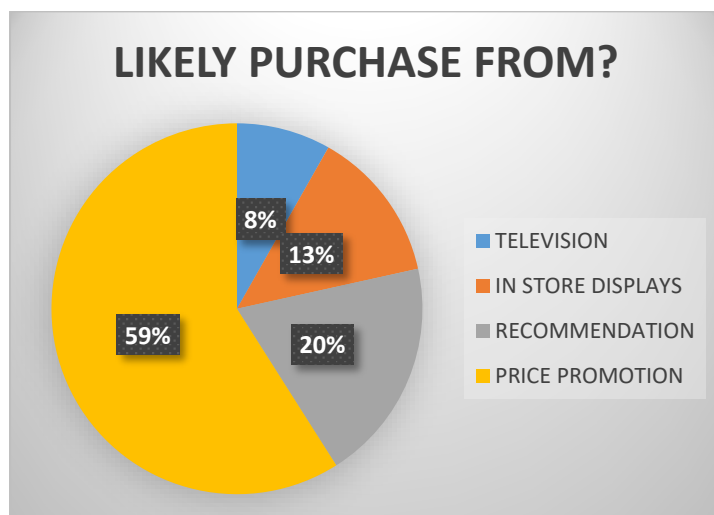
This graph shows the different parameter to different questions such as:
 Sport brand advertisements should feature men only - Strongly Disagree
 Sport brand advertisements should feature women only - Strongly Disagree
 Sport brand advertising should focus on sports teams - Agree
 Sport brand advertisements should focus on athletes - Agree
 Sport brand advertisements should focus on everyday people - Strongly Agree

11. **When considering buying a sporting brand, do you know which brand you are going to purchase before you enter a store?**
- Yes
 - No



When considering buying a sporting brand 77% of the customers are aware of which brand products they need to purchase and 23% of the customer check what new brands have been introduced and then purchase.

12. **What is most likely to cause you to purchase a specific sports brand?**
- Television
 - In store displays
 - Recommendation
 - Price promotion



Purchasing differs from person to person usually customer tends to purchase the products when there is price promotion as 59% says the survey, 20% says that they purchase on recommendation where as 13% says that they see in store displays and purchase the products and 8% sees on television and purchase the products.

Limitations of the Study:

A survey should involve a large sample size otherwise the findings of the survey cannot be generalized. But a larger sample size may increase the time and cost of collecting the primary data with the help of questionnaire. In some showroom it is not allowed to get the questionnaire. Some people were not willing to respond and few of them who responded were in hurry hence the active participation was lacking. Many of the respondents were not willing to fill the questionnaire. Some people were not willing to respond and few of them who responded were in hurry hence the active participations was lacking. Due to which I faced difficulties in collecting information's regarding our questionnaire. Another problem which I face was that people were hesitating to give information about their views freely.

Conclusion:

In this paper presented a point of view on the impact and importance that must be given to the perceptions that are formed in relation to a certain sports brand at the level of its fans. The Conclusions we have obtained from this study refer to the fact that perceptions are actually some mental connections that the consumers establish as a result of the interaction with a certain brand. These perceptions are based on the information the brain gathers about how consumers think, feel or react to the interactions they have with a brand. It is very important for any brand, not just sport brands, to know these perceptions of the consumer in order to be able to improve or increase the reputation and image of the brand. Thus, this study represents only a starting point for future research on consumer perception, due to limitations on insufficient analysis in this field or due to the small number of survey participants. The study offers important findings however. Here the consumers believes that quality of the products matters the most then comes the price and this is shown in Fan attachment to the club remain high even if the results are poor but the attendance rates might decrease. consumers require communication using modern technology which is both convenient and speedy. Communication with consumers is used to build emotional attachment. To conclude, the role of branding in sports management is an essential element in a team's triumph. It's about building a strong, compelling identity that resonates with consumers, fans, sponsors, and the community. The importance of effective branding in sports cannot be overstated – it's what turns teams into icons and games into unforgettable experiences. In the ever-evolving sports industry, the role of branding in shaping a team's identity and success will only become more crucial. For aspiring sports managers, understanding the power of branding is key to building a successful career in this dynamic field. Institutions like Symbiosis School of Sports Sciences are preparing future leaders to take on this exciting challenge, shaping the sports brands of tomorrow.

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Empowering the Sporting Journey: Exploring Autonomy-Supportive Coaching in Sri Lankan Girls' Secondary School Netball

Anuruddika Jayathilaka: Department of Business Administration, Faculty of Management Studies and Commerce, University of Sri Jayewardenepura, Sri Lanka.

Anuruddikakumudu@sjp.ac.lk

M.R.R.N.Yatigammana: Post Graduate Institute of Medical Sciences, University of Peradeniya, Sri Lanka.

ryatigammana@gmail.com.

Abstract:

In sports, coaches have an essential role in how players progress. Coaches' interpersonal approaches can also significantly impact how motivated athletes are. This study sets out to investigate motivation at a Sri Lankan secondary school for girls in a novel way. The main goal is to study the coaching environment and the relationship between coaches' motivation and using interpersonal behaviours that enhance autonomy. The researcher was fully involved in the daily dynamics of motivation and autonomy-supportive actions in this setting as a netball coach for young ladies in a secondary school below eighteen (18) years of age. Using scientific auto-ethnography, this research integrates individual experiences into a whole analysis. The framework of autonomy-supportive interpersonal behaviours drawn from Self-Determination Theory (SDT) is linked with personal experiences using thematic analysis as the analytical technique. This study provides a critical understanding of the intricate dynamics at work by closely examining the behaviours and the motivations that underlie them as coaches. This study contributes to the available body of knowledge on autonomy-supportive interpersonal behaviours, especially regarding coaching school netball. By examining these actions, this study offers insightful information on how administrative demands and instructors' assessments of students' enthusiasm for learning can both have a detrimental and good impact on teachers' self-determined motivation. This in-depth examination of autonomy-supportive interpersonal interactions in a Sri Lankan girls' secondary school, viewed through the prism of personal experience, offers a novel viewpoint and enhances the current conversation around SDT.

