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The title of the paper should provide a concise statement of the contents of the paper. A good title is very important and will attract readers and facilitate retrieval by online searches, thereby helping to maximize citations. The title should include topical keywords and allude to the interesting conclusions of the paper. A title that emphasizes the main conclusions, or poses a question, has more impact than one that just describes the nature of the study.

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Provide a context or background for the study (i.e., the nature of the problem and its significance). State the specific purpose or research objective of, or hypothesis tested by, the study or observation; the research objective is often more sharply focused when stated as a question. Both the main and secondary objectives should be made clear, and any pre-specified subgroup analyses should be described. Give only strictly pertinent references and do not include data or conclusions from the work being reported.

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Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first.

Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations. When data are summarized in the results section, give numeric results not only as derivatives (for example, percentages) but also as the absolute numbers from which the derivatives were calculated, and specify the statistical methods used to analyze them. Table font should be 10 and caption should be below table and figure.

Data should not be duplicated in both figures and tables. The maximum limit of tables and figures should not exceed more than 4. Mention the findings of the study in paragraph, while mentioning figure and table number in text in sequential order.

TABLE

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Discuss your findings by comparing your results with other literature

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CONCLUSION(S)

Conclusion should elucidate how the results communicate to the theory presented as the basis of the study and provide a concise explanation of the allegation of the findings.

ACKNOWLEDGEMENT

Provide the list of individuals who contributed in the work and grant details where applicable

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Original Article

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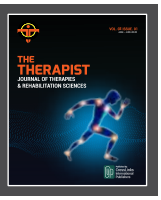

Aerobic Exercise in Physical Therapy: A Natural and Accessible Path to Holistic Health

OPEN ACCESS

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In the current world, a large number of citizens do not have time to engage themselves in exercise due to tight schedules. A set of health problems, including heart disease, diabetes, obesity, and stress, may result because of this lack of physical activity. Aerobic exercises are one of the simple and natural methods of keeping healthy. These are exercises which raise your heart rate and cause you to breathe quickly. Walking, jogging, swimming, cycling, and dancing are some of the common aerobic activities. They are often performed at indoor or outdoor venues, in groups or individually, and do not necessarily require special equipment.

Aerobic exercises are also referred to as cardio exercises, as they improve the functional capacity of the heart and lungs. These activities involve the use of large muscle groups, such as the legs and arms, in a consistent and sustained manner. Aerobic exercises are practiced by individuals of all ages. Simple everyday activities can serve as effective exercise—for instance, walking to the store instead of driving, taking the stairs instead of the elevator, or gardening—all of which may serve as forms of aerobic activity. Newcomers to physical activity can begin gradually with low-impact exercises such as slow walking or mild movement-based routines, and progressively increase the duration and intensity.

Aerobic exercise offers numerous health benefits, which are realized when it is performed on a regular basis. It strengthens the heart and supports improved blood circulation. It also reduces blood pressure and assists in regulating blood sugar and cholesterol levels. Aerobic activity is also effective in weight management by burning excess calories. Beyond the physical benefits, aerobic exercises positively impact mental health. Regular activity helps to reduce stress, anxiety, and symptoms of depression. It helps to sleep better and boosts the level of energy. People are more energetic, active and are more optimistic in their day to day lives.

In summary, aerobic exercise is an easy, safe, and natural way of improving physical and mental health. It is all inclusive and can be modified to suit individuals of different age groups and physical capacity. Aerobic exercise, when combined with physical therapy programs, may be significant in preventing diseases, rehabilitation, and improvement of the quality of life. It is important as physical therapists and other health professionals to advise, encourage and teach people to engage in aerobic exercise as part of their daily activities. It could be a formal exercise or a walk every day, each step counts. Being physically active is among the most effective and affordable decisions that one can make to improve the long-term health and functional autonomy.

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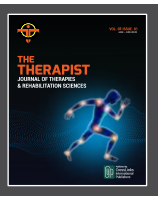

Original Article

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Comparison of the Visual Analog Scale and Oswestry Disability Index Between Working and Non-Working Women with Lower Back Pain

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ABSTRACT

Low back pain (LBP) is one of the most prevalent musculoskeletal disorders worldwide, significantly affecting women's daily activities, functional capacity, and quality of life. Occupational status may play an important role in influencing pain perception and disability outcomes. **Objectives:** To compare the scores of the VAS and OID between working and non-working women with low back pain. **Methods:** This study involved 356 participants, particularly women with LBP, of whom 178 were employed and 178 were unemployed. Subjects were included if they were women with non-specific LBP and met the required age range and employment status criteria. Exclusion criteria were being male, having a particular medical condition, deformities, or having undergone recent surgery. The subjects were recruited from offices and different homes in Karachi. All the participants were informed and provided written consent before participating in the study. The institutional review board or ethics committee gave the study ethical approval. **Results:** The average age of the participants was 31.16 years for both the working and the non-working women. Two groups did not differ significantly (p=0.826>0.05) in terms of VAS score. The ODI score, however, proved that there was a statistically significant difference (p=0.034<0.05), indicating that there was more functional restriction in one group. **Conclusions:** The study concluded that both working and non-working women experience functional limitations and pain due to low back pain, with significant differences in disability levels measured by ODI.

INTRODUCTION

Low back pain (LBP) is one of the most prevalent musculoskeletal disorders, affecting nearly 80% of individuals at some point in their lives [1]. In Pakistan, LBP poses a substantial public health burden, with prevalence estimates ranging from 25% to 60% among adults, leading to significant functional limitations, reduced work productivity, and increased healthcare utilization [2, 3]. Among women, LBP has a particularly high burden due to biological, social, and occupational factors, including hormonal fluctuations, caregiving responsibilities, and work-related physical or psychosocial demands [4]. These factors not only increase the risk of pain but also exacerbate its severity and chronicity. The consequences of LBP extend beyond physical discomfort, often impairing daily functioning, reducing social and occupational participation, and negatively impacting mental health and quality of life [5]. The economic burden is also considerable, with costs arising from healthcare utilization, productivity loss, and disability claims [6]. Visual Analog Scale (VAS) and Oswestry Disability Index (ODI) are very common in clinical and research settings to gauge the effects of LBP. A VAS is a non-complicated

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instrument that has a rating scale of 0-10, i.e., no pain to the worst pain that could be imagined, and is sensitive to time [7]. Although it is useful in measuring the severity of pain, it does not give an account of functional impairments. On the contrary, ODI will be used to measure disability that is directly related to LBP. It discusses ten areas of everyday life, such as personal care, lifting, walking, and social activity, where the scores are higher the more disabled the person is [8]. A combination of VAS and ODI offers a complete analysis of the pain intensity and functional impairment. Women might differ in employment status, and it can be a key factor in their LBP. Risk factors that can affect working women relate to the absence of proper ergonomics, excessive workload, excessive sitting time, and balancing between career and home life, which may lead to musculoskeletal strain [9, 10]. LBP in this population has been linked to low productivity, absenteeism, increased medical expenditures, and psychological outcomes [11, 12]. Homemakers and other caregivers, in general, face considerable risks, as well, since there are non-working women. Repetitive strain can be caused by household chores, such as lifting, bending, and excessive standing, whereas a lack of formal physical activity may cause the core muscles to be weakened. Symptoms can also be further worsened by stress and social isolation [13, 14]. In the case of non-working women, LBP may severely restrict mobility, lower the quality of life, and augment the level of reliance on others [1, 15]. Although LBP has been researched widely, there is still a gap in the understanding of how pain intensity and disability among working and non-working women differ. Employment status can also affect the severity of pain as well as coping styles, intention to seek health care, and chronic functional performance [16, 17]. This gap is critical in order to customize the preventive and rehabilitative interventions. Thus, the current experiment intends to provide the comparative results of VAS and ODI scores among working and non-working women with low back pain. Through these differences, the study will aim at offering meaningful information on how employment status influences the occurrence of LBP among women and also to guide policies to enhance the functional performance and life quality [18]. This study aims to compare the scores of the VAS and OID between working and non-working women with low back pain.

