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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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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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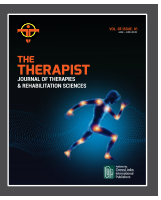

Current Political & Economic Turmoil & Healthcare Provision

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Pakistan is doing well in achieving some Sustainable Development Goals (SDGs). However, Pakistan is left behind in meeting SDG 3 goal which is related to its Population's health and wellbeing, which seem to be an impossible target in near future due to the current political turmoil and economic crisis, which is a huge challenge for the healthcare system. Unexpectedly following Pakistan's 2010 devolution of health to provinces instead of an improvement in provision of healthcare, low capacity of institutions, week central and provincial-coordination and increased interference by elites impeded any significant improvement in health sector [1]. The economic crunch has hit the healthcare sector very badly, affecting the medical supply lines since it relies mostly on imported raw medical supplies to manufacture medicines, and imports of complicated surgical equipment, including cardiac, orthopedic and cochlear implants essentially required for saving lives and for catering to the physical as well as communicational disabilities [2]. Hence, with Pakistan's fragile economy marred with precarious conditions including widespread floods of 2022 and extremism has brought the country's economy to a record low level, affecting all activities of life including healthcare provision to the masses [3]. Pakistani health professionals' competency is also at stake and low salaries are driving these professionals to opt for more than one job at a time and unfortunately compelling professionals to leave the country for better future [4]. The political turmoil and economic crunch have also resulted in inflation resulting in a record price hike affecting daily life; and raising crime rate which has also impact tourism, including medical tourism which has improved healthcare provision and income generation in some neighboring countries like India, UAE etc [5]. This also demands accreditation of medical institutions of the country with Joint Commission International (JCI) and other such international accreditation agencies to enhance healthcare quality and provision of standard healthcare. The current crisis has also multiplied many folds because of outbreaks of diseases in the flood affected areas, which are already marred with health issues like malnutrition and outbreak of infections like hepatitis, typhoid, paratyphoid and tuberculosis etc. Even in emergency and war situations, healthcare takes precedence, hence it is high time for the authorities and the government to mitigate the issues facing healthcare in the country by increasing budget allocation, systematic clinical and community healthcare provision, enhancing coordination of provincial and federal health authorities, hiring of medical and allied staff to fill the vacant positions, attractive salaries for this essentially required community, enhancing collaboration with World Health Organization, UNICEF and other international agencies, getting accreditation of medical institutions to enhance medical tourism and policy level decisions for sustainable healthcare policy. These steps will enhance quality of healthcare provision, retaining of highly skilled medical and paramedical manpower in the country and result in better provision of healthcare.

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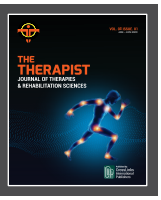

Review Article

Therapeutic Application of Cupping Therapy (Hijama): A Brief Review

Madiha Khan Niazi[1*], Farooq Hassan[2], Syed Zahoor Ul Hassan Zaidi[3], Saira Ghaffar[4], Zuha Sohail[1], Talha Noor[3], Zeerak Aamir[5] and Muhammad Amjad Ismail[3]

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ABSTRACT

Hijama is a form of Unani medicine that involves using heat or suction to partially vacuum a Hijama glass placed on the surface of the body in order to remove disease-causing material or divert it from the diseased area, return displaced organs to their proper positions, and encourage blood flow to the intrusion site. The cups used to administer hijama therapy gave the treatment its name. For sucking purposes, glass or wooden cupping glasses are employed, and a vacuum pump creates the suction. Hijama involves placing a cup to a specific area of the body and sucking blood from there. Hijama is a method of Istifragh that removes the disease's root cause.

INTRODUCTION

Hijama is an Arabic phrase that signifies "applying cups," and its literary equivalent is "sucking" [1]. It is a procedure that involves applying cup-shaped glass containers to the body's surface the removal of morbid materials, their diversion from the diseased area, and the use of heat or specialised suction equipment to generate a vacuum, and promote blood flow to the affected area. Cupping is a technique used to release toxic blood from superficial tiny capillaries in muscles [2]. HIJAMA is a minimally invasive surgical excretory procedure that opens the skin barrier by scarifying the top layer of skin. It also improves blood flow and waste excretion through the skin by applying pressure gradients and traction forces to the skin and underlying capillaries [3].

Equipments Of Hijama

- Glass or plastic cups
- Suction pump or lamp or candle
- Antiseptics
- Inflammable small cones of paper or cotton
- Sterilized gloves

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- Sterilized medical scalpel
- A pack of cotton and medical sterilized gauze pieces
- Micro pore adhesive tape
- A razor to remove the hair of site to be cupped if needed

Classification of cupping therapy types

Initial classifications for cupping therapy included dry and moist, but six new categories were added in 2016: technical types, power of suction, method of suction, materials inside cups, and area treated, sports, cosmetic, and aquatic cupping as depicted in figure 1 [4]. Aquatic cupping was included in the fourth category. This update provides a precise taxonomy of the many types of Hijama [5].

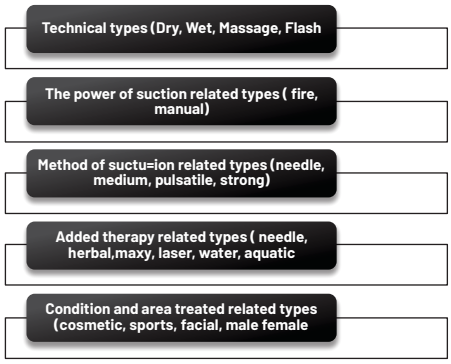

Figure 1: Classification of cupping therapy types

Classification of cupping therapy sets

Standard cupping therapy equipment should include a suction device, six or more cups in varying sizes, and more [6]. The three main categories of cupping therapy sets are as follows: the initial group is "cupping sets related to the types of cups" and it comprises silicone, silicone rubber, silicone glass, rubber bamboo, ceramic, and metal cupping sets. "Cupping sets related to the methods of suction" is the second classification, which comprises manual, automatic, and self-suction cupping sets. "Cupping sets related to uses" is the third classification as shown in figure 2, which comprises face, male, female, and sets for massage cupping [7].

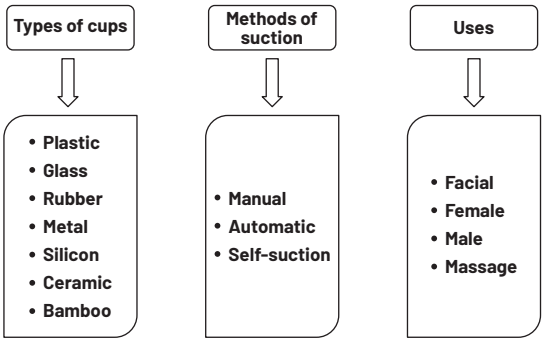

Figure 2: Classification of cupping therapy sets

Mechanisms of action of cupping therapy

Cupping therapy has been shown to increase blood flow, alter the biomechanical features of the skin, increase pain thresholds, improve anaerobic metabolism locally, reduce inflammation, and alter cellular immune response [8]. The mechanics of the cupping action are explained by a variety of ideas, such as the immune modulation theory and the genetic theory. Clinical research is needed to understand the processes underlying cupping therapy's effects [9, 10].

Indications

The objectives of cupping therapy include health promotion, treatment, and prevention [11, 12]. Numerous conditions have been claimed to benefit with cupping therapy [13, 14]. The two categories of these situations are localised conditions and systematic conditions. The location of cupping therapy is selected based on the disease being treated [15]. The back, followed by the chest, belly, buttocks, and legs, is the body part where the product is most frequently applied [16]. Other areas, including the face, can be treated using cupping [17].

Contraindications

People with cancer and organ failure should not have cupping therapy, pacemakers, haemophilia, acute infections, anticoagulants, serious chronic illnesses, puberty, pregnancy, menstruation, anaemia, a recent blood donation, recent wet cupping session, unanticipated medical issues, and refusal of the procedure [18, 19].

Adverse Effect

Cupping therapy has a variety of side effects, including scar formations, skin infection, burns, abscess formation, bullae formation, insomnia, skin discolouration, hyperpigmentation, and vasovagal attack [20].

CONCLUSIONS

Traditional and alternative medicine practitioners have used cupping therapy for centuries. There is mounting evidence that it may be helpful in treating various disorders, particularly those connected to pain. The practise of cupping therapy includes adhering to infection control procedures. This paper proposed three new classifications: one for cupping therapy sets, one for cupping therapy adverse events, and one for cupping therapy kinds.

Authors Contribution

Conceptualization: MKN
Formal Analysis: FH
Writing-review and editing: SZUHZ, SG, ZS, TN, ZA, MAI

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

Conflicts of Interest

The authors declare no conflict of interest.

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Volume 4, Issue 2 (April-June 2023)

Original Article

Trend of Snakebite Cases and their Management at Holy Family Hospital Rawalpindi During 2022

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ABSTRACT

Snakebite is a neglected public health problem of tropical and subtropical regions globally. Millions of cases are reported annually worldwide and about half of them are bitten by poisonous snakes. **Objectives:** To determine trend of snakebite cases and their management at Holy Family Hospital during 2022. **Methods:** A retrospective hospital-record based study was done to identify the trend of snakebite cases reported at Holy Family Hospital Rawalpindi during 2022. The data was gathered from hospital administrators pertaining to age, gender, residential address, types of snakebite and treatment given. Data were analysed by SPSS software version 25.0 and MS Excel 2016. Descriptive statistics were computed. Independent sample t-test was applied to measure statistically significant gender-based difference in mean age of the snake bite victims. $P < 0.05$ was considered significant. **Results:** Of the 90 snakebite cases, 64.1% were males. Mean age of the victims was 34.7 ±14.8 years. Difference in mean age of male and female victims was statistically insignificant ($P > 0.67$). Majority (33%) was resident of Rawalpindi, followed by 22% and 12.3% from Attock and Azad Jammu & Kashmir respectively. Peak of the cases was during July and August. As most (91.1%) of them were bitten by vasculotoxic snakes, so out of 1,117 anti-snake venom ampules about 93.1% were administered to those cases. None of the cases succumbed to snakebite. **Conclusions:** Snakebite has frequently been reported among residents of Rawalpindi and its neighbouring areas during summer season. The victims were promptly treated for their survival.

INTRODUCTION

Snakebite is a renowned occupational hazard that is now being perceived as a public health issue across the globe [1]. Approximately 1.8 to 2.7 million people worldwide are subjected to snake bite annually with resultant 80,000-138,000 deaths [2]. Human beings when bitten by a venomous snakes are injected with mixture of toxins [3]; henceforth, critical emergencies might be attributed to this mishap [4]. The greatest burden of snake bite associated mortality and morbidity has been acknowledged in African and Asian regions of the world[2]. Mortality among Russell's viper bite cases of Myanmar has been documented as high as 10% due to subjection of the cases to severe neurotoxicity. Victims below 12 years of age were notified with the highest Case Fatality Ratio (CFR) of 20%[5]. Although most of the snakes found in Pakistan are non-venomous [6]; however, detection of four venomous snake types predominantly in Sindh and Punjab provinces has imposed World Health Organization (WHO) to categorize these regions of Pakistan as the highest risk due to increased vulnerability of the respective population to snakebite [7]. A study by Shah *et al.*, among Southern Punjab inhabitants revealed a misconception of about 80% of the snakes being poisonous and around 50% acknowledged the recovery of victims on apt management [8]. Venomous snakebite in addition to certain communicable diseases has been recognized as the prime contributor to mortality in third world countries[9]. Despite having adequate information pertaining to types of snake

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venom and subsequent healthcare outcomes of envenomation, snakebite cases have sufficiently been reported for mismanagement globally due to poor knowledge about the composition of venoms and devenomizing approach[10]. Moreover, due to insufficient epidemiology known to us about snakebite and its greatest occurrence in rural areas and hence non-reporting to our healthcare centres[11], there is very meagre information about its propensity in our country. The current study was hence planned to envisage the snakebite cases reported at a public sector tertiary care hospital of Rawalpindi during 2022 and their management accomplished by provision of antivenoms with an intention to measure the frequency of this problem in our zone. This will not only aid to perceive the frequency of snakebites cases registering in a tertiary healthcare facility of Rawalpindi from diverse territories but will also highlight the management of envenomation executed for the survival of victims. In addition, this study will also enable our healthcare administrators as well as strategic planners to take necessary initiatives for coping with this problem in future.

METHODS

A retrospective hospital-record based study was carried out among snakebite cases reported to Holy Family Hospital Rawalpindi during 2022. The month-wise data of snakebite cases was gathered with informed consent of hospital administrators. Data were collected pertaining to age, gender, residential address, type of snakebite and treatment received by the cases. Data were analysed by SPSS software version 25.0 and MS Excel 2016. Descriptive statistics were applied. Gender based difference in mean age of the snake bite victims was statistically determined by independent sample t-test. $P < 0.05$ was taken as significant.

RESULTS

Of the total 90 snakebite cases reporting to Holy Family Hospital Rawalpindi during 2022, 72 (64.1%) and 18 (33.7%) were males and females respectively. Mean age of the cases was 34.7 ± 14.8 years. Gender-wise disparity in mean age of the snakebite cases was statistically insignificant on applying independent sample t-test as depicted below in Table 1.

Table 1: Gender-based difference in mean age of snakebite victims

Mean age of snakebite cases (mean ± SD)		P-value
Males (n = 72)	Females (n = 18)	
34.11± 15.9 years	35.9 ±14.7 years	0.67

Most (33%) of our cases belonged to Rawalpindi city as displayed below in Figure 1.

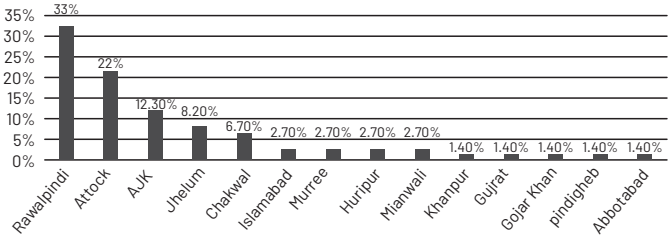

Figure 1: Residential area of snakebite cases

Frequent cases were reported during July and August 2022 as shown below in Figure 2.

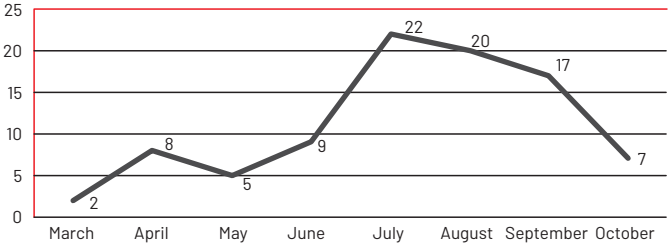

Figure 2: Trend of snakebite cases during 2022

Total 927 and 190 anti-snake venom ampules were administered to male and female patients respectively. Out of 1,117 ampules, most (93.1%) were administered to those who were subjected to vasculotoxic snake bite. Majority of the cases receiving anti-snake venom facility were 21-40 years of age as illustrated below in Figure 3.

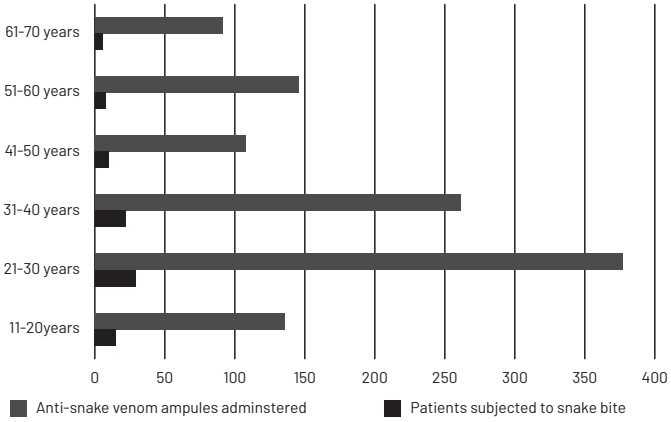

Figure 3: Age groups of the snake bitten cases & number of anti-snake venom ampules used

Majority (91.1%) of our patients were subjected to vasculotoxic snake bite as revealed below in Figure 4. All cases were swifty treated and recovered.

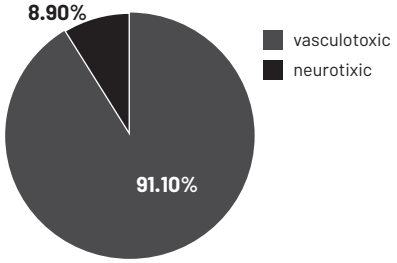

Figure 4: Category of snakebite cases

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DISCUSSION

Snakebite cases are maximally reported from highly populated provinces of pakistan like those of Punjab and Sindh that is chiefly attributed to preponderance of agricultural activities [12]. The greatest number of snakebite cases in current study have been reported during July and August when humidity in the climate prevails due to monsoon. According to a study carried out in Brazil, ecology of venomous snakes is remarkably associated with the climate of any region [13]. On the other hand, a colombian study concluded that snakebite envoming is attributed to rainfall only in extremely dried regions; however, temperature was not proven to moderate the occurrence of snakebite cases [14]. A study done among snakebite cases reporting to a tertiary healthcare centre of South Indian region elucidated the crowning of snakebite cases from September to December [15]. World Health Organization (WHO) has included snakebite envenoming in the list of category A Neglected Tropical Diseases (NTDs) during 2009 due to devastating healthcare consequences [16]. Ecological characteristics of any region that increase the likelihood of snakebite should thoroughly be investigated so that predictive modelling could facilitate the concerned strategic planners substantially in mitigating the cases. The male to female ratio of snakebite cases in our study was 4:1 with mean age of 34.7 ± 14.8 years. likewise, a cross-sectional study done in Emergency Medicine department of a tertiary care faciliity elucidated the age of cases from 15-45 years with male to female ration of 3:1 [17]. Similarly another retrospective study carried out on 2014-2021 data of asian snakebite cases explored that 70% of the victims were males with majority (45%) of them being 18-30 years old[18]. On the other hand, an observational study by Tchoffo *et al.*, among inhabitants of Cameroon revealed about 62% snake envenomization among females which was predominantl attributed to non-reporting of substantial cases to healthcare centres for treatment [19]. According to a study done among Sri Lankan populates, about 51.3% of snake-bitten cases were those of males [20]. In additon to gender and age based diversities in snakebite incidnece, occupation of the cases should also be scrutinized with an intention to provide all necessary protective measures as data pertainng to this variable was not avaiable from hospital record. Of the total 90 snakebite victims, about 33% were residents of rawalpindi city while 22% and 12.3% belonged to Attock and Azad Jammu & Kashmir (AJK) respectively. Most (91.1%) were bitten by vasculotoxic snakes. Being a public sector tertiary healthcare facilitiy, Holy Family Hospital of rawalpindi located in midcity makes it an ideal healthcare centre for the dwellers of nearby towns like Attock, Murree, Jhelum, Chakwal, Haripur etc. for accessing healthcare [21]. Sindh province across pakistan particularly its Rajanpur district is of paramount significane with respect to snakebite cases. A descriptive study analyzing 2000-2007 hospital record of cases highlighted maximum propensity (57%) of cobra bitten cases that indicated the envenomization of majority by neurotoxi snakes. However, likewise our study, antisnake venom services were also available there [22]. World Health Organization has also released the guidelines for managing snakebite cases particularly in South East Asian Region alongwith treatment of complications and measures to prevent snakebite [23]. Likwise Sustainable Development Goals (SDGs) to be attained by 2030, WHO Regional Director for SEARO (South East Asian Region Organization) has also specified a goal to reduce snakebite assocaited deaths and diasbilities by 50% by the end of 2030. Global strategy for prevention and control of snakebite envenoming has also been launched for this purpose [24]. These aspects not only highlight the significance of reporting the snakebite casses to healthcare centres immediately after onset but also emphasize training of the staff for prompt provision of managerial facilities.

CONCLUSIONS

Snakebite is very common in rawalpindi district and its nearby regions mainly during july and August. Reporting of significant number of snakebite cases depicts non-availability of anti-snake venom in other regional hospitals. Keeping in view the reported areas, respective healthcare facilities should adequately be equipped with anti-snake venom. Moreover, healthcare workforce should also be trained for prompt management of such cases in order to get rid of resultant mortality or disability.

Authors Contribution

Conceptualization: SZ
Methodology: SZ
Formal analysis: RS, FF
Writing-review and editing: RS, FF, SZ

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

Conflicts of Interest

The authors declare no conflict of interest.

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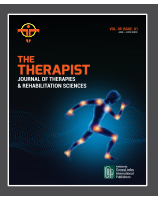

Original Article

Correlation of Chronic Fatigue with Post-Traumatic Stress Disorder and Symptom Severity in COVID-19 Survivors: A Cross-Sectional Study

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ABSTRACT

Corona virus (COVID-19) is an airborne contagious respiratory disease. Fatigue is much reported complain by post-COVID patients. COVID-19 had generated stress in a wide variety of patients can be termed as post-traumatic stress disorder. **Objective:** To find the correlation of chronic fatigue with post-traumatic stress disorder and symptom severity in COVID-19 survivors. **Methods:** The commencement of this study required the allowance from University of Lahore ethical committee. About 155 participants participated in this cross-sectional study who had been COVID-19 positive for once up till now, which had supportive evidence through reverse transcriptase polymerase chain reaction (RT-PCR) test. Only those participants got eligible for study who had survived COVID-19 infectious disease. The data were kept secured by negating any biasness. **Results:** From total of 155 COVID-19 survivors, 75 (48.39%) males and 80 (51.31%) females participated in study. Mean age was 29.32 ± 10.81. About 123 (79.35%) had symptomatic COVID-19. Majority of patients 79 (50.97%) self-categorized them as struggling with moderate symptoms during their quarantine period. About 114 (73.54%) self-perceived they accompanied fatigue after recovering from COVID-19.While 87 (56.13%) COVID-19 survivors had encountered high impact post-traumatic stress disorder. **Conclusions:** It was concluded that majority of COVID-19 survivors had moderate level of fatigue and high impact post-traumatic stress disorder. This was seen more commonly among females. This is an important finding which needs to be taken into consideration when making a treatment plan for patients.

INTRODUCTION

Corona virus (COVID-19) is an airborne contagious respiratory disease. As viral pandemic got spread over the world, resulted in many deaths and morbidities, experts speculated that COVID-19 virus was to blame. COVID-19 had the potential to produce long term and devastating post-viral consequences [1]. It first emerged in the city of China, Wuhan back in December 2019. SARS-Cov-2 was discovered from the samples of three patients at Wuhan Jinyintan hospital in their bronchoalveolar lavage fluid and was confirmed as the cause of COVID-19 on 24 January 2020 [2]. COVID-19 is now linked to SARS-Cov-2 virus [3]. World Health Organization gave virus its novel name as COVID-19 on 11th of February 2020. From its origin since 2019 it has shattered the economies globally, changed the lifestyles of people worldwide. Pakistan had its first case reported on 26th February 2020 due to which government had to enforce complete lockdown on March 13, 2020. Second wave started on 28th of October when the infectivity rate suddenly elevated due to ease of standard protocols and winter arrival. According to WHO, COVID-19 had reached across 223 countries till April 2021. There are four types of it namely alpha coronavirus, beta coronavirus, gamma coronavirus and delta coronavirus. After thoroughly studying the genome's full-length, it was

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discovered that the virus is a member of the 2b beta coronavirus phylogenetic tree and is a novel human affecting coronavirus of beta category, previously undetected in people or animals [4]. It is important to study the post-COVID symptoms, complications. Much study is already done on COVID-19. Fatigue was much reported complain by post-COVID patients but chronic fatigue is entirely different from fatigue as it can be characterized as set of symptoms like lethargies, headache, sore throat, cough, malaise, sleepless nights, tender lymph nodes and impaired cognition which use to diminish concentration or memory to some extent of patients. A prior Cross-Sectional study was conducted among nursing staff in American hospital; they experienced psychological problems, poor sleep and fatigue during COVID-19. Moreover the healthcare providers had to work for 40 hours with a break of half an hour [5]. Vulnerability of chronic fatigue was more among younger population [6]. COVID-19 had generated stress in a wide variety of patients which can be termed as post-traumatic stress disorder. Previous research found a link between post-traumatic stress disorder and a number of viral illnesses [7]. Moreover, a previous study showed that epidemics have an impact on both infected as well as non-infected individuals mainly due to stress, isolation etc., [8, 9]. Furthermore, earlier research has shown that stress and anxiety enhance the sensitivity to COVID-19 infection [10]. Tarsitani *et al.,* conducted cohort study regarding risk factor, prevalence of COVID-19 among hospitalized survivors of post-traumatic stress disorder within a span of 3 months. They concluded that patients with underlying pathologies and females are more prone to develop post-traumatic stress disorder [11]. Quarantine at home developed stress among patients. Critical patients at hospital also had undergone a lot of stress as they had to encounter high doses of medications, oxygen masks or ventilators to combat disease. The idea behind conducting research was lack of literature on current topic by Pakistani researchers, secondly there was peak of third wave with common complain of fatigue and dilemma of fear subjected as post-traumatic stress disorder as a symptom by COVID-19 survivors. Though studies have been conducted individually on chronic fatigue, post-traumatic stress disorder among COVID-19 survivors but no one has seen the combine effects of these study variable's so there was a dire need of studying the correlation of variables. COVID-19 can be categorized as mild, moderate and severe in terms of symptoms so accordingly fatigue as well as post-traumatic stress faced by patients can be associated.