Keywords: Autonomy-Supportive Interpersonal Behaviours, Coaching, Motivation, Netball, Self-Determination Theory.

Introduction:

Sports participation is associated with improved health and numerous other benefits (Mariani et al., 2019; Rocchi et al., 2013). As a result, school sports participation is gaining more attention, and the government is even taking the necessary action (Ministry of Sports, 2020). Coaches' actions, expectations, and aspirations can have a significant impact on young athletes' experiences because they foster a positive motivational environment and help participating athletes develop as individuals (Conroy & Coatsworth, 2007). Researchers have used experimental coach training studies to learn more about the parts of youth sport systems that help with social and emotional growth (Smoll & Smith, 2002; Conroy & Coatsworth, 2006; Conroy & Coatsworth, 2007). This is because youth sports coaches have a big impact on how motivated kids are to play organised sports and how well those games go for them.

This paper drew upon the researcher's experiences as a secondary school netball coach in Sri Lanka. The Sri Lankan educational system is pushing sports as a necessary component of education. Being a part of this system has provided the researcher with a wealth of experience, which has led to a transformation in her coaching techniques. The researcher had

experience playing national netball for a few years; therefore, she was well-versed in the best practices for student coaching and motivation. This study examines the researcher's efforts and experiences through the lens of autonomy-supportive interpersonal behaviours, allowing for a detailed analysis of how the researcher's experiences relate to known Self-Determination Theory (SDT) paradigms.

In the context of coaching secondary school netball in Sri Lanka, this study examines the relationship between coaches' motivation and their use of autonomy-supportive interpersonal behaviours—a relationship that has not yet received attention in experimental coach training research (Conroy & Coatsworth, 2007). Coaches can directly influence autonomy support, which has the potential to impact motivation and young development through sport in both direct and indirect ways (Conroy & Coatsworth, 2007; Yatigammana & Jayathilaka, 2024).

Literature Review:

- **Self-Determination Theory**

The key driver for youth sports participation is the level of engagement (Weiss & Petlichkoff, 1989; Álvarez et al., 2009). The attribute is often associated with pleasure, and athletes who express higher levels of intrinsic motivation are the ones who derive the greatest satisfaction from athletics (Álvarez et al., 2009). The Self-Determination Theory (SDT) is currently considered one of the most relevant methods for examining the social and personal factors of the sports experience that are positively linked to athletes' intrinsic motivation and happiness (Álvarez et al., 2009).

Based on the Self-Determination Theory (SDT), the capacity of a coach to create a stimulating atmosphere can impact the degree of intrinsic motivation experienced by a student (Ryan & Deci, 2000). Based on certain research (Reinboth et al., 2004; Álvarez et al., 2009), the motivation of athletes is linked to the coach's capacity to create a motivational environment that fulfils their fundamental psychological needs for competence, autonomy, and relatedness. Athletes' affective states are also said to be influenced by the kind of motivation they receive (Álvarez et al., 2009; Yatigammana & Jayathilaka, 2024). In the end, the quality of athletic involvement is thought to be influenced by the motivational climate (Álvarez et al., 2009).

According to SDT, there are three different types of motivation: extrinsic motivation, intrinsic motivation, and amotivation. These types of motivation vary depending on the degree of behavioural regulation and are positioned along a continuum that goes from high to low self-determination (Ryan & Deci, 2000; Álvarez et al., 2009). The highest level of self-determined drive is known as intrinsic motivation, and it happens when people feel free to devote themselves to pursuits that they find enjoyable and/or fascinating and that provide them with the opportunity to learn (Brière et al., 1995; Álvarez et al., 2009). On the other hand, extrinsic motivation occurs when people perform an activity because they place a higher value on the outcomes than on the activity itself (Brière et al., 1995; Álvarez et al., 2009). Lack of confidence in one's abilities, an inability to recognise the relationships between actions taken and anticipated outcomes, or a lack of enjoyment of the activity can cause amotivation, which is the lack of intention to take action (Brière et al., 1995; Álvarez et al., 2009).

According to SDT, competence, autonomy, and relatedness—three fundamental psychological demands that are natural, universal, and necessary for psychological development—are present in all human beings from birth. It also says that more self-determined types of motivation are attainable, provided the social environment supports meeting these requirements (Ryan & Deci, 2000). It specifically takes into account the fact that social circumstances that uphold people's autonomy are conducive to the promotion of self-determined motivation (Álvarez et al., 2009). Interpersonal behaviour is one of the social factors that has been shown to influence motivation in recent decades (Álvarez et al., 2009).

The dominant style and the autonomy-support style are the two interpersonal styles that have drawn the most attention (Álvarez et al., 2009). Controlling interpersonal behaviour diminishes perceptions of autonomy and the accompanying self-determined motivation by encouraging an external centre of cause (Álvarez et al., 2009). The autonomy-supporting style also promotes more self-determined modes of regulation, which in turn boosts autonomy (Álvarez et al., 2009).

