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EDITORIAL

Speech and language therapy, The Judicial System and Pakistan

Ayesha Kamal Butt[1], Michelle Quaye[1]

Speech and language therapists play a critical role in facilitating and enabling effective communication. This should transcend beyond the background of the client. However, to date there has been no evidence of any therapeutic facilities established for young offenders or within the judicial system in Pakistan. Internationally, a significant population namely 60% of the young population in the judicial system is deemed to have speech and language difficulties.(1)

There remains a pressing need to address the challenges faced by these marginalised individuals who may present with speech, language and communication needs (SLCN) that remain unassessed and untreated. Young offenders (YO) present with significant communication difficulties in comparison to their peers.(2) Accumulative research also indicates that individuals with SLCN are also more likely to engage in repeated crime (recidivism).(3) Minimal or inconsistent access to education and difficulties with literacy further contribute to risks of offending.(4) From a safeguarding perspective, communication difficulties associated with SLCN are more likely to lead to increased vulnerability in conditions of heightened stress or risk, such as conflict, harm and crime.(5)

Speech, language and communication needs are not only extremely complex, but they are also incredibly vast in their presentation. These difficulties could manifest themselves in many ways such as difficulties with reception and/or expression. The variability in SLCN presentation can also impact on comprehensive identification in earlier life. Inadequate speech and language skills can result in a breakdown in communication at any stage, such as the inability to comprehend legal terms and proceedings,(6) to process information, they may be perceived as willingly non-compliant by misinterpretation or to be able to adequately express their opinions, which impacts on the individual's ability to exercise their basic rights and in turn to seek justice.(7,8)

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Addressing the challenges:

There are no published, accessible, culturally and linguistically apt standardized assessments available in Pakistan. This results in the inability to provide evidence-based assessment findings to support claims of SLCN. The provision of indigenous assessments is paramount.

There is a lack of knowledge and awareness regarding SLCN in school teachers which impacts on early identification in Pakistan. If these issues are addressed at an early stage and support is made available, this could contribute to curtailing the high prevalence of adolescents and young adults engaging in high-risk criminal activity and entering the criminal justice system.(3)

Non-existent specialised training for police, lawyers and other professionals involved in the judicial system regarding SLCN awareness is a barrier to acceptance of these difficulties. Fostering collaboration between clinicians, legal professionals, and relevant government bodies is essential. This collaboration can help formulate attitudes, guidelines and standards for accommodating individuals with SLCN within the judicial system. Additionally, in judicial settings, the legal terminology used by professionals to conduct witness statements, sentencing and beyond can be unfamiliar to YO, which can further exacerbate adverse interactions with professionals. Young people with SLCN may present with difficulties in retelling past events (narrative skills), which could render them vulnerable to not clarifying important points or not giving an accurate overview of their perspectives, therefore impacting on accuracy of statements.(9)

There is no provision for rehabilitation within the judicial system, particularly speech and language therapy in Pakistan. There is a growing need for identification of individuals with conditions such as autism or other learning disabilities, which may remain unidentified. An additional incorporation of vicarious or

collaborative learning on an international level may deem beneficial for enhanced service delivery with this particular demographic.

The SLT profession is predominantly a female led profession around the world. This is a further barrier to SLCN support anecdotally, as female professionals in Pakistan have often been reported feeling uncomfortable working in such an environment or specifically influenced by their families to refrain from engaging with judicial service user groups. Speech therapy curriculum, course content and clinical placements do not address and include information on YO and the judicial system, which should be introduced to the profession in Pakistan. It is also crucial to raise awareness among the public, dispelling misconceptions surrounding SLCN, providing more insight to the links between SLCN and youth offending as well as promoting inclusivity.

Conclusion:

The integration of speech therapy services within Pakistan's judicial system is not only a matter of accessibility but also a fundamental issue of human rights and justice. By recognizing and addressing the challenges faced by individuals with SLCN, we can ensure that every citizen has equal opportunities and their rights are addressed. A comprehensive and collaborative effort between the speech therapy community, legal professionals, and policymakers is imperative to foster a more inclusive and just judicial system in Pakistan. It is paramount that timely assessments, therapy sessions, and counselling are provided to ensure individuals with SLCN receive the necessary support they require. Communication is a basic human right and organisations should be prioritising ways to accommodate all backgrounds and abilities in order to ensure beneficial outcomes. The neglect towards these young offenders and their basic human rights must stop and further proactivity towards preventative and supportive measures should continue to increase.

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RESEARCH ARTICLE

Correlation between body mass index, body perception and physical activity among university students

Momina Khalid[1], Saleha Amin Khan[1], Memoona Awan[1], Kanwal Asif[1], Mehwish Waseem[2], Muhammad Iqbal Tariq[2]

ABSTRACT

Background: With the current advancement in technology, sedentary lifestyles, and decreased physical activities, university students are highly prone to distorted body perceptions and obesity. However, limited studies have been conducted about body weight and body perception in university students studying in Pakistan.

Objective: This research aimed to determine correlation between BMI, body perception and physical activity in university students.

Methods: This is a correlational study. A sample size of 437 was calculated by online sample size calculator. Non-probability convenience sampling technique was used. The study was carried out in different universities of Islamabad and Rawalpindi and the tools such as International Physical Activity Questionnaire, Body Mass Index, and Figure Rating Scale were used. Data was analyzed using SPSS 22.

Results: BMI and body perception showed significant moderate positive correlation (r=0.472, p= <0.05). Physical activity showed significant weak correlation with body perception and BMI (r=0.125 and 0.024, p=<0.05).

Conclusion: It was concluded from the results of current study that students have misperceptions regarding their body weight but weight misperception was not a cognitive barrier in participants for physical activity and majority participants performed moderate to vigorous activities.

Keywords: Body perception, Body mass index, Correlation, Physical activity.

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Introduction:

University students have sedentary lifestyles and are not as physically active as per the recommendations of the World Health Organization (WHO). In recent times, there is a surge of increased weight among students and adults. Eating processed food, high in fat content, academic stress, not actively taking part in sports or outdoor activities are some factors that can lead to obesity.(1) According to WHO (2012), almost 300 million people were reported to be clinically obese.(2) The South Asian population has higher deposition of abdominal fat as compared to European regions. Pakistan is placed 165th (out of 194 countries) in terms of proportion of overweight population, with 22.2% of people over the age of 15 exceeding the threshold of obesity. This ratio is roughly congruent with other studies; which state one-in-fourth of Pakistani adults are overweight.(3)

Body Mass Index (BMI), body mass divided by the square of height (units of kg/m^2), is a commonly used tool to screen overweight and obesity. Since body size is often either over or underestimated, the awareness about normal BMI can be beneficial to attain realistic perception about one's body weight and health.(4) Many young people seem to be unaware of

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the fact that they are not only overweight but also susceptible to many diseases. It seems that this population has a skewed perception regarding their body image. Obesity is also linked to emotional and social problems like depression. There is also a stigma attached to it which leads to feeling of rejection, shame and guilt, further worsening mental health.(5)

Body Image Dissatisfaction (BID) occurs when people have negative feelings about their own body and are unable to respect, appreciate and accept their body as it is. It takes a toll on the individual's self-esteem and confidence.(6) Literature suggests that when participants are asked to choose their ideal body types, they pick images that are similar to the types shown in the media and when they are asked to choose silhouettes of how they perceive themselves, they choose the exact opposite of what is shown in the media.(7) For Asian individuals, BMI between 23 and 27 kg/m^2 is overweight and BMI >27 kg/m^2 is obese. Waist to hip ratio (WHR) higher than 0.85 in females and higher than 1.0 in male means that they are at higher risk for developing serious health risk.(8)

Most researches in this area have focused on other geographical regions. Not many studies were conducted to assess the correlation between Body Mass Index (BMI), body perception and physical activity among university students. This study bridges the gap on this correlation specifically in Pakistan. Obesity is emerging as a public health problem. Weight misperception is the discordance between an individual's actual weight status and the perception of his/her weight. It is a common problem in the youth population as enumerated by many international studies. However, data from Pakistan in this area is deficient. It is observed that a typical university student in Pakistan may not have the accurate perception of their body weight. This lack of awareness and limited knowledge greatly increases the risk factors of obesity and being overweight. Such an attitude causes them to live a very unhealthy lifestyle. The inactive lifestyle throughout our modern society has outdated the need for physical activity. Sleep deprivation and poor dietary behaviors also impact students' intellectual level and academic records. The objective of this study was to ascertain the correlation between body mass index, body perception and physical activity among university students and to assess the knowledge of students regarding the cardiovascular risk factors especially obesity.

Methods:

It was a correlational study. A sample size of 428 was calculated by online sample size calculator and we took data from 437 total students. The level of significance α=0.05 was used to check the hypothesis. Non-probability convenience sampling technique was used. The study included students from different universities, aged 18 -25 years. All students having any medical condition or history of cardiovascular disease, respiratory disease, endocrine issue or any hormonal imbalance were excluded. The study was carried out in different universities of Islamabad and Rawalpindi. Permission was obtained from the head of universities for our data collection process and took informed consent from the participants. This study was conducted from December 2021 to July 2022 after the approval from ERC; Ref# Riphah/RCRS/ REC/01193.

International Physical Activity Questionair - Short Form (IPAQ-SF), BMI, and Figure Rating Scale (FRS) were used as tools in this study. Body Mass Index (BMI) is calculated by dividing weight (kg or lbs.) by their height (m^2 or ft). FRS represents how a person recognizes his or her physical impression. It was an open access tool in which, individual chose the best figure that shows his or her present-day and his or her ideal body figure. In IPAQ-SF we calculated the results by MET calculated in METs minutes per /week and categorized accordingly. There are three categories of IPAQ which are high, moderate and low.

Through descriptive analysis of the demographic data, mean and standard deviation were calculated, whereas the variable graphs were through frequency and percentage. Data acquired was represented using tables and charts. Spearman's correlation for ordinal variables and Pearson's correlation for continuous variables was used. Data was analyzed using SPSS v.22.

Results:

Frequencies and descriptive characteristics were used to evaluate socio-demographic features and are specified as mean, standard, deviations, and sample percentage. Sample size was 437 in number in which 212 (48.5%) were males, out of which 112 were medical students and 100 were non-medical participants. Similarly, 225 (51.5%) were females of which 101 were medical and 124 were non-medical participants. Mean age of the participants was 20.94±1.54 years. Respondents were requested to fill their weight (kg) and height (m) through which BMI was calculated. Mean value of BMI was 22.3±4.05. Majority of the

participants (45.8%, n=200) were classified with normal healthy weight while 26.5% (n=116) were overweight and 16.9% (n=74) were underweight and only 10.8% (n=47) were obese. Many students, almost 167 (38.2%) male and female, took part in vigorous physical activity in the last7 days. While 146 (33.4%) had moderate and 124 (28.4%) had low physical activity. (Figure 1)

When students were asked to choose the figure that reflects their perception about how they look, majority students chose underweight category, and no one chose figures reflecting obesity. (Table 1)

Body satisfaction among individuals was done by subtracting ideal figure and perceived figure. This shows that about 48.5% students incorrectly estimated their weight. (Figure 2)

The cross tab between BMI and Body perception showed the student's misperception regarding their weight and actual weight categorized through BMI. (Table 2)

A moderate positive correlation was observed between BMI and body perception and weak correlation with physical activity showing that actual BMI and perceived body weight are different. Similarly, BMI and body perception are weakly correlated with physical activity. (Table 3)

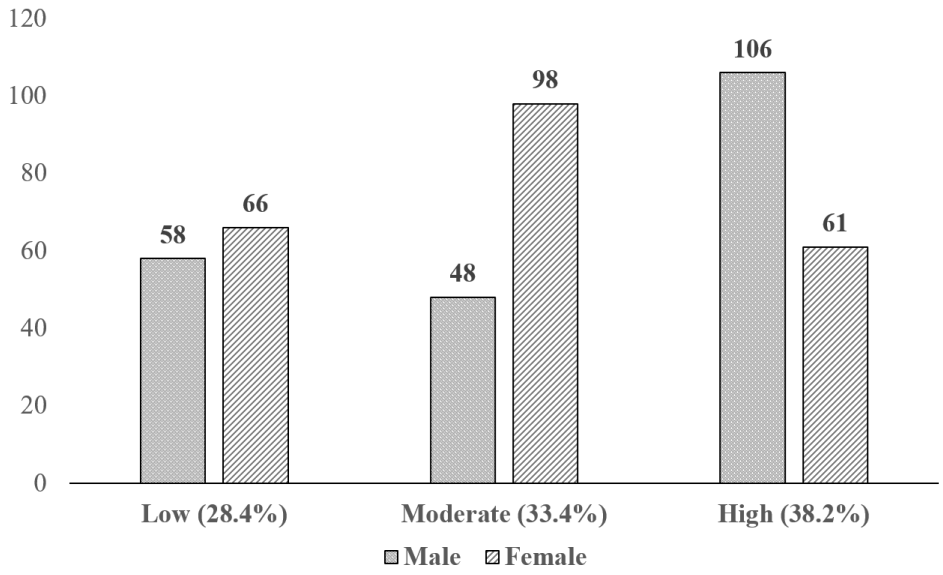

Figure 1: Gender wise physical activity level

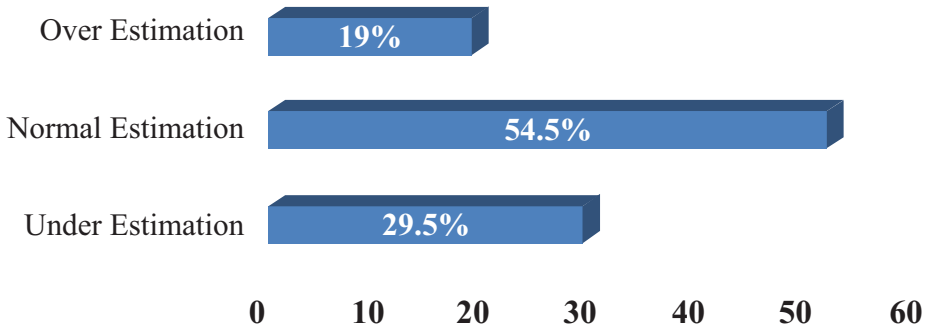

Figure 2: Body weight estimation

Table 1: Body perception through Figure Rating Scale (FRS)

Body perception	Perceived figure [n (%)]	Ideal figure [n (%)]
Underweight	230 (52.6%)	270 (61.8%)
Normal	200 (45.8%)	163 (37.3%)
Overweight	7 (1.6%)	4 (0.9%)

Table 2: Cross-tabulation of BMI and body perception (perceived)

Body Mass Index	Body perception (perceived figure)		
	Underweight	Normal	Overweight
Underweight	62	12	0
Normal	123	77	0
Overweight	36	77	3
Obese	9	34	4

Table 3: Correlation between BMI, Body Perception and Physical activity

Correlation analysis	r -value
Body Mass Index & body perception	0.472*
Body Mass Index & physical activity	0.125*
Body Perception & physical activity	0.024*

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

Discussion:

The purpose of this research was to find correlation between BMI, physical activity and body perception conducted on male and female students at universities. The findings of the current study revealed the actual weight categories and weight perception of university students which depicted their thoughts about their body shape and weight. As it is evident from the literature that body weight misperception can lead to eating disorders and certain health issues so by knowing the status of student's current level of body perception, future action can be taken to evade the issue.