METHODS

The commencement of this study required the allowance from University of Lahore ethical committee. Sample size of about 155 participants was calculated through Epitool, participated in cross-sectional study from Lahore who had been COVID-19 positive for once up till now, which had supportive evidence through reverse transcriptase polymerase chain reaction RTPCR test [12]. Non-probability convenient sampling technique was used. Only those participants got eligible for study who had survived COVID-19 infectious disease. Data collection was performed from COVID-19 survivors by gaining their consent in the Google document form which was later transformed into SPSS through Microsoft Excel. The study was completed in 6 months after synopsis approval. Male and females of age group 18-50 were considered who had only undergone COVID-19 once and got recovered. Patients who had undergone COVID-19 twice confirmed by Reverse transcriptase polymerase chain reaction testing (RT-PCR), patients who died because of COVID-19, patients currently in I.C.U or on ventilator, patients having any life-threatening infectious diseases i.e. influenza, endocarditis and central nervous related disease before contracting COVID19, patients having some serious systemic illnesses like myocardial infarction, congestive heart failure, diabetes mellitus, asthma, blood pressure, patients who have been suffering from any malignancy or cancerous disease and patients who were ineligible to give consent was not included in study**.** Self-administered proformas was used for recording demographics as well as symptoms severity. Chronic fatigue was assessed through validated multidimensional fatigue inventory questionnaire which comprised upon 5 sub-scales ranging from general fatigue to mental fatigue translated from English version [13], while for monitoring post-traumatic stress disorder impact, a valid event scale-revised IES-R was used [14]. All the questions were validated through previous literature. The data were analyzed by using SPSS version 25.0. Qualitative data depicted as frequency, percentage, cross-tabulation, bar and pie chart. While quantitative variable manifested as mean standard deviation, range and histogram. Ethical approval was received from Ethical review Committee of University Institute of physical therapy, The University of Lahore, Lahore, Pakistan (Reference number: IRB-UOL-FAHS-/837-V/2021). All ethical rules and regulation were followed while conducting the study and the participants were included in the study based on informed consent.

RESULTS

From total of 155 COVID-19 survivors, 75 (48.39%) males and 80 (51.31%) females participated in study. Mean age was 29.32 ± 10.81 with majority of participants from 18-35 age groups. People from almost all sectors of society

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participated in study. Out of total sample, 73 (47.1%) students, 23 (14.84%) doctors, 07 (4.52%) teachers, 07 (4.52%) bankers, 14 (9.04%) housewife, 05 (3.23%) engineers and 26 (16.77%) government or private category job holders/ businessman participated in study. Almost 123 (79.35%) had symptomatic COVID-19 out of which only 2 survivors availed ventilation during their stay at hospital. Majority of patients 79 (50.97%) self-categorized them as struggling with moderate symptoms during their quarantine period. About 114 (73.54%) self-perceived they accompanied fatigue after recovering from COVID-19.

Table 1: Descriptive statistics of five domains from MFI-20 scale (N=155)

Domains of Multidimensional Fatigue Inventory (MFI-20) scale	Mean ± SD	Minimum value	Maximum value
General fatigue	11.86±2.86	4.00	18.00
Physical fatigue	11.86±3.48	4.00	20.00
Reduced activity	12.13±3.23	4.00	20.00
Reduced motivation	11.27±2.64	4.00	20.00
Mental fatigue	11.30±3.08	4.00	20.00

MFI (Multidimensional Fatigue Inventory- Scale) indicating five different domains of fatigue was configured out in this study with the minimum value ranging from 4 to the highest value of 20 in 4 domains apart from general fatigue which illustrates peak value of 18 respectively. While 87 (56.13%) COVID-19 survivors had encountered high impact post-traumatic stress disorder.

Table 2: Descriptive statistics of IES-R scale cut off score (N=155)

Total IES-R Score Cut off	Male	Female	Total
No PTSD	04 (2.58%)	08 (5.16%)	12 (7.74%)
Partial PTSD	16 (10.32%)	17(10.97%)	33 (21.29%)
Probable PTSD	09 (5.81%)	14 (9.03%)	23 (14.84%)
High Impact PTSD	46 (29.68%)	41(26.45%)	87 (56.13%)

IES-R (Impact Event Scale Revised) clearly indicated that most of the individuals who participated in this study got suffered with high impact post-traumatic stress disorder while only slight no. of individuals got no post-traumatic stress disorder at all. Table 3 exhibits correlation of 5 domains of fatigue through MFI scale with three domains of Impact event scale revised.

Table 3: Correlation of domains from MFI-20 with IES-R score cut off

Domains of MFI-20 scale	IES-R Score (r)	p-value
General Fatigue	0.164	0.041*
Physical Fatigue	0.261	0.001*
Reduced Activity	0.240	0.003*
Reduced Motivation	0.168	0.037*
Mental Fatigue	0.327	0.000*

Correlation is significant at 0.05* level (2-tailed)

DISCUSSION

Post-COVID complications mainly involve chronic fatigue, post-traumatic stress disorder, cough, dizziness, breathing difficulty like set of symptoms. Specifically chronic fatigue has been reported by 61(39.35%) females which back previous literature, suggesting that females encountered more fatigue than males [15]. This study did not take into account the demographics comparison with chronic fatigue or even with post-traumatic stress disorder in detail. The future studies should take this point into consideration so that it can be significant to society. Moreover prior data suggests that symptom of fatigue itself continued for a span of 3 or so months even after getting discharge [16]. Previous literature indicated that males were more immune to any stress, trauma, anxiety or post-traumatic stress disorder [17]. But study validates that male in number of 46 (29.68%) got suffered from high impact post-traumatic stress disorder in contrast to 41 (26.45%) females. Studies of Xiong et al., depicted that stress and anxiety were not amongst the much reported symptom post-COVID but our research validates other way round [16]. 131 patients were examined in a study at Wuhan which demonstrated 29% of patients had presence of COVID-19 symptoms for a time period of two weeks. Literature suggests that 75% of patients had the presence of at least one symptom after getting recovered from COVID-19 for a time period of 7 or 12 weeks. COVID-19 survivors have mostly self-categorized them as struggling with moderate level symptoms in the study. About 79 (50.97%) have rated moderate symptoms, 28 (18.06%) had mild while 16 (10.33%) were impacted by serious symptoms. Findings of Demeco et al., suggests that about 81% patients encountered mild degree of COVID-19 which is clearly not in line with our results [18]. The studies before did not take the correlation of fatigue with post-traumatic stress like disorder along with symptom severity but my study validates the correlation of chronic fatigue with post-traumatic stress disorder. Moreover my study includes correlation of the five domains of MFI-20 including general fatigue, physical fatigue, mental fatigue, reduced activity, reduced motivation with the three domains of post-traumatic stress disorder, priory literature lacked such evidence specifically in our region. The most significant amongst all five domains of fatigue was mental fatigue with post-traumatic stress disorder. Prior researches have considered critical conditions like stroke, renal failure, heart related diseases but our piece of research negates it [19, 20]. People who have exposed themselves in order to bring home got much more affected than those who stayed at home in quarantine specifically suffered with high impact post-traumatic stress disorder. Future studies should take symptom severity as study gap in order to find association with both chronic fatigue and post- traumatic stress disorder along with their domains as used in my

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study.

CONCLUSIONS

Hence it was concluded that majority of COVID-19 survivors had moderate level of fatigue and high impact post-traumatic stress disorder. This was seen more commonly among females. This is an important finding which needs to be taken into consideration when making a treatment plan for patients.

Authors Contribution

Conceptualization: AZ
Methodology: HS
Formal analysis: HS, SP, SF
Writing-review and editing: HS, SP, SF, AZ

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

Conflicts of Interest

The authors declare no conflict of interest.

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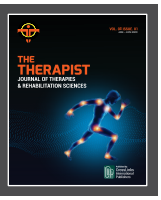

Original Article

Neck Pain Among Occupational Bike Riders Wearing Helmet in Twin Cities: A Cross Sectional Survey

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ABSTRACT

Neck pain is a pain, stress, and fatigue of the muscles in or around the spine beneath head. Sometimes this pain may continue from the neck region into the shoulders, arms and upper back. Bike riders wearing helmet are more prone to neck pain due to prolonged use of helmet. **Objective:** To find the frequency of neck pain in bike riders who wear helmet in Twin Cities. **Methods:** A descriptive cross-sectional survey was conducted among bike riders wearing helmet working with Careem, Bykea and InDriver considering non-probability convenient sampling. 227 participants were selected agreeing to inclusion and exclusion criteria. Data were collected from bike riders at different locations of Rawalpindi and Islamabad. Association of neck pain to the use of helmet and weight was observed in this study. Pain intensity was measured by Neck Pain and Disability Scale. Data were analyzed by using SPSS 26. **Results:** Out of 370 participants, 227 were helmet users, 149 (65.6%) had neck pain. 78 participants wearing helmet did not feel neck pain. **Conclusions:** This study concluded that there was 65.6% frequency of neck pain among bike riders wearing helmet in Twin Cities.

INTRODUCTION

The most convenient means of transportation are motorcycles and helmets use while riding on a bike is the required for safe travel. It is determined that helmets are the necessary item to wear to be safe in a possible occurrence of road traffic incident. Helmets save its user from serious head, brain and facial injury [1]. Motorcycle accidents are considered one of the main risk factors of road fatalities in developing countries. Helmet wearing is the most operational and nominal way of preventing head injuries, moreover, in case of injury it also reduces the intensity and severity of the injury among bike riders [2]. Although an economical source of transportation, however the motorcycles bear a remarkable risk of fall because, in most two-wheelers, the center of gravity is not consistent. The second major cause of calamities is the speediness of the vehicle. The chance of fatal collision becomes greater at higher speed [3]. Nevertheless discussed, neck pain is one of the frequently come across problem in motorcyclists because of recurrent use helmets while riding. Neck pain is a pain, stress, and fatigue of the muscles in or around the spine beneath head. There exist inadequate literature concerning the uneasiness among

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motorcyclists and the manifestation of neck pain because of helmet use. Distress and uneasiness in the body throughout the ride can be due to the seat ergonomics that include, height of seat, hardness of seat, bad postural habits, and bike suspension for smooth ride and handle position adjustments. People may experience neck and upper back pain even during short distance rides [3]. The weight of helmet is an additional burden on the head. This may lead to the head and neck problems in terms of pain and decreased range of motion [4]. Sometimes the motorcyclists avoid the use of helmet as it causes discomfort if they wore it for extended period [4]. Other reasons for not wearing helmet are hair loss, neck discomfort, pain in the neck and occasional headache [5]. Driving bike for long durations causes fatigue in the paraspinal muscles that hold the spine. Postural muscles are prone to fatigue and helmet weight further increases it. the use of helmet for longer durations also causes restriction in neck movements [2]. Motorcyclists stated remarkable restriction in their head and neck ranges of motion if the use of a helmet is prolonged [6]. The helmet usage in adults is not same throughout the world, it varies in countries; 8.6% to 75% in Iran [6] 56% in Pakistan, 19.7% in Spain, and in Vietnam it is 90% [7]. Some researchers have suggested that the neck pain reported by the motorcyclists can be due to the seating posture during ride [8]. However, limited studies have been commenced to find the level of neck pain during the ride while wearing the helmet. Sometimes neck pain may continue from the neck region into the shoulders, arms and upper back. Types of neck pain by causing include mechanical, non-mechanical, and referred pain. Nonspecific musculoskeletal pain, compressed nerve roots, joint diseases, bone and joint degenerative disease come under the category of mechanical pain whereas non mechanical neck pain includes inflammatory diseases pain, tumor and infectious pain. Referred pain of organs i.e. Heart, esophagus and other seemingly unrelated organ system [9]. Mechanical is the most prevalent which contribute for most of neck pain cases which have no known cause but it is believed to be caused by muscle strain and injury to ligaments [10]. Neck pain is very uncommon from any systemic and psychological problems e.g. fibromyalgia [11]. On the basis of signs and symptoms, it is further classified as diffuse and localized which accounts for the most used classification describing neck pain. Diffuse pain is that which does not respond to movement while localized means non-radiating and specific to the neck region. Radiating pain that radiates down the neck to arms in one or both sides which response to specific positions [11]. Middle aged adults are mostly affected while the mean age is 47.9 years at the time of diagnosis. The incidence rates are highest in 50-54 age group. Men are most prone to cultivate cervical radiculopathy than women; lower nerve roots are more at risk to get compressed [11]. Neck pain with red flags accounts for a serious and emergency condition which needs immediate consideration [12, 13]. It can classify on the basis of span as acute, sub-acute, and chronic. Usually, the time duration for acute neck pain is less than six weeks, for sub-acute between six to twelve weeks is sub-acute and more than twelve weeks is chronic [14]. Soft tissues of the neck back and abdomen provide stability to the spine. Facet joints inhibit as well as control spinal movements. Multifidus muscles play an important role in keeping the spine erect and provide stability during movements of the spine. Chronic low neck pain patients have issues in multifidus muscles because of improper posture and movement. Complications to multifidus and other extensor muscles remain constant even without pain due to poor biomechanics and are the most common cause of returning of neck pain after it disappears for some period [15]. Neck pain is highly related to the increasing age of bike drivers, prolonged times spent while driving and, improper posture and hours of helmet use [16]. The pain usually felt on movements like cervical extension, lateral bending, and Para spinal contact. Radiological imaging is important in diagnosing problems with mediated pains [17]. The probable incidence of neck pain in 1 year is10.4% and 21.3% with a spike incidence rate in office workers and most computer users [18]. Per year, 0.6% of the populace is prone to establish disabling neck pain and the rate of recovery of neck pain is 36.6%. Among subjects with prevalent neck pain at baseline, 37.3% report stubborn complications with neck pain and 9.9% showed increase in symptoms during follow up. Lastly, 22.8% of those with prevalent neck pain at baseline show a repeated episode. Neck pain is the most familiar pain found in motorcyclists. With the increasing age, prolonged sitting for riding and longer rides are the most prevalent risk factors among motorcyclists. Repeated lifting and without spinal support of rider's seat, weight of helmet and vibration caused by the engine are also associated with neck pain among motorcyclists [19]. Prolong sitting while driving for 4 or more hours without a change in posture is found to prevalent and related to the cause of neck pain [19]. Adjustment to change and improper head posture while riding bikes leads to neck pain. Improper fitting helmets may also contribute towards the cause of neck pain [6]. Neck pain is prevalent in riders with a history of more than 5 years of driving. It was also more prevalent among those who spent on riding with 8 or more hours riding per day. Age of rider, education level, stress, the posture adopted while riding, condition of motorcycle shock absorbers were highly related to neck pain among motorcyclists [3]. The

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aim of this study was to find out frequency of neck pain in occupational motor bike riders due to excessive use of helmet. There are very limited studies conducted on occupational motorcyclists all over the world. Neck pain affects the daily working of riders and this may lead to absence from job and less productivity of work as well. This research was conducted to provide information regarding neck pain due to prolong use of helmet among bike riders.

METHODS

This was a descriptive cross sectional study carried out in twin cities of Pakistan in the occupational bike riders of Bykea, Careem and Indriver with in the duration of 6 months from February 2022 to July 2022. Sample was raised by Slovin formula i.e. Confident interval (CI): 95% Margin of error(a-error):0.05

$n = N\ (1+Ne2)$

Where n= sample size, N= actual population, e= margin of error Number of registered riders in Rawalpindi and Islamabad is 5000, so N= 5000 n= 5000/1+5000(0.05)2 n=5000/13.5 n=370

Non probability convenient sampling technique was used and data were collected after informed consent through a semi structured questionnaire and NPAD scale. Occupational bike riders aged 18-45 years who use helmet during the bike ride for more than 4 hours a day, more than 3 days a week, using helmet for more than 6 months along with more than 10km distance travelled per day by riders were included in this study. All those with history of neck fracture or trauma, neck surgery, diagnosed cervical pathology and individuals who do not use helmet during bike ride and were not willing to be a part of the study was excluded from the sample. Data were collected using a self-structured questionnaire which consists of 34 questions recording data over the last 6 weeks. Questions regarding age, helmet weight, riding time per day, posture affecting rider's daily life over the past 6 weeks are asked in this questionnaire. The intensity of pain was measured using a Neck Pain and Disability scale .i.e. NPAD. The 20-item scale is used to find out the complications with neck pain intensity, neck movements, the level of effect on daily life accomplishments and, effect of neck pain on emotion and cognition. The NPAD is an authenticated tool to determine results in patients with neck pain. The tool is a go to and smooth tool in terms of completion and evaluation for both patients and evaluators respectively [20]. It can measure reliably the vocational, social, leisure and functional activities of life. The Cronbach's alpha scores of NPAD-d its subscales pain debility and nek function were 0.97, 0.95 and 0.87 respectively. Test retest reliability of NPAD-d was found by Bremerich *et al.*, and it was provided that NPAD is a reliable and valid to use in further studies on neck pain in future. The tool is found to be patient oriented and easy to execute [21].

RESULTS

The research was carried out in Rawalpindi and Islamabad. On the basis of inclusion and exclusion criteria, 143 participants were excluded out of 370 sample. Data of 227 participants were analyzed to formulate results. Mean age of population was 29±7.6 years. The results showed that the 65% occupational bike riders have neck pain. In current study 95 participants were wearing a helmet of weight ranging from 0.25-1.29 kg and 1 of them was having severe pain, 41 participants were wearing a helmet of weight ranging from 1.30-1.90 kg and 2 of them were having severe pain, 13 participants were wearing a helmet of weight ranging from 2.0-3.0 kg and 1 of them was having severe neck pain, hence concluded that increasing helmet weight leads to severity of pain in neck. Most of the participants were of age group 26 years to 29 years with 51(34.2%) were driving bike daily 71-100 Km. The figure 1 shows that the pain is localized in the posterior neck area in most 123 of the bike riders.

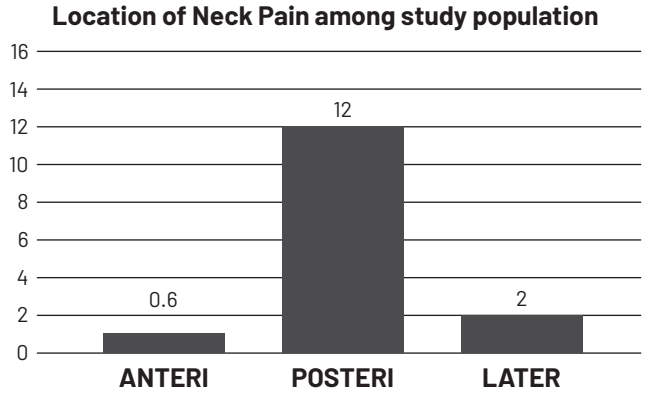

Figure 1: Graph representing the location of neck pain in study population

It was observed that more participants (72%) were wearing the helmet of weight ranging from 0.25-1.29kg. Out of 227 participants 34 (15%) were between the age of 18-21, 35 (15%) were between age of 22-25, 52 (22%) were between age of 26-29, 32 (14%) were between the age of 30-33, 28(12%) were between the age of 34-37, 21(9%) were between the age of 38-41 and 25(11%) participants were between the age of 42-45. Out of 227 participants, 149 (65.6%) were having neck pain and 78 (34.4%) were not having neck pain. Out of 149 participants 8(5.4%) had pain while neck flexion 109 (73.2%) had neck pain during extension, 21(14.1%) were had pain while side bending and 11(7.4%) had pain while rotating their neck. Table 1 is showing BMI (body mass index) distribution of the study population and it represents that 113 participants were normal while 35 were obese and only 8 were underweight.

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Table:1 BMI distribution of study population

BMI Category	Frequency (%)
Under Weight	8 (3.5)
Normal Weight	113 (49.8)
Over Weight	71 (31.3)
Obese	35 (15.4)
Total	227 (100.0)

Table 2 is showing that out of 149 participants having neck pain, 1(7%) had no stiffness, 47(31.5%) had very mild stiffness, 66(44.3%) had mild stiffness, 30(20.1%) had moderate stiffness and 5(3.4%) had severe stiffness.

Table 2: Neck stiffness statistics among those having pain in neck

Neck Stiffness	Frequency (%)
Not Stiff	1 (0.7)
Very Mild Stiffness	47 (31.5)
Mild Stiffness	66 (44.3)
Moderate Stiffness	30 (20.1)
Severe Stiffness	5 (3.4)
Total	149 (100.0)

Table 3 is representing that out of 95 participants wearing helmet having weight of 0.25-1.29kg, 42 participants had pain of moderate intensity on NPAD. 41 participants wearing helmet of weight of 1.30-1.90kg, 23 participants had pain of moderate intensity on NPAD while 13 of those wearing helmet of 2-3kg, 7 had moderate pain on NPAD scale.

Table 3: Cross tabulation of weight of helmet with intensity of neck pain

Weight of helmet in KG	Pain Intensity using NPAD			Total
	Mild Pain	Moderate Pain	Severe Pain	
0.25-1.29	52	42	1	95
1.30-1.90	16	23	2	41
2.0-3.0	5	7	1	13
Total	73	72	4	149

It was reported that 149 participants 2(1.3%) were riding bike daily 10-40 Km, 48(32.2%) were driving bike daily 41-70 Km, 51(34.2%) were driving bike daily 71-100 Km and 48(32.2%) were driving bike daily more than 100 Km.

DISCUSSION

This study shows that out of 370 motorcyclists 227 were helmet users and 149(65.6%) had neck pain while the previous study on neck pain due to helmet use conducted on 260 students in Pakistan in February 2020 by Arslan *et al.*, concludes that out of 190 helmet users 54 (28.42%) have neck pain associated with helmet use [22]. Bike riders are prone to fatigue, stress and injuries due to work related factors. These factors are occupational and non-occupational. This study evaluated the neck pain in occupational bike riders [19]. The occupational factors are posture, long riding position and years of bike riding [19]. This study concluded that the pain is strongly associated with posture of bike riding and long hours of bike riding. A total of 93 participants who were riding bike for more than 6 hours reported pain in the neck. In current study 95 participants were wearing a helmet of weight ranging from 0.25-1.29kg and 1 of them was having severe pain, 41 participants were wearing a helmet of weight ranging from 1.30-1.90 kg and 2 of them were having severe pain, 13 participants were wearing a helmet of weight ranging from 2.0-3.0 kg and 1 of them was having severe neck pain, hence concluded that increasing helmet weight leads to severity of pain in neck. This study shows that out of 227 participants, 149(65.6%) have neck pain while previous study conducted by Faryabi *et al.*, in September 2014 in Iran, states that (69.4%) out of 377 participants were avoiding wearing helmet because of neck pain [3]. Research study performed by Khan I *et al.*, shows that out of 300 participants 44% were not using helmet because of physical discomfort and results of this study are almost similar to current study which states 65.6% of helmet users have neck pain.it concludes that helmet use leads to neck pain which might be caused by improper fitting, size or weight of helmet [7]. The findings of the study suggests that out of 227 participants 149(65.6%) majority of the helmet users had neck pain while a study conducted on students of University of Lahore by Jafari *et al.*, in august 2018 in Lahore concluded that out of 184 bike riders wearing helmet, 58(31.2%) were having neck pain. Further they reported that neck pain is moderately positive corelated with neck pain and disability [23]. Kumar *et al.*, found out the relationship between cervical discomfort and neck pain in bike riders and reported that there was strong correltation of neck pain with the kinds of helmet and duration of the ride [24] while Jafari *et al.*, reported negative correlation of size and type of the helmet with neck pain and discomfort [23]. It is reported in this study that out of 227 helmet using occupational motorcyclist 78(34.4%) were not having neck pain while the previous study on neck pain due to helmet use conducted on 260 students in Pakistan in February 2020 by Arslan *et al.*, concludes that out of 190 helmet using participants 136(71.57%) were not having neck pain [22]. However the study also reported a remarkable risk factor of neck pain with extended distances and length of helmet use. Chance of developing neck pain increases with more motorcycle use [22]. Most of the participants were of age group 26 years to 29 years with 51 (34.2%) were driving bike daily 71-100KM. It means most of bike riders with neck pain are in their productive age, the finding are consistent with the findings of study performed in Iran by Faryabi *et al.*, [3]. While age of the bike riders had no significant association with the age of the rider reported by this study. The same

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findings were determined by Brown *et al.*, [25] and McCartt *et al.*, study [26]. This study determined that 149 participants were having neck pain and 123 (82.5%) of them were having posterior neck pain while the previous study performed by Misailidou *et al.*, states that neck pain is usually perceived posteriorly [15]. The findings of this study showed that among neck pain 85(57%) reported very mild emotional effects due to pain while previous study performed by Young *et al.*, [27] reported remarkably increased depression, anxiety/insomnia and somatic symptoms in patients having moderate to severe neck pain [27].

CONCLUSIONS

This study concluded that among occupational bike riders, frequency of neck pain due to helmet use is high. While weight of the helmet was causing pain of higher intensity.

Authors Contribution

Conceptualization: AH, IA
Methodology: AA, AK, RA
Formal analysis: SH
Writing-review and editing: SH, FZ, RA

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

Conflicts of Interest

The authors declare no conflict of interest.