- **Autonomy-supportive interpersonal behaviours**

One frequently studied component of coaching success is the extent to which coaches exhibit autonomy-supportive or controlling behaviours while interacting with players. Scholars such as Ryan & Deci (2002), Mageau & Vallerand (2003), Amorose (2007), Bartholomew et al. (2009), and Amorose & Anderson-Butcher (2015) have conducted extensive research on this topic. Coaches who endorse athletes' autonomy demonstrate their respect for their emotions and thoughts, encourage the freedom to choose, take initiative, and regulate their own behaviour, and minimise the reliance on pressure and demands to exert control over others.

Recent studies have found that coaches' interpersonal styles, namely whether they are controlling or autonomy-supportive, have an impact on the psychological and behavioural results of athletes. Research by Mageau and Vallerand (2003), Amorose (2007), Bartholomew et al. (2009), and Amorose and Anderson-Butcher (2015) supports these findings. Research consistently shows that actions promoting autonomy have a positive impact on athletes' development of adaptive motivation and overall well-being. Multiple studies by Amorose and Anderson-Butcher (2007), Gillet et al. (2010), Smith et al. (2010), Isoard-Gauthier et al. (2012), Kipp and Wilson (2012), Adie et al. (2012), Carpentier and Mageau (2013), and Amorose and Anderson-Butcher (2015) have demonstrated this.

Researchers have made several fascinating discoveries about the interpersonal approaches of instructors. Research indicates that athletes' assessments of their coaches' actions can accurately predict a range of motivational outcomes (Amorose & Anderson-Butcher, 2015). Furthermore, it is evident that a motivating strategy that supports autonomy in interpersonal coaching is successful (Amorose & Anderson-Butcher, 2015). In other words, autonomy-supportive behaviours positively correlate with adaptive motivational outcomes, such as the fulfilment of the fundamental psychological needs of competence, autonomy, and relatedness. Furthermore, as per self-determination theory (Ryan & Deci, 2002; Álvarez et al., 2009; Amorose & Anderson-Butcher, 2015), they have a positive correlation with stronger self-determined involvement motives. Furthermore, the self-determination theory (Ryan & Deci, 2002) elucidates a negative correlation between behaviors that promote autonomy and unfavorable outcomes, including burnout (Raedeke & Smith, 2001; Amorose & Anderson-Butcher, 2015), failure to meet basic psychological needs, and an increase in non-self-determined participation motives. From the players' point of view, however, coaches can interact with athletes in a way that supports their autonomy and effectively motivates and engages them in sports.

There are still unanswered questions, despite the fact that an increasing amount of research seems to be providing a reasonably clear picture regarding the motivational implications of various coaching behaviours. This study focuses on the possibility that coaching behaviours that support athletes' autonomy can impact their motivation.

- **The coach's motivational influence**

An athlete's motivation to work hard and persevere in their sport is crucial to their learning and performance. Therefore, inspiring athletes to reach their full potential in the hopes of success and achievement is a crucial part of a coach's job. Theoretically, coaches can affect athletes' motivation in a number of ways, including how they organise practices and games, how they make decisions, how they respond to athletes' performances by giving

feedback, and the relationships they build with athletes (Mageau & Vallerand, 2003; Amorose, 2007; Iachini, 2010). Coaches' acts may be one of the most important sources of motivation in sports (Mageau & Vallerand, 2003). This paper aims to investigate, within the setting of secondary schools in Sri Lanka, the coaching environment and the relationship between coaches' motivation and adopting interpersonal behaviours that improve autonomy.

Sport psychologists use a variety of theories to analyse players' motivation, but SDT has drawn a lot of attention and interest (Iachini, 2010). The theory states that meeting a person's three basic psychological needs has a major impact on motivation (Ryan & Deci, 2000; Ryan & Deci, 2002), namely competence, relatedness, and autonomy. According to Ryan and Deci (2002), competence is the ability to feel effective in one's continuous interactions with the social environment and to have opportunities to express and exercise one's capacities. The need for relatedness is the desire to have a sense of connection and belonging to people. This is known as the need for relatedness (Ryan & Deci, 2002; Baumeister & Leary, 2017). The concept of autonomy refers to the idea that one is in charge, and the source of one's behavior is known as the demand for autonomy (Ryan & Deci, 2002; Iachini, 2010). This viewpoint posits that any factor that influences the satisfaction of an individual's needs in a particular context, such as sports, will also influence their motivation to engage in that activity.

There are a wide range of activities in sports that might fulfil a person's need for motivation and gratification. However, studies (Vallerand & Losier, 1999; Ryan & Deci, 2002; Sarrazin et al., 2002; Mageau & Vallerand, 2003; Iachini, 2010; Yatigammana & Jayathilaka, 2024) demonstrate that coaches' general leadership styles and behaviours have a particularly significant impact. Coaches who exhibit interpersonal behaviours that promote autonomy have high degrees of intrinsic drive and autonomy, according to this study. These behaviours have positively impacted the athletes' motivated conduct, enhancing their sense of relatedness, autonomy, and perceived competence. Sport scientists that research SDT generally agree that one way to positively impact athletes' motivation is to get coaches to become more autonomy-supportive or to act in a way that supports students' needs for competence, autonomy, and relatedness (Mageau & Vallerand, 2003; Amorose, 2007; Iachini, 2010).

Methodology:

Though research indicates that autonomy-supportive coaching is important, little is known about how much coaches take this to heart (Iachini, 2010). We still need to answer the question of whether coaches' motivating methods and the implicit beliefs that inform their practice are consistent with SDT. Academics emphasise the need for qualitative assessments that delve deeper into this alignment (Amorose, 2007; Iachini, 2010; Yatigammana & Jayathilaka, 2024). Even though the literature has a large number of quantitative studies on autonomy-supportive methods, taking a qualitative approach offers a different point of view. Firstly, qualitative methods enable a deep, comprehensive comprehension of the particular tactics that coaches employ in their work. Secondly, a qualitative approach enables the exploration of tactics and methods that the coaching literature may not fully understand and document.