Results of the current study revealed that although majority students have normal body weight according to BMI, but their perception was not accurate regarding their weight. In our study, 51.5% correctly estimated their weight while 48.5% misinterpreted their body weight. Similar findings were discussed by K. Boutahar et al. in a survey of university students on the association of anthropometric profile/health and body image. They showed an increased rate of body dissatisfaction and underestimated their body weight.(9) It has been seen that in Asian countries, incidence of overestimation of body weight and struggle to reduce weight was high, whereas their body weights were typically low.

Another study in Pakistan conducted on undergraduate university students displayed an increased number of participants with weight misperception (42.2%).(10) About 1/3rd female university students in Karachi showed weight misperception.(11)

In our study, positive moderate correlation was found between BMI and body perception with r= 0.47 which indicates that BMI and body perception do not have strong relationship with each other. Body satisfaction among individuals was done by subtracting ideal figure and perceived figure. This shows that about 48.5% students incorrectly estimated their weight. Similar findings reported in 2019 among Saudi women, demonstrated that BMI positively correlated with Body Image Dissatisfaction, with small correlation r=0.135.(6)

Our results showed that many students took part in either moderate (33.4%) or vigorous activity (38.2%). In concurrence study conducted in 2021 on Pakistani Students, assessed that 36% were doing vigorous activity and 60.6% were doing moderate activity.(12)

Physical activity in our study showed very weak relationship with Body Perception and majority participants performed moderate to vigorous activities which indicates that weight misperception was not a cognitive barrier in participants of current study and they were physically active. In concurrence, a Saudi Arabian study conducted among university students reported that no relation was found between body perception and physical activity level.(13)

These findings are not in accordance with previous research which proposed that body image dissatisfaction is associated with minor probability of participation in physical activity in both gender participants. The possible reason for these contrasting results might be age group as participants of this study were 34–65 years old while current study participants were younger (18-25 years) and healthy.(14)

A thought-provoking outcome in the current study is that although majority students are normal (45.8%) according to BMI and percentage of overweight (26.5%) and obese (10.8%) participants was small, but a large number (48.5%) of participants perceive their weight incorrectly which indicates their dissatisfaction towards their weight. It could be justified by the reason that BMI gives information regarding physical measurements of body including weight and height of individual, but perception is related to shape of the body or specific body areas so individuals with normal BMI can also show dissatisfaction towards shape of body. It can be alarming as misperception of body can lead to eating disorders among students who are more concerned with body shape.(15)

The limitation of this study was the questionnaire (IPAQ) used, which only informed us about the physical activity practices of participants for the last seven days. Only BMI was used for obesity, waist to hip ratio which gives information about central obesity was not considered. It is recommended to observe eating behaviors of students as weight misperception is related to eating disorders. Waist to hip ratio is a far more reliable tool than BMI for the purpose of assessing obesity. But it is not as common or well known among the population. In future researches, abdominal obesity is as important to check for as overall obesity. For this study, our participants were young adults; we propose that it should be done on children as well in the future.

Conclusion:

It is concluded from the results of current study that students have misperceptions regarding their body weight but weight misperception was not a cognitive barrier in participants for physical activity and majority participants performed moderate to vigorous activities.

Disclaimer: It was part of thesis project (DPT) which was done in Riphah International University.

Conflict of Interest: None to declare

Source of Funding: None to declare

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Authors Contribution:

Khalid M: Design, acquisition, interpretation, drafting, final approval and agreement to be accountable for all the work**.**

Khan SA: Acquisition, interpretation, drafting, revising, final approval and agreement to be accountable for all the work.

Awan M: Acquisition, interpretation, drafting, revising, final approval and agreement to be accountable for all the work.

Asif K: Acquisition, interpretation, drafting, revising, final approval and agreement to be accountable for all the work.

Waseem M: Revision, final approval and agreement to be accountable for all the work.

Tariq MI: Revision, final approval and agreement to be accountable for all the work.

OPEN ACCESS

RESEARCH ARTICLE

Frequency of Postpartum Depression (PPD) in Rawalpindi and its determinants

Asma Iqbal[1], Madiha Ahmed[1], Khadijha Azhar[1], Asia Raza[1], Nazish Shifa[1], Hina Tabassum[1]

ABSTRACT

Background: Postpartum Depression (PPD) is a common complication after childbirth. It has serious impact on mental health of mother as well as behavioral and cognitive development of infant.

Objective: To determine frequency of PPD in a metropolitan area of Pakistan and its associated factors.

Methods: A cross sectional study was conducted at Gynecology and Obstetrics Department of Fauji Foundation Hospital, Rawalpindi over a period of six months from January to June 2022. A total of 252 female patients fulfilling the inclusion criteria were included. Patients Health Questionnaire (PHQ 9) was used for screening of PPD in the test subjects. Patients were categorized into two major groups: PPD (PHQ 9 ≥ 5) and No PPD (PHQ 9 ≤ 4). Odds ratio (OR) with 95% confidence interval was used to determine the association of various factors with PPD.

Results: Out of 252 patients, 87 (34.5%) had PPD while 165 (65.5%) had no PPD. The major determinants were Age > 35 years (OR 5.00, CI 1.286-19.440), BMI > 30 (OR 3.333, CI 0.77-14.43), Gestational Age ≤35 weeks (OR 6.354, CI 2.65-10.678), Parity >4 (OR 2.364, CI 0.548-10.19), number of female children >4 (OR 7.670, CI 3.458-9.650), Low birth weight baby (OR 2.529, CI 1.109-5.766), COVID-19 in pregnancy (OR 2.371, CI 1.162-4.838), family history of depression (OR 4.425, CI 2.119-9.242), past history of PPD (OR 3.793, CI 1.780-8.085), no social support from husband (OR 11.379, CI 3.447-37.5) and family (OR 6.322, CI 3.145-12.707).

Conclusion: The major determinants of PPD in this study were lack of social support from husband and family members, previous female children and preterm deliveries. Other risk factors included age, obesity, multiparity, low birth weight, COVID-19 in pregnancy, family history of depression and stressful event during pregnancy, sleep deprivation, bottle feeding practice, and neonatal admission in NICU.

Keywords: Family support, Mental health, Patients Health Questionnaire (PHQ 9), Post-partum depression, Pregnancy.

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Introduction:

Mental health is an important public health concern as it has a significant impact on the overall health of the population.(1) According to World Health Organization (WHO), around 25 percent of world population experienced some sort of behavioral or mental disorder at some point of their lives. Around 12 percent of the worldwide burden of disease is considered to be contributed by mental disorders.(2) The emergence of Coronavirus Disease (COVID-19) had a profound impact on the mental wellbeing health of people.(3) Amongst all the significant factors, a life event such as pregnancy and childbirth is also one of the leading causes of mental disorder in female patients.(4) Several physiological and psychological changes occur during pregnancy and after the delivery they may affect not only the physical but mental health as well, hence leading to development of mood and anxiety disorders in female patients.(5)

Postpartum Depression (PPD) is one of the most common complications after childbirth. These are the depressive episodes that occur after pregnancy and have a serious impact on mental health of mother as well as behavioral and cognitive development of infant.(6) Apart from various psycho-social risk factors, certain pathophysiological changes (neuroendocrine, neuroinflammation, neurotransmitter alterations, circuit dysfunction, and the involvement of genetics and

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epigenetics) also occur during pregnancy which plays a significant role in development of PPD.(7) According to "Diagnostic and Statistical Manual of Mental Disorders", 4th edition (DSM-IV) (8), PPD is a major depressive disorder (MDD).(9) The American Psychiatric Association(APA) has defined PPD as the presence of a Major Depressive Episode (MDE) within 4 weeks after delivery.(10) PPD presents a wide variety of symptoms. Main clinical symptoms of PPD include low mood, feeling of being helpless and hopeless, decreased interest in routine activities, lack of energy, insomnia, restlessness, changes in eating habits, irritability, inability to take decisions, suicidal thoughts and constant physical symptoms that are non-responsive to treatment.(11) There is a substantial variability of prevalence of PPD (0.5% to 60%) among various countries. Furthermore, it also depends on how the disorder is defined, socioeconomic and cultural status of the country, diagnostic tool employed for the screening purpose, and the duration over which the prevalence is measured.(12) In a review study which looked at the data of 565 researches from 80 different countries, revealed that worldwide prevalence of PPD is 17.22% and 1 out of every 5 female experiences PPD which is directly associated with the low income and geographical development. The prevalence of PPD is much lower in developed countries as compared to developing countries.(13) In Asia the prevalence of PPD ranges from 3.5% to 63.3%.(14) It has been noted in some studies that Pakistan has a very high incidence of PPD (17%-63%), one of the highest among Asian countries.(15) This study targeted the population of a metropolitan city, draining the suburbs where there is decent access to healthcare facilities to determine the prevalence in these areas so that the causative factors can be addressed in antenatal and postnatal care.

PPD has been associated with several risk factors which include marital relationship, family support, parity, prenatal depression, socioeconomic status, educational level, obesity, history of postpartum depression, complications during pregnancy. These risk factors vary among different regions and cultures. Identification of these risk factors and early detection of PPD may lead to better health outcome of mother. Hence, it is important to determine association of various socioeconomic risk factors related to PPD in each setup. The main objective of our study was to see the frequency of PPD in patients presenting in a tertiary care hospital of Rawalpindi and to determine its associated risk factors so that early and appropriate treatment can be given. Timely identification of the risk factors, early diagnosis and management through supportive care, cognitive behavioral therapy (CBT), psychological rehabilitation and pharmacological treatment if needed, has been found to be helpful for improving maternal health outcome.

As wide variations are found regarding prevalence of PPD in different areas of Pakistan (14-16), our study will also help in filling the gap in literature and encourage further research in this area.

Methods:

A cross sectional study was conducted at Gynecology and Obstetrics Department of Fauji Foundation Hospital, Rawalpindi over a period of six months from January to June 2022 after approval from the Institute Ethical Committee (Ref No 599/RC/FFH/RWP).

Estimated size of sample was 217, which was calculated by WHO sample size calculator with 95% confidence interval and 5% margin of error considering 17% as prevalence of PPD in Pakistani population.(13) A total of 252 female patients were included in our study. Inclusion criteria of our study was female patients having age between 20 to 40 years of age. Women who reported to Fauji foundation Hospital (FFH) in their postpartum period either in OBGYN outpatient department (OPD) or came for vaccination of newborns, were included in our study. Patients who had past history of depression or had communication issues or gave incomplete information was excluded from the study. Informed written consent was taken from all patients. Patients Health Questionnaire (PHQ 9) was used for screening of PPD amongst patients. PHQ 9 has a reported sensitivity of 85.5 %and specificity of 70%.(17) PHQ 9 consists of nine questions, based on occurrence of symptoms of depression over the last two weeks. Each question had a score from 0 to 3 regarding how frequently patient is facing the symptom. The questions were asked from the patients in Urdu and interpretation of PHQ 9 was made. Based on total score patients were considered to have None-minimal (score: 0-4), mild (score: 5-9), moderate (Score: 10-14), moderately severe (Score 15-19) and severe depression (Score: 20-27). However, to simplify our data we categorized patients into two major groups "patients with PHQ 9 score ≥ 5 were categorized into PPD group (n=87) while those who had PHQ $9 \leq 4$ were categorized into "no PPD Group (n=165)". A questionnaire was filled to determine the associated risk factors of PPD,

which consisted of socioeconomic and biological details such as age, parity, details of children, obstetric history, social support of family, ongoing illness, socioeconomic and educational status. The reliability of data was evaluated by applying Cronbach's alpha (0.817).

Statistical analyses was performed using IBM SPSS 26. Frequency and percentage were applied for qualitative variables and mean ± SD were used for quantitative variable such as gestational age. Comparison of means among different groups was done by applying independent T test (p value <0.05). Logistic regression analysis was applied and odds ratio (OR) with 95% confidence interval was used to determine association of various risk factors with PPD.

Results:

A total of 252 patients were included in this study, the mean gestational age of patients at the time of delivery was 38.11± 1.18 weeks. The mean gestational age at time of delivery was lower in patients who had PPD (37.66 ± 1.09 vs 38.35 ± 1.167 weeks) as compared to patients who had no PPD. Among 252 cases, 165 (65.5%) had PHQ 9 score between 0-4, 15(6%) had PHQ 9 score between 5-9 and 72 (28.6%) had PHQ 9 score between 10-14. The frequency of PPD in our patients was 87 (34.5%), whereas 165 (65.5%) had no PPD.

The major determinants were sub divided into three groups based on Maternal related, Pregnancy associated and Baby related factors. Table 1 shows that Age> 35 years (OR 5.00, CI 1.286-19.440), BMI > 30 (OR 3.333, CI 0.77-14.43), Parity >4 (OR 2.364, CI 0.548-10.19), no. of female children >4 (OR 7.670, CI 3.458-9.650), Patients having only female children (OR 2.394, CI 1.442-3.976)family history of depression (OR 4.425, CI 2.119-9.242), past history of PPD (OR 3.793, CI 1.780-8.085) has a positive association with the development of PPD.

Furthermore, in Table 2, it is evident that Gestational Age <35 weeks (OR 6.354, CI 2.65-10.678),COVID-19 in pregnancy (OR 2.371, CI 1.162-4.838), history of stressful event during pregnancy (OR 2.213, CI 1.247-3.926), no social support from husband (OR 11.379, CI 3.447-37.5), no social support from family (OR 6.322, CI 3.145-12.707)and sleep deprivation (OR 3.793, CI 2.407-5.978)have a significant association with PPD.

In addition, low birth weight baby (OR 2.529, CI 1.109-5.766), neonatal admission in NICU (OR 2.11, CI 0.891-5.005) and bottle-feeding practice (OR 1.707, CI 1.316-2.210.891-5.005) are major baby related factors responsible for PPD development (Table 3). The frequency of risk factors amongst both groups along with OR is shown in given tables in detail.