METHODS

This cross-sectional study was conducted for six months in different areas of Karachi after the approval of the study synopsis FROM Isra University, Karachi. The study duration was from July to December 2024. A total of 356 participants, comprising 178 working and 178 non-working women with non-specific low back pain (LBP), were recruited through convenience sampling. This sample of 356 participants was determined based on a 95% confidence level prevalence formula (n = Z2 x p(1-p)/d2) and adjusted to represent an equal number of working and non-working women and corrected against non-response. Male participants, deformed ones, or those who had undergone recent surgery were eliminated. All the participants were provided with written informed consent. The VAS a single-item instrument that measures pain intensity on a 0-10 cm scale, where 0 indicates no pain and 10 the worst imaginable pain was used to collect data, with the highest percentages representing the highest possible amount of disability [19], and the Oswestry Disability Index (ODI), a self-administered questionnaire, with 10 items assessing pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, traveling, and employment/homemaking, were used, scaling a The questionnaires were administered and recorded with the consideration of voluntary responses, code response and confidentiality. Analysis of data was done through SPSS 22. Continuous variables were calculated as descriptive statistics (mean ± SD), whereas categorical variables were calculated as frequencies/ percentages. The VAS and ODI categories were compared in terms of chi-square tests between working and non-working women, and independent t-tests were performed to compare the means. The p-value below 0.05 was taken to be significant.

RESULTS

This study included 356 women who had low back pain. The average age of the participants was 31.16 +/- 4.09, with a range of 24 years as the minimum age and 40 years as the maximum age (Table 1).

Table 1: Descriptive Statistics of ODI Scores among Working Women (n=178)

Statistic	Value
N (Valid)	178
Missing	0
Mean	31.16
Standard Deviation	4.09
Minimum	24.00
Maximum	40.00

Results showed that 28% of working women and 26% of non-working women reported no pain, while the majority reported mild to moderate pain. Severe pain was observed in 33% of working women compared to 30% of non-working women. The chi-square value was 5.094, indicating a non-significant association between employment status and VAS categories (p>0.05) (Table 2).

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Table 2: Comparison of VAS Scores Between Working and Non-Working Women with LBP (n=356)

VAS (Working Women)	No Pain	Mild	Moderate	Severe	Total
No Pain	3%	13%	6%	6%	28%
Mild Pain	10%	22%	17%	9%	58%
Moderate Pain	8%	24%	17%	10%	59%
Severe Pain	5%	9%	14%	5%	33%
Total	26%	68%	54%	30%	178%

Findings revealed that 18% of working women and 10% of non-working women reported no disability, while the majority experienced mild to moderate disability. Severe disability was slightly more prevalent among working women (39%) compared to non-working women (33%). Complete disability was notably higher in non-working women (33%) compared to working women (7%). The chi-square value was 27.779, indicating a statistically significant association ($p<0.05$) (Table 3).

Table 3: Comparison of ODI Score Grading Between Working and Non-Working Women with LBP (n=356)

ODI (Working Women)	No Disability	Mild	Moderate	Severe	Complete	Total
No Disability	3%	8%	1%	1%	0%	13
Mild Disability	3%	20%	6%	6%	0%	35
Moderate Disability	3%	17%	13%	13%	0%	46%
Severe Disability	1%	7%	10%	10%	1%	29%
Complete Disability	0%	0%	3%	3%	0%	6%
Total	10%	52%	33%	33%	1%	178%

DISCUSSION

Our study involved 356 women with low back pain (LBP), equally divided between working and non-working participants, and aimed to compare pain intensity and disability scores using the VAS and ODI. The findings demonstrated that working women were more likely to report moderate and severe disability, whereas non-working women more often reported mild disability. Pain intensity patterns were similar across groups, although working women reported slightly higher proportions of moderate pain compared to their non-working counterparts. These findings indicate that work and household roles can have different effects on the perception of pain and disability in women with LBP. The VAS and the ODI continue to be two of the most used instruments in clinical and research settings to measure pain and disability. In line with the literature, pain intensity as assessed by VAS was significantly related to scores on the ODI disability, indicating the interconnection of the two measures in LBP populations [2]. Later research confirms this relationship as well, indicating that psychosocial and occupational variables also affect disability scores, not just the intensity of pain [3, 20]. Specifically, the occupational aspect of LBP is applicable in our research. Females who are exposed to strenuous activities or sustained immobility postures have a higher risk of acute and chronic LBP. This has been proven recently with reports showing that ergonomic difficulties, bad posture, and heavy workloads are major causes of disability among working women [21]. The results of our study are also compatible with the recent prevalence studies that show that the burden of LBP is high in women all over the world. Indicatively, Yamada et al. noted that LBP is currently one of the most disabling diseases among women both at work and at home [3], and Adhikari et al. noted that it is becoming an increasing issue in South Asian populations, and employed women are at a high risk [20]. Such studies support the belief that both the levels of pain and disability in women are caused by some gender specific factors, such as hormonal influences, occupational exposures, and caregiving roles. The combination of our study with other studies currently shows that working women have more disability associated with LBP, probably as a result of both occupational strain and household workload. Ergonomic workplace adjustments, posture and lifting skills education, and specific rehabilitation of working women should therefore be the focus of future intervention, alongside the risks to the sedentary lifestyle of non-working women.

CONCLUSIONS

The study concluded that there is a significant difference in Visual Analog Scale and Oswestry Disability Index scores between working and non-working women with low back pain. Working women experienced higher levels of moderate to severe disability and moderate pain, whereas non-working women reported milder disability and pain. These findings indicate that employment status influences pain intensity and functional limitation, highlighting the importance of considering occupational factors when assessing and managing low back pain in women.

Authors Contribution

Conceptualization: TK
Methodology: AQ, NA
Formal analysis: AN
Writing review and editing: HG

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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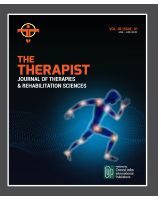

Original Article

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Sports Injury and Sport Safety Practices among Undergraduate Sports Participants

Kainat Bibi[1], Muhammad Taqi Kazmi[1], Muhammad Jawwad Baig[2*], Aiman Faraz[2] and Raee S Alqhtani[3]

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Sports Injury, Sport Safety Practices, Undergraduate Sports Participants

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ABSTRACT

Low back pain (LBP) is one of the most prevalent musculoskeletal disorders worldwide, significantly affecting women's daily activities, functional capacity, and quality of life. Occupational status may play an important role in influencing pain perception and disability outcomes. **Objectives:** To compare the scores of the VAS and OID between working and non-working women with low back pain. **Methods:** This study involved 356 participants, particularly women with LBP, of whom 178 were employed and 178 were unemployed. Subjects were included if they were women with non-specific LBP and met the required age range and employment status criteria. Exclusion criteria were being male, having a particular medical condition, deformities, or having undergone recent surgery. The subjects were recruited from offices and different homes in Karachi. All the participants were informed and provided written consent before participating in the study. The institutional review board or ethics committee gave the study ethical approval. **Results:** The average age of the participants was 31.16 years for both the working and the non-working women. Two groups did not differ significantly ($p=0.826>0.05$) in terms of VAS score. The ODI score, however, proved that there was a statistically significant difference ($p=0.034<0.05$), indicating that there was more functional restriction in one group. **Conclusions:** The study concluded that both working and non-working women experience functional limitations and pain due to low back pain, with significant differences in disability levels measured by ODI.