The methodology employed in this study was auto-ethnography, a qualitative research approach. Auto-ethnography, as described by Snyder (2015), is a qualitative research approach that requires researchers to reflect on their personal experiences and use them to gain insight into broader cultural and societal phenomena. The primary source of data in autoethnography is the researcher's personal experiences. The researcher then delves deeper into these experiences by utilising personal journals, self-interviews, and other relevant materials (Anderson, 2006). Autoethnography is a powerful technique for scholars who wish to delve into complex societal issues by utilising personal narratives and introspection (Chathuranga, 2024). The self-reflective analysis provides insight into the experiences of

being a netball coach for young women in a secondary school, namely those aged 11 to 18. Scholars who study autoethnography conduct research that this analysis builds upon. The researcher sourced the study's subjects from her personal experiences and classroom interactions, not from external entities. In the design of this experiment, the researcher specifically employed Leon Anderson's 'analytic autoethnography' method. Anderson (2006) defines analytic autoethnography as a form of ethnographic research where the researcher is dedicated to a research agenda that seeks to enhance theoretical understanding of broader social phenomena. The researcher is an active participant in the research group or environment, as evidenced by published work.

We used the framework of autonomy-supportive interpersonal behaviours to analyse the data. This analytical framework makes it possible to investigate in detail how the researcher's individual experiences fit into accepted SDT concepts. Theory provides a framework for interpreting data from our own observations as well as from other people. Therefore, it shares a close relationship with the study of cultural meanings and social relationships. The data analysis employs a theoretical lens, resulting in rich and cohesive experiences.

We used thematic analysis to analyse the data. Compared to other qualitative data analysis techniques, thematic analysis is more adaptable, able to summarise sizable datasets, offer thorough descriptions, draw attention to similarities and differences, produce surprising findings, and support the interpretation of social and psychological data (Braun & Clarke, 2006). We undertook the following procedures to achieve the article's goal: data gathering, data familiarisation, data transcription, preliminary code creation, theme search, theme evaluation, theme identification and labelling, and paper writing. As a result, thematic analysis was considered the best analytical method for interpreting the data.

Analysis and Discussion:

Both the Central Province and Sri Lanka youth netball teams selected a skilled netball player to represent them. Her accomplishments led to her becoming a professional netball player in Sri Lanka. She also participated in the 9th and 10th Asian Youth Netball Championships, where she achieved success and earned medals. She embarked on her coaching career at a government school. In addition, she was providing coaching services at an international school. Afterwards, the Maldives designated her as a coach. She received the opportunity to work as a part-time netball coach at a convent after completing her assignment in the Maldives. The study focuses on the experience acquired over a period of two years at a semi-government school with Catholic school management. The researcher began providing guidance to a team that exhibited instability and was selected based on political considerations. The coach selected the majority of the team players based on personal relationships and preferential treatment. The coach's initial task was to assemble a team based on each child's aptitude and proficiency. She used a variety of tactics to achieve this goal. The following strategies will be addressed.

An effective approach is to offer options while maintaining clear guidelines and limitations. The coach has consistently granted the players latitude in determining the days and times for conducting practices. However, the coach determines the minimum number of sessions each week, which limits these decisions. Several academics contend that allowing athletes to make choices within defined boundaries and regulations encourages autonomy-supportive interpersonal behaviours (Mageau & Vallerand, 2003; Amorose & Anderson-Butcher, 2007; Iachini, 2010). Several studies have emphasised the significance of choice in relation to athletes' intrinsic motivation (Dwyer, 1995; Goudas et al., 1995; Cordova & Lepper, 1996; Mageau & Vallerand, 2003). However, it is crucial to provide explanations for tasks and restrictions. Research suggests that coaches should explain the reasons behind assigned duties, as well as the boundaries and norms, to encourage athletes' autonomy (Deci et al., 1994; Grusec & Goodnow, 1994; Cordova & Lepper, 1996; Mageau & Vallerand,

2003). This explanation helps individuals understand and internalise the reasons behind their interest in activities. Empirical evidence demonstrates that individuals more readily assimilate and embrace significant tasks when their underlying values align.

During their time in school, children and teenagers go through a crucial period of emotional development. This is when they start to demonstrate a strong ability to trust in themselves and enhance their confidence and self-image (Espoz-Lazo et al., 2020). Thus, it was crucial for a coach to recognise and understand the emotions and viewpoints of others (Mageau & Vallerand, 2003; Amorose & Anderson-Butcher, 2007; Iachini, 2010). During various occurrences, such as when the school administration intervened and caused disorder among the team members, when the team experienced disappointment after losing a game or elation after winning a game, and when a member fell ill or got injured, the coach consistently inquired about and recognised the emotions of the team members. The coach's acknowledgement demonstrates the coach's ability to understand and consider the perspective of the athletes. It also indicates that the coach recognises the athletes as unique individuals with distinct needs and emotions (Mageau & Vallerand, 2003). To cultivate athletes' intrinsic drive, coaches should clearly articulate their overall approach and also recognise the potential for athletes to feel resentful towards specific regulations or expectations (Mageau & Vallerand, 2003).

Coaches who support autonomy give their players chances to take initiative and act autonomously (Deci et al., 1994; Mageau & Vallerand, 2003; Amorose & Anderson-Butcher, 2007; Iachini, 2010). It took the researcher several months to understand the students' disposition, despite their expected display of initiative and autonomy. Boggiano's (1998) research findings indicate that children who had the ability to make decisions regarding their activities in class, how to utilise their free time, and how to approach their work exhibited greater intrinsic motivation towards learning compared to children who perceived their teacher as being in control of all decisions (Boggiano, 1998; Mageau & Vallerand, 2003). In this scenario, the coach offered a limited number of techniques to the students, granting them the freedom to select their preferred strategy. As a result, there was an increase in internal motivation and a stronger commitment to continue training.