Discussion:

Certain factors have been identified in the maternal personal profile in our study as a cause of development of PPD. Maternal age is one such important risk factor. In our study, we found that if the mother was above 35 years, the odds ratio was 5. Although, we had only 12 cases above age of 35 but 9 (75%) of them developed PPD. Furthermore, the similar affect has been observed by Afsheen et, al.(15) However, she and her co-workers looked at the risk of development of PPD in various age groups. There were 178 cases of mothers of 30 or above years of age among whom 36 had very high risk of PPD as compared to mothers aged between 20-29 where among 210 cases only 16 had high risk of developing PPD. Another study by Nilofer and co-workers in 2009, conducted in Karachi and its surroundings which included patients from all parts of the country found that in mothers aged 35 or above, the prevalence of PPD was as high as 38%.(16,17) In the neighboring countries, similar trend was seen by Upadhyay and co-workers in a meta-analysis which was published in 2017, which looked at the studies published in India between 2000 and 2016, where studies clearly identified that a maternal age >35 to be a risk factor.(18) However, in the international studies this is not the case as reported by Agarwal et.al in 2022 where he looked at 58 studies with good strength found that 4 studies placed young females less than 25 at risk, as compared to 3 which favoured older mothers, but numerous other studies conclusively showed that age is not a risk of the development of PPD.(19) One of possible reasons is that the maternal ages have increased in the western population and several women are choosing to have children in the later part of life.(20) Hence, the data about young mothers is lacking. Furthermore, early unwanted pregnancies are more common there. Therefore, these women are unsupported during this testing time, and this results in increased PPD.

In this study high BMI >30 increased the risk threefold for development of PPD (66%, odds ratio of 3.33). Similar effect was seen in the German population by Johar and her coworkers were among 186 cases with BMI >30 23 developed PPD.(21) Although, a number of studies have shown the opposite (22,23) or U-shaped

Table 1: Frequency and percentage of maternal personal profile related factors in PPD vs No PPD patients

Risk Factors		PPD (n=87)	No PPD (n=165)	Total (n=252)	Odd's Ratio with 95% CI
Age (years)	20-29	45 (37.5%)	75 (62.5%)	120(47.61%)	0.200(0.051-0.778)
	30-35	33 (27.5%)	87 (72.5%)	120(47.61%)	0.126(0.032-0.496)
	>35	9 (75%)	3 (25%)	12 (4.76%)	5.00(1.286-19.440)
BMI	18-24.9	27 (37.5%)	45 (62.5%)	72 (28.57%)	0.300(0.069-1.299)
	25-29.9	54 (31.6%)	117 (68.4%)	171 (67.85%)	0.231(0.056-0.958)
	>30	6 (66.6%)	3 (33.3%)	9 (3.57%)	3.333(0.77-14.43)
Educational Status	Illiterate	0	27(100%)	27 (10.71%)	0.014(0.010-0.231)
	12^{th} grade	51 (45.9%)	60 (54.1%)	111 (44.04%)	1.842(1.070-3.171)
	Graduate	36 (31.6%)	78 (68.4%)	114 (45.23%)	0.974(0.588-1.943)
Occupation	Housewife	51(35.4%)	93(64.6%)	144 (57.14%)	1.04 (0.833-1.298)
	Working	36(33.3%)	72(66.7%)	108 (42.85%)	0.948(0.699-1.286)
Number of male children	0	60(48.8%)	63(51.2%)	123 (48.8%)	1.261(0.705-2.575)
	1	24(22.9%)	81(77.1%)	105 (41.66%)	0.311(0.175-0.554)
	2	3(14.3%)	18(85.7%)	21 (8.33%)	0.175(0.049-0.625)
	3	0	3(100%)	3 (1.19%)	0.012(0.011-0.031)
Number of female children	0	51(31.5%)	111(68.5%)	162 (64.28%)	0.928(0.267-1.398)
	1	12(26.7%)	33(73.3%)	45 (17.85%)	0.791(0.378-1.658)
	2	18(54.5%)	15(45.5%)	33 (13.09)	2.612(1.22-5.59)
	3	3(33.3%)	6(66.7%)	9 (3.57%)	1.088(0.262-4.525)
	4	3(100%)	0	3 (1.19%)	7.670(3.458-9.650)
Only female children	Yes	30(58.8%)	21(41.2%)	51 (20.23%)	2.394(1.442-3.976)
	No	57(28.3%)	144(71.7%)	201 (79.76%)	0.792(0.680-0.923)
Socioeconomic status	Lower	3(20%)	12(80%)	15 (5.95 %)	0.500(0.077-3.265)
	Middle	81(35.5%)	147(64.5%)	228 (90.47%)	2.204(0.604-8.038)
	Upper	3(33.3%)	6(66.7%)	9 (3.57%)	2.00(0.306-13.06)
Family History of depression	Yes	21(70%)	9(30%)	30 (11.9%)	4.425(2.119-9.242)
	No	66(29.7%)	156(70.3%)	222 (88.09%)	0.802(0.709-0.908)
Past history of PPD	Yes	18(66.7%)	9(33.3%)	27 (10.71%)	3.793(1.780-8.085)
	No	69(30.7%)	156(69.3%)	225 (89.28%)	0.839(0.749-0.940)

Table 2: Frequency and percentage of pregnancy associated factors in PPD vs No PPD patients

Risk Factors		PPD (n=87)	No PPD (n=165)	Total (n=252)	Odd's Ratio with 95% CI
Gestational Age (weeks)	≤35	3 (100%)	0	3 (1.19%)	6.354(2.65-10.678)
	36	12(50%)	12(50%)	24 (9.52%)	2.745(1.745-5.874)
	37	15(33.3%)	30(66.7%)	45 (17.85%)	1.025(0.967-2.014)
	38	42(51.9%)	39(48.1%)	81 (32.14%)	2.956(1.297-4.986)
	39	12(17.4%)	57(82.6%)	69 (27.38%)	0.457(0.145-0.927)
	40	3(10%)	27(90%)	30 (11.9%)	0.214(0.021-0.547)
Parity	0	33(45.8%)	39(54.2%)	72 (28.57%)	0.423(0.098-1.824)
	1	24(26.7%)	66(73.3%)	90 (35.71%)	0.182(0.042-0.785)
	2-3	24(29.6%)	57(70.4%)	81 (32.14%)	0.211(0.049-0.912)
	4 or more	6 (66.7%)	3(33.3%)	9 (3.57%)	2.364(0.548-10.19)
Comorbid	Yes	57(38%)	93(62%)	150 (59.52%)	1.162(0.949-1.424)
	No	30(29.4%)	72(70.6%)	102 (40.47%)	0.790(0.564-1.108)
COVID-19	Yes	15(55.6%)	12(44.4%)	27 (10.71%)	2.371(1.162-4.838)
	No	72(32%)	153(68%)	225 (89.28%)	0.892(0.804-0.991)
History of stressful event	Yes	21(53.8%)	18(46.2%)	39 (15.47%)	2.213(1.247-3.926)
	No	66(31%)	147(69%)	213 (84.52%)	0.852(0.748-0.970)
Social support of husband	Yes	69(29.9%)	162(70.1%)	231 (91.66%)	0.808(0.724-0.901)
	No	18(85.7%)	3(14.3%)	21 (8.33%)	11.379(3.447-37.5)
Social support of family	Yes	57(26.8%)	156(73.2%)	213 (84.52%)	0.693(0.592-0.811)
	No	30(76.9%)	9(23.1%)	39 (15.47%)	6.322(3.145-12.707)
Sleep deprivation	Yes	42(66.7%)	21(33.3%)	63 (25%)	3.793(2.407-5.978)
	No	45(23.8%)	144(76.2%)	189 (75%)	0.593(0.480-0.732)

relationship, but Johar study is more significant as it looks at a huge case mix, because not only does she looked at the pre pregnancy weight but also the effect of weight gain during pregnancy, showing a significance in development of PPD ($p< 0.05$). Sundaram addressed this issue in her study in 2012. She found that if we analysed all cases together, it shows that there is a positive co-relationship with obesity but once the co-morbidities are also included such as hypertension, diabetes and poor self-image, then there is no significant relationship.(22) Although, BMI appears to be independent of the concurrent risk factors leading to PPD, obesity is related to disordered eating habits more commonly associated with underlying depression. Certainly, pregnancy results in increased stress and this tips the balance in the favour of PPD.

A unique cultural preference of male child over female in our region has been highlighted as a significant risk factor for PPD (OR 2.3). In mothers with only female children there is twofold chance and in case if there are 4 or more girls then there is a 7 times higher risk. On the other hand, male child is not associated as a risk factor for PPD. This observation is in line with the

Table 3: Frequency and percentage of baby related factors in PPD vs No PPD patients

Risk Factors		PPD (n=87)	No PPD (n=165)	Total (n=252)	Odd's Ratio with 95% CI
Weight of Baby (kg)	>2.5	75(32.5%)	156(67.5%)	231 (91.66%)	0.912(0.832-0.999)
	1.5-2.5	12(57.1%)	9(42.9%)	21 (8.33%)	2.529(1.109-5.766)
Gender of baby	Male	45(34.9%)	84(65.1%)	129 (54.76%)	1.016(0.789-1.308)
	Female	42(34.1%)	81(65.9%)	123 (48.8%)	0.983(0.753-1.285)
Feeding practice	Breast Fed	33(23.9%)	105(76.1%)	138 (54.76%)	0.596(0.445-0.799)
	Bottle Fed	54(47.4%)	60(52.6%)	114 (45.23%)	1.707(1.316-2.214)
Neonatal admission in NICU	Yes	27(50%)	27(50%)	54 (21.42%)	2.11(0.891-5.005)
	No	60(32.1%)	134(67.9%)	198 (78.57%)	0.880(0.473-1.638)

regional studies.(24,25) In the western literature, this has been conclusively shown to have a weak or no association.(25) Zee et al published a meta-analysis in 2020 where she looked at the regional variation of development of PPD in female child vs male child and she found among 29 studies which looked at 119,736 cases in Asia overall OR was 1.3 but in India it was 2.61 which is very close to the figure reported in our study.

In this study, we observed a direct relationship of PPD with prematurity. We found an increased likelihood of developing PPD especially if the gestational age is less than 35 weeks (OR 6.3 vs 2.7). In a meta-analysis published in 2019 by Arantes et al., it was found that among 26 studies which qualified the screening criteria, 18 studies supported this finding.(26) It was revealed that there was a high OR of 7.6 when both the mother and child were hospitalized, and baby was in NICU which subsequently decreased to 2.2 in the same sample after 06 months of delivery. Although, our study excluded the preexisting psychological disorders, it is worth noting that prematurity is frequently reported in patients with preexisting disorders as reported in a number of studies such as by Uguz and coworkers who looked at the mean gestational ages in patients with major depression, anxiety disorder and panic disorders vs normal population and found that mean gestational age was almost 1 week less in patients with these disorders.(27) Similar effect was confirmed by Galeya et.al where they observed that depression was seen in 73 cases out of 206 cases with preterm birth as compared to 3049 vs 1080 cases. Similar trend was observed in anxiety disorder and panic disorders as well.(28)

It was observed in this study that a parity less than 3 has no significant bearing but once the number of children exceeded 4 or more, the risk factor jumped from OR 0.2 to 2.33. Afsheen and her colleagues who described the risk factors for developing PPD found that among 44 mothers with 4 or more live issues, there a 50% moderate to high risk for development of PPD.(15) In our neighboring country, a study was conducted by Dubey in 2021 which negated any association between PPD and parity less than 4.(29) Zhao and coworkers published a meta-analysis in 2020 in which they highlighted several studies researching PPD and found that most supported multiparity as risk factor.(30) It may be attributed to the fact that subsequent pregnancies occur in the advanced age which already has been discussed earlier. Furthermore, every subsequent pregnancy occurs in the presence of children which already not only require physical help but also require a steady financial income for upbringing. The addition of every child without any substantial increase in the income is only going to increase the stress exponentially.

The presence of support especially from the partner has a direct bearing on the risk of development of PPD. In our study, the odds ratio was a high of 11 as shown in table 2 in mothers who lacked support from family or partner. In 2021 a study was conducted by Lanjewar and co-workers in India.(31) They found that among the patients who suffered from PPD 66.7%(12) to 60%(6) lacked support from family or partner as compared to 82.5%(137) to 76.1%(156) who enjoyed family support. In another regional study by Savarimuthu in 2010, it was found that family support is very important in lowering PPD, but presence of partner has a more direct role.(32)

COVID-19 placed a unique stress on the women in pregnancy as its diagnosis during pregnancy lead to forced isolation during 2020-21. Although, this is no longer being practiced strictly. We observed a twofold rise (OR 2.37) in risk of developing PPD if patient suffered from covid during pregnancy, which is in line with studies and meta-analysis conducted on studies conducted during this period.(33,34) Furthermore, in a meta-analysis by Chmielewska in 2021, it was revealed that during pandemic, risk of development of PPD was also increased as compared to pre-pandemic levels (pooled mean difference 0·42 [95% CI 0·02–0·81; 03 studies, 2330 and 6517 pregnancies).(34)

These findings highlight the importance of determining associated risk factors for PPD among different demographic and socioeconomic regions in order to better understand and address this issue. The identification of risk factors will help us incorporate relevant patient education in their antenatal care. In addition, supportive care can be provided in the postpartum period to the patients at risk. Based on our study, future research can be done to evaluate the effect of early screening and diagnosis followed by early intervention on patient wellbeing. Further, research can also be done on the implications of maternal depression on parenting and child development.

This study has a few limitations. Despite being conducted in a major tertiary care hospital of a metropolitan city, a multi-centered trial would yield more generalizable results. The interpretations may change if additional variables are included, and spouses and family members of respondents are also involved. Better conclusions may be drawn from serial screening of these patients in the prenatal and the antenatal period. Health care providers should be aware of patients' circumstances during pregnancy, as preventing these risk factors may help improve maternal and child health outcomes. Some of these factors are modifiable and may be addressed early during antenatal visits to improve the patient wellbeing. Once the condition has developed, early detection and timely interventions through a multidisciplinary approach involving counseling, cognitive behavioral therapy (CBT), support groups, interpersonal therapy (IPT), psychological rehabilitation and anti-anxiety medication, if required, has the best results.

Conclusion:

In this study, it was concluded that the major determinants of PPD were lack of social support from husband and family members, previous female children and preterm deliveries. Other risk factors included age, obesity, multiparity, low birth weight, COVID-19 in pregnancy, family history of depression and stressful event during pregnancy, sleep deprivation, bottle feeding practice, and neonatal admission in NICU.

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Iqbal A: Conception, designing and drafting of work.
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RESEARCH ARTICLE

Online teaching self-efficacy of physical therapy educators in the wake of COVID-19 pandemic

Arshad Nawaz Malik[1], Saira Jahan[1]

ABSTRACT

Background: Following COVID-19, higher educational institutions are advancing towards distance learning, which is a new experience for many educators. Self-efficacy is a cognitive trait related to perseverance and determination in overcoming the challenges.

Objective: To assess the level of virtual teaching self-efficacy of physical therapy academicians.

Methods: A descriptive cross-sectional study was conducted. All physical therapy educators who were offering online courses during the pandemic received a link to a web survey through Google forms. The Michigan Nurse Educator's Sense of Efficacy for Online Teaching instrument was implied to assess self-efficacy for teaching methods. Using a 32-items MNESEOT scale, study respondents were asked to rate their responses to questions about teaching methods on a Likert scale ranging over 'nothing' (1) to 'a great deal' (9). Mean scores were computed for every participant for different domains of instructional strategies, classroom management, student participation, and computer skills.