INTRODUCTION

Sports are competitive team or individual physical activities or games that are organized with defined rules and goals. They may be played at amateur or professional levels and include a wide variety, such as individual sports like tennis, badminton, and golf, as well as team sports like basketball, cricket, football, and volleyball. Participation in sports promotes exercise, improves cardiovascular health, muscle strength, flexibility, and overall fitness. Beyond physical health, sports participation enhances mental wellness by reducing stress, anxiety, and depression through the release of endorphins, while also fostering cooperation, communication, teamwork, discipline, and time management skills [1, 2]. Engagement in sports offers extensive benefits for students. Contrary to the belief that sports may distract from academics, research shows that active participation positively influences academic performance. Students engaged in sports demonstrate improved focus, problem-solving skills, and cognitive function, along with better time management between athletic and academic responsibilities. Such activities contribute not only to improved academic achievement but also to self-control, cooperation, and resilience [3]. In addition, sports foster personal development by improving self-confidence, teamwork, leadership, social skills,

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discipline, brain power, and emotional regulation. They also provide career opportunities for students who pursue athletics professionally or transition into roles such as coaches, referees, or trainers [4]. Despite the wide-ranging benefits, participation in sports carries the risk of injuries. Sports injuries occur due to accidents, poor training practices, or failure to use protective equipment. They can be sudden or develop over time and are particularly common among individuals who neglect warm-up and cool-down routines or engage in high-intensity contact sports. Common sports injuries include fractures, cartilage tears, concussions, dislocations, tendinitis, sprains, and strains [5]. Such injuries can affect academic performance, cause long-term health issues, and even hinder career opportunities for student-athletes [6]. The importance of adopting safety practices in sports has therefore gained increasing attention. Adolescents and young adults, who are at a crucial stage of lifestyle formation, require education and awareness about safe participation. Recognizing risks, adhering to rules, and using appropriate safety gear such as helmets, shin guards, protective eyewear, and knee braces are critical preventive strategies [7, 8]. Warm-up and cool-down routines are equally essential to prevent musculoskeletal injuries and aid recovery. Sports safety gear helps protect against both minor and severe injuries, ensuring continuity in participation while safeguarding long-term health [9]. Essential equipment, such as helmets, mouthguards, protective goggles, shin guards, and elbow or knee pads, plays a vital role in minimizing risks, while emerging tools such as kinesiotape provide additional support and stability for athletes [10, 11]. Despite awareness of warm-up and cool-down practices, adherence to safety measures and use of protective equipment remains low. Most previous studies focus on professional athletes, leaving a gap in understanding injury patterns and safety practices among undergraduate participants. Assessing these factors is clinically significant, as it can guide universities in implementing preventive strategies, promoting safe sports participation, and reducing the risk of long-term. Given the increasing participation of undergraduate students in various sports and the potential risk of injury, it is important to evaluate their awareness and practices related to sports safety.

This study aims to focus on sports injuries and safety practices among undergraduate sports participants in Karachi, providing insights into existing gaps and highlighting the need for preventive measures and education.

METHODS

This study was a cross-sectional design conducted for six months in different universities of Karachi with a sample size of 377 participants, selected through a convenience sampling technique. The study duration was June to November 2024. Undergraduate students aged 18–25 years who had been actively participating in university-level sports for at least the past year and were willing to provide consent were included. Students outside this age range, not engaged in regular sports, with pre-existing major musculoskeletal disorders, or unwilling to participate, were excluded. Data collection was carried out using a self-administered questionnaire distributed to students, which they completed and returned; informed consent was obtained before participation Kitayama et al. [12]. Confidentiality was maintained by coding the data. The expected budget for the study was 15,000 Rupees. Ethical approval was obtained from the Institutional Ethical Review Committee of Isra University, Karachi Campus, and all participants were volunteers.

RESULTS

The study included 377 participants, with a higher proportion of male (59.2%) compared to female (40.8%). The majority of students (65.0%) were aged between 22 and 25 years, while 35.0% were in the 18–21 years' age group, reflecting the typical age distribution of university students. Regarding academic year, the highest representation was from third-year students (22.5%), followed by fifth year (21.5%), and second year (19.9%). These demographic characteristics provided a balanced sample across different age groups and study levels (Table 1).

Table 1: Demographic Characteristics of Participants

Variables	Category	Frequency (%)
Gender	Male	223 (59.2%)
	Female	154 (40.8%)
Age (Years)	18–21	132 (35.0%)
	22–25	245 (65.0%)
Study YearMale	1st Year	66 (17.5%)
	2nd Year	75 (19.9%)
	3rd Year	85 (22.5%)
	4th Year	70 (18.6%)
	5th Year	81 (21.5%)

A wide range of sports was reported by participants, with cricket (45.6%) being the most frequently played, followed by football (19.1%) and badminton (14.9%). Less commonly played sports included throwball (7.4%), volleyball (4.0%), and other activities such as athletics and swimming (9.0%). These results highlight the predominance of team-based field sports among university students, particularly cricket and football, which accounted for nearly two-thirds of all

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participation (Table 2).

Table 2: Sports Participation of Participants

Type of Sport	Frequency (%)
Cricket	172 (45.6%)
Football	72 (19.1%)
Throwball	28 (7.4%)
Volleyball	15 (4.0%)
Badminton	56 (14.9%)
Others	34 (9.0%)

Out of the 377 participants, 193 (51.2%) reported experiencing at least one sports-related injury. The most frequently reported injuries were hand (20.7%), ankle (19.7%), and muscle injuries (19.2%), followed by shoulder (15.0%) and knee injuries (12.4%). Less common injuries included elbow (5.7%), fractures (4.7%), and head injuries (2.6%). These findings suggest that extremities, particularly hands and ankles, are the most vulnerable body regions during sporting activities (Table 3).

Table 3: Sports-Related Injuries Among Participants

Type of Injury	Frequency (%) of Injured (n=193)
Shoulder	29 (15.0%)
Elbow	11 (5.7%)
Hand	40 (20.7%)
Knee	24 (12.4%)
Ankle	38 (19.7%)
Muscles	37 (19.2%)
Head Injury	5 (2.6%)
Fractures	9 (4.7%)

The majority of participants (59.9%) reported not using any safety equipment during sports activities. Among those who did, helmets (17.0%) and knee pads (9.0%) were the most commonly used, followed by gloves (6.4%) and elbow pads (3.7%). Mouth guards (1.9%) and shin guards (2.1%) were used only rarely. These findings indicate a concerning lack of protective measures among university athletes, potentially increasing their risk of injuries (Table 4).

Table 4: Use of Safety Equipment During Sports

Safety Equipment	Frequency (%)
Helmet	64 (17.0%)
Mouth Guard	7 (1.9%)
Knee Pads	34 (9.0%)
Elbow Pads	14 (3.7%)
Shin Guards	8 (2.1%)
Gloves	24 (6.4%)
Nothing at All	226 (59.9%)

The majority of participants reported performing warm-up (70.8%) and cool-down (61.5%) exercises during sports. However, a notable proportion of students (29.2% and 38.5%, respectively) admitted to neglecting these practices. Since warm-up and cool-down routines are essential for preventing injuries and enhancing recovery, these results highlight a partial adherence to safe sporting practices, with room for improvement (Table 5).