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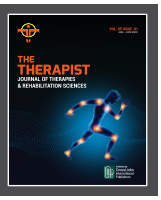

Original Article

Ascorbic Acid: A Potent Agent for Mitochondrial Damage Repair in H2O2 Treated Bone Marrow Mesenchymal Stromal Cells

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ABSTRACT

Bone Marrow Mesenchymal stromal cells (BMSCs) have shown an encouraging promise for cell-based treatments and regenerative medicine applications. Reactive oxygen species (ROS) can damage mitochondria and are detrimental to BMSC cell viability. Ascorbic acid, or vitamin C, is a crucial ingredient that is frequently added to culture media as an antioxidant. Its role in the proliferation of BMSCs has already been studied. However, no research has been done on its effects on the ability of BMSC to regenerate mitochondrial damage. **Objective:** To analyze the recovery of mitochondrial damage by H_2O_2-induced oxidative stress with Ascorbic Acid. **Methods:** BMSCs were cultured and treated with H_2O_2 in order to induce oxidative stress. The injured BMSCs were then treated with vitamin C and their regeneration and recovery from mitochondrial damage is investigated by cell viability assays, ELISA and gene expression profiling. Recovery from oxidative damage is checked through anti-oxidative enzymes. **Results:** Findings showed that supplementing with vitamin C greatly enhanced cell viability and proliferation. It significantly decreased the BMSC's generation of ROS brought on by H_2O_2. These results imply that Ascorbic Acid may enhance the rate of proliferation and reduces apoptosis by recovering the mitochondrial damage as evidenced by the down-regulation of BAX. **Conclusions:** H_2O_2 when given to BMSC could create oxidative stress which in turn damages these cells as evidenced by their decreased cell viability. Ascorbic acid was also observed to regenerate the cells from H_2O_2 injury with the help of increased cells' viability and proliferation and decreased apoptosis.

INTRODUCTION

Multi-potent bone marrow mesenchymal stromal cells are differentiated into multiple types of cells like bone, cartilage and fibroblast. BMSCs are considered to be the precursors of the body tissue. These cells were general but they have the ability to form specialized cells which performed specialized functions [1]. In the regenerative medicine field adult mesenchymal stem cell has a vital role. These cells can be isolated from any body tissue and minor differences and similar properties can be displayed because of their microenvironment origin; the display of characteristic occur after expansion. In vitro expansion can be obtained in serum-enriched media, fibroblast growth factor-enriched media, cytokine-free as well as in serum-free. In pathogenic conditions, oxidative stress played an important role. Cellular activities like cell attachment are negatively influenced by oxidative damage. On the other hand, antioxidants enhanced these activities. The basic cause of DNA damage and cellular senescence was thought to be oxidative damage. Due to defective mitochondrial functions, reactive oxygen species ROS was produced. Under hypoxic conditions when cells were treated with oxidants (H_2O_2) premature senescence was

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supported. Antioxidants enhanced the proliferation rate of bone marrow and adipose-derived MSCs while the effect of ROS remain un-cleared [2]. Cell viability of bone marrow stromal cells reduced by oxidants and antioxidant plays a vital role in the protection of cells from oxidant cytotoxicity was reported. Elimination of organelle and injured cell take place through a complex process referred to as apoptosis [3]. Antioxidants like Vitamin-C were water-soluble and necessary for the functioning of immune systems. A key role was played by Vit-C in other ECM components and the biosynthesis of collagen. Throughout the human body, it acted like co-factoring many biological reactions. When Vit-C is supplied to the culture medium, it increased the DNA synthesis and proliferation rate of BMSCs [4]. It acts as a scavenger of nitrogen species and reactive oxygen species. To get entry into the cells required a channel to pass the hydrophobic lipid bilayer of the plasma membrane. So, sodium-dependent Vit-C transporter 2 has been shown that transported Vit-C into BMSC. On the basis of this background, we developed an experiment in which we investigated the effect of Ascorbic acid on the injury regeneration of MSCs in bone marrow via an enhanced rate of proliferation and decreased rate of apoptosis.

METHODS

At The University of Lahore from the animal house after submitting the signed letter to the lab attendant a 2-month-old albino rat was purchased. After dissecting the rat, BMSC (bone marrow stem cells) were collected. For the purpose of isolating BMSCs, the bone marrow of C57BL/6 GFP-positive mice was collected by flushing their tibias and femurs [5]. Cells were centrifuged and resuspended in culture media in 25 cm2 culture flasks. The culture medium used was HG-DMEM supplemented with 100 g/ml Penicillin G, 100 U/ml Streptomycin and 20% FBS. When cells were 80-90 % confluent, 3-4ml trypsin was added to the flask. Incubate it at 37ºC, 5% CO_2 for 10-15 minutes. When cells became detached, 1-2 ml PBS was added to stop the activity of trypsin. The detached cells were then transferred to a sterilized 15ml falcon. After centrifugation, the pellet was re-suspended with 10% DMEM. And these cells transferred to a new T-75 flask. To check the cytotoxicity of Bone marrow mesenchymal stromal cells H_2O_2 injury was given with concentrations of 0.5mM, 1mM, 2mM, and 5mM for 2 hours and then gave the treatment of Ascorbic Acid with concentrations 30ug/ml, 60ug/ml, and 90ug/ml were used. A 96-well plate was used to conduct the 3-(4, 5-dimethylthiazol-2yl) -2, 5-diphenyltetrazolium bromide (MTT) assay (Invitrogen Inc., USA) for the evaluation of the proliferative capacity of BMSC. Phosphate buffer saline (PBS) was used to wash a monolayer of cells before they were cultured for two hours in 100 l of serum-free DMEM medium and 25 l of MTT solution (5 mg/ml). After being solubilized by 10% sodium dodecyl sulphate (SDS), the purple-colored formazan crystals emerged and the 570 nm absorbance was measured. The previous technique was used to calculate the percentage viability [6]. By using Trizol-method total RNA was extracted from all pre- and post-treated BMSC with Ascorbic acid. In different experimental groups, 1.5ml Trizol-reagent was added and saved in Eppendorf. These Eppendorf were further mixed properly and centrifuged again at 1200rpm for 10 min at 4ºC. After centrifugation, a pellet appeared which contained RNA and the supernatant was discarded. Afterwards, the pellet was cleaned twice with 70% ethanol by centrifuging them at 12000rpm [7]. After discarding ethanol, the pellet was dried and then added the 50ul DEPC water. By using 7ul of RNA, 1ul dNTPs (10mM) and 2ul of poly T were used to synthesize complementary DNA. This reaction mixture was shaken properly and incubated at 65ºC for 5 minutes and then immediately kept on ice. After that, 2ul of 5x reaction buffer, 1ul M-MLV reverse transcriptase and 7ul water were added and incubated for three steps: at 42ºC for 60 minutes, 70ºC for 5 minutes and 4ºC for minutes. The total reaction mixture was 20ul of c.DNA. Different groups of primers such as GAPDH for optimization of c.DNA, proliferation markers like TOP2A, PCNA, and KI67 and apoptotic markers such as BAX, CASPASE, and p53 were used for PCR. To make a PCR product, the reaction mixture is first prepared. After running PCR, these products were run at 1% agarose gel. In a 96-well plate, ELISA was performed for VEGF, P53 and ANNEXIN to check the apoptosis and angiogenesis of BMSC. 100ul of capture antibody in coating buffer was transferred to each well. After adding these the Plates were incubated at 4ºC overnight. The next day, captured antibody was carefully removed, and saved and washing was done with TBST solution three times. After washing, 100ul secondary antibody HRP (Horse reddish peroxidase) was added to each well and left it over overnight. Then, the secondary antibody was removed, and saved and washing was done with TBST. Afterwards, 100ul of Tetramethyl benzidine (TMB) was added for the detection of HRP as substrate solution for 20 minutes. After sufficient color development adds 100ul of stop solution 0.18M H_2SO_4 in each well. Absorbance was taken out at 450nm. Dead cell assay was Performed for live and dead cells in which Trypan blue was used as a prohibiting agent. [8]. The cells from the various study groups were washed with PBS three times before being incubated for five minutes with 50ul of Trypan blue. Cells were then three times rinsed in PBS and examined under a microscope. Trypan blue-stained cells were thought to be deceased. The crystal violet staining method

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was used to identify live cells. For this measurement, a 96-well plate was employed. After removing the medium from the dish, three PBS washes were performed. After washing, 2% ethanol mixed with 0.1 % crystal violet dye was poured into each well. It was kept at room temperature for 15 minutes. Cells were washed once more after the dye was withdrawn. In each well, 100ul of 1% SDS was then added and allowed to sit for 5–10 minutes. On the microtiter plate, absorbance was calculated at 595 nm. Antioxidant enzymes were checked with Glutathione Reductase, Catalase, Superoxide Dismutase and Ascorbate Peroxidase assay. Experiments were done in triplicates[9]. Standard Error Mean was checked by GraphPad.

RESULTS

The cell protective effect of Ascorbic acid on H_2O_2- induced cytotoxicity in the BMSC was observed. MTT assay for all groups shows a significant difference between the viability of treated groups and control. Significantly increased proliferation of BMSC is observed at 1Mm concentration of H_2O_2.

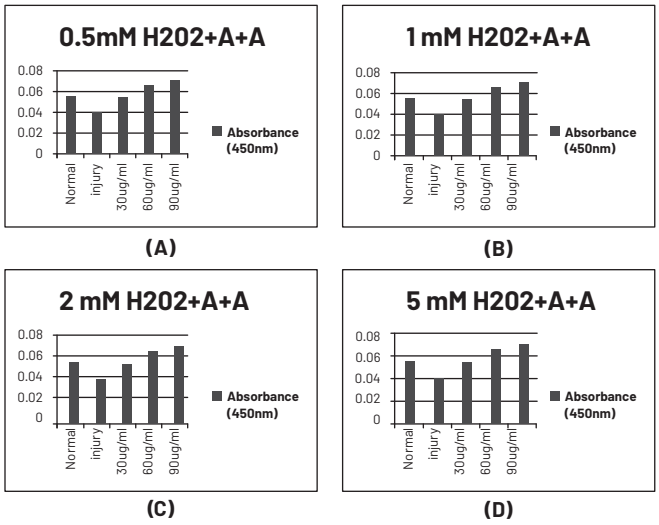

Figure 1: (A) In order to check the cytotoxicity levels in H_2O_2 post-treated BMSCs MTT assay was performed.

BMSC proliferation is dose- and time-dependently regulated by ascorbic acid. Ascorbic acid's effects on BMSCs were verified by the results of a cell proliferation assay (B) By calculating IC_{50}, we observed that at 1.19mM 50% of the viability of BMSCs occurred (C) 2mM H_2O_2 when Co-incubated with various concentrations of Ascorbic acid, decreased the 40% viability rate of BMSCs (D) at 5mM 30% viability of BMSC decreased as compared to other concentrations of H_2O_2. The value was shown as mean ± SEM where p <0.0001* showed significant values

Cell viability detection was done through crystal violet, trypan blue and ELISA VEGF (Figure 2).

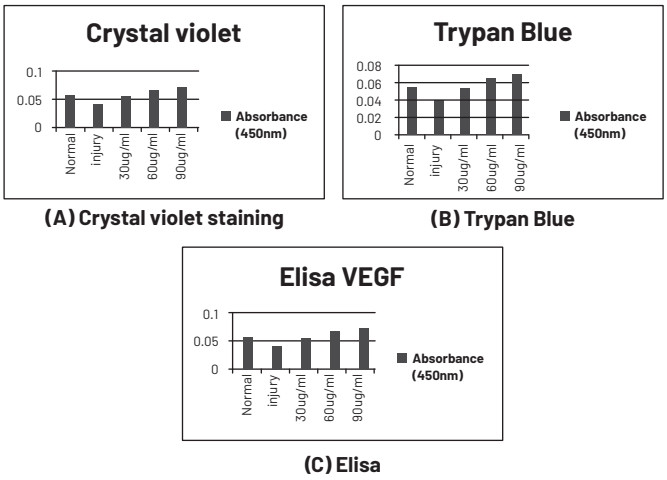

Figure 2: (A) Graphical representation of crystal violet staining showed increased viability of BMSC on the increasing dose of H_2O_2 as compared to control the ratio of dead cells become decreased as compared to the untreated cells (B) Percentage analysis of non-viable cells by trypan blue assay. 1 mM concentration of H_2O_2 Showed significantly low viability of BMSC in comparison with treated groups of BMSC. (C)Growth factor VEGF showed increased proliferation and decreased apoptosis analyzed by ELISA The absorbance was taken at 450nm

Gene profiling through PCR showed increased proliferation of treated BMSC at PCNA and TOP2A as compared to KI-67. Ascorbic acid increases BMSC survival against H_2O_2-induced apoptosis. Live cells increased as we increased the concentration of ascorbic acid. The value was shown as mean ± SEM where p <0.0001* showed significant values (Figure 3).

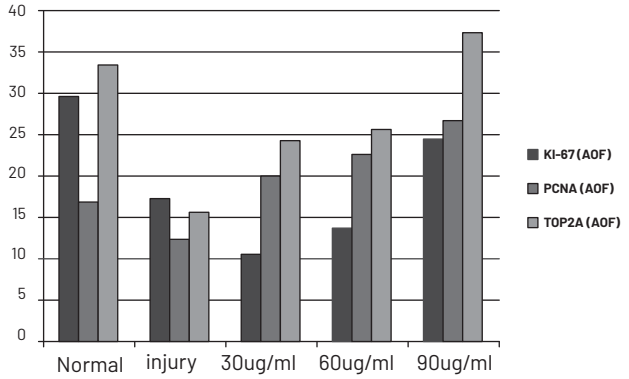

Figure 3: Representation of the increased angiogenesis through VEGF in post-treated groups. The value was shown as mean ± SEM where p<0.0001* showed significant values

Comparative analysis showed decreased apoptosis in figure 4.

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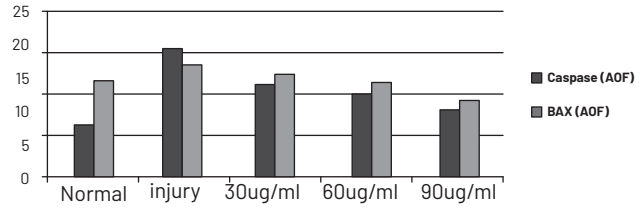

Figure 4: Expression analysis of apoptosis in treated groups of BMSCs through Annexin-V and p53 is decreased as compared to the untreated group

Post-treated BMSC treated with these enzymes showed increased activity versus control with standard error. More proliferation and less apoptosis were observed in treated BMSCs as compared to the untreated group.

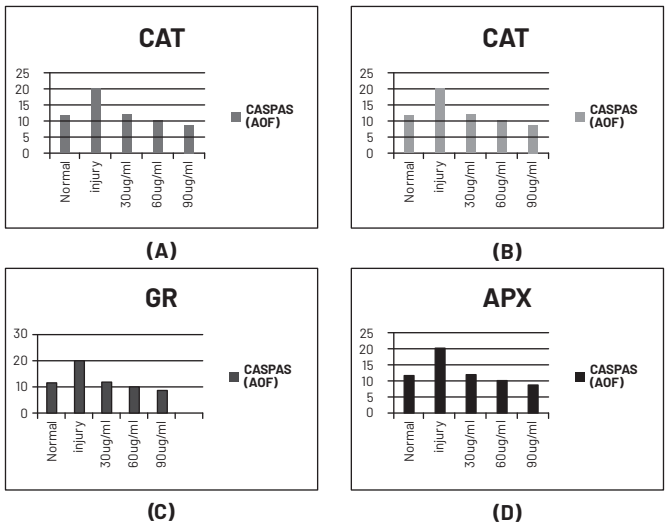

Figure 5: Evaluation of antioxidants graphs showed the antioxidant activity of SOD (A), CAT (B), GR (C) and APX (D) These figures show the levels of antioxidants in treated BMSC versus control the absorbance was taken at 560nm, 240nm, 340nm and 240nm respectively

DISCUSSION

Many studies have observed that ascorbic acid-induced various cellular responses. Previous study by Choi *et al.*, showed that low concentrations of ascorbic acid enhanced the proliferation rate of mesenchymal stromal cells [10]. A recent study by Vicencio *et al.*, revealed that during culture ascorbic acid modulated BMSC proliferation and served as a positive regulator of BMSC proliferation. Different concentrations of ascorbic acid in culture 30ug/ml, 60ug/ml, and 90ug/ml modulated the proliferation rate of mesenchymal stromal cells without loss of the cell's differentiation capacity. Crystal violet staining in our experiment showed increased viable cells (Figure 2). Our results demonstrated when trypan blue was performed it showed a decreased death rate of BMSCs as compared to the crystal violet. We examined the assumption that the ascorbic acid could direct and modulate BMSC growth. Angiogenesis inducer VEGF was an important regulator of neovascularization and it could easily proliferate the proliferation. In our experiment when BMSCs were treated with ascorbic acid, VEGF was up-regulated and enhanced the proliferation of BMSCs. Although expression p53 was associated with regulation of both senescence and apoptosis [11]. In a previous study by Xu *et al.*, showed that when BMSCs undergo cellular senescence, which was followed by the increased expression of p53, the level of apoptosis was up-regulated [12]. Our experiment indicated that BMSCs when treated with ascorbic acid, the expression level of p53 and annexin was downregulated as compared to the increased expression of VEGF (Figure 3). PCNA was the accessory protein for the functioning of DNA polymerase, the molecule essential for cell proliferation and intracellular DNA replication, Ki-67 was a molecule related to PCNA activity and chromatin closely, and Ki-67 is used as a cell proliferation indicator. Bax was the main molecule regulating apoptosis in the mitochondria [13]. The Bcl-2 family member BAX played a crucial part in the apoptosis process. Once the apoptosis process has been started CASPASE-3 cleaved into more apoptotic factors such as CASPASE-6 and CASPASE-9 and these factors become activated which further enhanced the effect of apoptosis on BMSC [14]. In our comparative apoptotic study, we concluded that BAX and CASPASE showed lower levels of apoptosis in BMSC while proliferative markers PCNA and TOP2A showed increased expression as compared to the KI67. The reduction in cellular proliferation and apoptosis induction in cancer cells is linked to the effect of cytotoxicity. Similar to this, our findings demonstrated that Kalonji extracts have the ability to induce apoptosis by up-regulating apoptotic markers like BAX, Caspase-3 and p53 reduce proliferation by down-regulating proliferative genes (PCNA, TOP2A, Ki67) in HeLa and HepG2 cells. Cell viability of bone marrow stromal cells reduced by oxidants and antioxidant plays a vital role in the protection of cells from oxidant cytotoxicity was reported [15]. In a recent study, we analyzed that ascorbic acid has a positive effect on the survival of BMSCs towards H_2O_2 that induced cell death. We found that the proliferation rate was enhanced with increased expression of SOD, and CAT. GR and the apoptosis rate were decreased [16]. The imbalance between the antioxidants and oxidants is referred to as oxidative stress which further leads to cellular death [17]. ROS basically formed by the reduction of an O_2 molecule that contained oxygen with unpaired electrons. Precursor of ROS which was a superoxide anion, formed by the transfer of one electron to an O_2 molecule [18]. SOD catalyzed this superoxide anion and further produced hydrogen peroxide. This H_2O_2 easily crossed the cell membranes and caused damage in the cells because it's a

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stable molecule as compared to superoxide anion. For the breakdown of H_2O_2, antioxidant enzymes SOD, and CAT will come and catalyze this molecule into water and oxygen [19]. Inactivation of proteins and DNA fragmentation is caused by the production of ROS which ultimately leads to apoptosis. In order to exert anti-oxidative function, CAT, GSH and SOD have the ability to scavenge the free radicals. Treatment with ascorbic acid was found to significantly decrease ROS- production and increase the anti-oxidative effect [20].

CONCLUSIONS

From the study, it was observed that H_2O_2 when given to BMSC could create oxidative stress which in turn damages these cells as evidenced by their decreased cell viability. Ascorbic acid was also observed to regenerate the cells from H_2O_2 injury with the help of increased cells' viability and proliferation and decreased apoptosis.

Authors Contribution

Conceptualization: RM
Methodology: SJA, SM
Formal Analysis: LM
Writing-review and editing: LK, NN, AM

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

Conflicts of Interest

The authors declare no conflict of interest.

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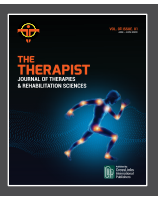

Original Article

Exploring Trends and Barriers to Physical Activity in Adolescents/ School Going Children of Rawalpindi

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ABSTRACT

Adolescent's active participation in PA may reduce the risk of chronic non-communicable diseases (NCDs) in adulthood. Barriers to PA and the association among these barriers were examined. **Objective:** To explore barriers to PA in the adolescent of public school of Rawalpindi, Pakistan. **Methods:** A Descriptive cross-sectional design, multistage cluster sample of adolescents (N = 400) with 214 (53.5%) male and 186 (46.5%) females was conducted. Independent variables such as sociodemographic, (i.e., education, age, gender, socioeconomic level), the discernment of barriers which did not permit to take part in PA, (i.e., fear of harm, lack of time, resources, social support, energy, and motivation, inaccessibility of recreational sports near residence and lacking skills); and adolescent's physical activity participation was evaluated using WHO tool, international physical activity questionnaire (IPAQ). To investigate the connection between perceived barriers and PA participation, multiple regression analysis was used. **Results:** Of the 400 adolescents females are more likely to perceive a lack of time as a barrier to engaging in PA [OR 2.17 (95% CI (1.45—-3.23)]. In a similar vein, those from lower socioeconomic levels are more likely to perceive a lack of motivation. [OR 2.17 (95% CI (1.42—-3.32]. Regarding poor /fair Self-perception of health have a high chance of perceiving scarcity of resource [OR 4.25 (95% CI (2.72—-7.43)] were viewed as obstacles to PA. **Conclusions:** Low socioeconomic status, lack and standard of education, and self-perception of health are indicators of are indicators of potential obstacles to physical activity.

INTRODUCTION

Worldwide, Physical Activity (PA) has been documented as being the essential lifestyle choices that significantly improve the welfare of school-age children and adolescents and have an impact on their healthy development [1]. PA is associated with greater physical strength, reduced anxiety and depressive symptoms, improved cardio-respiratory fitness, and a lower chance of contracting a number of non-communicable diseases [2]. It also has collective remuneration by escalating community relations and commitment [3]. World Health Organization (WHO) has reported physical inactivity among the top four risk factors that add in global mortality. Globally, physical inactivity is responsible for 1.9 million death includes disease as 10–16% of cases of breast, colon, and rectal cancers; 22% of coronary heart disease and diabetes mellitus [4]. Lancet PA Series has reported that 80% of adolescents are not able to meet the most favorable PA criteria [5]. According to AHA recommendations, schools with routine classes of physical education (PE) and playgrounds are important medium and moderators to promote and implement physical activity in adolescents [6]. Lifestyle and living environments of adolescents,

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cognitively, proceed as the barriers to PA [7]. According to the sociological approach, perceived barriers of PA are constructed at the intra and interpersonal levels and they are predictors of PA [8]. PA levels have been reported to be affected by socio demographic factors of gender, socioeconomic status, age, peers, PA of parents, time limitations, parental authority, internal barriers and other variables such as presence of parks and playgrounds in the neighborhood –external barriers [9]. Sedentary lifestyle of children has led to high prevalence of NCDs, is a significant factor in the rise in global obesity epidemic and therefore, rising mortality from cardiovascular diseases [10]. India (18.5%-88.4%), Pakistan (60.1%), and Sri Lanka (11.0%-31.8%) had the highest overall prevalence of inactivity among South Asian adults, according to physical activity patterns [11]. A study conducted at Lahore, found out of 200, male was 38 and 162 female (18 to 22 yrs). Physical inactivity was 69% and physically active were 31%; The Institute of Diet and Nutritional Sciences (UIDNS) at the University of Lahore had found 56% more physically inactive students than active students [12]. The average daily energy expenditure contributed by PA is 18-29%. Hooked on inadequately elevated rates of children/ adolescent obesity [13]. Furthermore, in order to classify definite contexts where PA may have deteriorated and can be targeted for active interferences. Consequently, aim of present is to identify the trends and of the awareness of impediments for PA in the adolescent's populace in Public Schools of Rawalpindi. Inadequate PA leads to increasing the weight of non-communicable diseases (NCDs) in Pakistan. There is an essential need to study the significance and influence of physical activity among adolescence and the major barriers that prevents the youth to adopt physically active and healthy lifestyle in adolescent years. The objective was to ascertain the hurdles to PA in the adolescent of Public School of Rawalpindi, Pakistan.

METHODS

This cross-sectional prevalence study was performed with 214 male and 186 females from Public School of Rawalpindi. The population was the adolescents of eleven to seventeen years of age as per the WHO criteria and was conducted from July to December 2019.The adolescents of all classes from 8th to10th of public school who gave informed consent were included. However, the adolescents with the chronic illness were excluded. The sample size was calculated through Open Epi Software at 38% prevalence for physical activity among adolescents i.e., 362 + 10 % non-response rate i.e., 398 at C.I Level of 95% and Significance Level of <0.05. The data were collected from 400 adolescents. The estimated internal consistency for a questionnaire with 41 items by Cronbach Alpha (Alpha was 0.726) calculated through pilot study. Multi-stage sampling technique was adopted and list of Public Schools of Rawalpindi was obtained from the Secretariat. Schools were divided into four clusters having equal proportions of male and female adolescents to avoid bias in the research study. One cluster was selected through Simple Random Sampling was performed using lottery method out of these four clusters. One Public school from that cluster was further selected through Simple Random Sampling technique using lottery system. The nominal rolls of all adolescents from 8th to 10th classes were obtained and then Universal Sampling technique was applied until the sample size reached to 400 adolescents from this sampling frame. WHO (International Physical Activity Questionnaire) IPAQ was employed as a data collection tool, comprising three parts. The socio-demographic variables were administered first, then barriers were assessed. After that, the extent of physical exertion evaluated. It permits categorization of respondents either Compliance/ Non-Compliance in response to participation in PA, comprising approximately one and a half hours per week of moderate level PA or about 75 minutes per week of high-level PA. This questionnaire assessed PA in MET-min/week and seated time, during past seven-day recollection of Physical Activity. Permission for the study was obtained from AFPGMI (Armed Forces Post Graduate Medical Institute) Ethical Review Board. Consent was obtained from participants in classroom. Anonymity and confidentiality assured. Participants had the choice to withdraw from research. At first step, weight and length of the sample were recorded, and the Body Mass Index (height in kg/m^2) was computed. The participants were then asked to fill the questionnaire regarding barriers to physical activity. Data collected from the respondents was kept under lock and key. SPSS version-23 used, descriptive and inferential statistics were employed. Data were analyzed by frequencies, percentages mean and standard deviation were measured, and presented in the form of tables. The p-value < .05 considered as significant. The variable demonstrating gender, in our study, obtained a value (1 for female, 0 for male), educational mark (1 representing Primary/ Secondary Education, 2 for higher education, 0 denote varying variety), health observation about one self (1 if poor/ regular, 0 for other cases). Value subjected to each variable of perception of barriers such as, fear to get injury/ trauma, absence of social support, limited time, dearth of motivation, deficiency of energy, limited resources and skills - 0 shows no, 1 for yes and 3 for don't know. Whereas, levels concerning socioeconomical values as 1-low, 2 - middle, 3 – upper middle class, and 4 –Elite/ business class.