According to Mageau and Vallerand (2003), receiving positive comments about their skills is a significant factor that influences athletes' internal drive. Undoubtedly, providing positive feedback, as opposed to no input, significantly enhances the intrinsic motivation of young people (Deci et al., 1999). When providing feedback, it is important to give input that is informative and does not seek to regulate performance (Mageau & Vallerand, 2003; Amorose & Anderson-Butcher, 2007; Iachini, 2010). Individuals receive positive feedback that enhances their perception of their own competence, thereby positively impacting their intrinsic motivation (Mageau & Vallerand, 2003). The researcher consistently provided positive feedback to the students, using phrases such as 'Keep it up', 'You did well', and 'You will do better in your next game'. This feedback motivated the students to further improve their performance. Mageau and Vallerand (2003) propose that providing positive feedback to athletes can enhance their inherent motivation.

Controlling behaviours refer to external influences that exert pressure on individuals to conform to specific thoughts and actions (Mageau & Vallerand, 2003). Controlling behaviors lead to situations where not conforming to a specific way of behaving harms the connection between the coach and athlete or the athlete's self-esteem (Mageau & Vallerand, 2003). Thus, refraining from explicit manipulation, guilt-driven criticism, and controlling remarks does not promote the development of autonomy-supportive interpersonal behaviours (Mageau & Vallerand, 2003; Amorose & Anderson-Butcher, 2007; Iachini, 2010). The researcher consistently ensured that the players received neither chastisement nor reward during instruction.

The coach encountered a few negative situations that prompted her to reduce behaviours that encourage ego attachment. The researcher had to intervene and take action in

situations where parents and administration showed bias against certain team members. Athletes in ego-oriented environments are consistently under pressure to maintain their self-esteem, which motivates them to seek self-enhancement (Mageau & Vallerand, 2003). Players' ego involvement leads them to deviate from the coach's or situation's prescribed path (Mageau & Vallerand, 2003). Consequently, individuals experience a significant decrease in their autonomy. Ego-involvement restricts individuals' attention to the end result and constrains their actions (Mageau & Vallerand, 2003). Duda et al. (1995) demonstrated that athletes who expressed ego-involvement in their sport also indicated reduced levels of intrinsic motivation. Thus, in order to promote autonomy-supportive interpersonal behaviours, it is necessary to minimise or reduce egoistic behaviours (Mageau & Vallerand, 2003; Amorose & Anderson-Butcher, 2007; Iachini, 2010).

Female athletes consistently reported more favourable motivational profiles, as seen in earlier studies (Pelletier et al., 1995; Amorose & Horn, 2000; Amorose & Anderson-Butcher, 2007). In addition, the study found that high school athletes were more likely to consider their coaches supportive of their autonomy (Amorose & Anderson-Butcher, 2007). The researcher has personally encountered the same situation repeatedly during her work as a netball coach at a secondary school for girls in Sri Lanka. This study offers a comprehensive analysis of the complex dynamics involved in coaching by closely investigating the behaviours and underlying motivations of coaches. This study enhances existing knowledge on autonomy-supportive interpersonal behaviours, specifically in the context of coaching school netball. This study provides valuable insights into how administrative expectations and instructors' evaluations of students' passion for learning affect teachers' self-determined motivation. This comprehensive analysis of autonomy-supportive interpersonal interactions in a secondary school for girls in Sri Lanka, observed from a personal perspective, provides a unique perspective and enriches the ongoing discourse on Self-Determination Theory (SDT).

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Study of Impact of Yoga on Hematological Parameters

Durgadas Sawant

Iti Sasane

Abstract:

Regular practise of Yoga is said to have beneficial impact on overall well being. The purpose of this study was to observe how regular Yoga practise affects various hematological parameters. Fifty nine healthy adults aged between 18 and 60 years volunteered to take part in the study. Prior written consent was taken from each participant. All participants were attending the one year Yoga teachers training course of Yoga Vidya Niketan, Navi Mumbai under the supervision of professional Yoga teachers. Hematological parameters like haemoglobin, C-Reactive Proteins, cortisol, white blood cell (WBC) count, platelet count, were measured before and after the training. Results showed highly significant increase in haemoglobin levels, significant increase in platelet count, significant reduction of C-reactive proteins, but WBC and cortisol levels did not show significant improvement. The results agree with previous studies about the beneficial impact of Yoga on hematological parameters.

Keywords: Hematological Parameters, Impact of Yoga, Haemoglobin, C-Reactive Protein.

Introduction:

Yoga has been practised for spirituality and also for healthy living since ancient times in India and signifies unity and oneness of mind and body (Barnes et al., 2004). Now the International Day of Yoga is celebrated globally on June 21 since 2015, following its inception in the United Nations General Assembly in 2014. Now Yoga is considered as one of the most important methods of complementary medicine in the United States (Villien et al., 2005; Jeter et al., 2015). There are many different styles of Yoga. The different Yoga styles contain different combinations and durations of components (e.g., postures, breathing, meditation, relaxation, and chanting) (Oken et al., 2004). All different styles of Yoga are based on five basic principles: proper relaxation, appropriate use of most of the muscles in the body and massage to all the organs, proper breathing, appropriate diet, positive thinking and meditation. Although Yoga is not primarily a therapy, studies have proved a significant role of Yoga in treating wide range of diseases such including coronary heart disease (Kwong et al., 2015), and mental health issues (Shohani et al., 2018). Hence, researchers describe Yoga to be a “lifestyle polypill” (Manchanda, 2016). There are various research reports suggesting that regular Yoga practise has many health benefits. Some of the benefits are stress control, reduced anxiety, and muscle strength improvement (Woodyard, 2011). However, there is not enough research about beneficial effects of Yoga on hematological parameters (Sharma & Kumar, 2016). There is one study by Banerjee et al. (2019), which studied the effect of Yoga on physical and hematological parameters. This study is an extension of that study to examine how Yoga practise affects hematological parameters.