Table 5: Warm-up and Cool-down Practices of Participants

Activity	Yes, n (%)	No, n (%)
Warm-up	267 (70.8%)	110 (29.2%)
Cool-down	232 (61.5%)	145 (38.5%)

DISCUSSION

The present study explored sports-related injuries and safety practices among undergraduate sports participants in Karachi. A total of 377 students aged 18–25 years were included, with males representing a larger proportion (59.2%) compared to females (40.8%). This gender distribution is consistent with previous studies reporting higher male participation in sports, particularly in competitive activities such as cricket and football [13]. The age and study year distribution also reflected typical undergraduate populations, supporting the representativeness of the sample. In terms of sports participation, cricket emerged as the most commonly played sport (45.6%), followed by football (19.1%) and badminton (14.9%). This finding aligns with earlier research reporting cricket and football as the most popular sports among South Asian university students [14]. The predominance of these sports may explain the relatively high rate of musculoskeletal injuries observed in the current study, as both involve frequent sprinting, tackling, and high physical contact. The prevalence of sports-related injuries in the present study was 51.2%, with hand (20.7%), ankle (19.7%), and muscle (19.2%) injuries being the most frequently reported. These results correspond with earlier studies on medical and high school students, which documented injury rates between 30% and 50% per season, with sprains and strains being the most common injuries [11, 13]. Similarly, ankle and knee injuries have consistently been reported as high-risk areas in youth and collegiate athletes, indicating a shared pattern across different age groups and sports disciplines [14, 15]. Compared to the 38% prevalence of sports injuries among medical students reported previously [13], the current study demonstrates an even greater injury burden among undergraduate athletes, likely reflecting their more frequent engagement in competitive sports. Safety practices in the present study revealed concerning trends. More than half of the participants (59.9%) reported not using any protective equipment during sports, while only 41.6% used gear such as helmets (17.0%) or knee pads (9.0%). This is consistent with earlier findings that inadequate safety practices are a major contributor to injury risk [7, 9]. The lack of equipment use underscores the

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urgent need for intervention, as universities with comprehensive safety protocols and training programs have been shown to report significantly lower injury rates compared to those without structured safety measures [16, 17]. On a more positive note, warm-up and cool-down practices were widely adopted, with 70.8% of participants performing warm-ups and 61.5% engaging in cool-down exercises. Previous research has highlighted the importance of such practices in reducing sports injuries, and inadequate routines were linked to nearly 60% of injuries among medical students [18]. Other studies have similarly emphasized that structured warm-up and cool-down routines significantly reduce the risk of musculoskeletal injuries in athletes across various sports [19, 10]. The relatively higher compliance with warm-up and cool-down in the current study reflects some awareness of injury prevention; however, the high injury prevalence despite these practices suggests that additional protective strategies, including equipment use and structured safety education, are essential. When compared with previous studies highlighting the role of sports safety awareness in influencing safety education intentions among adolescents [21], the findings of the current study suggest a different challenge. While student-athletes in Karachi appeared aware of some preventive practices, their actual compliance with protective equipment use remained low. This indicates that awareness alone may not be sufficient to drive behavioral change; institutional efforts, policy reinforcement, and structured education programs are needed to translate awareness into consistent safe practices. Overall, both previous and current studies converge on the conclusion that sports-related injuries remain highly prevalent, and effective safety interventions are underutilized. The findings of the present study call for universities in Pakistan to develop and enforce safety protocols, improve access to protective equipment, and integrate injury prevention education into sports programs to ensure the well-being of student-athletes. This study has limited demographics and focuses only on certain sports, excluding factors like ethnicity, past injuries, and socioeconomic status, which could provide valuable insights. Participants with severe injuries and reasons for not using safety equipment were not explored. Expanding data collection on injury types, frequency, routines, and equipment, along with larger, more diverse samples, and assessing psychological and academic impacts, would offer a deeper understanding of athlete safety.

CONCLUSIONS

The conclusion of the study highlights the pressing need for improved safety practices among undergraduate sports participants. Results show a significant number of students experiencing sports-related injuries; there is a concerning lack of use of protective equipment during sports activities. The majority of participants reported engaging in warm-up and cool-down routines, indicating an awareness of the importance of injury prevention. However, the relatively high incidence of injuries, especially in popular sports like cricket and football, underscores the need for universities to implement more effective safety protocols and education on injury prevention. Ultimately, the findings call for a collaborative effort to enhance the safety environment for student-athletes, ensuring their health and well-being while balancing academic and athletic commitments.

Authors Contribution

Conceptualization: KB
Methodology: MTK, MJB
Formal analysis: AF
Writing review and editing: RSA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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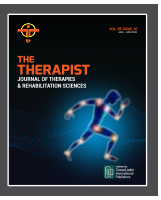

Original Article

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Prevalence of Sport Injuries among Football Players

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ABSTRACT

Football is a physically demanding sport that exposes players to a high risk of various injuries due to frequent physical contact, intense physical exertion, and high-speed movements. **Objective:** To find out the prevalence of sports injuries among football players. **Methods:** The study was cross-sectional, and participants were selected by a convenience non-probability sampling technique. To determine the prevalence of sports injuries, a self-adopted and validated questionnaire was used. 100 footballers were selected. Before data collection, informed consent was obtained before distributing the questionnaire. After filling out the questionnaire, the data were collected on the same day. SPSS version 22. was used for data analysis. **Results:** 100 participants were included in this study; the mean age ranged from 21 to 25 years old. The findings of the study showed that 40% participants had sprains, while 36% participants had muscle pain, 8% participants had fractures, 7% participants had wounds, 5% participants had tendon injury, 2% participants had bruises, and 2% participants had no injury. **Conclusions:** It was concluded that sports injuries are more prevalent among footballers. In this study, sprains and muscle pain were found to be more prevalent among footballers.

INTRODUCTION

Sport is a human activity involving physical exertion and skill, characterized by elements of competition and governed by a set of rules or patterns of behavior within an organizational structure [1]. Participation in sports, while beneficial for health, inherently carries a risk of injury. Sports injuries are typically defined as those occurring during exercise or athletic activities, affecting both competitive athletes and recreational participants. These injuries are broadly classified as either acute (resulting from a sudden traumatic event) or chronic (developing from prolonged overuse) [2]. Football, as a high-intensity sport demanding running, sprinting, jumping, and kicking, places significant stress on the neuromuscular system, leading to a high risk of injury [3]. The physical demands of the game often result in post-match fatigue due to factors such as dehydration, glycogen depletion, and muscle damage. Recovery from this fatigue and the associated injury risk is influenced by a complex interaction of intrinsic factors (e.g., training status, age, muscle strength) and extrinsic factors (e.g., match conditions, playing surface, fixture density) [3, 4]. Common football-related injuries include sprains, strains, fractures, and contusions, with the lower extremities, particularly the ankle and knee, being most vulnerable [5]. The impact of sports injuries extends beyond physical impairment, affecting an athlete's psychological well-being, confidence, and athletic identity [6]. Therefore, understanding injury prevalence, the proportion of athletes injured at a specific point in time, is

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crucial for developing effective prevention strategies [7]. Key risk factors identified in the literature include inadequate warm-up, fatigue, improper conditioning, and poor playing surfaces [8, 9]. Consequently, injury prevention, encompassing strength training, load monitoring, and education, is recognized as a fundamental component of athletic training programs to safeguard athlete health and optimize performance [10, 11]. Despite global research on football injuries, there is a need for more localized epidemiological data to inform context-specific prevention protocols. The findings will contribute valuable insights to the existing body of knowledge and help inform targeted injury prevention strategies for athletes in this region. Limited data exist on football-related injuries in Pakistan, creating a knowledge gap in understanding local injury patterns. This study provides region-specific insights, which can help coaches and sports physicians implement targeted prevention strategies to enhance player safety and performance.