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RESULTS

A sum of 400 respondent were involved in this research, out of a sum of 214 (53.5%) were male and 186 (46.5%) were female, 14 (3.5%) fathers were illiterate,70 (17.5%) were Middle/ primary passed, 133 (33.3%) complete their Intermediate, there were 100 (25%) fathers who complete their bachelor's degree and only 83 (20.8%) were having Professional/Honors, 47 (11.8%) mothers were illiterate,97 (24.3%) were Middle/primary passed, 112 (28%) complete their Intermediate, there were 89 (22.3%) mothers who complete their bachelor's degree and only 55 (13.8%) were having Professional/Honors, 18 (4.5%) of father were unemployed, 156 (39%) worked at Public sector, 159 (39.8%) were government employed and only67(16.8%) had own business, 77(19.3%) respondents belong to Low Middle Class, 168(42%) belong to Middle class, 99(24.8%) belong to upper class and only56 (14%) were belong Elite/Business Class, 278 (69.5%) respondent had primary education, 115 (28.7%) had secondary education and7(1.8%) had higher education, 6(1.5%) respondent poor self-perception of health, 95(23.8%) had fair, 230(57.5%) good and 69(17.3%) had very good self-perception of health as in table 1.

Table 1: Socioeconomic and Gender distribution

Variables	Frequency (%)
Gender	
Male	214(53.5)
Female	186(46.5)
Father's Educational status	
Illiterate	14(3.5)
Middle/Primary	70(17.5)
High school/Intermediate	133(33.3)
Graduate/Diploma	100(25)
Professional/Honors	83(20.8)
Mother's Educational status	
Illiterate	47(11.8)
Middle/Primary	97(24.3)
High school/Intermediate	112(28)
Graduate/Diploma	89(22.3)
Professional/Honors	55(13.8)
Occupation of Father	
Unemployed	18(4.5)
Private employee	156(39)
Govt. Employee	159(39.8)
Own Business	67(16.8)
Socio economical Level	
Low Middle Class (10,000-30,000)	77(19.3)
Middle	168(42)
Upper Middle Class (61,000-90,000)	99(24.8)
Elite/Business Class (>90,000)	56(14)
Educational Level	
Education Below 5 class	278(69.5)
Education Matric (10 class) or below	115(28.7)
Higher Education	7(1.8)
Self-Perception of Health	
Poor	6(1.5)
Fair	95(23.8)
Good	230(57.5)
Very Good	69(17.3)
Physical Activity Level	
Non-Compliant with the recommendation	253(63.2)
Compliant with the recommendation	147(36.8)

The mean Adolescent's Age was 15.00 ± 1.16 years ranging from 12 to 17 years, mean height was 58.05 ± 10.12 ranging from 43inches to140 inches, mean weight was46.92 ± 10.84 range from 30 kg to 104 kg and mean BMI was 22.42 kg/m2 ± 6.0 ranging from 12kg/m2 to 42 kg/m2 shown in Table2.

Table 2: Mean ± SD of Demographic Variables

Variables	Mean ± SD	Minimum	Maximum
Child's Age	15.00 ± 1.16	12 Years	17 Years
Height	58.05 ± 10.12	43 Inches	140 Inches
Weight	46.92 ± 10.84	30 Kgs	104 Kgs
BMI	22.42 ± 6.0	12kg/m2	42kg/m2

Lack of motivation to perform physical activity was highly frequent obstacle as, 64.80% after that deficiency of time reported, as shown in figure 1.

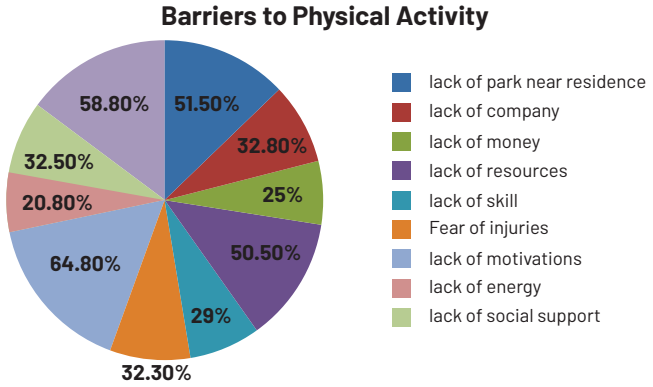

Figure:1 Barriers to Physical Activity

Table 3 reflects that females are at a greater probability of recognizing a time limit as an obstacle to PA [OR 2.17 (95% CI (1.45—-3.23)]. Likewise, individuals from unsatisfactory economic status are at a greater chance about feeling absence of social welfare [OR1.7(95%CI (1.07—-2.60)]. Regarding poor fair Self-perception of health are at a higher probability of feeling lack of social welfare [OR2.68 (95% CI(1.68—-4.28)] as barriers to PA.

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Parameter	Shortage of time			Lack of Social Care			Lack of enthusiasm		
	B	p-value	OR (95% CI)	*B*	p-value	OR (95% CI)	*B*	p-value	OR (95% CI)
Gender									
Female	0.4	0.006	2.17(1.45-3.23)	-0.7	0.001	0.4(0.31-0.74)	0.08	0.7	1.1(0.67-1.77)
Male	0	-	1(-)	0	-	1(-)	0	-	1(-)
Socio Economics Status									
Low	-0.1	0.06	0.90(0.60-1.34)	0.5	0.024	1.7(1.07-2.60)	0.07	0.4	1.2(0.8-1.3)
High	-	-	-	-	-	-	-	-	-
Self-Awareness of health									
Unsatisfactory/ Satisfactory	- 0.18	0.421	0.83(0.52-1.31)	0.9	0.001	2.68(1.68-4.28)	0.2	0.01	1.2 (0.68-2.02)
Above Satisfactory / Average/ Good	0	-	1(-)	0	-	1(-)	0	-	1(-)
Self-Awareness of health									
not in accordance with the Guidance	-1.3	0.001	-0.25(0.16-0.39)	0.5	0.018	1.72(1.1-2.71)	-0.3	0.025	1.35(0.80-2.26)
Compliant with the recommendation	-0		1(-)	0		1(-)1	-		1(-)
Constant	-0.02	0.6	0.8	0.4	0.02	.50	0.2	0.2	1.3

DISCUSSION

Our findings show females have a greater chance of seeing time shortage as an obstacle in performing PA [OR 2.17 ((1.45—-3.23)]. Likewise, individuals representing lower-socioeconomic strata at greater risk of seeing dearth of motivation, an obstacle for PA participation [O R 2.17(95% C I (1.42 - 3.32)]. Concerning poor /fair Self-perception of health are at a greater risk of recognizing dearth of resource [OR 4.25(95% CI(2.72—-7.43)] as hurdles to PA. On the bases of our outcomes, clearly deduce that motivational deprivation, time deficiency, insufficient resources were reported barriers in adolescents of public school, Rawalpindi. Our results correspond as stated by Sharifi *et al.*, whose discoveries revealed that most significant internal and external barriers for PA were dearth of time and lacking motivation [14]. Our findings are also match with a study conducted in Pakistani setup that shows, that out of total 35. study contributors 254 (72.6%) were discovered to be physically sedentary Lack of motivation, knowledge, skills, spouse and family support, accessibility to places for PA, availability of cost-effective facilities, and time were discovered to be significant barriers to PA. In particular, women living in extended families were found to be two times more likely to be inactive [15]. According to a Malaysian study, they belief that additional recreational activities with family and friends are more entertaining, in contrast to our findings, was the most frequently cited barrier, followed by weather, a lack of discipline, free time, money, and friends [16]. Similarly, nearly half of the studied audience said that discomfort and fatigue were the most common barriers to physical activity, followed by physical exertion and a lack of time [8]. Besides, a qualitative study was led by Dwyer *et al.*, to establish adolescent girls, perception of barriers was, lack of time, parental, teachers and peer influence, safety concern, inaccessibility of facilities and their cost; fondness for technology-related behavior; and competition issues [17]. In contrast, despite efforts to encourage adolescents to exercise more, physical activity rates have decreased over time, however, is the fact that adolescent girls contribute little less in PA in comparison to adolescent boys [18]. A recent study stated that alleged barriers to PA was greater amongst girls than boys that is, lack of motivation and lack of energy for exercise were reported by the girls [19]. According to a study, girls report different PA motivators and impediments than boys, gender and weight related bullying, male dominance, and concern for appearance or body shape [20]. Our findings also consistent with a study conducted in Karachi, Males studying in public facilities and had parents who encouraged participation in sports, were more physically active [21]. Our findings are also validated by the first meta-analysis in Pakistan, which included 14 different studies being conducted at school venue, through a sample size of 10,651. Results indicated 36.0% of weighted pooled prevalence of PA amongst Pakistani teenagers with an elevated heterogeneity as 99.28% [22].

CONCLUSIONS

Conclusively, factors foretelling the perception of hindrance to perform physical activity are largely low socioeconomic and lower educational levels due to their strong affinity with health behaviors that encourage to adopt a healthy lifestyle in adolescents.

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Authors Contribution

Conceptualization: JK, FD
Methodology: SAR, DYS, FD, MN, RY
Formal Analysis: DYS, SF, AUR
Writing-review and editing: MFH, FD, NN

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

Conflicts of Interest

The authors declare no conflict of interest.

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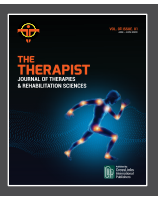

Original Article

Impact of Vigorous Exercise on Blood Serum Creatinine Concentration Among Students Athletes

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ABSTRACT

Creatinine is a chemical compound left over from energy-producing processes in your Healthy kidneys that filter creatinine out of the blood. Creatinine exits your body as a waste product in urine. **Objective:** To examine the impact of vigorous-intensity exercises on serum creatinine concentration among student athletes. **Methods:** Participants were categorized as the control group (CG=n-15) and the experimental group (EG=n-15). Eight-week self-made vigorous intensity exercise protocol was applied on EG. 5 ml blood was collected from each subject, and similarly, serum creatinine concentration was assessed through a serum creatinine test in a biochemistry laboratory. The results (pre and post-test) were statistically tested by independent t-test, mean, and paired sample t-test as statistical tools. **Results:** A statistically significant difference was found in the Creatinine level between the pretest and posttest scores of EG ($P < 0.05$) after the treatment. No significant difference was observed in Creatinine level in CG's pretest and posttest scores ($P > 0.05$). **Conclusions:** The study shows a considerable difference in the pre and post-test of the subjects of CG and EG, and thus it is shown that vigorous exercise has a positive impact on kidney functions, particularly on creatinine.

INTRODUCTION

Exercise refers to all those physical activities that increase the heart rate beyond normal. It is considered necessary for the preservation of physical as well as mental health [1]. Vigorous exercise requires high oxygen intake, such as running, swimming, soccer, jumping, carrying heavy loads, etc. [2]. In other words, vigorous activities are defined as activities ≥ 6 METS. From a health point of view, it is essential to perform the exercise as per the body's nature and requirements [3]. Kidneys are located on each side of the spine just below the rib cage. They are part of the urinary tract and filter blood from other wastes and toxic products produced during metabolic reactions and extra water to make urine [4-6]. Human kidneys are bean-shaped organs in the renal system that execute many vital functions, including preserving overall fluid balance [7, 8]. Inside the human body, healthy kidneys filter about half a cup (125mL) of blood per minute, removing different waste materials from the blood and extra water to make urine. The urine flows from the kidneys through two thin tubes, known as the ureter, to the bladder, while the bladder is part of the urinary tract [9-11]. Creatinine is produced due to the breakdown of creatine in muscles cells during

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contractions; when the muscle contract quickly then, the study of creatine occurs, which makes energy for body organs movements, improves muscles mass and release Creatinine is a waste product, which mixed with blood and filters in kidneys and remove with urine. This test quantify the ration of creatinine in blood is Serum creatinine [12, 13]. According to Wallimann *et al.*, and Wyss and Kaddurah-Daouk, almost adult healthy males whose kidneys perform normal functions typically range from 0.6 to 1.2 (mg/dL) of Creatinine in their blood, and nearly adult healthy females whose kidneys perform normal functions have about 0.5 to 1.1 mg/dL average level of Creatinine in their blood. Females usually have fewer creatinine levels than males because females are mostly less muscular than males [14, 15]. Kidneys perform essential functions in the human body to filter the blood from the different products produced during various metabolic activities inside the body [6, 16]. The field of medical, chemical, surgical and pharmaceutical sciences provides their solution to deal with kidney problem in their ways. Preliminary work was done in sports sciences and physical education to deal with kidney problems through exercise science.

METHODS

Male students were randomly selected from the Department of Sport Sciences and Physical Education (DSSPE), Gomal University (GU), Dera Ismail Khan (DIK), Pakistan. The participants, aged 18-22 years, used no medications and had no chronic health problems, and the subjects who volunteered to participate were included in the study. After applying the said criteria, the subjects were randomly categorized as the control group (CG=n-15) and the experimental group (EG=n-15). The study was followed with a single-dimensional experimental design with both two groups of the study. This sample size calculation for the study was made based on the availability and consent of the subjects and the criteria set for the selection for participation. Eight-week self-made vigorous intensity exercise protocol was applied on EG. 5 ml blood was collected from each subject, and similarly, serum creatinine concentration was assessed through a serum creatinine test in a biochemistry laboratory. The results (pre and post-test) were statistically tested by independent t-test, mean, and paired sample t-test as statistical tools.

RESULTS

Table 1 showed that the total respondents of the study were 30, the minimum age was 18 years, the maximum was 24 years, and the mean age was 20.46±1.53. The minimum height of the respondents was 160cm, the maximum was 185.88cm, and the mean height was 172.24±7.04. The minimum weight of respondents in the pretest was 56kg, the maximum was 92kg, and the mean weight in the pretest was 67.35±8.91. The minimum weight of respondents in the posttest was 53kg, the maximum was 78kg, and the mean weight in the posttest was 61.60±6.44. The minimum BMI in the pretest was 17.59, and the maximum was 31.08; the mean BMI in the pretest was 22.71±2.75. The minimum BMI in the posttest was 16.54, and the maximum was 26.93. The mean BMI in the posttest was 20.82±2.41.

Table 1: Analysis of respondents based on Age, Weight, Height and BMI

Variables	N	Min	Max	Mean ± SD
Age (years)	30	18.00	24.00	20.46±1.53
H (cm)	30	160.00	185.88	172.24±7.04
W (kg) pre	30	56.00	92.00	67.35±8.91
W (kg) post	30	53.00	78.00	61.60±6.44
BMI in Pre-test	30	17.59	31.08	22.71±2.75
BMI in Posttest	30	16.54	26.93	20.8246±2.41

Table 2 shows the pretest and posttest differences between Experimental Group B (VIE) and Control group on the weight pretest, weight posttest, BMI pretest and BMI posttest. No statistically significant differences were found in weight pre ($p > 0.05$) and BMI pre ($p > 0.05$), and statistically significant differences were found in BMI post ($p < 0.05$) and weight post ($p < 0.05$).

Table 2: Pre and Posttest differences between CG and EG in term of Weight and BMI

Measurements	VIE Group n=15	Control Group n=15	T	Sig.
	Mean ± SD	Mean ± SD		
Weight Pre	66.26±7.89	69.13±10.43	-.849	.403
Weight Post	58.50±6.17	64.67±4.22	-3.142	.004
BMI Pre	22.36±2.64	23.62±2.71	-1.291	.207
BMI Post	19.77±2.00	22.22±1.83	-3.489	.002

Table 3 shows the pretest and posttest differences between EG and CG at the Creatinine level. Significant was found in the Creatinine level between the pretest and posttest scores of EG ($p < 0.05$) after the treatment. No difference was found in Creatinine level between the pretest and posttest scores of CG ($p > 0.05$).

Table 3: Pre and Posttest difference of CG and EG in Term of Creatinine Level

Measurements	Pretest Creatinine	Posttest Creatinine	T	Sig.
	Mean ± SD	Mean ± SD		
VIE Group (EXP-B)	.773±.059	.953±.124	-6.874	.000
Control Group	.753±.091	.753±.074	.000	1.00

DISCUSSION

The study aimed to highlight the impact of vigorous exercise on blood serum creatinine concentration among student athletes; therefore, two groups that were CG and EG, comprised of 30 subjects (each group was formed of 15 participants), were randomly selected and thus, exercise protocol of vigorous activity was applied on EG. After careful completion of the study, the results showed a statistically significant difference in Creatinine level

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between the pretest and posttest scores of EG ($p < 0.05$) after the treatment. No significant difference was observed in Creatinine level in CG's pretest and posttest scores ($p > 0.05$). Another study conducted showed that creatinine excretion increased by 50% during exercise among the subjects [17]. So this study is also in link with the finding of the current research. Likewise, the survey conducted among eighty-eight subjects showed a significant correlation between creatinine concentrations and the 24-h urine volume: r=0.786, p<0.001 [18]. So this emerging finding also supports the result of the present study. The same result is shown by another study that people with chronic kidney diseases (CKD) or blood pressure should have kidney problems [19]. On the other hand, people interested in chronic kidney disease (CKD) should have a high level of creatinine in their blood [20]. Another study suggested that an increase in creatinine levels among healthy people can easily filter creatinine from the blood due to the enhancement of kidney functions. The study's finding shows a significant effect of exercise on BMI. In line with this finding, the surveys conducted by sikiru and Okoye and Johansen and Painter found that moderate-intensity exercise increases the level of creatinine level to customary conditions because creatinine produces due to the quick contraction of muscles [21, 22]. Another side the findings of this study also found that moderate-intensity exercise is also beneficial for the improvement and boosting kidney functions as well as another overall organic system of the human body. No requirement occurred for dialysis—the blood from different waste products is produced during various metabolic activities.

CONCLUSIONS

Based on analysis and findings, the researcher concluded that there is a significant difference in the pre and post-test of the subjects of CG and EG. Thus it is shown that vigorous exercise has a positive impact on kidney functions, particularly on creatinine. Therefore this research will lead to the development of a test model for players in higher education institutions. Almost our athletes, as well as bodybuilders who perform a daily high-intensity activity, will achieve optimal awareness and guidelines regarding the effect of moderate and vigorous intensity exercise on kidney filtration functions that, through regularly participating in any physical activity, can lead to nutritional health and long life expectancy.

Authors Contribution

Conceptualization: MU
Methodology: AK
Formal analysis: MJ
Writing-review and editing: MZIB, IU, MZ, SS, HN
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest

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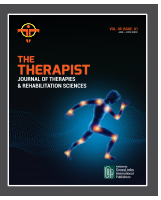

Original Article

Prevalence of Low Back Pain among Physiotherapists Working in Clinics and Hospitals of Islamabad

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ABSTRACT

Lower back pain (LBP) is a prevailing musculoskeletal condition that affects nearly all individuals at certain point in their lives. Although the majority of individuals with LBP experience temporary pain or disability and rapidly resume normal activities regardless of treatment, a small percentage develop chronic pain and disability. Among those with long-term pain and disability, few return to normal activities after experiencing LBP for more than one year. Despite the lack of discrimination based on gender, race, or work environment, certain professionals, such as physiotherapists, are at a heightened risk of developing LBP. **Objective:** To determine the prevalence of lower back pain among physiotherapists working in clinics and hospitals of Islamabad. **Methods:** A descriptive cross-sectional study was performed using demographic data, visual analogue scale (VAS) and OSWESTRY low back disability questionnaire to determine the prevalence of lower back pain among physical therapists working in clinics and hospitals of Islamabad. The study participants were physiotherapists working in Islamabad with age between 23 to 35 years. Data were analyzed by SPSS version-25. **Results:** A total of 50 physiotherapists participated in the study. Results showed that out of 50 participants, 50% had moderate amount of pain following the mild pain that was 44% and 6% showed no pain measured through Visual analogue pain scale. **Conclusions:** The present study concludes that low back pain is prevalent among physiotherapists working in clinics and hospitals of Islamabad.

INTRODUCTION

Lumbar pain, commonly referred to as lower back pain (LBP), is a prevalent medical condition characterized by pain originating from the lower back region and often radiating to one or both legs. LBP is recognized as a leading cause of disability and absenteeism from work, resulting in a significant socioeconomic burden, particularly in western industrialized countries [1]. According to current estimations, a substantial portion of the adult population, ranging from 50% to 80%, experiences episodes of lower back pain (LBP) at least once during their lifetime [2, 3]. Numerous studies have focused on the occurrence of low back pain (LBP) in the general and working population, with estimates ranging from 62% to 80% of the population suffering from LBP [4]. The condition known as Low Back Pain (LBP) is distinguished by the presence of one or more of the following diagnostic criteria: persistent pain lasting for a minimum duration of one-year, daily pain persisting for at least three months, intense pain which subsists for a duration of one day or longer, and pain which necessitates medical attention and/or sick leave [5]. Despite its indiscriminate nature with respect to gender, race, or occupational environment, certain professions have been identified as being more susceptible to LBP than others [6]. Physical therapists are a population at risk for the development of low back pain (LBP). A study conducted on physical therapists has reported lower backache to be the

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most common type of musculoskeletal disorders related to work [7, 8]. Physiotherapy is divided into different categories including kinesiotherapy (therapeutic gymnastics, movement therapy), physiotherapy (treatment involving natural or artificial physical stimulus), and massage. The physiotherapist has a different type of work in each of these departments, which may cause unusual strains in the locomotive system. Common stressors that pose a particular risk to a given physiotherapy domain include mechanical overload resulting from patient or equipment lifting, regular repeating of identical movements, enforced body positioning, bending and torso rotation with weight, deficient patient-lifting equipment, improper patient-lifting techniques, and unpredictable patient movements or falls [9, 10]. Long-term bending while doing massage therapy tasks necessitates standing efforts, static physical burden involving trunk turning & flexion, dynamical physical load - physical exertion, and monotype of movements [9, 11]. Intense loading in the workplace or imperfect musculoskeletal techniques used in handling patients may cause higher levels of lower back pain related to work. In the context of patient treatment, therapists may inadvertently overwork their muscles and joints while performing therapeutic maneuvers, leading to an increased risk of LBP [12, 13]. Several studies have assessed the risk factors that are most commonly associated with lower back pain (LBP) related to work in physiotherapists (PTs). The identified risk factors include providing medical care to a significant volume of patients within a single day, being in the same position for an extended duration, and assisting or relocating patients who are dependent [14, 15]. In order to address work-related lower back pain (LBP), it is necessary to incorporate at least one self-protective behavior along with the utilization of different tools and equipment [16]. Furthermore, due to work-related lower back pain (LBP), physical therapists (PTs) might seek medical care, adjust their activities of daily living (ADL) and recreational pursuits, or make alterations to their area of specialization, either within the field or by opting to leave it altogether [7, 17]. The primary aim of this survey was designed to determine the prevalence of LBP among physiotherapists working as clinical practitioners.

METHODS

A cross-sectional study was carried out in National Institute of Rehabilitation Medicine, Poly Clinic Hospital and Majestic Medicine Revitalizing Center Islamabad from June 2022 October 2022. The study was completed in a duration of 4 months after the approval of institutional review board and ethical committee (IRB & EC) of Bashir Institute of Health Sciences. A total of 50 participants were chosen using a non-probability convenience sampling method and the sample size was computed using Slovin's formula n=N/ (1+Ne2) with confidence interval at 95% and margin of error=0.05. The study included both female and male physiotherapists working in clinics and hospitals with age ranging 23 to 35 years. Pregnant physiotherapists and those with a history of spinal surgery, spinal injury, any spinal deformity and any trauma were excluded from the study. After getting an informed consent, data were collected directly from the participants using visual analogue scale, and OSWESTRY low back disability questionnaire. For descriptive analysis frequency and percentages, data were analyzed through SPSS version 25.0.

RESULTS

The present study comprised a sample of 50 participants falling within the age bracket of 23 to 35 years. Demographic analysis revealed that 24 (48%) of the total participants were male physiotherapists, while 26 (52%) were female physiotherapists Figure 1.