Methods:

Fifty nine healthy volunteers participated in the study. Fourteen participants were male, and forty five were female. The age range was 19-69 years. The study was designed as an uncontrolled longitudinal study. Written consent was taken from all the participants after explaining the study and sharing information of the blood tests planned for the study. All volunteers were going to start regular Yoga practise under Yoga Teachers Training Course from 21st July 2023. The participants were assessed just at the start of training on 6 August 2023, and again on 29 Feb 2024, after a gap of six months during which the participants had regular Yoga practise. The same subjects were chosen as both study and control groups.

Exclusion criteria included those who did not practise regular Yoga for the six month period. The hematological parameters measured are listed in Table 1.

Table 1. Hematological parameters measured

Parameter Measured	Method
Haemoglobin (Colorimetric)	Hb-SLS; RBC-Hemodynamic focus DC
Total and differential WBC count	Flowcytometry, 5 Part Cell Counter
Platelet and indices	Hemodynamic Focus DC
C-Reactive Protein	Immunoturbidimetric
Cortisol 8 AM	CMIA

After the first blood sample on 6th August 2023, all participants attended the Yoga training course over six months at Yoga Vidya Niketan, Navi Mumbai under the guidance and supervision of professional Yoga teachers. All participants also practised Yoga from 30 minutes to 90 minutes every week, daily or at least thrice a week. The blood parameters from before and after the six month training period were compared as mean \pm standard deviation (SD). Student's paired t test (two-tailed) before and after six months was calculated.

The purpose of the paired t-test is to determine whether there is significant difference between 2 sets of observations. This is done by checking whether the mean difference (μ_d) between the two sets of observations is equal to zero. Each entity is measured twice in the paired t-test, with observations taken before and after to create pairs of data. Two competing hypotheses, the null hypothesis (H_0) and the alternative hypothesis (H_1), are involved in the paired t-test. The null hypothesis assumes that the true mean difference between the paired observations is zero, indicating that there is no significant difference between the "before" and "after" values. According to this hypothesis, any observable differences are merely due to random variation. The alternative hypothesis, on the other hand, assumes that the actual mean difference between the paired observations is not zero, indicating a statistically significant variance between the "before" and "after" values. Conducting a paired observations t-test involves four steps and utilizes the following defined symbols:

D = Differences between 2 paired observations

\bar{d} = Sample mean of differences

σ = Sample standard deviation of the differences

d_i = The i^{th} observation in D

p = p-value (probability value) for the t-statistic

n = The sample size

t = t-statistic (t-test statistic) for a paired observations t-test

The four steps are listed below:

1. Calculate the sample mean

$$\bar{d} = \frac{d_1 + d_2 + d_3 + \dots d_n}{n}$$

2. Calculate the sample standard deviation

$$\sigma = \frac{(d_1 - \bar{d})^2 + (d_2 - \bar{d})^2 + (d_n - \bar{d})^2}{n - 1}$$

3. Calculate the test statistic

$$t = \frac{\bar{d} - 0}{\sigma / \sqrt{n}}$$

4. Determine the probability (p-value) of observing the test statistic under the null hypothesis.

Referencing statistical textbooks gives more precise outcomes. Statistical significance is ascertained by examining the p-value, which indicates the likelihood of observing the test results under the null hypothesis. When the p-value is lower, it means that getting a similar result if the null hypothesis were true has a very low chance. So with a low p-value we can assume that the null hypothesis may not be true. However the possibility of the null hypothesis still being true, and the results we obtained being purely an uncommon result, can never be fully dismissed. The appropriate p-value to be set by researcher for establishing statistical significance. Typically a value of .05 or lower is selected. The chance of getting such a result if the null hypothesis were true is 5% (or less).

Results:

Out of 59 participants, 14 (24%) were male and 45 (76%) were female. Figure 1 shows the gender demographic of the participants. As shown in Figure 2, age range of participants varied from 19 to 69.