This study aims to determine the prevalence and patterns of sports injuries among football players in Karachi, Pakistan.

METHODS

This study employed a cross-sectional design to determine the prevalence of sports injuries among football players in Karachi. The study duration was from October to December 2024. A sample of 100 male professional footballers aged 20 to 40 years was recruited from three different academies using a convenience non-probability sampling technique. Male football players aged 20–40 years, actively participating in training or competitions, and medically fit were included. Players with chronic illnesses, recent major injuries or surgery, irregular participation, or who did not consent were excluded. Data were collected using an adopted and validated questionnaire, after obtaining informed consent from the participants. The self-adopted questionnaire was validated through expert review for content relevance and clarity, and pilot-tested on a small group of football players to ensure comprehension and accuracy. The collected data were coded to compute descriptive statistics. Ethical approval for the study was granted by Isra University, Karachi Campus.

RESULTS

Findings show the age of participants. Results show that 1% participants are in the 16-20 years old, 79% of participants are in the 21-25 years of age, 19% of participants are in the 26-30 years of age, and 1% participants are in the 31-35 years of age (Table 1).

Table 1: Age of the Participant

Variables	Frequency (%)
16-20	1 (1.0%)
21-25	79 (79.0%)
26-30	19 (19.0%)
31-35	1 (1.0%)
Total	100 (100.0%)

Results show that you have not sustained any injury due to football since playing. The result shows that 98% of participants sustained injury, while 2% of participants didn't sustain any injury (Table 2).

Table 2: Have You Sustained Any Injury Due to Football Since Playing

Have Sustained Any Injury	Frequency (%)
Yes	98 (98.0%)
No	2 (2.0%)
Total	100 (100.0%)

The findings show location of injury, result shows that 42% of participants sustained lower leg injuries while 38% of participants sustained ankle injuries, 12% of participants sustained knee injuries while 3% of participants sustained hand injuries while 2% of participants were not sustained with injuries while back, hand and elbow injuries are sustained 1% each (Table 3).

Table 3: Location of Injury

Variables	Frequency (%)
Ankle	38 (38.0%)
Not Applicable	2 (2.0%)
Back	1 (1.0%)
Elbow	1 (1.0%)
Head	1 (1.0%)
Knee	12 (12.0%)
Hand	3 (3.0%)
Lower Leg	42 (42.0%)
Total	100 (100.0%)

This study shows the type of injury. 40% of injuries were sprains, 36% of injuries were muscle pain, 8% of injuries were fractures, 7% of injuries were wounds, 5% of injuries was tendon injuries while 2% of injuries were bruises while 2% of participants did not report any injury (Table 4).

Table 4: Type of Injury

Variables	Frequency (%)
Bruise	2 (2.0%)
Fracture	8 (8.0%)
Muscle Pain	36 (36.0%)
Sprain	40 (40.0%)
Tendon Injury	5 (5.0%)
Wound	7 (7.0%)

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Not Applicable	2 (2.0%)
Total	100 (100.0%)

40% of injuries were due to kicking. The ball, while 22% of injuries were due to foul play, 20% of injuries were due to running, 14% of injuries were due to tackling, 3% of injuries were due to a fall, and 1% of injuries were not applicable (Table 5).

Table 5: Cause of Injury

Variables	Frequency (%)
Fall	3 (3.0%)
Foul Play	22 (22.0%)
Kicking the Ball	40 (40.0%)
Running	20 (20.0%)
Tackle	14 (14.0%)
Not Applicable	1 (1.0%)
Total	100 (100.0%)

DISCUSSION

The primary objective of this study was to determine the prevalence and patterns of sports injuries among footballers in Karachi. The findings revealed a high prevalence of injuries, with 98% of participants reporting at least one injury, underscoring the significant risk associated with football participation. This aligns with the established understanding that football is a high-risk sport for musculoskeletal injuries [11]. Consistent with the global literature, the results confirm that the lower extremities are the most vulnerable region for football-related injuries [12, 13]. In the present study, lower leg (42%) and ankle (38%) injuries were the most prevalent, followed by knee injuries (12%). This distribution is supported by a large body of evidence. For instance, a study on amateur football players in Kano City, Nigeria, also reported that the majority of injuries (78.3%) occurred in the lower extremities [14]. Similarly, research conducted at Islamia University Peshawar found a high proportion of ankle and muscle injuries [15]. The predominance of lower limb injuries can be attributed to the sport's biomechanical demands, which involve frequent cutting, jumping, and kicking motions that place substantial stress on the ankles, knees, and surrounding musculature [11, 16]. However, the primary causes of injury identified in this study present an interesting point of discussion. While previous research, such as the study in Kano City, identified rough tackles as the major cause (67.2%) [14], the current findings indicate that "kicking the ball" was the most frequently cited cause (40%), followed by foul play (22%) and running (20%). This discrepancy may be explained by contextual factors specific to the sampled academies in Karachi, such as training emphasis, technique, or pitch conditions. The high percentage attributed to kicking suggests potential issues with improper technique, muscle fatigue, or inadequate conditioning of the kinetic chain during this fundamental activity [17]. Furthermore, the significant proportion of injuries linked to running highlights the role of overuse and fatigue, which are well-documented risk factors in football [18]. The study has several limitations that must be considered when interpreting the results. The cross-sectional design and the use of a convenient sample from only three academies in Karachi limit the generalizability of the findings to a broader population of football players in Pakistan. A larger, multi-center study with a probabilistic sampling method would provide more robust epidemiological data. Additionally, the reliance on self-reported data via questionnaire may be subject to recall bias. Despite these limitations, the findings contribute valuable localized data to the field of sports medicine in Pakistan. The high prevalence of injuries, particularly those linked to fundamental skills like kicking, underscores the critical need for targeted injury prevention programs in local football academies. These programs should emphasize proper technique training, core and lower limb strengthening, and load management to mitigate overuse injuries [19, 20]. Future research should investigate the specific biomechanical and contextual factors behind the high rate of kicking-related injuries in this population to inform more effective preventive strategies.

CONCLUSIONS

The study revealed a high prevalence of sports injuries among football players, with ankle sprains and muscle pain being the most common. Injuries predominantly occurred during the second half of matches, with kicking the ball, foul play, and running identified as the primary causes. These findings highlight the need for targeted injury prevention strategies, proper training, and adherence to safety measures to reduce the risk of football-related injuries.

Authors Contribution

Conceptualization: UT
Methodology: IS, SAHK
Formal analysis: AW
Writing review and editing: MYM

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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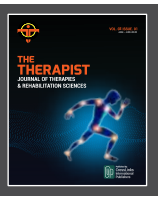

Original Article

OPEN ACCESS

Prevalence of Avoidant/Restrictive Food Intake Disorder (ARFID) in Undergraduate DPT Students

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ABSTRACT

Avoidant/Restrictive Food Intake Disorder (ARFID) is a relatively new eating disorder diagnosis characterized by limited food intake due to lack of interest, sensory-based avoidance, or concern about aversive consequences, which can negatively impact nutritional health and quality of life. University students, such as those pursuing a Doctor of Physical Therapy (DPT), may be at risk due to stress and lifestyle factors. **Objectives:** To determine the prevalence of ARFID in undergraduate DPT students. **Methods:** A cross-sectional study was conducted on 377 students from different universities in Karachi using the PARDI-AR-Q-Self-14+ questionnaire. SPSS version 22 was used for data analysis, including frequencies and percentages. **Results:** The findings revealed that out of 377 participants, 28% responded "YES" while 72% responded "NO" to ARFID prediction. Participants' ages ranged from 18 to 26 years, with a female majority (72%) compared to males (27%). The highest prevalence was observed in lack of interest in food, with 53.3% at level 1, 18.3% at level 2, 15.1% at level 3, 8.5% at level 4, 4.0% at level 5, and 1.1% at level 6, whereas sensory-based avoidance showed the lowest prevalence. Most participants fell within a healthy BMI range, while the least were classified as obesity class I. **Conclusions:** Undergraduate DPT students demonstrated low prediction of ARFID but highlighted a notable lack of interest in food or eating as the most prevalent pattern. The overall findings suggest limited awareness about ARFID among students, indicating a need for educational programs, seminars, and webinars to increase awareness and promote a better quality of life.