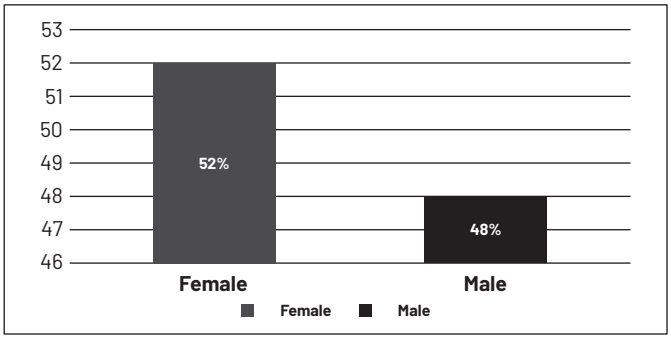

Figure 1: Percentage of Gender of Gender Distribution

Age distribution revealed that the majority (30%) were 24 years old. Participants aged 25 and 26 years old accounted for 18% and 16% of the sample, respectively, while those aged 23, 27, and 28 years constituted 8%, 10%, and 8% of the sample, respectively. The remaining age categories were represented by 4% of 30 years old, and 2% each for 31, 32- & 35-years old participants Figure 2.

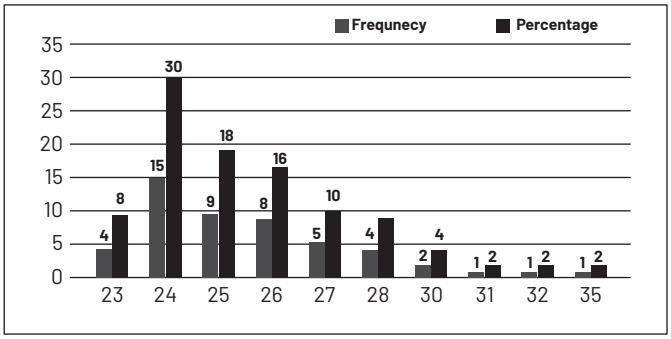

Figure 2: Percentage of Age Distribution of Participants

In this study, pain was assessed utilizing the Visual Analogue Pain Scale. The results indicated that among the

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participants, a majority of 25 individuals (50%) reported experiencing a moderate level of pain, with 22 individuals (44%) reporting mild pain, and only 3 individuals (6%) reporting no pain Figure 3.

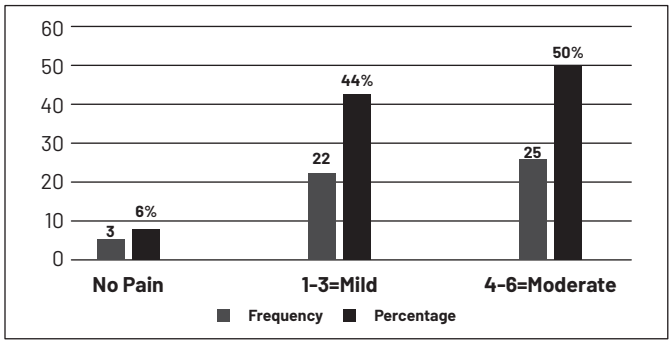

Figure 3: Frequency and Percentage of Pain using Visual Analogue Scale

The Oswestry Lower Back Pain Index questionnaire was utilized to measure the degree of disability resulting from lower back pain. Analysis of the responses revealed that 26 out of 50 participants, corresponding to 52%, reported experiencing mild disability, 13 participants or 26% reported moderate disability, whereas 11 participants corresponding to 22% reported no disability Figure 4.

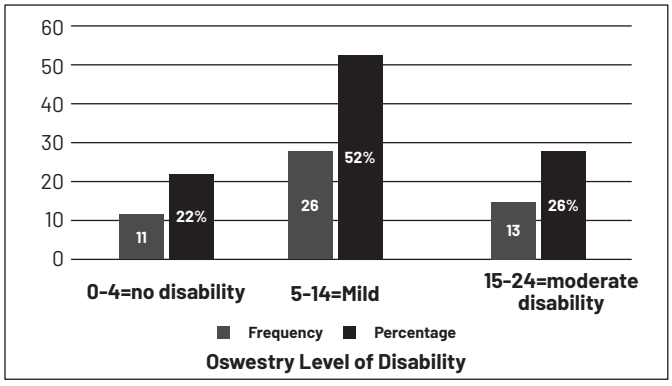

Figure 4: Frequency and Percentage showing Disability Level

Regarding the prevalence of pain and disability in a particular gender the results revealed that among the female physiotherapists, 6 (12%) had no disability, 12 (24%) had mild disability, and 8 (16%) had moderate disability. In comparison, among the male physiotherapists, 5 (10%) had no disability, 14 (28%) had mild disability, and 5 (10%) had moderate disability Figure 5.

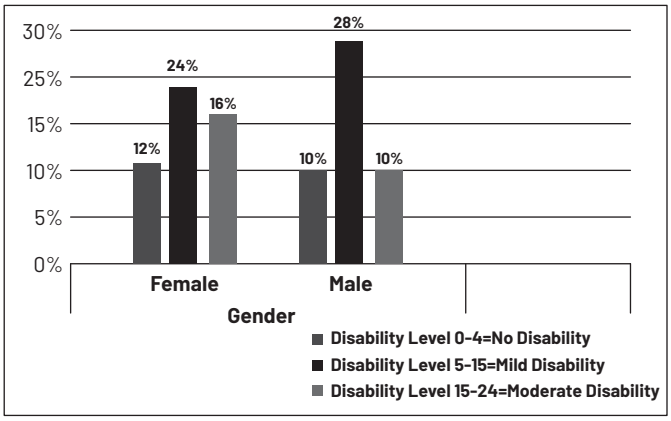

Figure 5: Level of disability among male and female physiotherapists

It was also found that the participants face daily life functional disabilities caused by low back pain. Functional disability encountered by the participants across various daily life activities is shown in Table 1-2.

Table 1: Frequency and Percentage of participants having functional disability in terms of pain intensity, lifting and sleeping

Level of Pain					
	Capable of enduring the pain without the need for pain relievers	Pain is severe, but managed without the use of painkillers	Pain relievers provide total alleviation from pain	Pain relievers provide a moderate alleviation of pain	Pain relievers provide minimal alleviation of pain.
Frequency (%)	18(36)	23(46)	5(10)	3(6)	1(2)
Lifting					
	Can effortlessly handle heavy loads without experiencing pain	Lifting heavy load causes more pain.	Unable to pick heavy load off the floor due to pain, can lift only if suitably placed	Unable to pick heavy load due to pain, but can pick light to medium load if suitably placed	Can only pick light loads
Frequency (%)	10(20)	21(42)	10(20)	8(16)	1(2)
Sleeping					
	Pain does not hinder sound sleep	Can achieve good sleep only with the aid of medication	Even with aid of medication, sleeps less than 6 hrs.	Even with aid of medication, sleeps less than 4 hrs.	Even with aid of medication, sleeps less than 2 hrs.
Frequency (%)	28(56)	13(26)	7(14)	2(4)	0

Table 2: Frequency and Percentage of participants having functional disability in terms of sitting, standing and walking

Sitting					
	Can use any chair of their choice for sitting	Can use only selected chair for sitting as long as one like	Cannot sit >1 hour due to pain	Cannot sit > ½ hour due to pain	Cannot sit >10 minutes due to pain
Frequency (%)	11(22)	25(50)	10(20)	3(6)	1(2)
Standing					
	Can stand without additional pain for as long as desired	Can stand for as long as desired, but it causes additional pain	Cannot stand > 1 hour due to pain	Cannot stand > ½ hour due to pain	Cannot stand >10 minutes due to pain
Frequency (%)	9(18)	26(52)	9(18)	4(8)	2(4)
Walking					
	No hindrance in walking due to pain	Pain prevents walking more than one mile	Cannot walk > ½ mile due to pain	Cannot walk > ¼ mile due to pain	Can only ambulate using walking aids
Frequency (%)	22(44)	10(20)	14(28)	4(8)	0

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DISCUSSION

In this study, the prevalence of lower back pain among physiotherapists working in clinical settings or hospitals was investigated. The Visual analogue scale and Oswestry disability index were used to measure lower back pain. The study found that lower back pain is prevalent among physiotherapists, and previous research has also shown that low back pain risk can be heightened by factors like abnormal posture, job-related hazards, and specific occupational aspects such as lifting or moving dependent patients, as well as the physical therapist's age and gender. Abolfotouh *et al.,* conducted a cross-sectional study in which 259 physical and occupational therapists from rehabilitation centers in Saudi Arabia were selected. The study revealed that rehabilitation professionals experienced a 73.7% 1-year prevalence of low back pain, with 52.5% experiencing severe pain lasting ≥ 1 day, 22.4% experiencing chronic lower back pain, 23.9% seeking medical leave due to lower back pain, and 18.5% seeking treatment due to pain in lumbar region [18]. In our study, 52% of participants experienced mild and 26% experienced moderate level disability due to low back pain while performing their daily functional activities. The results are similar to the study mentioned above in term of lower back pain prevalence but in our study majority of the physiotherapists experienced mild pain unlike the study by Abolfotouh *et al.,* in which 52.5 % experienced severe pain [18]. In Bloemfontein, South Africa, Barnes *et al.*, conducted a study examining the prevalence of work-related low back pain among actively practicing physiotherapists. The study included the participation of 84 physiotherapists, and the findings revealed that 67% of the respondents had encountered work-related low back pain (WRLBP) [19]. The result of our study in which 52% physiotherapists experienced lower back pain supports these findings. A study was carried out by Alghadir *et al.,* in Riyadh, Saudi Arabia, aiming to investigate the occurrence of work-related low back pain (LBP) among physical therapists. The study also examined the factors linked to work-related LBP and its consequences. To collect data, a self-administered online questionnaire was distributed to 600 members of the Saudi PT association. The findings from the study indicated that 89.65% of the therapists experienced LBP after commencing their PT practice, while 35.6% reported LBP during the survey period [20]. In our study, we found that pain with lifting heavy weights was reported by 42% of participants,14% need medication to sleep properly without pain and 28% cannot walk more than half mile due to pain. Transferring of dependent patients, as well as the age and gender of physical therapists, are also linked to the occurrence of low back pain among the participants in this population. Glowinski et al. carried out a study aimed at determining the prevalence, risk factors, and symptoms of back pain among physiotherapists in Poland. The study encompassed a cohort of 240 physiotherapists, and the Oswestry Disability Index (ODI) questionnaire was utilized to evaluate the responses [21]. According to the data, physiotherapists had a 91.7% incidence of spinal pain (88.9% for massage, 97.3% for physical therapy, and 91.1% for kinesitherapy). This study is similar to our study that they also assessed prevalence of low back pain among physiotherapists by using Oswestry disability index. The findings of this study align with our own results regarding the prevalence of lower back pain among physical therapists. The prevalence of pain in lower back and functional limitations among physiotherapists working in clinical settings and hospitals is a growing concern. This issue has been identified as a significant occupational health problem worldwide. Despite their extensive knowledge and experience in managing musculoskeletal disorders, physiotherapists are not immune to the experiencing low back pain and related functional impairments. As such, preventative measures and interventions aimed at mitigating the risk of low back pain and functional limitations among physiotherapists are warranted. Moreover, further studies should be conducted on a larger scale with a larger sample size, so that the result can be more generalized. Psychosocial measures should also be emphasized in future studies.

CONCLUSIONS

The present study concludes that low back pain is prevalent among physiotherapists working in clinics and hospitals, and it was also significantly associated as a cause of functional disability in terms of daily activities.

Authors Contribution

Conceptualization: AJ
Methodology: AJ, TJ, SK
Formal Analysis: AJ, ST, MW
Writing-review and editing: AJ, ST, MN, HMK

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

Conflicts of Interest

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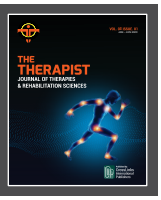

Original Article

Impact of Endurance Exercises on Knocked Knees as a General Health Concern

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ABSTRACT

Knocked knees are a problem in children and adults, making it challenging to walk or run and causing knee pain. In this problem, the knees gradient inward while the ankles remain spaced apart. **Objective:** To analyse the impact of endurance exercises on knocked knees as a general health concern. **Methods**: The study participants were randomly selected from the department of sports science and physical education, University of Punjab, Pakistan. Subjects were categorized as a control group (CG) and an experiential group (EG). Each group was comprised of twenty subjects. All the subjects were informed about the risk and benefits of participation in the study. Thus, written informed consent was taken from each subject. In addition, Ethical approval (293/SPS) was also obtained from the University of the Punjab, Lahore, Pakistan. **Results:** The mean and standard deviation during the pre-test were 50.60±2.35, and the mean and standard deviation during the post-test was 53.05±2.33. The t value was 1.788, and Sig was .96. Therefore, the table shows no significant difference in CG in knee-knocking before and after training sessions imposed upon EG. The mean and standard deviation of EG during the pre-test was 50.00±2.07, and the mean and standard deviation of EG during the post-test was 58.35±2.20. The t value was 17.376, and Sig was .000. Therefore, there was a significant difference during pre- and post-test EG analysis in knee-knocking. **Conclusion**: Based on the analysis, the researcher concluded that exercise has a vital role in rehabilitating the knocked knee.

INTRODUCTION

The knocked knee is a general health concern found among children; thus, it is recovered in childhood. Sometimes this problem continues till death, but the main factor responsible for such a situation is a lack of awareness and proper concentration. Difficulties in walking, running and other routine activities are associated with knocked knees [1]. Likewise, knee pain, knee pain, limited knee alignment, and direct effects on the body's posture and walk pattern are also problems caused by knocked knees [2]. The knocked knee also affects the performance of the thigh muscle; the person with banged knee does not walk like an average person because of the difference in knee angle and alignment [3]. A person with a knocked knee has more risk of falling and improper body movement because knocked knee makes a person unstable and imbalanced [4]. A person with knocked knees is always at the risk of falling instead of standing correctly after jumping due to a deformed angle of the knee [5]. The knocked knee is a deformity linked with alteration of knee alignment, thus causing poor body posture and affecting other body

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segments. Knocked knee creates difficulties in the lower body and affects the whole body movement styles [6]. Knocked knee directly affect the performance of athletes because knocked knees negatively affect physical fitness and degrades the overall motor functions of our body in any sports, which include running or based on lower muscles mostly [7]. Obesity is a significant health problem for children and adults and cause body load on bones, particularly on leg bones and knee joints. Due to this load, the knee angle becomes deformed and causes knocked knee [8]. Knocked knees originate from the distal femur [9]. Any biomechanical abnormality in any joint of the body, exclusively related to knee joints, causes serious injuries such as knee pain, difficulty walking and arthritis. The exception in the knee joint is majorly driven by knocked knees [10]. In some cases, knocked knee person's patella dislocates due to the knee joint angle difference [11]. Knee muscles are the most influential group of muscles, and the loss of their functions is linked with knocked knees [12]. Poor body movements are commonly observed in children and adults with knocked knees [13]. The most common cause of knee-knocking or genu valgum is medial torsion of the proximal tibia, and due to this, the lateral side becomes more weight-bearing. More weight on the lateral side of the body increases the chances of knee injuries in knocked knee-affected persons [14]. Epiphyseal Staple is used for correcting angular deformity at the knee. This technique is also used to correct knocked knees in children, which was observed to be more effective in children under 11.5 years old [15]. The knocked knee can be treated through a guided growth technique with extra periosteal application of a flexible two-hole plate and screws, but this technique takes 32 months after surgery (16 months for each leg) in children with a mean age of 11.6 years old. Recovery time is faster in children under the age of 10. Through this surgery, 1 of 25 children had a rebound deformity, but no permanent physical tethers were encountered. The guided growth technique, as performed using a flexible titanium plate, is simple and safe for treating periarticular deformities of the leg [16].

METHODS

The researcher adopted the below procedures to reach specific findings and conclusions. The study was concerned with rehabilitating knocked knees through endurance exercises, so the researcher applied a quantitative research approach. The study participants were randomly selected from the department of sports science and physical education, University of Punjab, Pakistan. Subjects were included in the study by adopting the inclusion criteria such as; subjects having ages more than 18 years and less than 25 years, subjects having no health issues, subjects voluntarily participating in the study and only male subjects were included in the study. Likewise, the subjects were excluded from the study by adopting the exclusion criteria, such as subjects less than 18 years of age and more than 25 years, issues with health consequences such as heart problems, and subjects who refused to participate. The self-made endurance exercises protocols consisting of Leg Abduction (4×12), Hip Abduction (4×12), Squats (4×12), and Side lunges (4×12) were developed and applied to the subjects for two months. The researcher personally monitored the whole exercise session. Ethical approval was obtained from the university's ethical review board of Punjab (293/SPS). The collected data were processed through the statistical package for social sciences (SPSS, version 26.0), and thus appropriate statistical tools were applied for analysis. T-test was used as a statistical comparison of CG and EG in pre and post-test study. Mean was applied for calculating the mean average; thus, Standard deviation (SD) is a widely used measurement of statistical variability. It shows how much variation there is from the average (mean).

RESULTS

Table 1 shows the anthropometric characteristics of CG before and after Training. Data were expressed by using mean and standard deviation. The total number of subjects was 20. The maximum range in term of age was 17.00; the minimum range was 24.00, and the mean and standard deviation was 20.29±2.70. The maximum range in term of height was 156.00, and the minimum range was 188.00; the mean and standard deviation were 172.55 ±6.32. The maximum range in term of weight before training was 54.00; the minimum range was 92.00, mean and standard deviation was 63.77 ±7.80. The maximum range in term of weight after the post-test was 55.00, and the minimum range was 94.00. The mean and standard deviation was 64.79 ±7.82.

Table 1: Anthropometric analysis of CG during and pertest and post-test

Testing Variables	N	Max	Min	Mean ± SD
Age	20	17.00	24.00	20.29±2.70
Height	20	156.00	188.00	172.55±6.32
Weight/Kg/Pre	20	54.00	92.00	63.77±7.80
Weight/ Kg/Post	20	55.00	93.00	64.79±7.82

Table 2 shows the anthropometric characteristics of EG before and after Training. Data were expressed by using mean and standard deviation. The total number of subjects was 20. The maximum range in term of age was 16.00; the minimum range was 23.00, and the mean and standard deviation was 19.29 ±1.70. The maximum range in term of height was 157.00, and the minimum range was 187.00; the

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mean and standard deviation were 171.55 ±6.32. The maximum range in term of weight before Training was 53.00; the minimum range was 92.00, mean and standard deviation was 62.77 6.80. The maximum range in term of weight after the post-test was 52.00, and the minimum range was 91.00. The mean and standard deviation was 61.77±7.80.

Table 2: Anthropometric analysis of EG during and pertest and post-test

Testing Variables	N	Max	Min	Mean ± SD
Age	20	16.00	23.00	19.29±1.70
Height	20	157.00	187.00	171.55±6.32
Weight/Kg/Pre	20	53.00	92.00	62.77±6.80
Weight/ Kg/Post	20	52.00	91.00	61.77±7.80

Table 3 shows the pre-test and post-test analysis of CG. Data were expressed by using mean and standard deviation. The total number of subjects was 20. The mean and standard deviation during the pre-test was 50.60±2.35, and the mean and standard deviation during the post-test was 53.05±2.33. t value was 1.788, and Sig was .96. Therefore, the table shows no significant difference in CG in knee-knocking before and after training sessions imposed upon EG. The mean and standard deviation of EG during the pre-test was50.00±2.07, and the mean and standard deviation of EG during the post-test was58.35±2.20. t value was 17.376, and Sig was.000. Therefore, there was a significant difference during pre and post-test analysis EG in knee-knocking.

Table 3: Independent Sample T-test showing the Comparison of both of CG and EG before and after the prescribed time period of exercise

Testing Variables	N	Mean ± SD (Pre)	Mean ± SD (Post)	T	Sign
Knee Knocking (CG)	20	53.70±2.34	53.05±2.33	1.788	.096
Knee Knocking (EG)	20	50.00±2.07	58.35±2.20	-17.376	.000

DISCUSSION

Results of the study showed that the mean and standard deviation during the pre-test were 50.60±2.35, and the mean and standard deviation during the post-test was 53.05±2.33. The t value was 1.788, and Sig was .96. Therefore, the table shows no significant difference in CG in knee-knocking before and after training sessions imposed upon EG. The mean and standard deviation of EG during the pre-test was 50.00±2.07, and the mean and standard deviation of EG during the post-test was 58.35±2.20. The t value was 17.376, and Sig was .000. Therefore, there was a significant difference during pre- and post-test EG analysis in knee-knocking. Such an emerging concept is supported by [17] by showing that endurance exercises significantly change body weight, body mass index (BMI), waist-to-hip ratio (WHR), per cent body fat (%BF), or VO2max. Likewise, a combined, structured multidisciplinary intervention for childhood obesity reduces body weight, body mass index and enhanced fitness [18]. The study by Eliakim *et al.*, showed the short- and longer-term benefits of a combined dietary-behavioral-physical activity intervention among obese children [19]. This finding is also in line with the present study's findings. The mean and stander deviation of subjects in terms of Knocked Knee during the post-test was 6.66 ± .087. The level of Sig was .001, which shows that there is a positive effect of endurance exercise on the Knocked Knee of subjects (P value was .001 <a=.05). Finding of the study conducted by Shelbourne and Nitz, supported by the present study indicating accelerated rehabilitation program has been more effective than our initial program in tumbling limitations of motion (particularly knee extension) and loss of strength while maintaining stability and preventing anterior knee pain [20].

CONCLUSIONS

Based on the analysis, the researcher concluded that exercise has a significant impact on the rehabilitation of the knocked knee. The researcher also concludes that exercises have a considerable impact on rehabilitating lower limb alignment. Based on the findings and conclusion, the researcher recommended that exercise endurance play a vital role in rehabilitating knocked knees. Therefore, endurance exercises should be given to all those subjects having problems with knocked knees. In addition, proper care and early concentration on the part of parents about their children should be given.

Authors Contribution

Conceptualization: MM
Methodology: AK
Formal analysis: MJ
Writing-review and editing: MZIB, JAS, AB, I, AA

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

Conflicts of Interest

The authors declare no conflict of interest.

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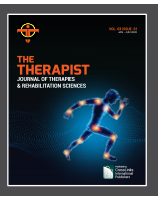

Original Article

Knowledge, Attitudes and Interest of Evidence Based Practice among Physical Therapist Working in Pakistan

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ABSTRACT

Evidence-Based Practice (EBP) is an approach that integrates the best available research evidence with clinical expertise and patient values to guide clinical decision-making. **Objectives:** To determine the knowledge, attitudes and interests towards Evidence-Based Practice (EBP) among physiotherapists in Pakistan. **Methods:** We surveyed 302 physical therapists working in Government and private settings in Pakistan via an online survey. The survey questionnaire encompassed four sections: (1) respondent characteristics; (2) knowledge of the principles of EBP as well as attitudes, interests, use and perceived efficacy of EBP. Data were analyzed using the SPSS version-23. **Results:** Overall 85% perceived EBP study is useful and necessary in PT clinical practice and 83% of respondents believed the importance of literature discoveries in regular practice and in improving the worth of patient care. Moreover, 77% showed interests to incorporate evidence increasingly in regular practice and 82% of participants were interested in seeking and enhancing proficiency to implement EBP in practice. **Conclusions:** Majority of physical therapists took part in this study held positive attitudes towards the role of EBP. Most participants were interested in incorporating their perceived roles in practice as a means of honing their skills.

INTRODUCTION

Sackett states Evidence-Based Practice (EBP) as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients by integrating individual clinical expertise with best available external clinical evidence from systematic research" [1]. A significant role for Evidence-based Practice in enhancing patient care is evident in literature [2]. EBP optimizes the practitioner's knowledge through current standardized evidence and provide uniformity in clinical decision-making globally in-patient care. Thus, it curtails the practical disparities in clinics [3]. EBP is a five-step process that requires attention at every stage. It is a process of making a problem into a clinical question, assimilation and evaluation of current evidence, incorporating one's own skills and preferences, before reevaluating the entire integration in order to reach the obvious conclusion. If necessary, repeat the steps [4]. Similarly, since 1992, evidence-based practice had

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widened its roots to the physical therapy and rehabilitation. McColl found in his study about the role of EBP in improving the quality of the patient care endorsed by many clinical practitioners [5]. However, for the successful implementation of EBP, some practitioner and organizational attributes play vital role and discrepancy in both or one character may impede the transfer of evidence into practice for the patient care. Practitioner attributes consist of knowledge, belief, attitudes, proficiency, and self-efficacy regarding EBP, also termed as EBP primary influencers. Organizational influences include internet availability to search and appraise literature, a resource person, specific library section, peer group facilitation etc. [6]. According to pollock *et al.*, although clinical physical therapists apparently regard the pivotal theory of EBP, but insufficient incorporation of clinical evidence into the decision-making process either due to weak practitioner attributes or organizational discrepancy halt the implementation of EBP and thus generate the practitioner and organizational barriers to practice [7-9]. Therefore, barriers to EBP driven by practitioners and organizational means are necessary to study and identify so the education infrastructure can fix this discrepancy and proceed with their aim of converting evidence into practice of physical therapy [10]. In Pakistan, physiotherapy is a growing field, and there is a growing awareness of the importance of EBP. However, the extent to which EBP is being practiced among physiotherapists in Pakistan is not well documented. Hence, this study aimed to determine the level of knowledge, attitudes, and interest among Pakistani physical therapists about Evidence Based Practice.