Figure 1. Gender demographics of participants in the study

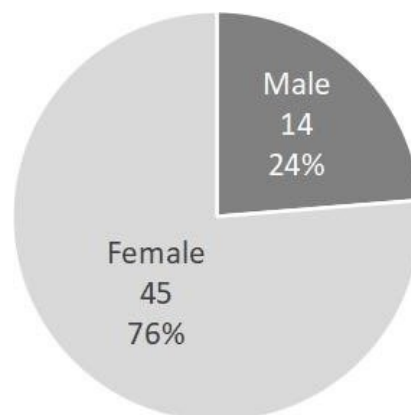


Figure 2. Age distribution of participants in the study

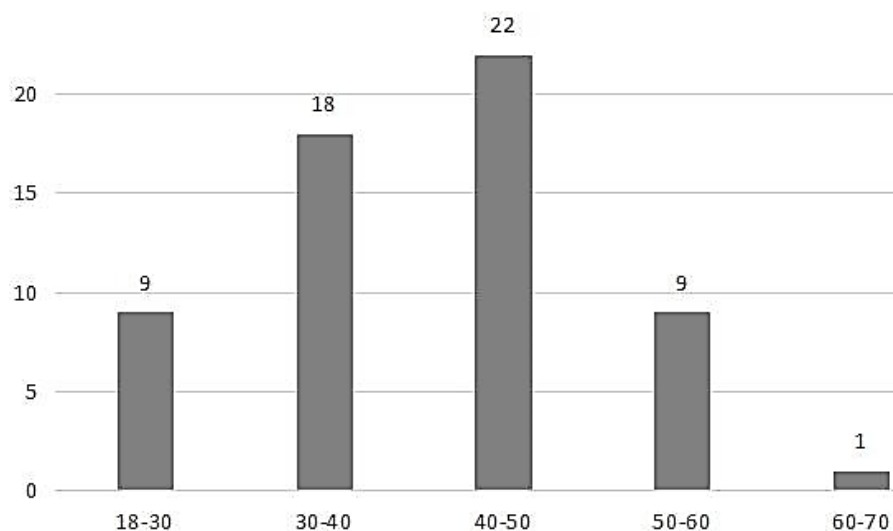


Table 2 shows summary of hematological parameters before and after Yoga practise.

Table 2. Parameters before and after Yoga training

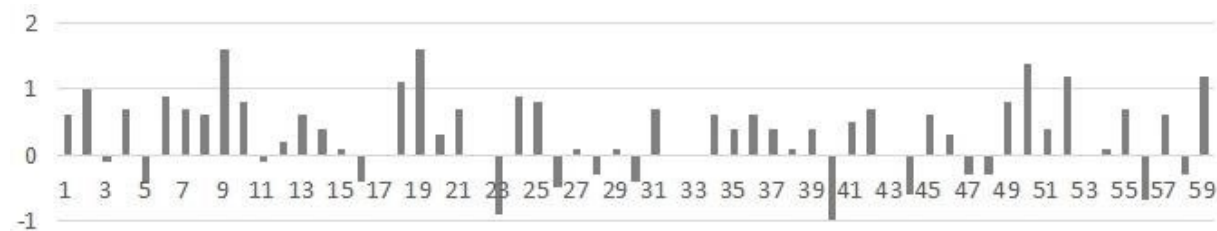
Parameter	Before training	After training	P Value
Haemoglobin	12.75 \pm 1.40	13.08 \pm 1.39	0.000076 (Very highly significant)
Platelet count	297 \pm 78	318 \pm 80	0.018 (Significant)
C reactive Protein	3.16 \pm 3.32	2.20 \pm 1.98	0.020 (Significant)
WBC count	6574 \pm 1490	6758 \pm 1656	0.476 (Not significant)
Cortisol	11.84 \pm 3.07	11.88 \pm 4.28	0.993 (Not significant)

Note: P value < 0.05 taken as significant, < 0.01 highly significant and < 0.001 as very highly significant.

Discussion:

Based on the hypothesis that Yoga training has beneficial effect on health, various hematological parameters were compared before and after Yoga training. After six months of Yoga training, broadly all participants reported improvement in general well being.

Very highly significant ($P < 0.001$) improvement was seen in haemoglobin levels in this study. As seen in Figure 3a, most of the participants showed increase in haemoglobin levels. Most of the participants showed increase in haemoglobin levels.

Figure 3a. Difference in haemoglobin levels before and after Yoga training

Around 66% of all participants showed increase in haemoglobin levels as seen in Figure 3b. In case of female participants, the proportion of females who showed increase in haemoglobin levels is even higher (71%) as seen in Figure 3c.

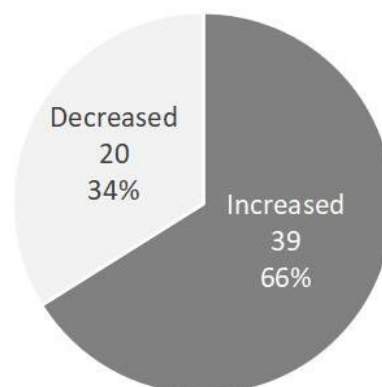
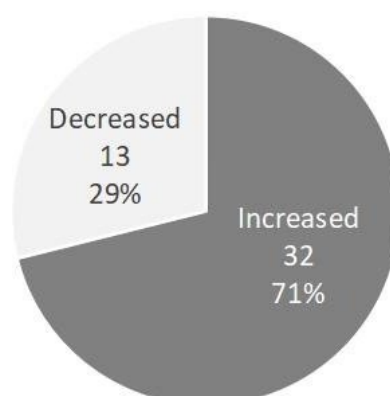
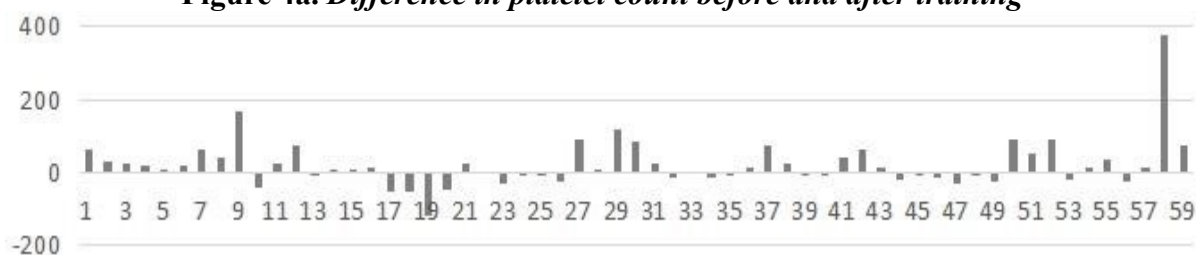
Figure 3b. Comparison of haemoglobin levels in all participants