INTRODUCTION

The DSM-5 includes a new diagnosis named Avoidant/Restrictive Food Intake Disorder (ARFID), a severe eating disorder in which a person avoids certain meals, limits food intake, or avoids eating completely, resulting in long-term failure to meet nutritional needs and affecting men and women of all ages [1]. ARFID has gained attention due to its potential impact on health, academic performance, and psychological wellness among young adults, particularly students in demanding programs such as Doctor of Physical Therapy (DPT). International studies report ARFID prevalence in children and adolescents ranging from 1% to 5%, while in young adults, it may reach 5-8% [2]; nationally in Pakistan, data are limited, but emerging evidence suggests restrictive eating patterns are present among university students [3]. ARFID arises from a combination of genetic, psychological, biological, cultural, and social factors [4], with genetic causes including hereditary predispositions and environmental influences such as dietary restrictions at home, sociocultural pressures including thinness ideals and strict food beliefs, and psychological factors linking ARFID with OCD, anxiety, ADHD, and autism, where symptoms such as sensory sensitivity, weak hunger signals, and fear of choking or vomiting contribute to restricted eating [5].

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Signs and symptoms include picky eating, lack of interest in food, texture avoidance, fear of choking or allergic reactions, and possible malnutrition [6-8]. Five subtypes are recognized: avoidant ARFID, aversive ARFID, restrictive ARFID, adult ARFID, and ARFID plus, which coexists with conditions like OCD or autism [5]; in this study, all subtypes were considered, with the majority of participants exhibiting the "lack of interest in food or eating" pattern. Diagnosis under DSM-5 TR requires evidence of nutritional deficiency, weight loss, psychosocial impairment, and exclusion of other disorders [1], and treatment involves a multidisciplinary team including doctors, psychiatrists, psychotherapists, and dietitians, with approaches such as Cognitive Behavioral Therapy for ARFID (CBT-AR), Family Based Therapy (FBT-ARFID), and Supportive Parenting for Anxious Childhood Emotions (SPACE-ARFID) [7]. Another serious eating disorder described in DSM-5 is PICA (Persistent Ingestion of Non-Nutritive Substances), defined as the persistent consumption of non-nutritive substances for at least one month, which may occur due to nutritional deficiencies, pregnancy, intellectual disabilities, or psychiatric disorders such as schizophrenia and OCD, and involves ingestion of substances like clay, ice, soap, dirt, paint, or hair, causing symptoms such as abdominal pain, constipation, diarrhea, anemia, parasitic infections, lead poisoning, and intestinal obstruction [9-11]. Both ARFID and PICA are associated with serious health consequences, including malnutrition, impaired academic performance, and psychosocial difficulties, highlighting the importance of early detection and multidisciplinary care [12-14]. Despite the global prevalence of ARFID, limited data exist for university students, particularly undergraduate DPT students in Pakistan, and understanding prevalence and patterns in this population is essential to develop awareness programs, preventive strategies, and appropriate interventions. Early identification of ARFID patterns can prevent long-term nutritional deficiencies and psychological complications, improve academic performance, and support overall health and quality of life among students.

This study aims to determine the prevalence of ARFID in undergraduate DPT students.

METHODS

A cross-sectional study was conducted for six months among undergraduate students of physical therapy from different medical universities in Karachi (June to December 2024), using a convenience sampling technique with a sample size of 377 calculated via the Rao-Soft sample size calculator. Inclusion criteria included male and female undergraduate DPT students aged 18–26 years willing to participate, while exclusion criteria covered individuals below 18 or above 26 years, pregnant women, non-physical therapy medical and non-medical students, school-going students, and those unwilling to participate. Data were collected using the PARDI-AR-Q-Self-14+ questionnaire, a 14-item self-report tool designed to assess ARFID in adolescents and adults, evaluating three domains: lack of interest in food/eating, sensory-based avoidance, and fear of aversive consequences. Each item is rated on a 6-point Likert scale (1 = not at all, 6 = extremely), with higher scores indicating greater severity, and mean scores were calculated for each domain to classify severity levels. Participants were approached, the research procedure was explained, informed consent was obtained, ensuring confidentiality, and the questionnaire was collected immediately after completion. Ethical approval was obtained from the Institutional Ethical Review Committee of Isra University, Karachi Campus, and participation was voluntary. Data were coded and analyzed using SPSS version 22, with descriptive statistics including frequencies, percentages, mean, standard deviation, minimum, and maximum values calculated for demographic variables, BMI categories, ARFID prediction, and ARFID domain scores. Data visualization was performed using tables and bar charts to display ARFID patterns. As this was a descriptive study, no inferential statistical tests were applied.

RESULTS

The prediction of ARFID was reported; out of 377 participants, 28% participants responded Yes, and 72% participants responded No (Table 1).

Table 1: Prediction of ARFID

Variables	Frequency (%)	Cumulative Percent
Yes	112 (28%)	28%
No	265 (72%)	72%

The gender of the participants was mentioned. Out of 377 participants, 72% were female, while 27.6% were male. The BMI of the participants was mentioned. Out of 377 participants, 26.8% participants were underweight, 52.8% participants were of a Healthy weight, 17.2% participants were overweight, and 3.2% participants were in obesity class I (Table 2).

Table 2: Gender and BMI of Participants

Variables	Frequency (%)	Cumulative Percent
Gender		
Female	273 (72.4%)	72.4%
Male	104 (27.6%)	100.0%
Total	377 (100.0%)	–
BMI		
Underweight	101 (26.8%)	26.8%
Healthy Weight	199 (52.8%)	79.6%

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Overweight	65 (17.2%)	96.8%
Obesity Class I	12 (3.2%)	100.0%
Total	377 (100.0%)	-

The sensory-based avoidance by the participants was reported. Out of 377 participants, 73.7% participants were at level 1, 9.3 % participants were at level 2, 5.3 % participants were at level 3, 4.2% participants were at level 4, 3.2 % participants were at level 5, while 4.2 % participants were at level 6 (Table 3).

Table 3: Sensory-Based Avoidance

Variables	Frequency (%)	Cumulative Percent
1	278 (73.7%)	73.7%
2	35 (9.3%)	83.0%
3	20 (5.3%)	88.3%
4	16 (4.2%)	92.6%
5	12 (3.2%)	95.8%
6	16 (4.2%)	100.0%
Total	377 (100.0%)	–
Mean of Sensory-Based Avoidance		
Mean ± SD	1.67 ± 1.349	–
Minimum	1	–
Maximum	6	–

The Lack of interest by the participants was reported. Out of 377 participants, 53.3% participants were at level 1, 18.3 % participants were at level 2, 15.1 % participants were at level 3, 8.5 % participants were at level 4,4.0 % participants were at level 5, while 1.1 % participants were at level 6 (Table 4).