METHODS

A self-structured Google form questionnaire was used for this cross-sectional mail survey and sent via PPTA listed emails to accumulate data from the physiotherapists practicing in clinical settings in Pakistan. Via consent form, the aim and inclusion criteria of the study were informed. Inclusion criterion encompass graduated physiotherapists that are currently practicing in clinical setups and having a clinical experience of minimum ≥ 1 year. On the contrary, Physical therapists working merely in academic setups or practicing jobs other than clinical practice were excluded. Moreover, Students and graduated PT having no clinical experience or < 1-year experience were also excluded. All government and private hospitals, private clinics, and rehabilitation centers currently functional in Pakistan were included in the research setting. Participants were enlisted through the non-probability convenience sampling technique comprising male and female practitioners currently practicing in any functional clinical practice type in Pakistan**.** The exact number of Physical Therapists is not yet registered however, various physical therapy association revealed that in Pakistan, estimated number of physical therapists is around 10,000. Barriers to distant contacts still existed and the risk of ghosted therapists was also evident. Hereby, from the PPTA list, physiotherapists at active status were considered around 2000, and beyond the PPTA list, practitioners in the vicinity of Faisalabad (≥ 200) were considered. Using the online Sample Size Calculator keeping Confidence Level 90%, the sample size was calculated as 300-309 [11]. To avoid biases and for the effectiveness of results, members beyond inclusion criteria were withdrawn from the study and the final sample size recorded was 302 after fulfillment of the sample recruitment procedure. A questionnaire was generated by Google, and only those who agreed "Yes" were enrolled. On the preliminary page of the survey questionnaire, there is an informed consent section with aims and instructions about the survey, as well as a privacy statement and query. Google based questionnaire was conditional to previous researches listed questions [12-14]. The study questionnaire is bounded with 4 sections; Section A has contained respondent's demographics variables encompassing 11 items regarded as: Name, Age, Gender, Highest Qualification, Specialization, Clinical Experience, Number of patients seen per day, primary practice type, Employment status of the Physical Therapist. Section Two to identify the effectiveness of evidence-based practice (Q12-23) which was further collapsed into two sub-groups later in data analysis in order to examine the attitudes and beliefs of respondent's physical therapists towards evidence-based practice (Q12, 13, 15, 17-20) and interest and perceived role in EBP (Q14, 16, 21-23) respectively. regarding EBP making the complete questionnaire of 33 items. For section B and C, respondents made their agreement with the statement of items based on 5-item Likert Scale having options for response, “strongly disagree”, “disagree”, “neutral”, “agree”, “strongly agree” ascending. This initial draft was forwarded for comments, addition, and subtractions, to Supervisor who have great command in Evidence-based practice. The questionnaire modified in light of their comments was as Survey Questionnaire. This procedure is based further on Lynn *et al.*, and Iles *et al.*, [15, 16]. Statistical Package of Social Sciences (SPSS version 23.0) was used for the execution of data analysis. Data were carefully examined, reviewed, and analyzed during data entry and data analysis by both researchers.

RESULTS

The finding of the study shows that out of 302 respondents who actively participated in this research via google sent questionnaire, 113 (37.4%) were male and 189 (62.6%) were

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female. Most of the respondents fell in the age category 26-30 years encompassing around 44.4% (n=134) presence there, 125(41.4%)respondents came under the category 21-25 years and 43 (14.2%) respondents were above 30 years old. Furthermore, 156 (51.7%) respondents were those who were highly qualified till DPT. Out of the 191 specialized respondents, 53 (17.5%) were specialized in Orthopedic Physical Therapy(Table 1).

Table 1: Demographic information of the participants

Variables	Level	Frequency (%)
Age	21-25 years	125 (41.4)
	26-30 years	134(44.4)
	>30 years	43(14.2)
Gender	Male	113(37.4)
	Female	189(62.6)
Highest Qualification	DPT	156(51.7)
	MS/M.PHIL	141(46.7)
	PhD	5(1.7)
Specialization	Non-Specialized	111(36.8)
	Specialized	191(63.2)
Type of Specialization	Musculoskeletal Physical Therapy	51(16.9)
	Orthopedic Physical Therapy	53(17.5)
	Cardiopulmonary Physical therapy	23(7.6)
	Sports Physical Therapy	28(9.3)
	Neurological Physical Therapy	36(11.9)
Clinical Experience	1-5 years	250(82.8)
	6-10 years	31(10.3)
	>10 years	21(7)
No. of Patients seen per day	15-Jan	194(64.2)
	16-30	77(25.5)
	30-50	31(10.3)
Primary practice type	Govt. Hospital	73(24.2)
	Private Hospital	97(32.1)
	Private Clinic	90(29.8)
	Rehabilitation Center	42(13.9)
Employment Status	Full time	170(56.3)
	Part-time	132(43.7)
City	Islamabad	49(16.2)
	Lahore	87(28.8)
	Faisalabad	116(38.4)
	Rest of Punjab	50(16.6)

Table 2 provides the percentages of respondents by the category of their responses i.e., disagree, neutral, and agree. The characteristics of such categories were concerning the EBP education, attitudes and beliefs, interests and perceived role that EBP studies may provide. The percentage of characteristics of the first section of Education inferred participants showed diversity in whether they had learned the foundation of EBP after the academic program, formal training for finding research literature, or critically evaluating it or not. The results showed that about 66.2% of respondents agreed on the characteristic attribute of Education that they had learned EBP education as a part of their academics. 9.9% disagreed with getting such education while 23.8% were not sure about their inclination toward EBP education so they have opted Neutral. The percentage of characteristics of the second section Attitudes and Beliefs inferred that the participants substantially exhibited positive responses towards attitudes and beliefs concerning the EBP.

Table 2: Physical Therapist Knowledge, attitudes and interests towards EBP

Characteristics	Frequency	Response (%)		
		Disagree a	Neutral	Agree b
Knowledge & Attitudes & Beliefs				
I learned the foundations for EBP as part of my academic preparation.	302	9.9	23.8	66.2
I have received formal training (e.g., workshops, courses) in search strategies for finding research relevant to my practice.	302	18.2	24.2	57.6
I received formal training in how to critically evaluate research literature as part of my academic preparation. Received	302	17.2	27.2	55.6
Application of EBP is necessary in the practice of physical therapy.	302	8.3	6.6	85.1
Literature and research findings are useful in my day-to-day practice.	302	9.3	7.9	82.8
The adoption of EBP places an unreasonable demand on physical therapists.	302	34.1	30.8	35.1
EBP improves the quality of patient care.	302	8.6	8.9	82.5
EBP helps me make decisions about patient care.	302	8.6	10.6	80.8
EBP does not take into account patient preferences (i.e., patients' reported values and preferences for treatment).	302	44.4	27.5	28.1
There is a definite divide between research and practice.	302	19.9	26.8	53.3
Interests & perceived role				
"I need to increase the use of evidence in my daily practice."	302	8.9	14.6	76.5
"I am interested in learning or improving the skills necessary to incorporate EBP into my practice."	302	8.9	9.6	81.5
"Physiotherapists should be responsible for conducting their own literature reviews to answer their clinical questions."	302	10.9	16.6	72.5
"Physiotherapists should be responsible for critically evaluating the quality of the literature to address their clinical questions."	302	11.6	13.9	74.5
"Physiotherapists should be responsible for interpreting whether research findings apply to their individual patients."	302	10.6	14.6	74.8

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[a] Response category of "strongly disagree" & "disagree" were combined

[b]Response category of "strongly agree" & "agree" were combined

Plenty held the belief that an EBP study is necessary for physical therapy practice (85%), and 83% of respondents believed the importance of literature discoveries in regular practice. 83% thought EBP is improving the worth of patient care. 81% of participants saw EBP as a helping material for decision-making about patient care. 53% held the opinion that there's a definite divide between literature and research. While equal percentage division had been seen in the attribute where 35% of respondents agreed and 34% of respondents disagreed on EBP adoption had placed an unreasonable demand on physical therapists. The finding of the current study showed that 77% PTs showed interests to incorporate evidence increasingly in regular practice. 82% of participants were interested in seeking and enhancing proficiency to implement EBP in practice.73% thought they should be responsible for conducting their literature reviews to response the clinical problems. 75% were concerned that they should be responsible for critically evaluating the quality of the literature. 75% believed that physiotherapists should be responsible for understanding research discoveries (Figure 1).

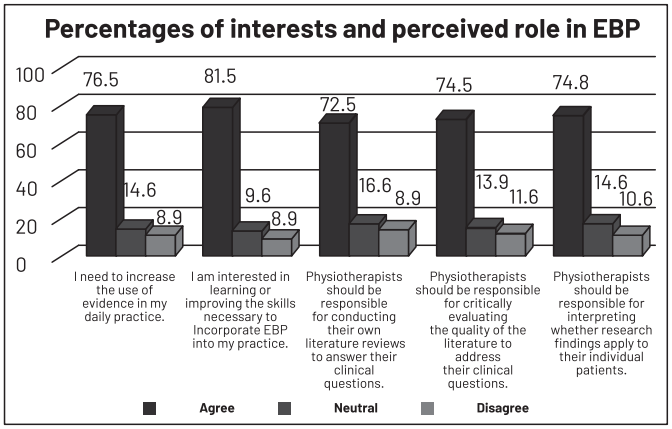

Figure 1: Percentages of interests and perceived role in EBP

DISCUSSION

In Pakistan, physiotherapy is a growing field, and there is a growing awareness of the importance of EBP. However, the extent to which EBP is being practiced among physiotherapists in Pakistan is not well documented. Overall, majority of respondents held positive attitude toward the knowledge and usefulness of EBP. However, there is a difference in apparent knowledge and demonstration of actual knowledge plus skills in practice. Italian study called this insufficiency an overrated knowledge and risk to insufficient practice [17]. The survey findings of our study are acquainted with those of Canadian study 2007, Colombian study 2015 and Brazilian study 2020 as they concluded positive attitudes towards the usefulness of EBP [12, 18, 19]. One study conducted in 2018 investigated the knowledge and attitudes of physiotherapy students in Pakistan towards EBP. The study found that while most students had a positive attitude towards EBP, their knowledge of EBP principles was limited. Given that EBP enhanced the treatment quality and treatment decision status by 83% and 81% in our study, Brazilian study declared by 90 and 94% due to more reliance on patient management model and Canadian study by 84% and 78% respectively [12, 19]. Despite of overwhelming positive attitudes by 80 to 90%, only 44% of the respondents considered patient's preferences as part of EBP. Similar results were shown by Italian study [17]. Brazilian and Swedish study somehow resulted better 53% and more than 50% respectively [19, 20]. This discrepancy in our and former study is evident from the fact that direct access to physical therapists is not entirely practiced in Pakistan yet making the whole EBP process less applicable as compared to the countries showing positive results [17]. Around 65% individuals chosen that EBP places inflexible conditions on physical therapists and more than half of the population agreed on gap existing between research and practice. Previous researches such as APTA and Canadian survey also had gathered similar results regarding role of attitudes towards EBP [12, 14]. More than 70% respondents believed to increase need of evidence into practice, for learning new skills for EBP implementation, for conducting own literature reviews, critically appraise them and learn to interpret the research findings into practice showed interests and perceived role wasn't seemed to be setting up any barrier in EBP implementation into practice as similar results were evident in Canadian study held in 2007 [12]. Characteristics associated with interests were not seemed setting up any barrier to EBP implementation into practice. More than 70% of respondents believed to increase the need for evidence in practice, learning new skills for EBP implementation, conducting own literature reviews, critically appraising them, for learning interpretation of research findings into practice. In a Canadian study in 2007, similar results had been found about the perceived roles in EBP with the exception that around 50% did not agree with the statement that conducting research is a responsibility of physical therapists [21]. However, unlike the Canadian study where 45% of respondents were >15 years of clinical experience physiotherapists, our study figured out 83% were less than 5 years of clinical experience, and the youngest physiotherapists recognized more the importance of literature findings and their role in their practice. Moreover, the current study has highlighted the gap that existed between apparent and actual knowledge in practice which is unique in its type when compared with

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other studies in Pakistan. However, response rate was lower than expected as many mails were not responded.

CONCLUSIONS

Majority of physical therapists took part in this study held positive attitudes towards the role of EBP. Most participants were interested in incorporating their perceived roles in practice as a means of honing their skills. Overall, it appears that while there is growing awareness of EBP among physiotherapists in Pakistan.

Authors Contribution

Conceptualization: SA
Methodology: LM, ST
Formal analysis: LM, ST, MK, GI, NA
Writing-review and editing: SA, LM, MK, GI, TG

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

Conflicts of Interest

The authors declare no conflict of interest

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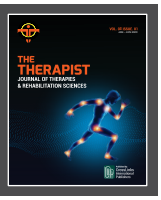

Original Article

Awareness of Dietary Habits and Balanced Lifestyle Among Physical Therapy Students

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ABSTRACT

Obesity has now-a-days became global epidemic and the fifth leading cause of death. A strong relation has been observed between obesity and mortality among the general population **Objective:** To observe the nutritional status of the food intake in physical therapy students to make a guideline to modify the dietary habits. **Methods:** A cross-sectional study conducted in January 2022 to June 2022 among the students at Dow University of Health Sciences (DUHS), Karachi. The minimum sample size was calculated as 75. A self-designed questionnaire was used to collect data from the students. IBM SPSS Version-26 was used for data analysis. **Results:** The average weight and height of the students was 52.8 ± 9.5 SD (kg) and 5.34 ± 0.27 SD (feet). The BMI was measured as (height)^2 / weight. The mean BMI calculated was 20.4 ± 3.4 SD. Based on the BMI, the frequency of overweight students was 13 (8.2%) and obese were 2 (1.3%). Remaining 52 (32.9%) were under- weight. The majority of students i.e., 82.2% reported that they eat two to three meals per day. Consumption of fruits and vegetables was least common. Less than one-fourth of the students said that they intake fruits on regularly. Snack consumption other than regular meals was about 21.5% among students. **Conclusions:** Students were found to have normal weight. The current study indicates that most of the students were well aware and concerned of obesity and over-weight and they tried to maintain their body weight by controlling diet.

INTRODUCTION

Obesity has now-a-days became global epidemic and the fifth leading cause of death [1]. Globally around more than two million people were dying due to being obese or over-weight in a calendar year [2]. Over-weight means the excess of body fats while obesity means the huge amount of fats present in body [3]. A strong relation has been observed between obesity and mortality among the general population [4]. Chronic diseases like hypertension, coronary heart disease, hyperlipidemia, hypertension, gallbladder disease, diabetes mellitus and different types of cancers are associated with obesity [5]. In developed and developing countries the harms occurring due to obesity is growing at an alarming stage [6]. In the United States, obesity was up to 40% among the US adults [7]. The obesity has increased thrice in the developing countries particularly among populations that have a sedentary lifestyle involving less physical activity and over expenditure of cheap energy dense food affecting children and adolescence over the last 20 years [8]. In Asia, Thailand has maximum rates of adult obesity due to a combination of a sedentary lifestyle and high utilization of foods filled with sugar and little nutrients [9]. It was estimated that, in 2019, almost half of the children living in Asia under 5 years of age were over-weight or obese. According to the World Health organization (WHO), obesity was found to be more common among women than men [2, 3]. A study showed that in The

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National Health Survey of Pakistan, in 1990-1994 showed that 1% of population was reported to be obese [8]. A recent study observed that prevalence of over-weight or obesity was around 46% in Pakistan [10]. Another study roughly estimated that about 52% of over-weight and 73% of obese people does not even know about their problem and consider it as normal [3]. Obesity is a state of abnormal and excess fat deposition in adipose tissues to the point that can have adverse effects on health 3. The alteration in the diet (especially fast-food consumption) has become more westernized is one of the main causes of obesity. College students are prone to poor diet resulting in body weight gain [11, 12]. The rapid increase of Obesity and overweight especially in younger generation is a common problem in developing countries due to inappropriate diet and inactive lifestyle [8]. Limited resources are available in Pakistan to overcome this issue. Therefore, there is need to promote Health education regarding, diet exercise and other related topics in medical schools [12]. The rationale of the current study was to document the nutritional content of the food intake in physical therapy students to make a guideline to modify the dietary habits and to prevent the risk associated with obesity among the students. Thus, the purpose of this study to provide awareness of obesity and dietary habits among physical therapy students at medical university, Karachi.

METHODS

A cross-sectional study conducted in January 2022 to June 2022. The data were collected from the students of Doctoral of Physiotherapy (DPT) at the institute of Physical Medicine and Rehabilitation (IPM & R), Dow University of Health Sciences (DUHS), Karachi. The minimum sample size was calculated as 75 by taking 95% confidence coefficient, 5% as the margin of error, and 5.1% as the prevalence of obesity in a large-scale Pakistan Panel Household Survey [13]. In our study we targeted more than twice the required sample size due to the non-response. A sample of 158 students of age 19-38 years were included in the study. The students who carry out the inclusion criteria of age and agreed for taking part were selected for this study from Physical Therapy Department, IPM&R, DUHS. The exclusion criteria were the students other than physical therapy department. Data were collected using the non-probability purposive sampling technique. The response rate among students was high. A consent was taken from the students prior to the data collection. A self-designed questionnaire was used to collect data from the students. Questionnaire contains ten questions of different types such as close ended and multiple-choice questions. Data collection were done in two steps. In the first step, questionnaire was filled by students and in second step anthropometric measurements were taken. Smoking and eating habits were asked from the students. The designed questionnaire was taken from an already published study where the authors standardized their questionnaire to use among university students. The students were told about the objectives of the study before the collection of data. Weight, height and body mass index (BMI) were measured after the questionnaire filling. Height was measured using a metal ruler and weight was measured using measuring scale. Students were asked to take off the shoes and socks, with head straight, feet together, knee straight, heels, buttocks and shoulder blades are in contact with the vertical surface of the scale. The BMI was measured as (height)^2 / weight. According to National Institutes of Health (NIH), adults were classified based on BMI as underweight (BMI < 18.5), normal (BMI= 18.5 – 24.9), overweight (BMI = 25 – 29.9), or obese (BMI >30). IBM SPSS Version 26.0 was used for data analysis. Results were expressed as descriptive for the quantitative variables and frequency and percentages for categorical variables.

METHODS

The data were collected from 158 students with mean age of 21.5 ± 2.3 SD (year). Among the total participants, the proportion of female participants was 135 (85.4%) and remaining 23 (14.6%) were male participants. The average weight of the students was 52.8 ± 9.5 SD (kg) and the average height of the students was 5.34 ± 0.27 SD (feet). The mean BMI calculated was 20.4 ± 3.4 SD. The results indicated that the most of the students 91 (57.6%) were found to have normal weight. The frequency of overweight students was 13 (8.2%) and obese were 2 (1.3%). Remaining 52 (32.9%) were under-weight. The demographic data is shown as follows (table 1).

Table 1: Demographic Characteristics of the Students

Variables	Total
Number of Students	158
Male /Female	23/135
Age (Years)	21.53±2.2
Weight (Kg)	52.79±9.47
Height (Cm)	5.34±0.27
BMI	20.36±3.37

Response related to eating habits, lifestyle, fruits and vegetable consumption, patterns of meal, smoking habits and fried food is shown in Table 2. About half of the students said that they take meals regularly. More than 2/3 of the students mentioned that they eat breakfast daily or thrice to four times in a week. The majority of students i.e., 82.2% reported that they eat two to three meals per day. Consumption of fruits and vegetables was least common. Less than one-fourth of the students said that they intake fruits on regularly. Snack consumption other than regular

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meals was about 21.5% among students. Routine eating with family and friends was observed among two-third of the students. Smoking was not common among students. About 97.5% of the students do not smoke, half of the remaining were ex-smokers and half were current smokers (Table 2).

Table 2: Questionnaire

Questions	Levels	Frequency (%)
Do you take your meals regularly	Always	61(38.6)
	Regular	74(46.8)
	Sometimes	23(14.6)
Do you take breakfast	Daily	84(53.2)
	Three or four times per week	43(27.2)
	Once or twice per week	22(13.9)
	Rarely	9(5.7)
How many times do you eat meals except snacks?	One time	21(13.3)
	Two times	71(44.9)
	Three times	59(37.3)
	Four times	7(4.4)
How often do you take snacks apart from regular meals	Daily	34(21.5)
	Three or four times per week	44(27.8)
	Once or twice per week	37(23.4)
	Rarely	43(27)
How often do you eat green colored vegetables	Daily	22(13.9)
	Three or four times per week	54(34.2)
	Once or twice per week	64(40.5)
	Rarely	18(11.4)
How often do you eat fruits?	Daily	32(20.3)
	Three or four times per week	49(31)
	Once or twice per week	42(26.6)
	Rarely	35(22.2)
How often do you eat fried food?	Daily	23(14.6)
	Three or four times per week	51(32.3)
	Once or twice per week	59(37.3)
	Rarely	25(15.8)
How do you eat with family?	Daily	105(66.5)
	Three or four times per week	17(10.8)
	Once or twice per week	13(8.2)
	Rarely	23(14.6)
What type of food do you think you should eat to have a balanced nutrition?	Mainly meat	8(5.1)
	Mainly vegetables	18(11.4)
	Meat, vegetables and other varieties of food	123(77.8)
	Others	9(5.7)
Please state your smoking history?	current smoker es-	2(1.3)
	smoker	2(1.35)
	Non smoker	154(97.5)

DISCUSSION

Pakistan is facing the dual burden of communicable as well as non-communicable diseases. The contributing factor in the non-communicable disease being the consumption of high-density diet, sedentary lifestyle and physical inactivity which results in increased burden of over-weight and obesity [14]. In the study under discussion, the aim was to observe the prevalence of obesity which was found to be 1.3% and the prevalence of over-weight was 8.2%. The prevalence of under-weight was 32.9% which gave an idea about the awareness of obesity among students. The prevalence of obesity and over-weight was observed as 5.4% and 5.8% in Pakistan in a recent study whereas the proportion of under-weight population was 21.9%. [15]. When we look at the combine proportion of obesity and over-weight, the findings of this research were quite close to our results. Another study conducted in Pakistan reported that prevalence of obesity as 5.1% and the 22.2% was the prevalence of over-weight. The prevalence of obesity was seen as 4.8% which was relatively higher to our

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findings in a study conducted in Baluchistan, Pakistan [16]. A study observed the obesity among Peshawari adults as 8.0% [17]. In the underlying study, a low prevalence of obesity and over-weight was found. Quite opposed to our findings, the prevalence of obesity was around 20.8% to 27.9% and the prevalence of over-weight was around 29.0% to 46% among Pakistan adults [18, 19]. Another study reported that 46% of the participants were either obese or over-weight [20]. We observed that the female participants were comparatively more over-weight and obese. A study conducted in Northern areas of Pakistan showed that the obesity was more prevalent among women as compared to men. Study indicated that prevalence of obesity or over- weight was 14.1% for women while it was 13.5% for men [21]. The prevalence of over-weight was higher among girls i.e., 12.7% and the prevalence of over-weight was 9.9% among boys [14]. In various studies conducted in Pakistan, the prevalence of obesity and over-weight was more common among female population [15, 21]. However, there was observed a slight difference between the two. Fats or lipids were the third main macronutrient and important component in our diet. Usually, fats are rich in dairy products and meat. So far it has the most visible source and cause of obesity and other non-communicable diseases such as cardiovascular diseases and some type of cancer [14]. Keeping that in mind, minimum intake of these is essential. Our study results indicated that fruits and vegetables consumption was rare in 22.2% and 11.4% of the participants. The consumption of meat mainly was only among 5.1% of the participants.

CONCLUSIONS

The awareness of obesity and its associated factors are necessary to reduce the risk of various non-communicable diseases. The current study indicates that most of the students were well aware and concerned of obesity and over-weight and they tried to maintain their body weight by controlling diet. The consumption of fruits and vegetables has remained an important component of their daily diet and most of the participants tried to control fat consumption. Other risk factors such as smoking was common among small proportion of participants.

Authors Contribution

Conceptualization: RF
Methodology: UH
Formal analysis: MJ
Writing-review and editing: SB, RF

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

Conflicts of Interest

The authors declare no conflict of interest.

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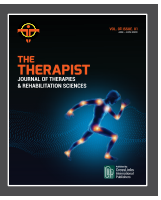

Original Article

Perception of Oncology Patients toward the Quality of Life and Rehabilitation

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ABSTRACT

Cancer is a worldwide pandemic disease 1 in 8 deaths is due to cancer globally. The major parameter used for the evaluation of cancer treatment is quality of life. **Objective:** To find out the perception of oncology patients towards the quality of life and rehabilitation. **Methods:** This study was a cross-sectional survey conducted in two tertiary care hospitals and one medical center in Karachi. Non-probability purposive sampling technique was used for sampling. Ethical approval was prior obtained from Parent Institute. Data were analyzed by SPSS version-23.0. **Result:** A total of 255 survey forms were filled out by oncology patients. Mostly158 (62.0%) patients lie between the ages of 20-49 years. There were 117 (45.9%) males and 138 (54.1%) females. Change in quality of life with time related to post-diagnosis. Those who were diagnosed < 5 years rated mean overall physical health as 5.46 ± 1.7, > 10 years rated 4.39 ± 1.8, and 5-10 years rated 4.22 ± 1.5. Satisfaction of patients regarding physical therapy sessions <5 years of post-diagnosed responded mean satisfaction level was 7.33 ± 2.494, 5.00 ± 1.633 of >10 years patients, and 6.08 ± 1.714 of 5 to 10 years post diagnosed patients. Improvement in QOL after physical therapy sessions <5 years diagnosed patients responded mean QOL as 7.39 ± 2.367, >10 years of patients responded 5.70 ± 2.032, and 5 to 10 years patients responded 6.45 ± 1.670. **Conclusions:** This study concluded that the perception of oncology patients regarding rehabilitation to maintain their quality of life is significant.