Results: Faculty who were asked how effective they felt teaching online stated that they were most effective when using computers and instructional strategies (7.0), followed by classroom management (6.9) and student engagement (6.6) with a mean score of 27.50±4.7. Participants generally reported that they could prepare, conduct, and evaluate online courses to an extent greater than "some" to "quite a bit."

Conclusion: It is concluded that the self-efficacy of study participants in online instruction was quite high.

Keywords: Physical Therapy Educators, self-efficacy, online education, online teaching.

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Introduction:

Teaching in traditional education system and online courses are distinct from each other, they simply vary in their approach and delivery, but neither is superior or inferior. Educators or academicians now have to switch from conventional classrooms to online learning environments due to the recent expansion of online education. For high-quality online education to be delivered, faculty must adopt new teaching methods, pedagogies, and technologies. They must also learn new skillset to prosper, feel accomplished and confident. Success in web-based education influenced by a strong sense of self-efficacy.(1) A cognitive attribute called self-efficacy is coupled with the perseverance, tenacity, commitment, resilience and determination in defying the odds. The perception of one's own effectiveness reflects one's self-efficacy.(2) In realm of virtual teaching, the sense of self-efficacy refers to the confidence one has in their abilities to manage their own behaviors and thoughts to deliver instructions effectively.(3) Teaching satisfaction is related with high teaching self-efficacy.(4,5) The efficacy of online teaching can be evaluated based on extrinsic or intrinsic factors. The former may involve income, institutional assistance, resources, and technology available for online teaching, while the latter may be associated with student motivation in online courses and one's enthusiasm for future teaching and learning opportunities.(6) The ability to cope with difficult circumstances, adapt to changing situations, and remain resilient are closely related with self-efficacy in the context of online teaching.(7)

Higher self-efficacy and satisfaction levels among faculty may increase their likelihood of continuing in academia for a longer period of time.(7) The present

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study was conducted with the purpose to assess the degree of self-efficacy in online education environment among physical therapy academicians across various programs, ranging from undergraduate PT to postgraduate PT.

Bandura proposed the theoretical framework of self-efficacy to elucidate the exertion and perseverance of coping strategies with individuals' beliefs about the effectiveness of their efforts, which play an important role in their motivation and performance, and that these beliefs can be influenced by their past experiences and the feedback they receive. By consistently completing challenging tasks, one can attain mastery and enhance their sense of self-efficacy.(8) The relationship between expectations and performance highlights the significance of being motivated and persistent in accomplishing goals. Perceived self-efficacy states an individual's confidence in their capabilities to succeed.(9)

Educator's self-efficacy level reveals their acceptance in their abilities to have a positive influence on the learning outcomes of students in a subject.(10,11) Studies have established a strong relationship between teacher's self-efficacy, student's accomplishment and outcomes of learning objectives.(12) The degree to which online nurse educators feel capable and confident in their abilities can be affected by their self-determination in web based learning platform as well as their familiarity and comfort level with computers and online learning technologies and the confidence in traversing the technical infrastructure.(13)

Educationists having greater levels of self-efficacy can increase their students' chances of success. Multiple studies have examined the instructional outcomes associated with high teacher self-efficacy, including teacher well-being, job satisfaction, commitment, and efficacy, as well as student engagement, motivation, and educational achievement have been shown to positively correlate with teachers' sense of competence and higher level of self-efficacy.(14)

Years of teaching experience are one of several variables that affect an educator's self-efficacy in web-based learning environment. Robinia and Anderson discovered that nurse educationalists had greater rating of self-efficacy subsequent to teaching minimum 1 web-based course as evident by the Michigan Nurse Educators' Sense of Efficacy for Online Teaching (MNESEOT) results. Additionally, they reported that as educators gained more expertise, their confidence in their ability to teach online increased.(15,16)

Methods:

This descriptive cross-sectional survey was approved by the ethical review committee (Ref # Riphah/RCRS/REC/01145) of Riphah College of Rehabilitation and Allied Health Sciences, (RCR&AHS) Riphah International University, Islamabad. From September 2020 to March 2021, a web-based survey was distributed to investigate how effective physical therapy faculty members felt about their self-efficacy. Sample size was calculated using epitool, keeping the confidence interval 95% and assumed population standard deviation was 7.5.(17) To take part in this study, academicians from several physical therapy colleges were invited. Participants in the present study had at least one online graduate or postgraduate course they had taught. The 32-item MNESEOT tool was used to measure level of self-efficacy for online teaching.(15,16) The efficacy of student engagement, instructional strategies, classroom management, and computer use are among the constructs on this measure. The MNESEOT has demonstrated high reliability, with a Cronbach's alpha of 0.93 for the overall tool and scores of .80 or higher for the subscales.(6,16)

Each individual item of MNESEOT tool, the present study employed a Likert-type rating scale with response choices covering a range of 1 (none) to 9 (a great deal). Data was analyzed utilizing SPSS 21. Exploratory data analysis were applied to investigate the socio-demographic attribute comprising means and standard deviations (SD) for continuous variables and frequencies and percentages for categorical variables. An independent t test was applied to ascertain the differences in means of the outcome variables.

Results:

Total 55 physical therapy educators participated in this study. The majority of study participants were female, 40 in number (73%). The study assessed the relationship between online teaching self-efficacy levels, as measured by the mean MNESEOT scores, and factors such as age, gender, academic designation, teaching level, and teaching experience amongst study participants. The mean age of the study participants was 31±3.6 years, spanning from 26 to 41 years. The academicians possessed 6±3.1 years of overall teaching experience going from 1 to 15 years. The study participants were alike in terms of their age, gender, years of teaching experience, qualifications, academic rank, and the level of teaching (varying from undergraduate to postgraduate), as illustrated in Table 1.

Table 1: Demographic characteristics of study respondents

Variables		n(%)	Variables		n(%)
Age (years)	26-30	27(49)	**Teaching Level**	Undergraduate	24(43.6)
	31-35	18(32.7)		Postgraduate	4(7.3)
	36-41	10(18.1)		Both	27(49.1)
Gender	Male	15(27)	**Teaching Experience**	1-7 years	42(76.3)
	Female	40(73)		8-15 years	13(23.6)
Academic Rank	Lecturer	20(36)	**Qualification**	MPhil	1(1.8)
	Senior Lecturer	14(25.5)		MS	47(85.5)
	Assistant Professor	19(34.5)		PhD	4(7.3)
	Associate Professor	1(1.8)		DPT, PP-DPT	3(5.5)
	Professor	1(1.8)			

The participants were guided to grade their responses to the 32 items of the MNESEOT tool using a Likert scale, where they implied the degree of their agreement with statements linked with digital teaching on an grade of 1 (indicating "nothing") to 9 (indicating "a great deal"). Mean scores of MNESEOT scale were computed for each participant in the areas of instructional strategies, classroom management, student engagement, and computer skills. The total MNESEOT score was then calculated using these means subscale values ranging from 4 to 36. Faculty who were asked how effective they felt at teaching online said they were most effective when using computers and instructional strategies (7.0), followed by classroom management (6.9) and student engagement (6.6) (Table 2). Study participants reported that they could prepare, conduct, and evaluate online courses to an extent greater than "some" to "quite a bit with a mean score of 27.50± 4.7 as shown in table 2. Through all of the subscales, the score remained constant.

Table 2: Online teaching efficacy MNESEOT rating

Variables		Mean	Standard Deviation	Ranges
Domains of online teaching self-efficacy	Student Engagement	6.6	1.2	5-6
	Classroom Management	6.9	1.2	5-7
	Instructional Strategies	7.0	1.1	5-6
	Computer Skills	7.0	1.2	5-8
Total MNESEOT score		27.5	4.7	5-8

Mean MNESEOT scores used as a measure of online teaching self-efficacy were compared to age, gender, academic designation and years of teaching experience. On independent sample t-test, male and female MNESEOT mean scores were almost the same i.e. 25.08±4.54 for male participants and 26.71±4.9 for female participants and did not differ significantly ($p = 0.626$). The results of Pearson's correlation interpretation showed that there was no statistically significant relationship between the total scores of MNESEOT tool with age or duration of teaching experience of the study participants. The MNESEOT score variations amongst program did not differ significantly.

Discussion:

The main focus of the current study was to assess the level of self-efficacy of physical therapy educators in teaching online. Due to the pandemic, education has quickly shifted online; therefore, evaluating the effectiveness of faculty members in teaching online courses is crucial. The outcomes of the MNSEOT items indicated that the study participants scored above the 70th percentile, indicating a higher level of self-efficacy in teaching online.

Both the present study and Robinia's study found that physical therapy academicians felt confident in their abilities to teach courses online, particularly with

regards to computer skills, instructional strategies, and classroom management, though, both studies also indicated that the educators had lower levels of self-efficacy when it came to engaging students in the online environment.(16)

Similar to previous research, the current study discovered that the least confident online instructors are in their abilities to keep students interested or engaged in their courses.(6,18) The results of this study are comparable to those of Robinia and Anderson with Wise showed no relation among years of teaching experience with self-efficacy of nursing educators in teaching online courses.(15,19)

As demonstrated previous research conducted by Howe et al., the faculty members who participated in the present study expressed a relatively greater level of self-efficacy with their courses teaching online.(20) Duration of teaching experience did not have any relation with the level of self-efficacy that the respondents in current study had with their online teaching, as was also observed in former studies conducted by Howe et al. or Wise.(19,20) This is established because an educator has expertise in a conventional classroom environment which does not assure that they will be successful teaching in online education. In order to perform well and feel content in the transition from physical classroom instruction to web based courses, teachers may require adequate training timeframe, preparing module study materials, and adjusting towards new teaching environment.(20)

Proficiency in the skills required in web based courses is a requirement for self-efficacy in online teaching.(21) When confronted with circumstances they are unsure of, like teaching online, instructors' self-efficacy for online teaching might affect how determined and focused they are and how well they manage stress from unforeseen challenges.

The lower response rate in this study could have been a limitation. Data was collected from numerous educational institutions using various teaching strategies and learning management systems, which was a study's strength. It is essential to provide a training session on how to increase student's participation in an online learning environment. Additionally, more research on the methods that improve the effectiveness of online instruction is required. Additional research aimed at enhancing self-efficacy in online learning is worthwhile given that it helps students succeed. It is worthwhile to devote time and resources to further research aimed at enhancing student achievement in online learning.

Conclusion:

The study concluded that the study participants had greater levels of self-efficacy in teaching online courses. However, the study's significant finding was that physical therapy academicians were not entirely confident about how to engage with students (student's engagement) effectively in the online environment.

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Malik AN: Conception of work, Interpretation of data, and Final approval of the version to be published.
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RESEARCH ARTICLE

Gait analysis among patients with quadriceps weakness after anterior cruciate ligament reconstruction post 9 months

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ABSTRACT

Background: One of the most frequent musculoskeletal injuries in young adults is anterior cruciate ligament (ACL) damage. Following ACL reconstruction, there have been reports of changes in the lower extremity joints' kinematics and kinetics, including decreased knee ROM during the stance and swing phases of walking and weakened knee joint flexor and extensor muscles.

Objective: To analyze the gait parameter among patients with Quadriceps weakness after Anterior Cruciate Ligament Reconstruction (ACLR) post 9 months**.**

Methods: A descriptive cross-sectional study was carried out on 143 soccer players with age range of 18-39 years, who had unilateral ACL rupture managed through arthroscopic-assisted ACLR Endo-button procedure post 9 months. Written informed consent from the participants was taken before data collection. Observational gait analysis (OGA) with 66 check-off option is used to identify the gait deviations among the patients.

Results: In ankle during the weight acceptance phase, inadequate dorsiflexion (36.4%) and plantar flexion (23.8%) were reported; during single limb support, early heel off was (4.2%) and inadequate dorsiflexion (44.1%) and during single limb advancement, toe drag was (18.2%) and inadequate dorsiflexion (65%). In knee during the weight acceptance phase, inadequate extension (59.4%) and flexion (16.1%) were reported; during single limb support.

Conclusion: OGA revealed gait deviations as inadequate dorsiflexion, inadequate extension, and inadequate flexion due to eccentric loss of quadriceps widely after ACL reconstruction post 9 months**.**

Keywords: Anterior cruciate ligament, Gait, Knee, Quadriceps avoidance.

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Introduction:

Among the most frequent musculoskeletal injuries, anterior cruciate ligament (ACL) tears usually affect young adults.(1) The most common knee injuries resulting from participation in sports are said to be ACL injuries.(2) In comparison to the general population, people under 30 years old experience ACL ruptures more frequently.(3) When the knee is considerably flexed, the ACL inhibits anterior tibial translation in relation to the femur, which plays a crucial role in knee joint biomechanics.(4)

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Injuries to the ACL occur 0.41 per 1,000 hours of professional football play.(5) Knee morphology is one of the contributing factors which leads to ACL injury such as intercondylar notch, condylar shape, Q angle, poor tibiofemoral congruency and reduced ACL size.(6) Following an ACL injury, the individuals experience knee joint effusion, limited range of motion (ROM), aberrant patterns of gait, and decreased strength of quadriceps.(7) Conversely, decreased knee extension have been associated with weakness of quadriceps and the "Quadriceps-Avoidance" gait, both of which have been connected to decreased functional performance.(8)

When there is complete ACL rupture, one of the treatment options is reconstruction. Hamstring or quadriceps tendon graft is used for this purpose.(9,10) After ACL reconstruction (ACLR), the normal range of motion can be regained and the individual can perform his daily activities without any pain or problem. Muscle weakness occurs after 3 months of ACLR and sometimes post 6 months due to skeletal muscle fiber deficit. ACLR leads to cellular contractile dysfunction

which ultimately results in decrease muscular strength leading to quadriceps weakness.(11-13)

Knee joint is more sensitive for the kinematic changes than the other joints.(14-15) After ACLR, kinematic changes occur as the tibia is in internal position leading to abnormal loading of knee joint which initiates the degenerative changes and development of osteoarthritis (OA). There is more extension during stance phase and less extension during pre-swing and terminal stance phase of gait. The deficit in extension occurs due to quadriceps weakness.(16-19)

Hence, after ACL reconstruction during walking, alterations in lower extremity joint kinetics and kinematics have been documented.(20-23) Within the first year following surgery, patients with ACL reconstruction have also been found to have decreased knee ROM during the stance and swing phases of walking and deteriorating strength of the knee joint flexor and extensor muscles.(24-25) Moreover, weakness of quadriceps muscle increases after ACLR that contributes to knee osteoarthritis.(26) Many gait deviations will occur in weight acceptance phase, owing to quadriceps weakness as the eccentric control of quadriceps is required to control the knee flexion and is involved in shock absorption. But when there is quadriceps strength weakness, the shock absorption capability reduces leading to knee osteoarthritis.(27-28)

It was reported that the people after early post-ACLR walk with tensed knees in the affected limb, which is demonstrated by decreased knee flexion angle and internal knee extension in the initial 50 percent of the stance phase of the gait cycle. This "stiffened knee" approach has a negative impact on force attenuation at the knee and accelerates the onset of posttraumatic arthritis.(29)

In most of the previous literature, only correlation between athletes' gait mechanics and symmetry in strength of the quadriceps in athletes after Anterior Cruciate Ligament Reconstruction has been reported but no conclusion was drawn regarding involved limb and related gait abnormalities specifically. Thus, this study aims to determine gait asymmetries due to quadriceps weakness in involved extremity. After anterior cruciate ligament reconstruction, the majority of the prior literature only reported a correlation between athletes' gait mechanics and symmetry in quadriceps strength, but no specific conclusions were made regarding the involved limb and associated gait abnormalities. Therefore, the purpose of this study was to identify gait asymmetries caused by quadriceps weakness in the affected extremity. A further benefit of this study is that it will enable clinicians' implement gait-specific training in rehabilitation to lessen post-operative gait asymmetries and to act as a manual for going back to work and being a contributing member of society.