Table 4: Lack of Interest

Variables	Frequency (%)	Cumulative Percent
Levels of Lack of Interest		
1	201 (53.3%)	53.3%
2	68 (18.0%)	71.4%
3	57 (15.1%)	86.5%
4	32 (8.5%)	95.0%
5	15 (4.0%)	98.9%
6	4 (1.1%)	100.0%
Total	377 (100.0%)	–
Mean of Lack of Interest		
Mean ± SD	1.95 ± 1.246	–
Minimum	1	–
Maximum	6	–

DISCUSSION

Avoidant/Restrictive Food Intake Disorder (ARFID) is characterized by restricted food intake either through avoidance of certain foods or by reducing overall quantity, and it can occur across all ages, genders, and body weights [15]. Restriction is often associated with sensory-based avoidance, lack of interest in food, or concern about aversive consequences. Previous research among adults with disorders of gut–brain interaction demonstrated that ARFID symptoms were linked to lower body mass index (BMI), whereas shape/weight-motivated eating disorders were more closely associated with higher depression, anxiety, and pain interference. This suggests that ARFID symptomatology is not restricted to underweight individuals and may present across different body weight categories, aligning with the notion that ARFID is independent of weight or shape concerns. Gender distribution in ARFID has been reported to show a higher prevalence among females, although the disorder can affect all genders [16, 17]. The predominance of females in previous studies may reflect greater reporting or awareness of eating-related difficulties in this group. The PARDI-AR-Q questionnaire has been widely used in ARFID research to establish diagnoses and evaluate the concurrent validity of its subscales, showing excellent reliability [18, 19]. Sensory-based avoidance and lack of interest in food are consistently identified as the most prominent drivers of restrictive eating behaviors, whereas concern about aversive consequences, although less frequent, may still contribute meaningfully to ARFID symptomatology. These findings highlight the multidimensional nature of ARFID and the importance of assessing all relevant domains when evaluating patients. Previous psychometric validation of the PARDI-AR-Q demonstrated that severity-of-impact items clustered into four factors: concern about aversive consequences, sensory-based avoidance, lack of interest, and overall severity. High intraclass correlations across these subscales support its concurrent validity and the robustness of its domains in assessing ARFID-related symptomatology [20].

CONCLUSIONS

The highest prevalence of sports injuries was observed among football players, with ankle sprains and muscle pain being the most common. Other types of injuries were also reported. Most injuries occurred during the second half of matches, and the primary causes were identified as kicking the ball, foul play, and running.

Authors Contribution

Conceptualization: S
Methodology: MM, KA
Formal analysis: GF
Writing review and editing: AMA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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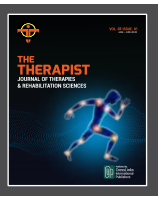

Original Article

OPEN ACCESS

Immediate Effect of Theragun Vs Transcutaneous Electrical Nerve Stimulation in Treating Non-Specific Neck Pain Among Young Adults

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ABSTRACT

The study used Theragun and TENS on non-specific neck pain among young adults. The study was conducted to evaluate the immediate effect of the two modalities for the treatment of non-specific neck pain. Evaluation was made according to the results to determine which treatment is more effective. **Objectives:** To find out the immediate effects of Theragun vs transcutaneous electrical nerve stimulation (TENS) in treating non-specific neck pain among young adults. **Methods:** This quasi-experimental study was conducted on 60 young adults with non-specific neck pain, equally divided by gender and assigned to two groups: Group 1 received TENS therapy, and Group 2 received Theragun treatment. Pain was assessed using the Visual Analog Scale (VAS), and cervical range of motion was measured with a universal goniometer pre- and post-intervention. Data were analyzed using SPSS version 22.0. **Results:** A total of 60 participants were included in the trial of TENS and Theragun, with 30 in each group, equally distributed between males and females. The significance value of Theragun was found to be 0.699 (>0.05), and that of TENS intervention was 0.223 (>0.05). **Conclusion:** The study concluded that both treatments are effective individually in treating non-specific neck pain, but as a comparative study, there were no significant differences observed.

INTRODUCTION

The neck is the anatomical region situated between the clavicle and mandible, containing vital structures that separate the head from the thorax and support essential functions, including respiration, speech, swallowing, metabolic regulation, and the connection of the brain with the cervical spine and circulatory and lymphatic networks. The neck clinically is separated into the anterior (front) triangle and the posterior (back) triangle. The anterior triangle can further be divided into the submental triangle, the submandibular triangle, the carotid triangle, and the muscular triangle each harboring important muscles, nerves, blood vessels, and lymph nodes that are important in surgery and clinical practice. As an example, the carotid triangle contains the common carotid artery, internal jugular vein, vagus nerve, and other important neural structures, emphasizing the importance of caution during interventions in this region. The posterior triangle, bounded by the sternocleidomastoid, trapezius, and clavicle, includes the occipital and subclavian (supraclavicular) triangles and contains nerves, vessels, and muscles such as the spinal accessory nerve, roots of the brachial plexus, and subclavian artery, which are also clinically significant. The neck muscles, including the platysma, sternocleidomastoid, trapezius, digastrics,

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mylohyoid, geniohyoid, sternohyoid, sternothyroid, thyrohyoid, and omohyoid, coordinate complex head and neck movements, maintain posture, and facilitate functions such as swallowing and respiration. Each muscle has specific origins, insertions, innervation, and vascular supply, making them essential in both physiological and clinical contexts [1]. Neck pain is one of the most common musculoskeletal disorders in the world, with a given yearly prevalence of 42-67% among young adults. Research has noted that the prevalence of pain lasting more than 90 days has risen by 21% in the population between 2006 and 2016. Disability and poor quality of life are related to neck pain and decreased productivity, resulting in a significant economic burden due to healthcare costs and work loss. Young adulthood, defined as the period from 18 to 29 years of age, represents a critical time for establishing long-term health behaviors. During this phase, individuals experience significant physiological, social, and occupational transitions, making them vulnerable to musculoskeletal disorders, including neck pain [2]. Non-specific neck pain (NCNP), characterized by pain in the lateral and posterior neck without identifiable pathology, often resolves spontaneously but can become chronic if symptoms persist beyond 12 weeks. Contributing factors include biomechanical strain, postural deficits, and psychosocial stressors such as anxiety and depression, which influence pain perception and functional outcomes [3, 4]. Recent non-pharmacological interventions for neck pain include percussive therapy using handheld devices such as the Theragun and transcutaneous electrical nerve stimulation (TENS). Theragun delivers repetitive mechanical vibrations to soft tissues, enhancing blood and lymphatic flow, reducing lactic acid, relaxing muscles, and increasing range of motion, thereby improving recovery, performance, and overall well-being [5-7]. TENS is a non-invasive electrotherapeutic modality that delivers electrical impulses through the skin to modulate nociceptive transmission, providing analgesia for various musculoskeletal and neuropathic conditions [8-10]. Both modalities offer accessible, self-administered, and complementary approaches for managing neck pain, with potential benefits for functional outcomes and quality of life. According to the literature review, both Theragun and TENS have shown beneficial effects alone in the treatment of non-specific neck pain, so it is necessary to identify if they have a better impact when given in combination in order to achieve quick pain relief and early recovery. Non-specific neck pain is common among young adults, causing discomfort and limiting daily activities. While TENS and Theragun have been used to reduce pain and improve cervical mobility, there is limited research directly comparing their immediate effects in this population. Most studies focus on chronic pain or long-term outcomes, leaving a gap in evidence for quick, effective interventions. Comparing these modalities can help clinicians choose the most effective treatment for rapid pain relief and improved neck function, preventing chronic symptoms and enhancing daily performance.