INTRODUCTION

Quality of life is defined by WHO as: with reference to the culture's personal beliefs, perceptions, knowledge, goals, standards, and comforts. It is a major parameter used for the evaluation of different procedures of treatment in many types of research [1]. Cancer is a worldwide pandemic disease 1 in 8 deaths are due to cancer globally [2]. Nowadays in Pakistan rate of cancer is increasing by 150,000 cases per year [3]. All over the country cancer is a chronic disease and it is the 2nd major reason for death and the most prominent type of cancer noticed by breast, cervical, oral cavity, and colorectal [4]. At any level, the condition of a specified cancer patient was linked to the quality of life [5]. To measure the health position of all kinds of cancer patients used different tools to assess the patient's Quality of life, although hand cancer had a particular tool to measure their well-being status of life [6]. Cancer patients face many issues which are related to community-based and psychological support [7]. Lifestyle modifications are the main concern point for cancer patients like smoking, alteration in nutrition, reducing alcohol consumption, and promoting their physical activity [8]. Previous studies showed that cancer patients perform physical activity decreases the recurrence of cancer, improves their lives, decreases the complications of

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cardiovascular, and improve their quality of life [9]. In multiple studies factors affecting the physical activity among cancer survivors like adult age, males, the higher combined status of social and economic, need more social assistance, with decreasing the symptoms of the disease and improving their perception of physical activity [10]. With reference to the safe mode for cancer patient's physical activity can be performed in the acute as well as chronic phases of treatment [11]. According to the American Cancer Society and American College of Sports Medicine standard guidelines for physical activity during the treatment period is 150 minutes (moderate to vigorous) per week [12]. Furthermore, physical activity can be performed for a whole week in accordance with the activity of daily living of a patient. According to the Institute of Medicine, quality defines the levels of health services for the population enhancing the health outcomes of care of patients with current professional knowledge [13]. There are three major aspects of quality the structure of a strategy, processing, and outcome of the strategy. The coordination between patient and attendant which has the ability to change the input of structure into the outcome is known as the Quality process. According to the research attention to the good quality of treatment can relate to better health outcomes [14]. however, cancer patients have different characteristics and they require more high-quality health care as compared to other patients. A study reported that cancer adversely affects the physical, mental, social, psychological, and financial status of patients which in turn affects their quality of life [15]. According to the framework of the Health Belief model cancer survivors can modify their sedentary lifestyle if they receive enough support from family and friends and they have a strong belief regarding the benefits of a healthy lifestyle and knowledge of prevention and cure related to the disease [16]. By the application of the health belief model the motivation level of patients can be targeted by the physician to improve the level of physical activity in cancer survivors. But the accurate amount of patients' beliefs related to physical activity is still under study. In our study, we addressed the perception of cancer survivors regarding the quality of life and the role of rehabilitation to improve their health status.

METHODS

This study was a cross-sectional survey conducted from Sep 2022 to Jan 2023 in two tertiary care hospitals and a private clinical center and institute located in Karachi Pakistan. The sample size was 255 patients calculated through Open Epi software. After receiving ethical approval from the competent authority, research participants were recruited through non-probability purposive sampling technique data were collected from patients directly by the use of validated questionnaires at OPD and Oncology wards. In this study, there were two questionnaires used: A questionnaire of Life-related to oncology was used. This instrument is commonly used in research to measure the quality of life of Cancer Patients/ Cancer Survivors [17]. And another self-administered questionnaire used to measure the perception of cancer patients regarding physical therapy was previously used in the study of the Netherlands [18]. In inclusion criteria, we used two age categories in our questionnaire in which 20 to 49 years and greater than 50 years of both genders were included with diagnosed patients with any type of cancer and who had undergone treatment. In exclusion criteria, cancer survivors with mental impairment, and communication barriers that can affect the level of coordination and communication were excluded from this study. The time period of the treatment was not included as the selection criteria because our aim is to check the perception of patients regarding their quality of life after having cancer and rehabilitation treatment which can be measured at any level of disease. SPSS version 23.0 was used to analyze the data. Frequencies and percentages used to show descriptive statistics. One-way ANOVA and Chi-square test was used to know the statistical significance between the variables at p-value ≤ 0.05.

RESULTS

A total of 255 survey forms were filled out by oncology patients. Mostly158 (62.0%) patients lie between the ages of 20-49 years. There were 117 (45.9%) males and 138 (54.1%) females. The Marital status was classified as 187 (73.3%) married and 68 (26.7%) were single (Table 1).

Table 1: Demographic Characteristics of Respondents

Variable	Frequency (%)
Age	
>50	97(38)
20-49 years	158(62)
Gender	
Female	138(54.1)
Male	117(45.9)
Marital Status	
Married	187(73.3)
Single	68(26.7)

Change in quality of life with time-related to post who were diagnosed < 5 years rated mean overall physical health as 5.46 ± 1.7, > 10 years rated 4.39 ± 1.8, and 5-10 years rated 4.22 ± 1.5. Oncology patients coping and dealing with disease and related treatment post-diagnosed < 5 years rated a mean treatment score of 5.62 ± 1.295, >10 years rated 6.43 mean ± 1.500, and 5-10 years rated as 6.22 ± 1.569. In response to the question related to the quality of

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life (QOL) of patients, they respond mean QOL value of 5.37 ± 1.421 of <5 years post-diagnosed patients, >10 years post-diagnosed responded 4.04 ± 1.659, and 5-10 years post-diagnosed responded 4.14 ± 1.087. Questions related to depression answered mean value of depression 7.24 ± 1.471 of <5 years post-diagnosed patients, 7.54 ± 2.073 of >10 years post-diagnosed patients, and 7.70 ± 1.138 of 5 to 10 years post-diagnosed patients. Regarding the fear of cancer spreading participants of the research responded mean related to fear of cancer was 7.51±1.740 of <5 years post-diagnosed patients, 8.80 ± 1.147 of >10 years of post-diagnosed patients, and 7.98 ± 1.308 of 5 to 10 years post-diagnosed patients. The reaction of the family regarding the disease question, answered by participants mean behavior change was 6.90 ± 1.721 of <5 years of diagnosed patients, 6.91 ± 1.953 responded by >10 years of diagnosed patients, and 7.392 replied by 5 to 10 years of diagnosed patients. Questions related to the employment status after the disease disclosure of <5 years mean effect on employment was 5.07 ± 2.739, >10 years replied mean of 4.54 ± 2.794, and 5 to 10 years post diagnosed patient responded mean of 6.48 ± 2.450. The financial burden of patients after the disclosure of disease to <5 years of patients reported a mean financial burden of 6.24 ± 2.375 of mean and SD, >10 years bear the burden of mean 8.22 ± 1.474, and 5 to 10 years bear 6.82 ± 1.859. Response of patients related to the uncertainty of the future was replied as a predictive mean of long-term ideas as 7.60 ± 0.971 of < 5 years of patients, 7.46 ± 1.785 of >10 years of patients, and 8.30±1.066 of 5 to 10 years of patients. Questions related to the satisfaction of patients regarding physical therapy sessions <5 years of post-diagnosed responded mean satisfaction level as 7.33 ± 2.494, 5.00 ± 1.633 of >10 years patients, and 6.08 ± 1.714 of 5 to 10 years post diagnosed patients. Regarding the question related to the improvement in QOL after physical therapy sessions <5 years diagnosed patients responded mean QOL as 7.39 ± 2.367, >10 years of patients responded 5.70 ± 2.032, and 5 to 10 years patients responded 6.45 ± 1.670 (Table 2).

Table 2: Change in Quality of Life of Oncology Patients

Variable	Time Post Diagnosis (years)	Mean ± SD	p-value
Rate your overall physical health	< 5	5.46±1.746	0.000
	>10	4.39±1.844	
	5-10	4.22±1.502	
How difficult is it for you to cope today as a result of your disease and treatment?	< 5	5.62±1.295	0.001
	>10	6.43±1.500	
	5-10	6.22±1.569	
How good is your quality of life?	< 5	5.37±1.421	0.000
	>10	4.04±1.659	
	5-10	4.14±1.087	
How much depression do you have?	< 5	7.24±1.471	0.088
	>10	7.54±2.073	
	5-10	7.70±1.138	
Spreading (metastasis) of your cancer	< 5	7.51±1.740	0.000
	>10	8.80±1.147	
	5-10	7.98±1.308	
How distressing has illness been for your family?	< 5	6.90±1.721	0.095
	>10	6.91±1.953	
	5-10	7.34±1.192	
To what degree has your illness and treatment interfered with your employment?	< 5	5.07±2.739	0.000
	>10	4.54±2.794	
	5-10	6.48±2.450	
How much financial burden have you incurred as a result of your illness and treatment?	< 5	6.24±2.375	0.000
	>10	8.22±1.474	
	5-10	6.82±1.859	
How much uncertainty do you feel about your future?	< 5	7.60±0.971	0.000
	>10	7.46±1.785	
	5-10	8.30±1.066	
How much satisfied with your physical therapy session?	< 5	7.33±2.494	0.000
	>10	5.00±1.633	
	5-10	6.081.714	
How much do physical therapy sessions improve your quality of life?	< 5	7.39±2.367	0.000
	>10	5.70±2.032	
	5-10	6.45±1.670	

Responses of post-diagnosed <5 years patients related to the perception of physical therapy in cancer rehabilitation was 5.8% for counseling, 94.2% for exercise, 0% for the home program, >10 years of post-diagnosed patients responded for counseling 15.2%, for exercise 43.5%, for home program 41.3% and the response of 5 to 10 years patients 13.3% for counseling, 40% for exercise and 46.7% for a home program with significant p-value of < 0.0001 (Table 3).

Table 3: Perception of Physical therapy among Oncology patients

In your perception the role of physical therapy in cancer habilitation?	Time post-diagnosis (years)			p-value
	< 5	>10	5-10	
Counseling	6	7	14	0.000
	5.8%	15.2%	13.3%	
Exercise	98	20	42	
	94.2%	43.5%	40.0%	
Homecare program	0	19	49	
	0.0%	41.3%	46.7%	
Total	104	46	105	
	100.0%	100.0%	100.0%	

DISCUSSION

World widely there are a few components used to evaluate the health status of the individual as well-being: physical, psychological, and social is known as Quality of life. From

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the previous study, it was revealed that many measurement tools were used to analyze the quality of life of a person [19]. Present study evaluates the perception of oncology patients along with the quality of life who have undergone oncological treatment. It is reported in many studies that oncological treatment affects the quality of life of an individual during and after treatment. In our study majority of patients perceive the role of physical therapy in exercise more as compared to counseling and home program. As reported in the study: there is a possibility of improvement in quality of life and reduction of mortality rate among oncology patients if they indulge in physical activity in daily life [20, 21]. There are some physical and pathological fences to the participation of the oncological patient in physical activity like tiredness, body pains, sleep changes, low willpower, decrease or loss of appetite, and time, etc. Another Pichardo *et al.*, study suggested that counseling sessions are needed for oncology patients to increase the awareness and importance of physical activity and proper exercise routines on a daily basis [22]. In our research overall health status of participants was more affected in the first five years of post-diagnosed cancer. But the perception of research participants regarding the counseling by the physical therapist was more in 5 to 10 years of post-diagnosed patients. According to some studies quality of life of oncological patients was associated with some factors that indirectly change the level of health status and physical activity between them like the type of cancer, diagnosis, type of treatment, prognosis, and time [23, 24]. In comparison to previous studies our study is not only evaluating the quality of life of oncology patients but also checks the perception of patients regarding the role of physical therapy rehabilitation. As the study reported, there is a need for training programs that should explain the importance of physical activity in oncology patients to reduce the associated factors of disease like joint pain, loss of bone, fatigue, etc. [25]. Although the Physical therapy profession has a specialization field related to oncological rehabilitation. Their duty is to propose a rehabilitation program that can facilitate the patient to restore and retain physical, and psychological well-being and also help them to quickly recover from oncological treatment. Another study reported, there are several side effects of cancer treatment that can impact the level of physical activity in oncology patients like deep vein thrombosis, neutropenia, edema, fatigue, and shortage of specialized rehabilitation teams that can specifically treat the issues of oncology patients in an effective manner [26]. McDonough *et al.*, study revealed, cancer survivors who perceived the benefits of rehabilitation and physical activity were more likely to improve their quality of life during and after the treatment period [27]. The perception of patients can variate by the counseling and rehabilitation sessions. Our data showed 94.2% of > 5 years old post-diagnosed oncology patients have been aware of the role of exercise in cancer treatment.

CONCLUSIONS

The very important health issue that influenced the quality of life of people is cancer. Physical therapy proposed oncological rehabilitation for many years to patients who were cancer survivors. This study revealed the perception of patients towards rehabilitation that it can improve their quality of life. And the results proved that there is a strong correlation between the quality of life and the number of years of post-diagnosed oncology patients.

Authors Contribution

Conceptualization: KJ
Methodology: SRB, KAS, RI
Formal analysis: STC
Writing-review and editing: KAS, SA

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

Conflicts of Interest

The authors declare no conflict of interest.

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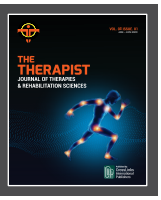

Original Article

Emotional Lability and Perceived Social Support in Association with Psychological Well-Being Among University Students: An Exploratory Analysis

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ABSTRACT

Objective: The Current study examined correlation among emotional lability, perceived social support and psychological well-being of university students. **Methods:** Cross sectional study with quantitative method was used in the current study. Sample comprised of 300 university students from various backgrounds was recruited through random probability sampling technique. For assessment self-developed demographic sheet with standardized scales Affective Lability Scale, Multi-Dimensional Scale of Perceived Social Support, and Ryff's Psychological Well-Being Scale 42-Items Version were administered. For analysis both descriptive and inferential statistics were used. **Results:** Results revealed that perceived social support had a positive relationship with psychological well-being(r=0.49**), which means that with increase in social support, psychological well-being begun to improve. Moreover, PSS had negative relationship with emotional lability (r= -0.52**), indicating that emotional instability decreases with the increase of PSS. Furthermore, results of regression analysis explored that PSS is significant predictor of EL and PWB among university students. Mean score test results indicates that EL and PWB are affected by PSS. Hence, a significant relationship exists between perceived social support and PWB and EL. **Conclusions:** To conclude it is stated that perceived social support presented role as a moderator in predicting the relationship between emotional lability and psychological well-being.

INTRODUCTION

In the chaotic environment of university life, the emotional storms with relentless waves of negativity, threaten to overwhelm the delicate mental equilibrium of students. University students often face various stressors, such as academic demands, social transitions and increased independence, which can contribute to emotional lability. Without the necessary support systems, students are left defenseless and find themselves vulnerable. Deprived of understanding, empathy, and acceptance, students are left adrift, desperately seeking comfort in a vast ocean of uncertainty. Without the anchor of support, they experience isolation, distress, and a sense of powerlessness when confronted with emotional challenges. In this tale, perceived social support emerges as a lifeline. Students yearn for the refuge of understanding, care, and encouragement that perceived social support promises. And psychological well-being stands as the ultimate quest for university students. By investigating the relationships between emotional lability, perceived social support, and psychological well-being among university students, we strive to shed light on the intense emotional struggles faced by this vulnerable

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population and their dire need for supportive environment. Emotional Liability is characterized by unpredictable mood swings, often including inappropriate laughter, crying, or anger that are out of proportion to the situation. According to APA emotional lability is a tendency towards sudden, rapid, and exaggerated mood changes that can be triggered by various stimuli, whether internal or external [1]. Emotional lability is linked to impulsive behaviors, thoughts of self-harm, and aggressive acts [2-4]. As described by Gollan, emotional lability refers to the inclination to undergo recurrent and unpredictable shifts in emotional states which are typically triggered by relatively minor stimuli, and characterized by a lack of emotional regulation [5]. Perceived social support is how a person perceives friends, family, and others as sources of material, psychological, and general support available when needed. The question is whether social support is perceived to be consistently associated with well-being. This is because perceived levels of support, love, and compassion can convey positive experiences [6]. A review found that quality social support was also associated with improved physical and mental health [7]. Psychological well-being is a multidimensional concept that encompasses positive functioning, including eudaimonic and hedonic well-being, well-being related to society, psychological well-being, and subjective well-being [8-11]. These dimensions reflect diverse aspects of human experience, such as experiencing positive emotions, personal growth, forming positive relationships, and achieving life satisfaction [12]. Engaging in positive health behaviors and making lifestyle choices have a beneficial impact on both psychological well-being and physical health [13]. Fluctuations in emotions is critical for psychological wellbeing. Different previous researches have linked instability in emotions with psychological health. In 2015, Houben and his colleagues performed a meta-analysis to investigate the association between dynamics of short-term emotion and psychological well-being. Total 79 articles were considered in the meta-analysis. Conclusions of meta-analysis include that the psychological health and maladjustments of people are tied to how their emotions evolve over time. Less fluctuating and more stable emotions are sign of greater psychological well-being where as more fluctuating and unstable emotions are sign of psychological maladjustment or lower psychological well-being [14]. In a study published in 2022, it was observed that there exists a negative association between perceived social support and emotional difficulties. Research demonstrated that adolescents in the age range of 17-18 years who perceive higher levels of social support tend to experience fewer emotional difficulties [15]. D'Aurizio *et al.*, conducted a systematic review exploring the significance of emotional instability in borderline personality disorder and concluded that emotional instability serves as the central characteristic of this particular disorder. Research outcomes validated the involvement of emotional instability in the development of borderline personality disorder but also emphasize its ongoing significance in the maintenance of the disorder [16]. Contrary to that, studies focusing on Perceived social support in individuals diagnosed with emotionally unstable personality disorder indicate that elevated levels of social support perception have a beneficial impact on overall well-being [17]. Perceived social support and psychological stress were correlated to depression. It was extensively recognized that perceived social support beneficial impacts on overall health and well-being [18, 19]. Multiple researches have provided evidence suggesting perceived social support from parents, friends, and from school environment plays a significant role in mitigating depressive symptoms among children and adolescents [20]. During the corona virus situation in Turkey, a research study was carried out involving 378 participants aged 13 to 18 years. The research uncovered a strong and positive relationship between perceived social support and psychological well-being within this particular population. The findings suggested that with enhanced perception of social support, there was a corresponding increase in psychological well-being among the adolescents [21]. Review of literature shows the role of perceived social support in buffering the negative effects of emotional lability and fostering positive psychological outcomes. However, the existing literature on emotional lability among university students is limited, revealing a notable gap in our understanding of this critical aspect of their psychological well-being. This gap calls for further investigation to comprehensively explore the nature, causes, and consequences of emotional lability among university students. Future studies should focus on investigating effective interventions and programs that enhance emotional well-being and social support among university students. This review sets the stage for our research, we aim to pave the way for innovative interventions and practices that profoundly impact the emotional, social and psychological well-being of students. Theoretical Framework. Perceived social support has remarkable alliance with emotional lability and psychological well-being. If social support was well-fortified then students have high life expectations and positive life view, have healthier psychological well-being and low emotional fluctuations. Social support has negative relationship with emotional lability and has positive relationship with psychological well-being.

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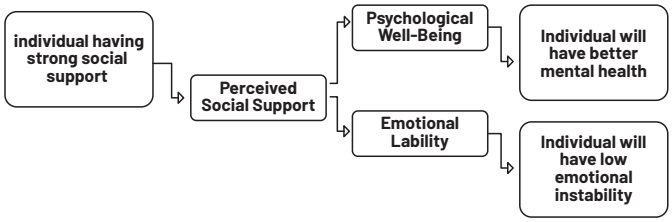
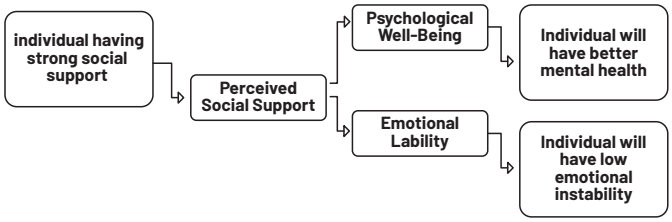


As, those students who have weak social support, they have to face more emotional disturbance and have poor mental health. They are usually stressed and have low capability of carrying out their tasks capability of carrying out their tasks.



METHODS

Current research sample was comprised of 300 university students from both male and female population belong to both rural and urban habitat with an age range of 18 to 26 years. Sample size was selected through G power. G Power is a statistical software widely used for power analysis and sample size determination in research studies. It allows researchers to calculate the required sample size based on various parameters. Sample was collected from different universities, both government and private from Sialkot, Pakistan. Random probability sampling technique was used which means that the sample was selected from the population using a method that gives each member of the population an equal and known chance of being included in the sample. This approach ensures that the sample is representative of the larger population. A cross-sectional study is a type of observational study design where data were collected from a population or sample at a specific point in time. It aims to provide a snapshot or a "cross-section" of the population at that particular moment, examining the prevalence of certain characteristics, behaviors, or outcomes. For the purpose of assessment self-developed demographic sheet with standardized scales Affective Lability Scale [22]. Multi-Dimensional Scale of Perceived Social Support [23] and Ryff's Psychological Well-Being Scale [8, 24], 42 Items Version were administered. For analysis both descriptive and inferential statistics were used. Correlation analysis among the variables of emotional lability, perceived social support and psychological well-being, Pearson Product Moment Coefficient of Correlation Analysis for Model variables among university students, Linear Regression Analysis and Mean Comparison and standard deviation and T- test for the purpose of analysis.

RESULTS

Linear regression analysis and interpretive correlations were applied. (SPSS, version-26). Mean percentages and standard deviations for were calculated using descriptive statistics.

Table 1: Correlation analysis among the variables of emotional lability, perceived social support and psychological well-being

Variables	N	Mean ± SD	1	2	3
Perceived social support	300	57.89±22.85	-	-0.52**	0.49**
Emotional Lability	300	95.34±13.89	-	-	-0.32**
Psychological well-being	300	148.26±11.42	-	-	-

**Significance level at the 0.01

Table revealed that perceived social support had a positive relation significant, where as there is also significant relationship between emotional lability and psychological well-being. Emotional lability had a negative relationship with the perceived social support that means emotional reduced with the increase of the social support.

Table 2: Linear Regression Analysis of Affective Lability Scale (ALS)Multi-Dimensional Scale of Perceived Social Support and Ryff's Psychological Well-Being Scale (PWB), 42 Items version among university students

Variables	B	R	R2	ΔR	F
Emotional Lability	0.52	0.52	.002	-.001	0.716
Psychological well-being	0.49	0.49	.029	0.26	8.865

Linear regression analysis was basically applied to check the effect of perceived social support psychological well-being and emotional lability. Results explored that perceived social support predict significantly the emotional lability among university students and psychological well-being among university students. Hence, a significant relationship exists between perceived social support and psychological well-being and emotional lability(Figure 1).

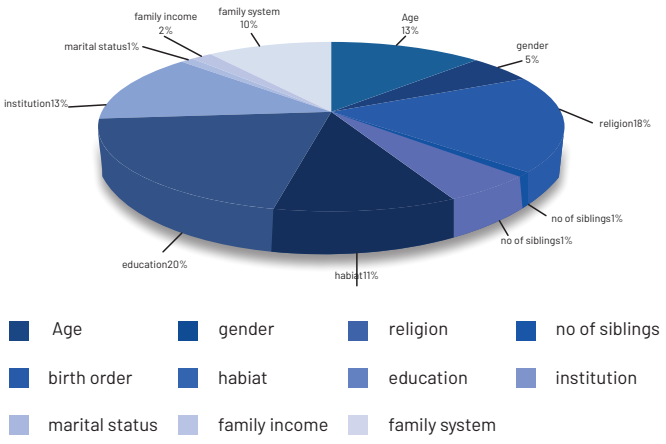


Figure 1: Pie chart of frequencies of demographic sheet

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DISCUSSION

The present research study investigated the relationship between emotional lability, perceived social support, and psychological well-being among university students. The results of the study provide valuable insights regarding the importance of presence of perceived social support among university students. Study findings demonstrated significant negative relationship between perceived social support and emotional lability. When university students feel more supported by others, their emotional instability decreases. This means that having stronger social support acts as a shield against turbulent emotions, promoting a sense of calm and balance. Previous research has shown that social support helps people become more resilient in handling stress and responding to challenges in healthier ways. It's also consistent with previous studies. A study showed a negative relationship between perceived social support and emotional liability. Key findings of the study revealed that 17–18-year-olds who had higher levels of social support had fewer emotional lability [25]. It means that effect of perceived social support would be inversely proportional to the emotional lability. The study found a positive correlation between perceived social support and psychological well-being among university students. This means that when students perceive greater support from their social networks, their overall psychological well-being tends to be higher. In simpler terms, having stronger social support systems in place is associated with better mental and emotional well-being for university students. Social support theory highlights the significance of social relationships and networks in promoting psychological well-being and propose that individuals who have a strong social support system were better able to manage effectually with stress and anxiety [26]. In table 1, results indicated significant relationship between perceived social support and psychological well-being. This significant relationship was found in a study of 90 epilepsy patients. Which shown that strong social support and psychological well-being improved overall mental health [27]. Social support is crucial during difficult times. A person who is suffering from any disease can find comfort only by sharing his problems with family, friends or others. In our cultural context, it has been observed that individuals with healthy relationships and the support of family friends and relatives leads a healthier life and better managing with problems. Hence, there were the positive and significant relationship between perceived social support and psychological well-being. Furthermore, findings have shown a significant relationship between perceived social support, emotional ability and psychological well-being among university students. Previous researches have not studied this unique combination together. However according to previous research enhanced perception of social support, there was a corresponding increase in psychological well-being among the adolescents [28]. Tables reveals that there was a significant relationship between perceived social support, emotional lability and psychological well-being. Findings also suggests that managing and reducing emotional lability is important for promoting positive mental health outcomes among students. Emotional instability is involved in the development of borderline personality disorder but also emphasize its ongoing significance in the maintenance of the disorder and affects individual mental health [29]. Contrary to that, individuals diagnosed with emotionally unstable personality disorder with elevated levels of social support perception have a beneficial impact on overall well-being [30]. Tables result reveal that Emotional lability had a significant negative relationship with the psychological well-being that means emotion lability reduced with the increase of the psychological well-being. Moreover, findings of the study provide compelling evidence that the level of perceived social support has a transformative effect on the link between emotional lability and psychological well-being. The presence of strong social support can act as a protective factor, mitigating the impact of emotional lability and fostering enhanced psychological well-being. Conversely, a lack of perceived social support may exacerbate the negative effects of emotional lability, leading to poorer psychological well-being. It can be concluded that, higher social support is fundamentally connected with less emotional lability and enhanced the psychological well-being.