Methods:

It was a descriptive cross-sectional study, a total of 143 participants were recruited from Bahria Town Football Academy, Model town Football Club, Lahore Football Academy, Fame Football Club and from Ghurki Trust and Teaching Hospital, Lahore. Non-probability convenience sampling was the approach used for sampling. The study took place between June 2020 and December 2020.

The Lahore College of Physical Therapy's ethical board gave the study their approval (LCPT/DPT/20/532). Through the World Health Organization Sample Size Calculator, sample size is determined. The estimated sample size was n=143 with 95% confidence interval, anticipated population proportion p=0.104 and absolute precision d=0.05.(30)

Adult soccer players with age range 18-39 years, who had unilateral ACL rupture, managed through arthroscopic-assisted ACL Reconstruction (ACLR) Endo-button procedure post 9 months, were included in this study. Whereas, athletes with restricted knee joint movement, patients who had any meniscectomy concomitant PCL injury, any spinal deformity (e.g., scoliosis), prior history of both knee surgeries, any history of recent ankle dislocation and ankle sprain and any other musculoskeletal injuries were not included in this study. Prior to data collection, participants' written informed consent was obtained.

Observational gait analysis (OGA) identifies the gait deviations. It is a full body gait analysis form of 176 check-off to determine gait deviations by observation. The abbreviated form JAKC OGA with 66 check-off option used to identify the gait deviations among the patients with quadriceps weakness after ACLR. Patient's gait was observed by videotaping from multiple views. JAKC-OGA form includes determination of stride length, walking speed and cadence. Once the deviations were documented, the deficits can be obtained.(31) Observational gait analysis has high validity of 0.94. Inter observer reliability is moderately high that is 0.76 while the intra observer reliability is also high as 0.89.(32) The Statistical

Package for Social Sciences SPSS version 26 was used for data entry and analysis. Data was presented using frequency tables, pie charts and bar charts.

Results:

There were 143 participants and their ages ranged from 22 to 38 years old. The mean age of these participants was 30.85, with a standard deviation (SD) of 3.98.

In figure 1 shows frequency of right and left limb anterior cruciate ligament reconstruction surgery.

During the gait cycle, 84 (58.7%) participants reported maximum ankle deviations during flat foot 58.7% (n=84) in initial contact phase whereas maximum participants i.e. 65% (n=93) had inadequate dorsiflexion during pre-swing to terminal swing phase as shown in table 1.

During the gait cycle, maximum deviations reported at calcaneus were excessive inversion by 18.4% (n=12) participants during mid-stance to terminal stance whereas maximum participants [18.9% (n=27)] had excessive inversion during pre-swing to terminal swing phase as shown in table 2.

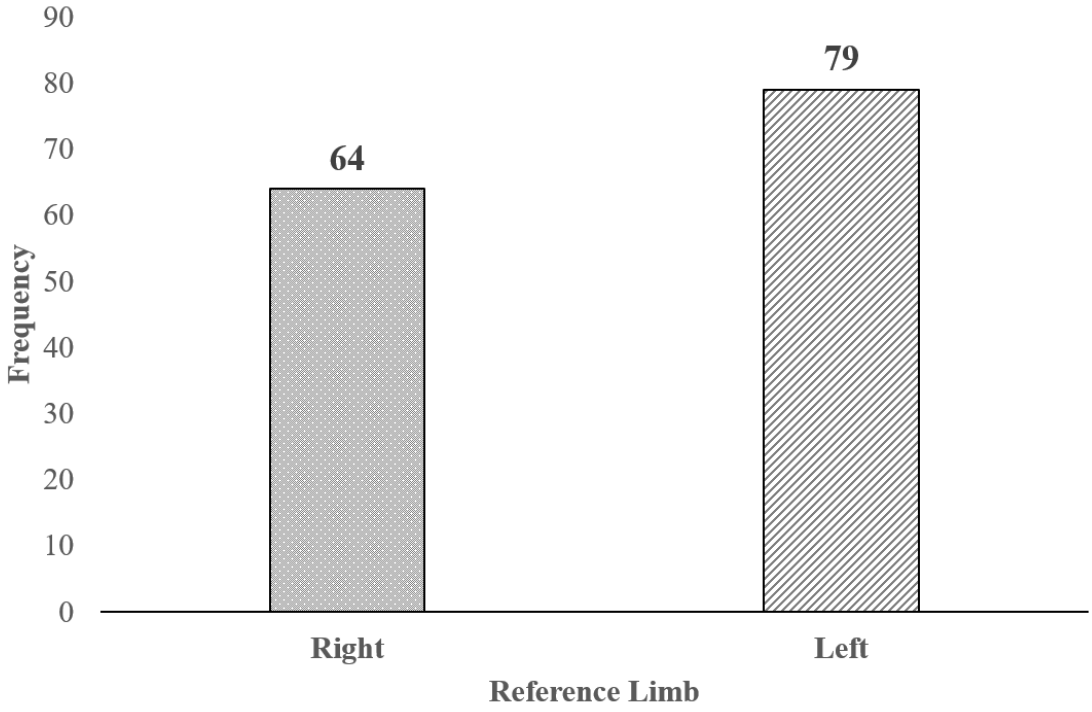

Figure 1: frequency of right and left limb anterior cruciate ligament reconstruction surgery

Table 1: Frequency of ankle deviations

Phase of gait cycle		Ankle deviations	n (%)
Weight acceptance	Initial contact	Flat foot	84 (58.7%)
		Inadequate dorsiflexion	52 (36.4%)
	Loading response	Foot slap	36 (25.5%)
		Inadequate plantar flexion	34 (23.8%)
Single limb support	Mid stance and terminal stance	Early heel off	6 (4.2%)
		Inadequate dorsiflexion	63 (44.1%)
Swing limb advancement	Pre swing to terminal swing	Toe drag	26 (18.2%)
		Inadequate dorsiflexion	93 (65%)

During the gait cycle, maximum deviations reported at knee were inadequate flexion 25.5% (n=36) at loading response, whereas in mid stance to terminal stance inadequate extension 39.9 % (n=57) was reported and during pre-swing to terminal swing phase inadequate flexion was 52.4% (n=75) as shown in table 3.

During the gait cycle, maximum deviations reported at thigh were inadequate flexion 57.3% (n=82) at initial contact, whereas; during pre-swing to terminal swing phase inadequate flexion was 46.2% (n=66) as shown in table 4.

Table 2: Frequency of calcaneal deviations

Phase of gait cycle		Calcaneal deviations	n (%)
Weight acceptance	Initial contact	Excessive inversion	5 (3.5%)
	Loading response	Excessive inversion	5 (3.5%)
Single limb support	Mid stance and terminal stance	Excessive inversion	12 (18.4%)
Swing limb advancement	Pre swing to terminal swing	Excessive inversion	27 (18.9%)

Table 3: frequency of knee deviations

Phase of gait cycle		Knee deviations	n (%)
Weight acceptance	Initial contact	Inadequate extension	23 (16.1%)
	Loading response	Inadequate flexion	36 (25.5%)
		Hyperextension	24 (16.8%)
		Extensor thrust	13 (9.1%)
Single limb support	Mid stance and terminal stance	Inadequate extension	57 (39.9%)
		Hyperextension	23 (16.1%)
		Extensor thrust	16 (11.2%)
Swing limb advancement	Pre swing to terminal swing	Inadequate flexion	75 (52.4%)
		Excessive flexion	26 (18.2%)
		Inadequate extension	59 (41.3%)
		Extensor thrust	25 (17.5%)

Table 4: Frequencies of hip deviations

Phase of gait cycle		Hip deviations	n (%)
Weight acceptance	Initial contact	Inadequate flexion	82 (57.3%)
	Loading response	Inadequate flexion	81 (56.6%)
Single limb support	Mid stance and terminal stance	Inadequate extension	37 (25.9%)
		Medial rotation	20 (14%)
		Adduction	6 (4.2%)
Swing limb advancement	Pre swing to terminal swing	Inadequate flexion	66 (46.2%)
		Lateral rotation	5 (3.5%)

Table 5: frequency of pelvis deviations

Phase of gait cycle		Pelvic deviations	n (%)
Single limb support	Mid stance and terminal stance	Contralateral drop more than 5°	1 (0.7%)
		Inadequate backward rotation	28 (19.6%)
Swing limb advancement	Pre swing to terminal swing	Ipsilateral drop more than 5°	2 (1.4%)
		Inadequate forward rotation	28 (19.6%)
		Excess forward rotation	10 (7%)
		Excess posterior tilt	5 (3.5%)

Table 6: Frequency of trunk deviations

Phase of gait cycle		Trunk deviations	n (%)
Single limb Support	Mid stance and terminal stance	Forward lean	55 (38.2%)
Swing limb advancement	Pre swing to terminal swing	Forward lean	5 (3.5%)

During the gait cycle, maximum deviations reported at pelvis were inadequate backward rotation 19.6% (n=28) at mid stance to terminal stance, whereas; during pre-swing to terminal swing phase inadequate forward rotation was 19.6% (n=28) as shown in table 5.

The frequency of trunk deviations were forward lean in 55(38.2%) participants at single limb support as presented in table 6.

Dicsussion:

The important findings of study indicate the Quadriceps weakness after ACLR led to many gait deviations in stance as well as in swing phase such as foot flat in ankle, inadequate extension in knee and inadequate flexion in hip during initial contact that suggest the loss of eccentric work of quadriceps. Moreover, from pre swing to terminal swing, there was inadequate dorsiflexion in ankle, inadequate flexion in knee, inadequate flexion in hip and forward leaning in trunk that highlight the loss of concentric work of quadriceps. This suggested that quadriceps weakness after ACL reconstruction results in many gait deviations due to both concentric and majorly eccentric loss of quadriceps. Earlier studies add credibility to the concept that quadriceps weakness partially explains the altered gait patterns seen in ACL damage patients.

Hossein et al conducted a study in 2021 which revealed that there was a strong positive correlation between the asymmetry of rectus femoris activity and biceps femoris activity. In the contact phase, the injured limb's quadriceps strength was substantially lower than the uninjured limb. This study's findings are congruent with current findings, which showed gait deviations as inadequate dorsiflexion, inadequate extension, inadequate flexion due to eccentric loss of quadriceps majorly after ACL reconstruction post 9 months whereas former study revealed a significant relationship between kinesiophobia and asymmetry in muscle activity and vGRF in different phases of the gait cycle.(33)

A study was conducted in 2020 by Nao aki et. al after anterior cruciate ligament restoration, gait asymmetries are linked to early-onset knee osteoarthritis (OA). During over-ground walking, when participants had full knee range of motion, trace or less knee effusion, greater than 80% quadriceps strength limb symmetry index, ability to hop on each leg without pain, and initiated running, 70 participants, grouped by sex and mechanism of injury (MOI), underwent biomechanical testing. Using mixed-model analysis of variance (α =.05), the bilateral knee kinetics, kinematics, and joint contact forces were compared. In conclusion, their findings imply that gait asymmetries exist for all sex and MOI groups 6 months following ACLR. Males who sustained non-contact injuries showed clinically significant under-loading of the affected limb, in contrast to individuals who sustained contact injuries. There was a less obvious pattern in women. Our research suggests that quadriceps

weakness may contribute to this reduction in knee flexion and may be is to be blamed for the increased risk of early arthorgenic alterations. Our findings underscore the need for interventions that go beyond typical strengthening and sport-specific training to address biomechanical asymmetries and gait abnormalities that commonly persist among even the most thoroughly rehabilitated patients. Although quadriceps femoris strength is widely used as a gauge for recovery progress in return to play standards, others have used a quadriceps index of at least 90% as a standard for eligibility to return to sports.(34-37) This study supports the prior research showing that patients' knees can resume regular activity when they have full range of motion, no effusion, and everyday activities are normal. These conditions were met by each participant in our study; they all exhibited normal ROM and knee function during routine activities. The group with a quadriceps index under 80%, however, displayed walking and running patterns that were akin to those of patients with ACL deficit. These changes raise the possibility that the entire range of motion, the absence of effusion, and high self-rating function scores may not be adequate conditions for "return to play."

The fact that the results of this study are restricted to walking, an activity with comparatively low demand, is one of its limitations. Higher-level return-to-sport tasks may offer more insight, but they cannot be made since they require more quadriceps strength. ACL and concurrent injury subgroup analyses are not part of this study. Prior research has suggested a connection between quadriceps strength and gait mechanics, but our data does not include preoperative or early postoperative rehabilitation time points.

Conclusion:

Observational gait analysis revealed gait deviations as inadequate dorsiflexion, inadequate extension, inadequate flexion due to eccentric loss of quadriceps, majorly after ACL reconstruction post 9 months.

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Authors Contribution:

Imran A: Conception and design, literature search, collection, and assembly of data.

Tariq H: Drafting the article and statistical expertise, article writing, final approval and guarantor of article.

Faisal S: Drafting the article and critical revisions of article.

Asim HM: Analysis and interpretation, content writing.

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RESEARCH ARTICLE

Satisfaction level among rural and urban physical therapy students regarding their knowledge and clinical practice: a cross-sectional study

Sabiha Arshad[1], Iqra Waseem[2], Tahir Mahmood[3], Komal Tariq[4]

ABSTRACT

Background: Physical therapy (PT) is an emerging field in Pakistan. Numerous studies have been conducted to evaluate the level of satisfaction and attitude of medical students and nurses towards their clinical practice environment, but there are few studies on physical therapy students.

Objective: To assess student satisfaction levels among rural and urban physical therapy students regarding their knowledge and clinical practice.

Methods: A cross sectional study was conducted with a sample size of 250 PT students of different medical colleges in Punjab through convenient sampling technique. Physical Therapy Student Attitudes Questionnaire (PSAQ) was used. After taking consent, data was collected and analyzed by SPSS version 26.