This study aims to find out the immediate effects of the Theragun vs transcutaneous electrical nerve stimulation in treating non-specific neck pain among young adults.

METHODS

This quasi-experimental study was conducted in various colleges, universities, hostels, and gyms in Karachi to compare the short-term effects of Theragun and TENS therapy on pain and cervical range of motion in participants with non-specific neck pain. The study duration was October to December 2024. A total of 60 participants aged 18–26 years (30 per group) were included, with equal representation of male and female. The sample size was determined based on feasibility and previous similar studies. Participants were assigned to the two groups using simple random sampling, but full randomization with allocation concealment was not performed. Inclusion criteria comprised willingness to participate, presence of non-specific neck pain, and age between 18 and 26 years, while exclusion criteria included fracture or healing fracture of the neck, dermatitis, any known cervical pathology, cancer or tumor of the cervical spine, and unwillingness to participate. All the participants had given informed consent. The extent of pre- and post-treatment pain was assessed using the Visual Analog Scale (VAS), and cervical range of motion was measured with a goniometer. Data were compared in SPSS version 22.0. The Isra University granted ethical approval, and all participant information was kept confidential, with permission obtained for the use of data in research and publication.

RESULTS

The age distribution of participants is shown. In the Theragun group, most participants were 24 years old (26.7%), with ages fairly evenly distributed between 20 and 26 years. In the TENS group, ages 23 and 25 were the most frequent (30% each), indicating a higher concentration in these age groups compared to the more balanced Theragun group (Table 1).

Table 1: Age Distribution of Participants in Theragun and TENS Groups

Age (Years)	Theragun (n=30)	TENS (n=30)
20	4 (13.3%)	1 (3.3%)
21	5 (16.7%)	3 (10.0%)
22	5 (16.7%)	3 (10.0%)
23	5 (16.7%)	9 (30.0%)

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24	8 (26.7%)	3 (10.0%)
25	2 (6.7%)	9 (30.0%)
26	1 (3.3%)	1 (3.3%)

This study presents the gender distribution of participants. Both groups had equal representation of males and females, with 15 males and 15 females in each group (50% each), ensuring no gender bias in participant selection (Table 2).

Table 2: Gender Distribution of Participants

Gender	Theragun (n=30)	TENS (n=30)
Male	15 (50.0%)	15 (50.0%)
Female	15 (50.0%)	15 (50.0%)

The duration of neck pain for both groups is shown. In the Theragun group, 20% of participants experienced pain for 1–2 weeks, 43.3% for 3–4 weeks, and 36.7% for more than 4 weeks. In the TENS group, the majority (66.7%) had pain for more than 4 weeks, indicating longer-standing symptoms in this group (Table 3).

Table 3: Duration of Neck Pain Among Participants

Duration	Theragun (n=30)	TENS (n=30)
1–2 Weeks	6 (20.0%)	1 (3.3%)
3–4 Weeks	13 (43.3%)	9 (30.0%)
>4 Weeks	11 (36.7%)	20 (66.7%)

Results show the mean pain scores before and after interventions. Both groups demonstrated a reduction in pain, though the changes were not statistically significant ($p>0.05$) (Table 4).

Table 4: Pre- and Post-Pain Scores (VAS) in Theragun and TENS Groups

Group	Pre-Pain (Mean ± SD)	Post-Pain (Mean ± SD)	p-Value
Theragun	3.5667 ± 1.19434	1.5333 ± 0.73030	0.699
TENS	3.9333 ± 1.14269	1.9333 ± 0.73968	0.223

The findings present the pre- and post-intervention mean values for cervical range of motion. No significant differences were observed between the two groups in all measured directions ($p>0.05$) (Table 5).

Table 5: Pre- and Post-Range of Motion in Theragun and TENS Groups

Movement	Theragun Pre ± SD	TENS Pre ± SD	Theragun Post ± SD	TENS Post ± SD	p-Value
Flexion	59.37 ± 10.91	54.23 ± 12.63	68.00 ± 10.79	70.10 ± 11.75	0.555
Extension	59.40 ± 11.27	62.47 ± 11.08	69.40 ± 8.90	69.63 ± 9.42	0.481
Left Lateral Flexion	38.93 ± 5.02	39.00 ± 5.04	44.53 ± 2.36	43.27 ± 4.81	0.560
Right Lateral Flexion	39.33 ± 5.85	37.37 ± 5.20	43.90 ± 3.05	42.10 ± 4.54	0.098
Left Rotation	69.97 ± 12.38	65.37 ± 13.17	77.40 ± 9.49	73.50 ± 10.37	0.729
Right Rotation	67.03 ± 11.25	65.30 ± 11.56	76.73 ± 9.72	72.67 ± 9.68	0.697

DISCUSSION

This research examined the acute consequences of two modalities, Theragun and transcutaneous electrical nerve stimulation (TENS), on the management of non-specific neck pain in young adults. The first aim was to compare the efficacy of the two interventions and to find out whether one form of modality results in better acute pain relief. Understanding these effects is clinically important for achieving rapid symptom reduction and promoting early recovery. Our findings indicate that both Theragun and TENS significantly reduced neck pain individually. The pre-treatment pain scores were slightly higher in the TENS group than in the Theragun group. Post-treatment, pain levels decreased in both groups. However, comparative analysis revealed no statistically significant differences between the two modalities ($p>0.05$). These results align with Anjana et al. who reported no significant differences between TENS and hot water bottle therapy for immediate neck pain relief, although both interventions were effective compared to placebo [11]. Similarly, previous studies observed significant pain reduction following Theragun application on trigger points in frequent mobile phone users, supporting the efficacy of percussive therapy for musculoskeletal discomfort [12]. Range of motion (ROM) outcomes further support the effectiveness of both interventions. Pre- and post-treatment measures for cervical flexion, extension, lateral flexion, and rotation did not show significant differences between the Theragun and TENS groups. Although minor improvements were observed in both groups, these changes were not statistically significant, indicating that both modalities have comparable immediate effects on cervical mobility. This is consistent with Camilleri et al. who demonstrated that TENS effectively improves cervical flexion and rotation but does not significantly affect lateral flexion [13]. The standard error values for pre- and post-treatment pain were slightly lower for the Theragun group compared to the TENS group, suggesting marginally higher precision in pain reduction with Theragun. However, the difference is minimal and does not translate into clinical significance. These findings highlight that both treatments are safe, non-invasive, and provide immediate symptomatic relief, making them suitable options for young adults with non-specific neck pain [14]. Previous studies offer additional context. Díaz-Pulido et al. reported that high-intensity laser therapy provided superior pain relief compared to TENS in patients with temporomandibular joint disorders, indicating that while TENS is effective, other modalities may offer enhanced results in specific conditions [15]. Similarly, percussive therapies like Theragun have shown promising results in reducing muscle stiffness and pain in various musculoskeletal regions [16-18]. Other studies also

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confirm that both TENS and percussive therapy provide immediate analgesic effects without adverse events [19, 20]. Only a single session of each modality was administered, preventing assessment of long-term or cumulative effects.

CONCLUSIONS

The study concluded that both TENS and Theragun individually reduce non-specific neck pain; however, no significant difference was observed when comparing the two modalities. Future research is recommended to include a larger sample size, explore additional treatment modalities, and incorporate multiple treatment sessions to better evaluate their effectiveness.

Authors Contribution

Conceptualization: FH
Methodology: MU, KTU
Formal analysis: SAW
Writing review and editing: SA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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