Figure 3c. Comparison of haemoglobin levels in female participants

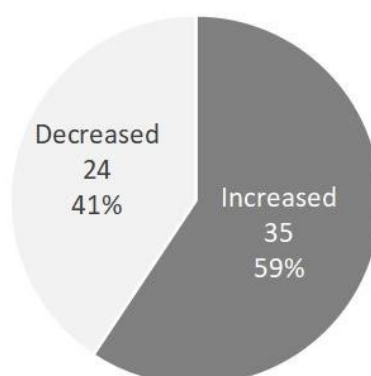
Increased level of haemoglobin is consistent with earlier studies. In a study of 150 participants, Sayyad et al. (2010) studied, among other factors, the effect of Sudarshan Kriya Yoga for 8 days. In the study, it was found that haemoglobin levels increased, along with better lipid profile and pulmonary functions. In another study of treating anemic patients with folic acid, iron and Yoga practise for three months, Ramanath et al. (2013) observed various beneficial results like improvement in haemoglobin, pulse rate and blood pressure. The reason for increased haemoglobin can be explained by two different mechanisms:

- release of erythropoietin due to hypoxia during Yoga practises; increased release of iron stores from reticulo-endothelial cells and
- enhanced release of reserved RBCs by splenic contraction (Ramanath et al., 2013; Mairbäurl, 2013).

A significant ($P < 0.05$) increase was seen in the platelets in this study. As seen in Figure 4a, most of the participants showed increase in platelet levels.

Figure 4a. Difference in platelet count before and after training

Around 59% of all participants showed increase in platelet count levels as seen in Figure 4b.

Figure 4b. Comparison of platelet count before and after training

This increase in platelet count is consistent with earlier studies. A similar study by Chohan et al. (1984) was conducted involving 4 months of Yoga training for 7 adults. They also found a rise in platelet count Purohit et al. (2011) found a rise in platelets in 87.5% subjects. In their study, clotting time was increased while bleeding time was decreased significantly. Bleeding time can be defined as the time interval between the moment when bleeding starts and the moment when the bleeding stops due to the formation of temporary platelet plug. Bleeding time usually lasts for 3–4 min. Clotting time is the time interval from onset of bleeding to formation of first fibrin thread and normal clotting time usually lasts for 5–8 min. The reason for increased platelet count can be explained by two different mechanisms:

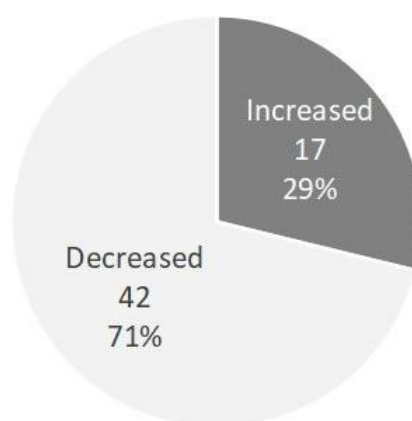
- hypoxia induced during Yoga practises;
- enhanced contraction of spleen which can release the reserved platelets.

Another significant observation of this study is the improvement in C-Reactive Proteins. A significant ($P = 0.02$) reduction can be seen in C-Reactive Proteins after the Yoga training. As seen in Figure 5a, most of the participants showed reduction in C-Reactive Protein levels.

Figure 5a. Difference in C-Reactive Protein level before and after Yoga training



Figure 5b. Comparison of C-Reactive Protein level before and after Yoga training



One study by Mehrabani et al. (2013) demonstrated that there was a significant C-Reactive Protein decline in both obese and non-obese groups after 19 weeks of aerobic exercises. Since regular exercise decreases body fat percentage and fat is a source of IL-6 production, fat reduction decreases serum levels of cytokines and reduction in serum levels of IL-6 weakens the signaling pathway of C-Reactive Protein production. Improved physical readiness due to exercise physiology is the main reason for decline in levels of C-Reactive Proteins (Ford, 2002; Esposito et al., 2005; Isasi et al., 2007; Kasapis & Thompson, 2005). This is consistent with results of our study.

Previous studies have shown that exposure to short-term stress (e.g., physical exercise) can lead to changes in WBC (Edwards et al., 2007; Timmons et al., 2006). Some studies have reported alterations in leukocyte and subset counts in response to high intensity exercise

(Sand et al., 2013). In our study, however there is a minor decrease in WBC count, although this finding is not significant ($P = 0.476$).

In other literature, it has been suggested that reduction in stress may be expected to lower the cortisol levels. Considering that Yoga helps in reducing stress, reduction in cortisol levels may be expected, which can be attributed to the reduction of stress-related consequences (Thirthalli et al., 2013). However, our study shows a slight increase in the mean value of cortisol levels, although this finding is not statistically significant ($P = 0.993$). One explanation for this contradictory, although insignificant finding in our could be that the participants had a Shuddhi Kriya practical exam on the same day as the blood collection for the second sample (blood sample after 6 months Yoga training). The anxiety and stress of appearing for the test could have contributed to elevated cortisol levels.

Limitations:

This study did not use control groups, and had relatively small sample size. Stricter inclusion and exclusion criteria could also refine the findings further. The study was also restricted by the available testing methods for hematological parameters. In future, a longitudinal research could be conducted over a longer duration - like 12 months to confirm the conclusions.

Conclusion:

This study shows that Yoga has positive effect on health. In particular, the findings of improved haemoglobin, platelet and C-Reactive Protein are statistically significant. Most of the findings in this study are consistent with previous studies. Further studies may further support or extend the findings of this study.

Acknowledgment:

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