CONCLUSIONS

In sum, it is concluded that there is a significant relationship between emotional lability, perceived social support and psychological well-being among university students. Perceived social support acts as a moderator in predicting the relationship between emotional lability and psychological well-being.

Authors Contribution

Conceptualization: SA
Methodology: TD, TZ, NM, KS
Formal analysis: SA
Writing-review and editing: TD, NA

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

Conflicts of Interest

The authors declare no conflict of interest.

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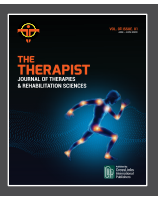

Original Article

Effects of Instrument-Assisted Compressive Versus Decompressive Myofascial Release in Patients with Non-Specific Low Back Pain

Sheeraz Shehzad[1*], Samraiz Mughal[2], Rana Muhammad Arslan[1], Umer Farooq[3], Aliha Imran[4], Misbah Jabeen[1], Zoya Binte Rohail[5] and Tamjeed Ghaffar[2]

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ABSTRACT

Non-specific low back pain, a common condition, affects vast majority of the population worldwide and can be treated with soft tissue mobilization either with compression or decompression. **Objective:** To compare the effects of instrument-assisted compressive versus decompressive myofascial release on pain intensity, lumbar range of motion, and disability in non-specific low back pain. **Methods:** This quasi-experimental study was conducted at Laeeque Rafiq Hospital from February 2023 to April 2023. Two groups were included: one received instrument-assisted compressive myofascial release (Ergon tool), and the other received decompressive myofascial release with dry cupping. The study followed the patients for three weeks, collecting measurements of pain intensity, lumbar flexion and extension range of motion (ROM), and disability scores of low back pain. Data analysis were performed using SPSS 21.0. **Results:** There were a total of 44 patients. 23 patients were assigned to the compressive myofascial release technique group and 21 patients to the decompressive myofascial release group. Pain severity and disability score in the decompressive myofascial release group reduced significantly compared to the compressive myofascial release group at the end of the third week and first week respectively (p-value=0.02 and p-value=0.05 respectively). Lumbar flexion and extension ROM improved significantly in the compressive release group as compared to the decompressive release group after 1st and 2nd week respectively (p-value=0.01 and p-value=0.04 respectively). **Conclusions:** Decompressive myofascial release reduces low back pain and disability, while compressive myofascial release improves lumbar range of motion.

INTRODUCTION

Non-Specific Low back pain (LBP), a common condition seen in the general population causes medical, social, and economic problems worldwide, affecting more than 50% of adults in their lives [1, 2]. The lifetime prevalence of non-specific low back pain is estimated to range from 60% to 70% in developed nations [1, 3]. The use of manual therapy techniques to treat low back pain has grown in popularity over the years. Myofascial release (MFR) is one common type of manual therapy that targets muscles and the fascia. Despite its origins in the 1940s, the term "myofascial release" was first used in 1981 in a manual called "Myofascial Release" conducted at Michigan State University [4, 5]. The two most common techniques for mobilizing fascia and muscle (myofascial mobilization or release) are decompressive and compressive myofascial release. [6, 7]. Myofascial decompression (MFD) is a negative pressure

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soft tissue mobilization technique that uses suction to mobilize skin, muscles and fascia. This is usually accomplished with the aid of suction cups. This helps to mobilize the muscles and the fascia. The most commonly employed technique for decompressive myofascial release is dry cupping [8, 9]. Contrary to that, positive pressure can also be applied to mobilize myofascia, with the help of specially designed instruments (e.g. Ergon's tool) [10]. After applying pressure, the instrument is moved in several directions, according to the targeted area and the myofascial is mobilized or released. This technique is also known as instrument-assisted soft tissue mobilization (IASTM) or augmented soft tissue mobilization (ASTM) [11, 12]. The efficacy of both decompressive (dry cupping) and compressive myofascial release (IASTM) on low back pain have been evaluated by previous studies [13-16]. Dry cupping was found to be more efficient than sham cupping at reducing pain and functional disability, according to a 2021 study that examined its effects on persistent nonspecific low back pain [14]. The effectiveness of cupping therapy and instrument-assisted soft tissue mobilization technique in treating active myofascial trigger points (MTrPs) in the low-back region of amateur football players was compared in a randomised controlled trial. When compared to cupping, the IASTM technique had a significantly greater effect on pain reduction during MtrP compression. [17]. A 2022 study conducted in India to determine whether or not a single session of cupping and instrument-assisted soft tissue mobilization (IASTM) therapy would be sufficient to temporarily reduce pain intensity and functional disability in patients with nonspecific low back pain. The patients improved significantly in terms of pain severity and disability [18]. A randomized pilot study conducted on 24 patients with trigger points and nonspecific neck pain concluded that dry cupping has beneficial effects in improving pain in the patients [19]. The aim of our study was to compare the effects of compressive (IASTM) and decompressive (dry cupping) myofascial release technique in non-specific low back pain patients and find out if there is any difference in the effects of two techniques.

METHODS

It was a quasi-experimental study conducted at Laeeque Rafiq Hospital Multan after approval. All patients were informed about the treatment protocol and informed consent was received. Patients were eligible for this study if they were 25 to 60 years old, having nonspecific LBP with pain intensity score of 4 or more in the Numeric Pain Rating Scale (NPRS). Exclusion criteria included the following: patients who had a contraindication to cupping therapy or IASTM, were undergoing physical therapy at the time, had any systemic illness that could interfere with the assessments, showed symptoms of serious spine pathology, such as fractures, inflammatory diseases, infections, or tumors, and were unwilling to participate in the study. The study duration was from February 01, 2023, to April 31, 2023. Hot-pack was applied to lower back area for 10-15 minutes to both groups. For myofascial decompression using dry cupping, patients were asked to lie prone. On each side of the paraspinal region, four to six plastic cups were applied to the skin. A mechanical device was used to partially evacuate the air from the cups. A comfortable level of negative pressure was established. The treatment took 15 minutes. The lower back region was targeted during compressive myofascial release using an Ergon tool. It also took 10-15 minutes. Sample size was calculated as follows: For detecting a true difference in means of the groups compared of 4 points on the numeric pain score, and assuming a pooled standard deviation of 5 points, the study would require a sample size of approximately 25 for each group (i.e. a total sample size of 50 with equal group sizes) to achieve a power of 80% and a level of significance of 5% (two sided) [20]. Consecutive sessions were given for first week (5 days), on alternate days for next 2 weeks (3 days per week). Patients were evaluated before the treatment, after first week, after second week and after third week of treatment. The outcome measures used were Numeric Pain Rating Scale (NPRS) for pain intensity, Oswestry Disability Index (ODI) for disability score and lumbar flexion and extension range of motion (ROM). The treatment effects of the both techniques at each interval (1st, 2nd and 3rd week of treatment) were compared using independent sample t-test. The analysis was made to compare two techniques of soft tissue mobilization and find out if there is any difference between two groups receiving different treatments. The difference between two groups at specific time interval was calculated using independent t-test whereas the difference between two groups over time was calculated by linear regression analysis. A p-value of 0.05 or less was regarded as significant. SPSS version 21.0 was used to analyze the data.

RESULTS

Fifty-five patients were assessed for eligibility. 4 patients declined to participate in the study. 26 patients were assigned to the compressive (IASTM) myofascial release group and 25 were assigned to the decompressive (dry cupping) myofascial release group. Seven patients did not come for follow-up sessions (Figure 1: CONSORT diagram). In total, data of 44 patients were analyzed (23 patients in IASTM group and 21 patients in dry cupping group). The baseline characteristics of patients taking part in this study are provided in Table 1.

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Table 1: Baseline characteristics of enrolled patients

Characteristics	Compressive myofascial release group (n=23)	Decompressive myofascial release (n=21)
Age (Mean ± SD)	38.09 ± 6.4	36.7 ± 5.6
Gender		
Male	16 (69.5%)	16 (76.2%)
Female	7 (30.5%)	5 (23.8%)
Low back pain duration		
< 1 week	8 (34.88%)	6 (28.57%)
1-2 weeks	5 (21.74%)	4 (19.05%)
2 -4 weeks	5 (21.74%)	5 (23.81%)
> 4 weeks	5 (21.74%)	6 (28.57%)

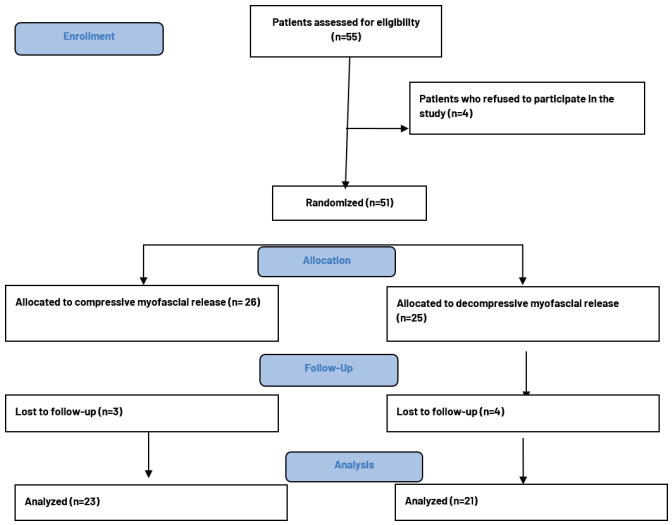

Figure 1: CONSORT flow diagram

Comparison between pain score by numeric pain rating scale data before and after follow-up sessions of 1 week, 2 weeks and 3 weeks between two groups have been provided in the Table 2. There was a statistically significant difference between two groups at the end of 3 weeks' session (p=0.02). Pain was reduced more in the decompressive myofascial release group (2.62 ± 0.9) as compared to the compressive myofascial release group (3.09 ± 1.4) at the end of three weeks. The group mean difference was 0.93 (CI 0.13-1.74). Linear regression analysis showed statistically significant difference between two groups over time (p-value=0.003)(Table 2).

Table 2: Comparison of Numeric Pain Rating Scale (NPRS) score between two groups

Parameter	Pre-intervention baseline (Mean ± SD)	One-week after intervention (Mean ± SD	Two-weeks after intervention (Mean ± SD)	Three weeks after treatment (Mean ± SD)	Group difference over time p-value*
Compressive myofascial release (n=23)	6.43 ± 0.9	4.4 ± 0.9	3.8 ± 1.3	3.09 ± 1.4	0.003
Decompressive myofascial release (n=21)	6.9 ± 1.2	4.67 ± 1.1	3.71 ± 1.2	2.62 ± 0.9	
Group mean difference change from pre-intervention baseline		0.28 (-0.20-0.77)	0.62 (-0.16-1.41)	0.93 (0.13-1.74)	
p-value#		0.24	0.11	0.02	

*Compares two groups over time, calculated by linear regression

#Compares two groups at specific intervals, calculated using independent t-test

Comparison between Oswestry Disability Index (ODI) score before and after follow-up sessions of 1 week, 2 weeks and 3 weeks between two groups are given in the Table 3. There was statistically significant difference between two groups at the end of 1st week sessions (p=0.05). The mean difference between two groups after first week of treatment 1.04 (CI -0.03-2.12). Table 3.

Table 3: Comparison of Oswestry Disability Index (ODI) score between two groups

Parameter	Pre-intervention baseline (Mean ± SD)	One-week after intervention (Mean ± SD	Two-weeks after intervention (Mean ± SD)	Three weeks after treatment (Mean ± SD)	Group difference over time p-value*
Compressive myofascial release (n=23)	28.8 ± 4.4	26.4 ± 4.5	22.8 ± 3.9	20.17 ± 4.5	0.15
Decompressive myofascial release (n=21)	33.1 ± 6.7	29.6 ± 5.8	26.2 ± 5.1	24.2 ± 5.4	
Group mean difference change from pre-intervention baseline (confidence interval)	-	1.04 (-0.03-2.12)	0.81 (-0.89-2.53)	0.19 (-1.90-2.29)	
p-value#		0.05	0.34	0.8	

*Compares two groups over time, calculated by linear regression

#Compares two groups at specific intervals, calculated using independent t-test

Lumbar flexion range of motion (ROM) data before and after follow-up sessions of 1 week, 2 weeks and 3 weeks of two groups have been provided in the Table 4. There was a statistically significant difference between two groups at the end of 1st week sessions (p=0.014). Lumbar flexion ROM was increased more in the compressive myofascial release group as compared to the decompressive myofascial release group at the end of first week. The group mean difference was 1.6 (CI -0.3-3.5). Linear regression analysis

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showed statistically significant difference between two groups over time (p-value=0.02) (Table 4).

Table 4: Comparison of Lumbar flexion range of motion between two groups

Parameter	Pre-intervention baseline (Mean ± SD)	One-week after intervention (Mean ± SD	Two-weeks after intervention (Mean ± SD)	Three weeks after treatment (Mean ± SD)	Group difference over time p-value*
Compressive myofascial release (n=23)	24.5 ± 6.8	30.7 ± 5.6	34.6 ± 5.02	38.9 ± 5.1	0.02
Decompressive myofascial release (n=21)	27.4 ± 6.9	31.9 ± 6.1	36 ± 5.2	40.2 ±4.9	
Group mean difference change from pre-intervention baseline (confidence interval)	-	1.6 (-0.3-3.5)	1.2 (-1.1-4.01)	1.3 (-1.1-4.3)	
p-value#		0.014	0.065	0.10	

*Compares two groups over time, calculated by linear regression
#Compares two groups at specific intervals, calculated using independent t-test

Lumbar extension range of motion (ROM) data before and after follow-up sessions of 1 week, 2 weeks and 3 weeks of two groups have been provided in the Table 5. There was a statistically significant difference between two groups at the end of 2nd week sessions (p=0.014). Lumbar extension ROM was increased more in the compressive myofascial release group as compared to the decompressive myofascial release group at the end of second week. The group mean difference was 0.35 (-0.38-1.09). Linear regression analysis showed statistically significant difference between two groups over time (p-value=0.008) (Table 5).

Table 5: Comparison of lumbar extension range of motion between two groups

Parameter	Pre-intervention baseline (Mean ± SD)	One-week after intervention (Mean ± SD	Two-weeks after intervention (Mean ± SD)	Three weeks after treatment (Mean ± SD)	Group difference over time p-value*
Compressive myofascial release (n=23)	4.5 ± 2.3	6.8 ± 2.2	8.4 ± 2.9	9.9 ± 2.5	0.008
Decompressive myofascial release (n=21)	4.4 ± 2.3	6.3 ± 2.3	7 ± 2.3	8.8 ± 2.1	
Group mean difference change from pre-intervention baseline (confidence interval)	-	0.35 (-0.38-1.09)	0.57 (0.05-2.35)	0.65 (-0.35-2.28)	
p-value#		0.34	0.04	0.14	

*Compares two groups over time, calculated by linear regression
#Compares two groups at specific intervals, calculated using independent t-test

DISCUSSION

Our study found out that decompressive myofascial release technique on lower back resulted in significant decrease in pain and disability score whereas compressive myofascial release technique proved beneficial in improving lumbar flexion and extension range of motion in patients with non-specific low back pain. The efficacy of both decompressive (dry cupping) and compressive myofascial release (IASTM) on low back pain have been evaluated by previous studies and systematic reviews. A 2021 study by de Melo Salemi *et al.*, showed that that dry cupping was effective in reducing pain and functional disability in low back pain patients [14]. In our study, pain was reduced more in the group that was treated with dry cupping or decompressive myofascial release technique as compared to the other group. This is comparable to what has been reported in the literature. A randomized controlled trial (RCT) that compared the effectiveness of compressive myofascial release with decompressive myofascial release concluded that compressive myofascial release had greater effect on pain and myofascial trigger points in lower back area [17]. Our study showed that compressive myofascial release technique resulted in increased lumbar and flexion range of motion. Another study by Jain *et al.*, found beneficial effects of single session of decompressive myofascial release and compressive myofascial release on pain severity and disability in patients of low back pain [18]. Our study had longer follow-up sessions and found significant reductions in pain severity, especially in the group that was treated with decompressive myofascial release technique. Another study by Lee *et al.*, that evaluated effects of compressive myofascial release using Graston technique in chronic low back pain patients found significant improvements in lumbar ROM as well as decrease in pain intensity [13]. Our study also showed similar results. However, this study only reported outcomes at the end of 4 weeks whereas we reported outcomes at three intervals. Myofascial decompression by dry cupping has also resulted in beneficial effects in conditions other than non-specific lower back pain. Dry cupping's effects on pain and function in those with plantar fasciitis were examined in one study with 29 participants. For four weeks, the patients received treatments twice a week. In the population tested, dry cupping therapy was found to significantly reduce pain and increase function [21]. Our study was reported according to the guidelines mentioned in CONSORT statement [22]. The study duration of three weeks which is longer than the previous studies published is another strength of this study. However, this study also had few limitations. First, it did not include the random sampling of patients which may have some impact on the results. Second, the sample size was small and it would be difficult to generalize the results on a larger population. The reason of sample size being small can be linked to longer follow-up duration of this

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study. Our study also did not shed light on within group differences and we only reported differences between the groups. This study also had a smaller number of females (27%) and majority were males. Future researches should focus on large sample size, with randomization of patients and inclusion of equal or nearly equal number of male and female patients.

CONCLUSIONS

Both compressive and myofascial release techniques are beneficial for patients with non-specific low back pain; Decompressive myofascial release with dry cupping resulted in reduction in pain severity and disability whereas compressive myofascial release improve lumbar flexion and extension range of motion.

Authors Contribution

Conceptualization: SS, ZBR
Methodology: SS, RMA
Formal analysis: SS, SM, MJ, TG
Writing-review and editing: SS, SM, RMA, UF, AI, MJ, ZBR, TG

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

Conflicts of Interest

The authors declare no conflict of interest.

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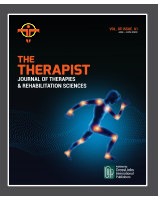

Commentary

Causes, Precautions and Management of Risk Factors Associated with Dehydration among Athletes

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Adequate intake of water is essential concerning the upkeep of body function. Water also hydrates discs between the vertebrae in the spine and foils tendons, ligaments, and muscles from becoming tight and stiff. Insufficient water intake may cause health problems, such as kidney stones and urinary tract infections (UTIs) in women, poor physical and psychological performance, improper salivary gland function, dehydration, etc. This commentary aims to unpin the facts about the causes, precautions, and management of risk factors associated with dehydration among athletes. Previous epidemiological studies have shown that exercise causes sweating and resultant loss of fluids, affecting an athlete physically and psychologically. In addition, previous studies have also demonstrated that dehydration negatively influences performance and causes high body temperature or glycogen use and the consequent reduction in muscle reserves. Likewise, the studies also showed that dehydration caused pain in joints and muscles, slowed the healing rate, and increased the chances of injuries. Based on the conclusion of previous studies, dehydration should be rehabilitated by fulfilling the fluid level in the body by consuming clean water, clear broths, ice pops and sports drinks. In severe conditions, oral rehydration therapy, intravenous (IV), is also suggested. The human body comprises 75% water inside cells, blood vessels and between the cells. Without water, living things cannot survive sufficient intake of water help the body to maintain its functions. Likewise, the body loses water throughout the day, as when we breathe, sweat, urinate, and defecate; the body restocks the water by drinking fluids. The body sometimes leads to a state of dehydration when intake is lower than consumption of the body, which causes headaches, lethargy, and constipation. Dehydration is a common problem concerned with fluid and electrolytes among the elderly. Frequently loss of water causes dehydration. Age-related changes in total body water, thirst perception, renal concentrating ability, and vasopressin effectiveness probably caused dehydration among the elderly. In addition, other health problems such as infection, high-protein tube feedings, cerebral vascular accidents, and medication-related hypodipsia are also associated with ageing and are particularly relevant for elderly patients. Proper patient treatment for dehydration depends upon the water deficiency assessment [1]. Dehydration is a state of the body when the body loses more fluids than intake [2, 3]. Insufficient water intake upsets the balance of minerals such as sugar and salt and thus affects the body's functions. Water makes up over two-thirds of the healthy human body. In addition to sweating, vomiting and diarrhea, diuretics (water pills) can result in increased urination, which causes body dehydration [4, 5]. Dehydration may be categorized into three types: hypotonic (primarily a loss of electrolytes such as sodium potassium chloride, calcium, magnesium, phosphate, and bicarbonate are electrolytes in blood and other body fluids that carry an electric charge, hypertonic (An imbalance between

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water and salt in the body it occurs when the body loses too much water while excessive or too much salt is in the fluid outside the cells) and isotonic (there is an equal loss of water and Sodium, commonly caused by vomiting and diarrhea) [6-9]. There are many reasons for dehydration, such as lack of time, avoiding safe drinking water, travelling, hiking or camping. In addition, diarrhea, vomiting, fever, excessive sweating and increased urination [10, 11]. Dry mouth, absence of tears while crying, sunken eyes and cheeks, no wet diapers for three hours etc., are the main signs & symptoms of dehydration. The main signs and symptoms include dry mouth and tongue, no tears when crying, no wet diapers for three hours, sunken eyes and cheeks, a sunken soft spot on top of the skull and littleness' or irritability [11]. Dehydration problem is commonly found among children. Intravenous (IV) therapy and oral rehydration therapy (ORT) are effective ways of treating dehydration [12]. Intravenous (IV) therapy is a method of managing fluids directly into veins. Thus these procedures enable different substances such as water, medication, blood, or nutrients to access the body quickly through the circulatory system [13]. Likewise, ORT is a method of managing fluids for preventing and preventing patients with diarrhea [14]. Likely it involves drinking water with modest amounts of sugar and salts, specifically Sodium and potassium. A nasogastric tube can also give oral rehydration therapy [15-18]. The nasogastric tube, also called the NG tube, is a medical tube that passes through the patient's nose; thus, for a limited duration, food substances and medications are delivered to the stomach or to draw the implications out [19-21]. The problem of dehydration is also found in players. The dehydration rate is low among the players in badminton despite of moderate sweat rate. Likewise, the badminton players were adequately hydrated during the game, and thus the dehydration attained was low. In addition, badminton did not cause fatigue and significantly increased the prevalence of proteinuria, leukocyturia and erythrocyturia [22]. Proteinuria, also known as albuminuria, is evaluated protein in the urea; it is not a disease that sometimes affects kidneys. A high protein level in urea means that the kidney's glomeruli filter is not working correctly, allowing too much protein to escape into the urine. When the glomeruli are damaged, the condition is called nephritis or glomerulonephritis. Other conditions can lead to nephritis, including hypertension, heart disease and diabetes, as well as different types of kidney disease [23, 24]. Leukocyturia (LU) indicates the presence of leukocytes in urine, and UL may be due to urinary infections or non-infectious factors. In some conditions, such as chronic renal failure, heart failure, and diabetes mellitus, bacteriuria (BU) without LU can be encountered [25]. Erythrocyturia indicates impaired renal function and strongly predicts poor renal outcomes in patients with known renal disease [26]. The problem of dehydration is found among players of aerobic and anaerobic activities [27, 28]. Dehydration negatively impacts cardiovascular stability, and psychological status did not significantly affect anaerobic performance [29, 30]. Muscle cramps are aching, spasmodic, and involuntary skeletal muscle contraction during and after exercise and have no causal metabolic, neurological, or endocrine pathology [31]. Nocturnal or cramps associated with metabolic abnormalities are not considered exercise-associated muscle cramps (EAMC). In addition, the problem of several types of cramps is considered linked with EAMC [32, 33]. Dehydration caused physical exertion. Change in body mass is associated with the volume and intensity of exercise, and thus, awareness among children about dehydration is also helpful in cognitive and physical performance [34]. Similarly, understanding a balanced diet and promising strategies for health is also essential for athletic performance; likewise, the intake of fluids also influences athletes' performance and recovery [35]. Physical training causes dehydration from consuming fewer water and mislaid through sweating, which affects an athlete physically and psychologically [36]. Exercise causes sweating and resultant loss of fluids, affecting an athlete physically and psychologically. In addition, previous studies have also demonstrated that dehydration negatively influences performance and causes high body temperature or glycogen use and the consequent reduction in muscle reserves [37].

CONCLUSIONS

Previous epidemiological studies have shown that exercise results in ingesting fewer drinks and fluids lost through sweating, which affects an athlete physically and psychologically. In addition, previous studies have also demonstrated that dehydration-related decreases in performance may have several causes, such as increased body temperature or glycogen use and the consequent reduction in muscle reserves. Likewise, the studies also showed that dehydration caused pain in joints and muscles, slowed the healing rate, and increased the chances of injuries. Based on the conclusion of previous studies, dehydration should be treated by fulfilling the fluid level in the body by consuming clean water, clear broths, ice pops and sports drinks. In severe conditions, oral rehydration therapy,iintravenous (IV), is also suggested.

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