Results: The study comprised of 250 participants, where the rural were 148 and urban were 102 with a mean age of 23.40±3.60 years. Results showed that there was neither a significant association (p-value=0.78) between gender and rural and urban students' satisfaction levels nor a significant association (p-value=0.43) between age and rural and urban students' satisfaction. The total mean score of rural and urban students was 87.91 and 89.83 respectively with a p- value = 0.39.

Conclusion: There was no significant difference between the overall satisfaction level of urban and rural students regarding their knowledge and clinical practice. Both genders and ages had no effect on students' satisfaction levels who belong to different residential areas nor did academic years of study and socioeconomic status affected the satisfaction level of students belonging to urban and rural areas.

Keywords: Clinical practice, Knowledge, Physical therapy, Satisfaction, Students.

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Introduction:

Students enrolled in physiotherapy programs must have both theoretical knowledge and practical training through closely monitored clinical rotations in order to advance their careers and seek professional growth.(1) Physical therapy (PT) is a practice-based profession, and a key component of PT education is clinical practice.(2) Medical students' clinical rotations in healthcare institutions and learning are essential parts of their curriculum because of the practical orientation of the medical field.(3) Since the quality of clinical learning typically reflects the quality of the curriculum framework, acquiring high-quality clinical experience within a supportive and pedagogically appropriate clinical learning setting is seen as a significant priority for educational institutions.

In modern physical therapy education, there is a lot of discussion about how to evaluate clinical settings as learning environments. The satisfaction of the PT students is regarded as a significant criterion of such assessment, contributing to any prospective changes to maximize the learning activities and accomplishments in clinical settings.(4) According to a study, nursing students are satisfied with their clinical practice settings related to their learning environment, supervisory relationship, and the nurse teacher's responsibilities.(5)

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Placements in clinical learning environments give students the chance to hone their abilities, get to know the profession, and overcome the knowledge gap between the curriculum and the workplace. Students agreed that the ward manager's leadership style was the most important and influenced their opinions, based on results. The nursing teacher's responsibility, however, earned the lowest mean score, indicating a need for improvement and clarification as well as a need for improved communication and collaboration between nursing schools and the clinical training hospital.(6)

In general, PT student's satisfaction with the academic and clinical training processes was low in Ethiopia. The recommendation was made to concentrate on measures to increase physiotherapy student satisfaction by promoting the pre-college physiotherapy education program and upgrading classroom amenities.(7) Evaluations of academic experience indicate the excellence of services offered in the areas of education, interpersonal communication, and infrastructure.(8)

Therefore, numerous studies have been conducted to evaluate the level of satisfaction and attitude of medical students and nurses towards their clinical practice environment, but there are few studies on PT students. Additionally, there was a gap in the literature because no study has been conducted to categorize the satisfaction of students from different residential areas, so in present study day scholar students were included. The study's aim was to determine how satisfied PT students were with their knowledge and clinical experience so that effort can be made on developing ways to achieve clinical practice excellence by enhancing the educational process.

Methods:

This was a cross-sectional study which was conducted using convenience sampling technique was used. Data was collected from first to final year PT undergraduate students. Approval was taken from ethical review committee of University of Lahore, Lahore campus (REC-UOL-/24-08/2022). Data was collected from physiotherapy students of different rehabilitation colleges in Punjab including Agile Institute of Rehabilitation Sciences Bahawalpur, Imran Idrees Institute of Rehabilitation Sciences Sialkot and the University of Lahore as well having attached hospitals to these mentioned institutes were included. Each student was informed that their confidentiality will be maintained and this study will not be harmful to anyone. Students who belonged to villages (rural areas) and city or town (urban areas) and were studying Doctor of Physical therapy in different medical colleges in Punjab were included. Students taking online classes were excluded from the study. The study's duration was from March to June 2022. The sample size was calculated by using mean value of samples sizes of previous literature. The total number of participants in one previous study was N=300 (9) and in other study was N=173 (10) with average value of N=237. So, after adding 5% attrition rate, total sample size was N= 250.

The physical therapy student attitudes questionnaire (PSAQ) constructed by Tedla JS. comprising of 25 statements and each statement has a 5-point Likert scale grading response was used to collect the data having reliability of 0.86.(10) Questionnaire had four subdivisions named A, B, C and D. Subdivision named A was constructed to find out attitudes and perceptions of PT students about their own profession, subdivision B was related to anticipation or predictions of a good future for students, subdivision C was about patient exposure to students and subdivision D was related to assessing the satisfaction level of student's learning.(11) The questionnaire was distributed to PT students online and physical. Written consent was taken from each student before participating in the study. Each student was informed about confidentiality of their information and right to withdraw from this study at any time.

The data was analyzed by SPSS version 26. Independent t-test was applied to compare the mean satisfaction scores of urban and rural students at level of significance (P value) with value of <0.05 must be accepted with a confidence interval = 95% and power = 80.

Results:

Total students n=250 (rural=148 and urban=102) with total 80 males and 170 females were included. The age ranges from 19 years to 27 years, mean age of participants was 23.40+ 3.60 years. Table 1 shows the demographics of participants.

Mean score of all four subdivisions of rural and urban students is 87.91 and 89.83 respectively and p value for the overall sum is >0.05 using Independent t-test indicating there is no significant difference between the satisfaction level of urban and rural students. Table 2 shows the mean PSAQ scores.

Table 1: Demographic data of the participants

		Frequencies according to Residence		Total
		Rural n (%)	Urban n (%)	n (%)
Gender	Male	46 (18.4%)	34 (13.6%)	80 (32%)
	Female	102 (40.8%)	68 (27.2%)	170 (68%)
	Total	148 (59.2%)	102 (40.8%)	250 (100%)
Age in Years	18-23	3 (1.2%)	1 (0.4%)	4 (1.6%)
	24-30	145 (58%)	101 (40.4%)	146 (58.4%)
	Total	148 (59.2%)	102 (40.8%)	250 (100%)
Professional Years of Study	1st Year	23 (9.2%)	22 (8.8%)	45 (18%)
	2nd Year	53 (21.2%)	33 (13.2%)	86 (34.4%)
	3rd Year	32 (12.8%)	23 (9.2%)	55 (22%)
	4th Year	24 (9.6%)	14 (5.6%)	38 (15.2%)
	5th Year	14 (5.6%)	8 (3.2%)	22 (8.8%)
Socio-economic Status	Upper class	12 (4.8%)	6 (2.4%)	18 (7.2%)
	Middle class	131 (52.4%)	90 (36%)	221 (88.4%)
	Lower class	4 (1.6%)	6 (2.4%)	10 (4%)
	Total	147 (58.8%)	102 (40.8%)	250 (100%)

Table 2: Mean PSAQ scores of the participants

PSAQ items subdivision		Variables	N	Mean	Std. Deviation	Std. Error Mean	*p*-value
A	**Section perception of Profession**	Rural	148	21.64	3.93	.32	0.32
		Urban	102	22.11	3.44	.34	
B	**Good Future**	Rural	148	17.10	5.13	.42	0.35
		Urban	102	17.71	5.12	.50	
C	**Patient Exposure at Clinical hours**	Rural	148	24.54	5.46	.44	0.60
		Urban	102	24.90	5.46	.54	
D	**Satisfaction level**	Rural	148	24.63	5.82	.47	0.52
		Urban	102	25.09	5.53	.54	
	All Sum	Rural	148	87.91	17.90	1.47	0.39
		Urban	102	89.83	16.82	1.66	

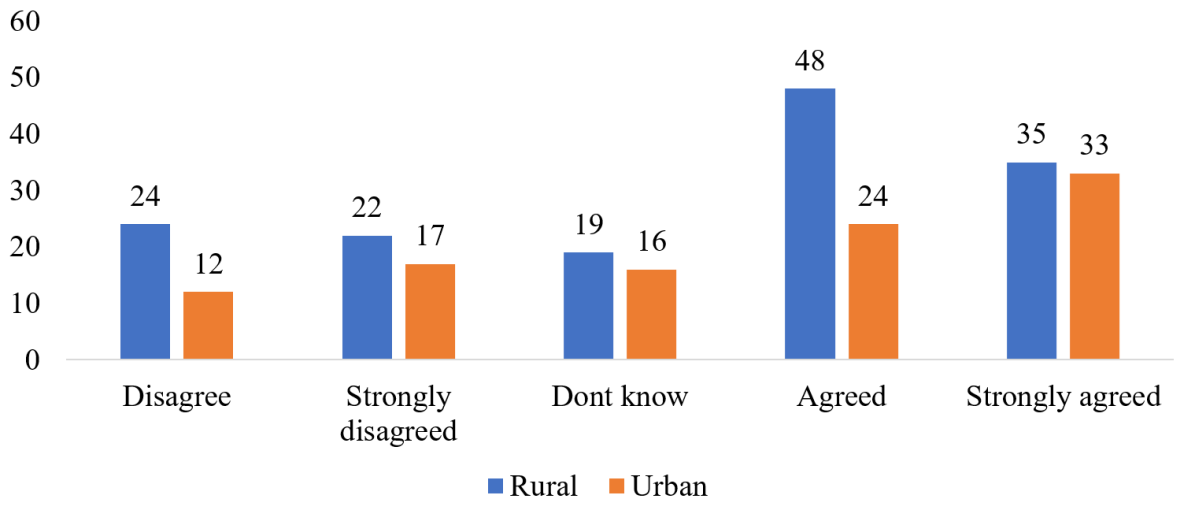

Figure 1: Satisfaction level with education and ready to work as a physical therapist

The figure 1 shows that 48 (19.2%) rural and 24 (9.6%) urban students agreed to work as physical therapists in future while 35 (14%) rural students strongly agreed with this statement.

Discussion:

In present study, a total of students n=250 (rural=148 and urban=102) with 80 males and 170 females were included. Mean scores of PASQ questionnaire for rural 87.91 and urban 89.83 students show that both students were satisfied but the p value >0.05 shows that there is no significant difference between the satisfaction level of urban and rural students.

Another study done by Anne Friman et al. in 2017 on attitudes and perceptions from nursing and medical students in relation to wound care results showed high scores on the attitude scale (mean 53.2, possible maximum = 60) that indicated positive attitudes (12), supporting current results of PT students' positive attitudes and perceptions about their profession.

Results of subdivision A showed that the mean score of rural PT students was 21.64 and urban students was 22.11 and P-value = 0.32 (more than 0.05 and was considered as not significant) showed students did not differ in attitude and perceptions, and it was not affected by the residential area of students. The results of current study were also supported by another study conducted by Mari Kannan Maharajan et al. in 2017 on healthcare professional students' attitudes and readiness towards inter-professional learning and overall response rate was 83%. Considering other fields dentistry mean score = 76.85, medicine mean score = 75.08, pharmacy mean score = 77.44 and health science mean score = 76.88 showed positive responses.(13)

Subdivision B of the current study was related to anticipation or predictions of a good future for students. Results of subdivision B showed that the mean scores of rural PT students and urban PT students were 17.10 and 17.71 respectively with a p-value = 0.35. These scores predicted that anticipations of students about their professional life are comparatively low as compared to other subdivisions' mean scores but an important factor is that their anticipation and predictions were positive and were not affected by students' residence or background. The results of a cross-sectional survey and qualitative analysis of UK medical students conducted in 2018 by Zohair Jamil Gazzaz et al. with the aim to find out the student's attitudes towards their future career and general practice, favor the current study results. The response rate was 89% (280/315) and 40% of participants said that general practice was an attractive or very attractive career option.(14)

The current study subdivision C results showed that the mean score of rural PT students was 24.54 and urban students' mean score was 24.90 and the P-value score was 0.60. These values explain that both types of students had great exposure to patients in attached hospitals to their pedagogical institutes without any discrimination. These results are supported by a study, completed by Jenna M. Khan et al. in 2019, there was significant improvement of overall knowledge about the

field of radiation oncology from pre elective to post elective (P < .001). Feedback of students included enjoying direct exposure to contouring, tele-health, and time with residents.(15)

There are positive correlations between gain and students' satisfaction with various aspects of teaching, particularly with communication between teachers and students. This suggested that good communication between teachers and students also contributes to enhancing the students' satisfaction. The results of this study support current study results in which the mean scores of rural PT students and urban PT students were 24. 63 and 25.09 respectively and their level of significance value was (P-value = 0.52). These values reveal that all students were much more satisfied with their clinical learning whether they belong to rural or urban areas.(16)

Another survey lacked the satisfaction level of students who were involved in clinical rotations done by Shshidhar Venkatesh et al. in 2020. Comparing current study the results showed that maximum students were satisfied.(17) This residential area as a barrier on student's satisfaction was addressed in current study. Hence, student's residence does not affect their satisfaction of learning but facilities like internet can effect learning. In current study, more students were satisfied in contrast to a study that was done in 2021 in Ethiopia by Melaku Hailu Temesgun to assess the satisfaction of PT students with the teaching and learning process but overall student's satisfaction was low as only 33.1% of overall students were satisfied for all categories.(7)

In current study, some of the online data, student response can vary. Further this study has not focused on the contributing factors that can affect the satisfaction. These kind of surveys must be conducted in future to make the students more satisfied by making more policies and by eliminating the deficiencies of clinical learning and barriers among students. There were was lack of such studies, so it was difficult to compare it with other studies.

Conclusion:

There is no significant difference between the overall satisfaction level of urban and rural students regarding their knowledge and clinical practice.

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Authors contribution:

Arshad S: Conception and design, statistical expertise, drafting of the article.

Waseem I: Collection and assembly of data, analysis and interpretation of the data.

Mahmood T: Analysis and interpretation of the data, critical revision of the article for important intellectual content.

Tariq K: Literature search and assembly of data.

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RESEARCH ARTICLE

Association of forward head posture with neck pain, cervicogenic headache, neuropathy, and neck mobility among university students: a cross-sectional study

Ayesha Basharat[1], Muhammad Mustafa Qamar[1], Hamna Afzal[2], Kirran Sikandar Gondal[3], Shanza Tanveer[3], Tubaa Saleem[1]

ABSTRACT

Background: With the rising popularity of media devices, frequent users often exhibit poor habitual neck posture and suffer from a forward head deformity that may lead to neck and upper limb dysfunctions.

Objective: To determine the association of forward head posture (FHP), neck pain, cervicogenic headache, neuropathy, and neck mobility among university students.

Methods: An observational cross-sectional survey was conducted on students. There were four hundred participants in this study who were divided into two groups, Group 1's (G1) study hour was >6hrs and Group 2's (G2) study hour was <6hrs. The craniovertebral angle was measured by using a mobile app Photogrammetry Maneuver to evaluate head neck alignment. A digital camera of 12 megapascals was placed approximately 5 feet away from the participant. The camera's height was adjusted parallel to the participant's shoulder level, and they were asked to stand in their anatomical posture barefooted. Outcomes were measured as headache, local tenderness, neuropathy and range of motion associated with FHP. Data was collected through questionnaire and analyzed by using SPSS version 23.

Results: There was significant association of duration of study with forward head posture ($P<0.05$). A strong positive correlation was found between forward head posture neck pain ($r=0.78$), cervicogenic headache ($r=0.54$), and neuropathy ($r=0.29$). Students also presented with decreased cervical range of motion.

Conclusion: Students with prolonged study hours suffered more from forward head posture, neck pain, headache, hypomobility and neuropathy as compared to students with less study duration.

Keywords: Craniovertebral angle, Forward head posture, Headache, Hypomobility, Neuropathy, Photogrammetry.

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Introduction:

Head posture is considered ideal when the skull is neutral, not tilted, extended, rotated, or retracted. Forward head posture deformity is the most common deviation from ideal posture and is characterized by the forward projection of head into sagittal plane such that it is anterior to trunk.(1, 2) The cervical spine aims to contain and protect the spinal cord, support the skull, and enable diverse head movement.(3) Forward head deformity (FHD) is the most common postural fault that may be a source of neck pain, described by muscle imbalance as neck muscles become shortened and tighter, it is hard to hold neck straight, producing round shoulder, and may be associated with an upper crossed syndrome that affects the range of movement.(4) Individuals with neck pain found it a frequent source of disability and economic burden, that carries essential health issues impacting general life activities, moods, and daily work.(5)

According to the literature, work-related stress may contribute to musculoskeletal disorders.(6) According to gender male: female ratio, 4:5 suffered from neck pain and tension-type headache.(7) Prolonged sedentary activities like indulging in TV, computer, video games, and smartphone texting can cause forward

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head anomaly.(8) Different types of athletic activities may be considered a source of faulty neck disorders.(9) Movements related deformity were seen more in massage therapists (10), and hairstylist, and computer developers.(11) Its pathogenesis was not known; however, it was suggested that it has links with peripheral myofascial and central mechanisms.(12)

Different maneuvers were used to measure head and neck alignment. Radiographic techniques have been used to measure different postural angles, including spinal angles. Photogrammetric angle measurement is a simple and objective technique for measuring the posture of different parts of the body.(12,13) Exercises relax sternocleidomastoid and scalene muscles, relieve pain, disability, and improve CV angle.(13) Kinesio tape, myofascial release stretching exercises relieved round shoulder and FHD. Pharmacological treatment was used to relax muscles and associated deformities in chronic neck pain.(5,14). The widely used treatments are physical therapy, medication, Soft tissue manipulations, relaxation, and cognitive therapy. (15, 16)

This was a prime study, in which craniovertebral angle was calculated by the photograph method used to determine the prevalence of moderate to severe postural deformity of the cervical spine, and to rule out the relation between deformity and associated symptoms.

Methods:

A comparative cross-sectional survey was conducted at the University of Sargodha from January 2022 to December 2022. Ethical approval for study was obtained from Ethics Review committee, Sargodha Medical College, Sargodha Pakistan (UOS/SMC/6644) Data collected by the photogrammetric method and a self-administered questionnaire contained demographics, and health history questions. The actual calculated sample size was 386 for a total population of almost 8000 Sargodha university students by using the Yamane formula of sample calculation. Purposive sampling technique was used and four hundred students from different departments were selected and divided into two groups based on study hours (Group 1 > 6 hours, and Group 2 <6 hours).

Students suffering from rheumatology disorder, neck and head surgery history were excluded. Students with prolonged working hours and faulty mechanics and deformity were separated and remaining data of associated symptoms was taken from these students through a structured questionnaire that was developed based on previously available literature. Informed consent was taken after explaining the whole study procedure.

After positioning in anatomical standing, two points were marked, one at C7 (that was located by asking the participants to flex and then extend the cervical spine as C7 is more prominent on flexion) and the other was on external auditory meatus. A digital camera was used to take photographs, and angle was measured by drawing a line from external auditory meatus to the seventh cervical vertebrae and a horizontal line at the seventh vertebrae level (Figure 1 and 2).

Data was analyzed using SPSS 21. Descriptive data was calculated in the form of mean and standard deviation. The relation between different variables was assessed by using Pearson correlation.

Figure 1: Normal angle between C7 and tragus

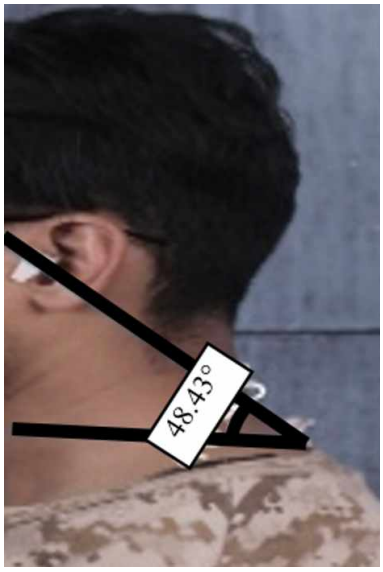

Figure 2: Craniovertebral angle showing forward head posture

Results:

Student's average age in years was 22±2.0 years. Craniovertebral angle was measured and interpreted according to values: Normal alignment angle=53.2° - 56.8°, Slight deformity=46.9°-49.1°, Moderate-severe forward head deformity=40.7°-43.02°.

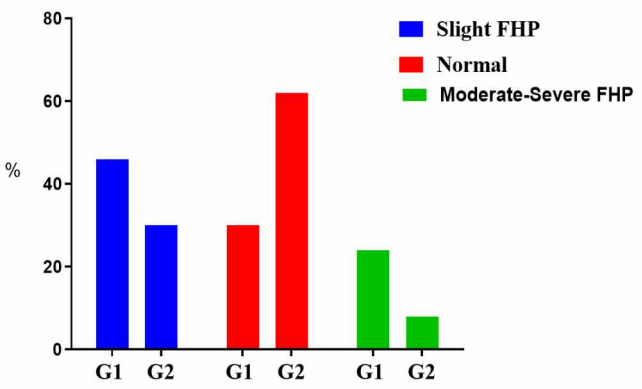

Figure 3: Forward Head Posture in both Groups

Prevalence of deformity found 70% in G1, out of which 46% suffered from slight, and 24% suffered severe forward head posture deformity. Students in G2 determined 38% prevalence (with 30% and 8% suffered from slight to severe neck malalignment respectively) and 62% had normal alignment.

A strong positive correlation was found between FHP and neck pain assessed by local muscle tenderness ($r=0.78$; $p<0.05$), between FHP and cervicogenic headache ($r=0.54$; $p<0.05$), FHP and cervical neuropathy ($r=0.29$). There was strong positive, moderate positive and mild positive correlation between forward head posture and neck rotation right and left ($r=0.61$; $p<0.05$), extension ($r=0.57$; $p<0.05$) and neck flexion ($r=0.45$; $p<0.05$).

Discussion:

As the usage of media devices such as computers and smartphones is expanding with study purposes, the regular users often exhibit incorrect postures which is considered a common visual display terminal syndrome, mostly found in individuals working for prolonged hours with visual activities in a consistent position. Pocking chin is a poor habitual neck posture, which often coexists with the upper crossed syndrome. It may also be characterized by hyperextension of upper vertebrae; it may also be complicated with thoracic kyphosis that was a combination of forwarding shoulders and round upper back. Current literature provides knowledge about the occurrence of mechanical neck deformity, which was produced silently without producing noticeable symptoms, but once developed produces major health issues, disturbing life activities.

Digital X-rays and other radiographs have been used for diagnostic purposes by drawing different angles to see bony alignments. Observational and photographs methods were also in tradition in clinical practice.(16) Previous studies applied three methods; craniovertebral, head tilt and head position angle.(17) It was provided that the craniovertebral angle's outcome of head malalignment was more accurate than head position and head tilt angle maneuver, and also there is no dramatic difference between last two methods.(18) Situation matched in the study as a non-invasive photographic method was used to evaluate the FHP in students.

This assessment's reliability has been reported satisfactory in the sagittal view in previous studies.(17, 19) Although radiographic techniques are more helpful to validate the surface measurements of posture angles as landmarks were visible and fixed on radiographs, it provides more accurate information for spinal normal or abnormal alignments.(20) But because it is an expensive and time taking procedure, thus it could not be implemented in the current study. Radiations have hazardous effects on health and cost issues; they are not always practical. The photogrammetric technique for measuring the cervical spine posture deviations is an affordable method and provides numerical values. The study included two groups depending on study hours, suggesting whether the prolonged hours of study causes a strain on neck muscle and led to permanent deformity or not. In this method, lateral pictures were taken for both groups and angle of cervical curve was measured. Maintaining balance depends on vision, proprioception, vestibular function, feet touch surface, and aging.(21) Result similarity found in the study showed that due to prolonged study, visual activities had reduced postural control ability temporarily but recovered with time. Postural control was checked through the kinesthetic sense test perceived disturbed but that was not well-marked.

The relation between head posture and chronic neck pain of non-traumatic origin was determined in symptomatic and asymptomatic individuals through video images and showed that patients with chronic pain had more deviated head alignment than pain-free participants.(22) The existence of tenderness in sub occipital muscles and head posture in individuals with

chronic tension headaches and healthy individuals was compared and found a positive relationship between trigger points, tension headaches, and faulty neck posture.(23) Neck pain prevalence and associated symptoms were found in direct relation to neck mal-alignment and reduced neck angle in dentists, who worked in a flexed neck position for extended time compared to dental students who is working hours are less. It was also found that range of movement decreased more in dentists as compared to dental students.(24) Neck flexion produces more compression on the cervical spine than neck extension, which caused deviation of normal curve posteriorly. This continuous mechanical stress is harmless for a short period, but if this stress is continuous and repetitive, it will produce permanent structural changes in spine resulting in faulty head deformity. It was determined that students who had FHD suffered more with cervical pain and headache. Although there was a positive relation between FHP and cervical neuropathy, as students complained of radiating pain due to nerve compression, the ratio of sufferers was low as compared to local cervical pain and headache. Students agonized from FHD showed decreased mobility and range of all cervical spine movements.

Although the study was conducted on Sargodha university students, but data was collected by evidence based structured questionnaire and interpreted carefully so results could be generalized.

Conclusion:

It was concluded that most of the students with prolonged study hours may lead to forward head deformity. Forward head deformity is associated with neck pain, cervicogenic headache, and hypomobility of cervical spine.

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Qamar MM: Analysis and Interpretation of data, statistical expertise.

Afzal H: Collection and assembly of data, drafting.

Gondal KS: Discussion & Conclusion.

Tanveer S: Analysis & Interpretation of data.

Saleem T: Critical revision of article and drafting.

OPEN ACCESS

RESEARCH ARTICLE

Severity of central sensitization in patients with chronic low back pain

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ABSTRACT

Background: Low back pain develops into Chronic Low Back Pain (CLBP) due to the contribution of various psychosocial factors in approximately 10-20% of all patients. CLBP is classified into three groups namely neuropathic, nociceptive and central sensitization (CS). CS results in pain due to hyper-responsive nociceptive neurons and recruitment of sub-threshold or normal stimuli.

Objective: To determine the frequency of central sensitization in patients with chronic low back pain

Methods: A descriptive cross-sectional observational study was conducted on 388 patients with CLBP, aged between 18 to 44 years, using non-probability convenient sampling. Patients were recruited from Ghurki Trust and Teaching Hospital, whereas, adults with a history of spinal surgery within the last 12 months, use of NSAIDs/analgesics, and coexisting neurological, respiratory, cardiac, or rheumatic disorder were excluded. The participants were requested to fill the Central Sensitization Inventory (CSI) questionnaire which has a test-retest reliability of 0.817.

Results: Out of 388 participants, 22.7% (n=88) of the participants demonstrated subclinical central sensitization. Mild central sensitization was reported by 33.0% (n=128) participants, 20.6% (n=80) demonstrated moderate central sensitization scores on the CSI. Whereas, severe central sensitization was found in 13.4% (n=52) participants and 10.3% (n=40) of the participants reported extreme central sensitization category based on their scores on the CSI.

Conclusion: Mild central sensitization was reported frequently among patients with chronic low back pain.

Keywords: Central Sensitization, Central Sensitization Inventory, Chronic low back pain, Low back pain.

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Introduction:

Pain in the area between the 12th lower costal margin and the inferior gluteal folds is considered to be low back pain. It leads to the highest number of Years Lived with Disability (YLD) than any other condition and ranks at fourth place in relation to the burden of disease.(1,2) It is a highly prevalent condition worldwide, with females affected more than men and had a greater incidence among higher age groups.(3-5)

Low back pain develops into chronic low back pain in approximately 10% to 20% of all affected individuals, which is known as pain exceeding the time duration of 3 to 6 months.(6) The global prevalence of chronic low back pain in individuals between 24 to 39 years of age was 4.2%, whereas a prevalence of 19.6% was found in those with ages between 20 to 59 years old.(7-9)

Various predictors including work-related dissatisfaction, high workload, increased psychological distress, mood disorders like anxiety and depression, smoking and obesity, have all been recognized for chronic low back pain.(10) As far as the heterogeneous nature of clinical presentations of chronic low back pain is concerned, it was classified into 3 categories: Nociceptive Pain: Result of noxious stimulation of peripheral nerve endings, Neuropathic Pain: Arising from nerve entrapment or nerve root inflammation, and Central Sensitization Pain.(11)

Central Sensitization results in pain due to hyper responsive nociceptive neurons and recruitment of subthreshold or normal stimuli. This can be clinically detected by determining the presence of hyperalgesia and allodynia.(12-14) Testing for the presence of Waddell signs has proven their utility in this respect.

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These signs point the clinician towards an alteration of behavioral and psychosocial response in any given patient.(15)

The term "central sensitization" was first used by Woolf, where it was described as a syndrome of hypersensitivity characterized by an exaggerated response to a stimulus resulting from a low nociceptive threshold.(16) Two mechanisms were put forward by Woolf to describe the process of central sensitization, the first mechanism involved the recruitment of subthreshold sensory inputs by previously ineffective synaptic junctions resulting in activation of a nociceptive circuit. The second mechanism occurring simultaneously includes central augmentation of the pain response resulting from amplified neuronal activity. A combination of these two processes generates an excessive pain response known as central sensitization.(17,18)

Central sensitization affects pain intensity experienced by patients which is linked to changes in the CNS, as well as cognitive and psychological factors.(19-21) Other symptoms which may be attributed to the presence of central sensitization include cognitive dysfunction, headaches, dizziness, sleep disturbances and fatigue.(17)

Pain Neurophysiology Education is a recently developed approach that targets central sensitization by inducing a change in the patient's beliefs towards their pain.(22,23) Negative attitudes and behaviors related to pain, such as fear-avoidance behavior and catastrophizing has diminished with the assistance of this technique. Lower pain ratings and disability has also been reported in patients who have received pain neurophysiology education.(24,25) Cognitive Behavioral Therapy as part of a pain psychology program should be incorporated in altering pain perception related to central sensitization.(26)

This study may help to fill the existing gaps in knowledge and improve understanding pertaining to the phenomenon of central sensitization (CS) and will facilitate physical therapists in the recognition of symptoms and signs of CS in patients suffering from Chronic Low Back Pain (CLBP). As the previous literature provides insufficient knowledge regarding CS among patients with CLBP, it would set a background for physical therapists in the assessment of patients with central sensitization type of chronic low back pain, so that they may be able to differentiate it from pain due to a musculoskeletal source. Hence, the results of this study would provide a greater understanding of the presentation of CS in CLBP and help clinicians to classify CS in the patients with CLBP, potentially resulting in targeted interventions and better outcomes.

Methods:

It was a descriptive cross-sectional observational study, conducted at Ghurki Trust and Teaching Hospital, Lahore, from June 2020 till December 2020 after approval from the Lahore College of Physical Therapy's ethical board. 388 participants were recruited to participate in this study using non-probability convenience sampling technique. The study was approved by the ethical board of Lahore College of Physical Therapy (LCPT/DPT/16/540).

Adults aged between 18 to 44 years, reported low back pain for 24 weeks or more, moderate to high-intensity pain, disproportionate pain after normal tissue healing time, use of antipsychotic drugs prescribed by a physician, and 3 or more Waddell signs positive out of 5 were included in the study (Waddell signs- superficial and non-anatomic tenderness over a wide area of lumbar skin to light touch or pinch, axial loading and acetabular rotation simulation with a positive sign considered if pain occurs in first 30° of rotation, distracted straight leg raise (SLR) discrepancy which is deemed positive when pain is reported by the patient on formal SLR examination in supine position and marked decrease in pain on distracted SLR in sitting position and the examiner extends the knee. An exaggerated painful response to such a stimulus was considered overreaction, which is not reproduced on providing same stimulus at a later time and regional weakness and sensory disturbance). Whereas, adults with a history of spinal surgery within the last 12 months, use of NSAIDs/analgesics, and coexisting neurological, respiratory, cardiac, or rheumatic disorder were excluded.

The participants were requested to fill out the Central Sensitization Inventory (CSI) questionnaire with assurance to maintain their anonymity and complete protection of their provided data. The CSI has a test-retest reliability of 0.817 and Cronbach's alpha of 0.879. (27) It is a self-report type of questionnaire consisting of 25 items. Each item is rated from 0 (never) to 4 (Always) on a Likert scale and the total score of all items is calculated out of 100. A score of 0 to 29 will place the participant in the Subclinical category, 30 to 39 score falls into the Mild category, 40 to 49 is Moderate, 50 to 59 would be labeled as Severe and a score of 60 to

100 would be categorized as Extreme central sensitization. The CSI 25 questions are further divided into sub-categories which are physical symptoms, emotional distress, headache/jaw symptoms and other symptoms. Psychosocial factors are mentioned in emotional distress symptoms which include questions related to stress that make symptoms worse, for instance, feeling sad or depressed, having anxiety attacks, poor memory, and difficulty in concentrating.

Data was entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 21. Data was presented using frequency tables, pie charts and bar charts

Results:

Out of 388 participants, the minimum age was 18 years and maximum was 44 years with a mean age of 30.3 and standard deviation (SD) of 8.18. Gender distribution is shown in figure 1 where 236 participants were females and 152 were males.

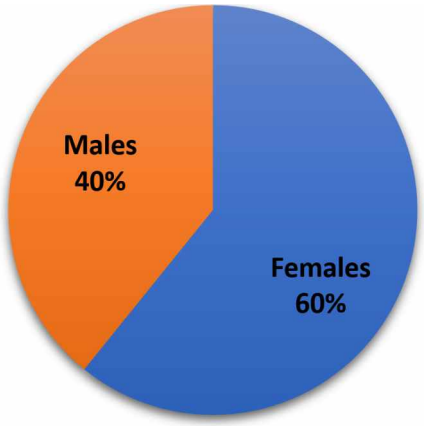

Figure 1: Gender distribution of the participants

Central sensitization among patients with chronic low back pain was assessed with CSI as shown in Table 2. The table showed the CS was classified into following domains on the basis of symptoms such as physical, emotional distress, headache, jaw symptoms, skin problems and feeling lethargic in the morning.

Table 1: Central Sensitization Inventory

Symptom	Questions	Never n(%)	Rarely n(%)	Sometime n(%)	Often n(%)	Always n(%)
Physical Symptom	Muscle stiff/achy	36(9.3)	72(18.6)	140(36)	76(19.6)	64(16.5)
	Pain all over body	56(14.4)	92(23.7)	152(39)	40(10.3)	48(12.6)
	Do not sleep well	24(6.2)	148(38)	124(32)	56(14.4)	36(9.4)
	Pelvic pain	184(48)	80(20.4)	80(20.4)	24(6.1)	20(5.1)
	Tension in neck & shoulder	32(8.2)	88(22.7)	132(34)	76(19.6)	60(15.5)
Emotional Distress	Anxiety Attacks	108(28)	44(11.2)	132(34)	84(21.6)	20(5.2)
	Difficulty concentrating	56(14.4)	104(26.9)	120(30.9)	64(16.5)	44(11.3)
	Stress makes symptoms worse	84(21.6)	68(17.6)	124(32)	56(14.4)	56(14.4)
	Sad or depressed	20(5.3)	96(24.8)	156(40)	88(22.7)	28(7.2)
	Poor memory	80(20.6)	96(24.6)	112(29)	60(15.5)	40(10.3)
Headache/ Jaw Symptom	Sensitive to bright lights	144(37.1)	64(16.5)	96(24.7)	60(15.5)	24(6.2)
	Headaches	8(2)	108(28)	108(28)	160(41)	4(1)
	Pain in jaw	160(41)	132(34)	40(10.3)	56(14.7)	0(0)
	Certain smells make dizzy	184(47.5)	76(19.5)	40(10.3)	48(12.4)	40(10.3)
Other symptoms	Un-fresh in morning	20(5.2)	40(10.3)	228(58.8)	76(19.6)	24(6.1)
	Skin problems	112(29)	92(23.7)	84(21.6)	84(21.6)	16(4.1)

Participants of the study (n=388) completed the provided CSI questionnaire and were divided into subclinical, mild, moderate, severe, and extreme central sensitization categories according to the total score. Thus, 22.7% of the participants (n=88) demonstrated subclinical scores of central sensitizations. Whereas 33% of the participants (n=128) reported mild central sensitization, 20.6% of the participants (n=80) demonstrated moderate central sensitization. However, severe central sensitization were found in 13.4% of the participants (n=52) and 10.3% (n=40) participants showed extreme central sensitization based on their scores on the CSI as shown in figure 2.

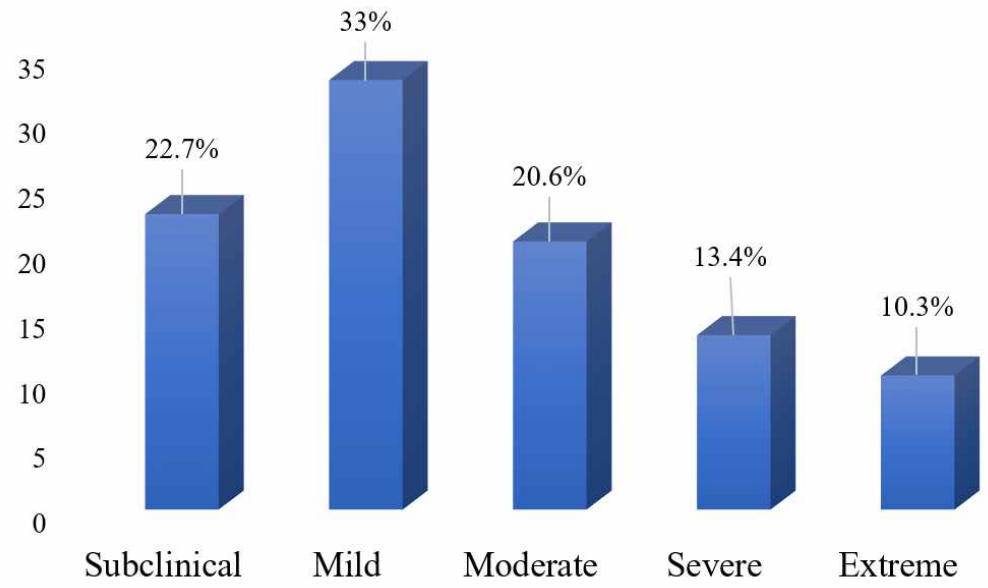

Figure 2: Bar Chart showing severity of central sensitization

Discussion:

Central Sensitization (CS) is a phenomenon in which the central nervous system becomes hypersensitive to pain, leading to increased pain perception and reduced pain thresholds. It is believed to be a factor which can contribute in developing and maintaining such chronic pain conditions as CLBP.(28) The current study is focused on determining the severity of central sensitization among patients with chronic low back pain. The study was first of its kind to be conducted in Pakistan as it emphasized the occurrence of central sensitization symptoms among patients suffering from chronic low back pain. Conclusion drawn from the present study indicates a wide variety of symptoms present in individuals with CLBP which points towards the phenomenon of central sensitization and mild central sensitization was reported in 33% of the participants.

Neblett R et al in 2015 carried out a study to evaluate whether a new screening tool called the central sensitization inventory (CSI) may help clinicians to identify people with central sensitization (CS). The CSI is a screening tool developed to notify medical professionals that a patient's presenting symptoms may be connected to a CSS and that further examination for a CSS should be taken into account in order to begin the most appropriate assessment and treatment plan. Thus, it was reported that in terms of sensitivity, the CSI accurately recognized 82.8% of CS patients as having a CS with a positive likelihood ratio of 2.93%, while 54.8% of non-CS patients were correctly identified as not having a CSS (i.e., specificity). Although there is a large likelihood of false positives when evaluating patients with complicated pain and psychophysiological illnesses, the CSI is still a valuable and reliable tool for assessing individuals for the possibility of a CS.(29) However, in the current study, CSI was used to determine the severity of central sensitization as CSI has a test-retest reliability of 0.817 and a Cronbach's alpha of 0.879 and it reported the presence of mild CS in majority of the participants.

Cristina Roldán-Jiménez et al. in 2020 conducted a cross-sectional study on Central Sensitization in Chronic Musculoskeletal Pain Disorders (CMPD) in different populations. This study calculated the percentage of patients with various CMPDs who also symptoms have linked to CS. Despite the fact that participants had average subclinical CSI total scores, participants with scores greater than 40 were discovered across a variety of CMPD, age, and BMI categories. High CSI scores had the greatest impact on people with LBP and neck discomfort in particular. In view of these findings, doctors are advised to use the CSI in CMPDs in addition to their assessment for better therapeutic decision-making.(30) Whereas, in the present study it was reported that 34% of the patient sometimes had tension in their neck and shoulder and 15.5% always had it. Moreover, 36% patients fell that their muscles were stiff sometimes and 16.5% always felt that their muscles were stiff and 12.6% always felt pain all over the body.

K Aoyagi, et al. in 2019 conducted a study on Subgroup of Chronic Low Back Pain Patients with Central Sensitization. This study concluded that patients with CS had more severe pain, greater disability, higher level of depression and anxiety compared to patients without CS.(31) Thus, in the current study, 34% reported to sometimes experience and 21.6% often had anxiety attacks, while whereas, 40% patients stated sometimes having and 22.7% often had depression.

A cross-sectional study was carried out by E Huysmans et al. in 2018. The studies reported that cognitive and behavioral factors such as catastrophizing, pain behavior, kinesiophobia and pain intensity are associated with the presence of central sensitization. This is suggestive of the contribution of such factors to the persistence of pain and increased disability levels in chronic low back pain patients.(32) Hence, the current study 58.5% sometimes and 19.6% had often felt lethargic in the morning and 30.9% sometimes and 16.5% often had difficulty in concentration.

JR Clark et al. in 2019 conducted a qualitative study and reported that central sensitization is found to be associated with poor outcomes in the population. Certain personal characteristics are found in these individuals, for instance, emotional and physical hypersensitivity, learning difficulties, history of trauma (either physical or emotional), anxiety and memory problems. The present study has also extracted similar findings with analysis of the answers provided by patients on the CSI.(33) Whereas, in the current study participants reported that stress makes symptoms worse in 32% patients sometimes and 14.4% stress makes symptoms were always worse.

In 2019 DM Klyne et al. reported that transition of acute low back pain into chronic low back pain can be averted by swift intervention which specifically targets the mechanism of central sensitization found in such patients in order to achieve better outcomes. However, several patients recover from the acute phase without developing central sensitization.(34) However, in the current study, the patient recruited had CLBP and majority of them reported mild central sensitization.

In 2017 D Goubert et al. reported that pain response augmentation was a characteristic of central sensitization. Altered pain processing is found in patients with mild to severe chronic low back pain by assessment of pain pressure thresholds in manual algometry testing.(35) Hence, as reported in the current study, 12.6% always had pain all over the body.

Small sample size, data collected from a single setting and use of non-probability convenience sampling, affects the strength and generalizability of the results. Moreover, the study only identifies symptoms of central sensitization by use of a self-report questionnaire. Future studies conducted on a larger scale on multiple settings with diverse age groups could provide a greater amount of information about the presence of central sensitization symptoms in chronic low back pain patients. Quantitative data collected by tools such as Digital Pressure Algometer, Cold Pressure Test or Quantitative Sensory Testing could improve understanding related to central sensitization. Moreover, studies should be conducted to measure factors affecting scores of the CSI and the effects of CS on functional activities and activities of daily living of participants.

Conclusion:

This study investigated the severity of central sensitization in patients with chronic low back pain and found symptoms of pain in areas other than the lower back region, including jaw pain, pelvic pain and generalized body pain. The scores of all participants led to the conclusion that mild central sensitization was reported frequently among patients with chronic low

back pain.

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Authors contribution:

Pervaiz R: Study conception and design, data collection.

Faisal S: Drafting of article, data analysis and interpretation, critical review.

Safdar N: Assembly of data, statistical expertise.

Saleem F: Writing assistance, literature search.

Asim HM: Final approval and guarantor.

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LETTER TO THE EDITOR

The rate of feasibility should be examined as a primary objective in a pilot study: a letter to the editor

Aftab Ahmed Mirza Baig[1], Rabia Hassan[2], Zobia Abid[2]

The primary aim of the pilot study should be to estimate, discuss, and conclude feasibility (referral recruitment, and retention rates of participants). It should be informed in the pilot study. This type of study prevents the researcher from initiation of an extensive study without suitable information and understanding of the methods. At times, the project is reflectively labeled as a pilot study when some directions of the methods are not bring off or accomplish.(1)Researchers in Pakistan provide their results with p-value and do not mention the above primary intent with any rate of feasibility for their proposed project, not in results and conclusion.(2) As the pilot studies of interventions are underpowered studies, the testing of hypotheses with the level of significance regarding the effects of the intervention should not be employed. However, there could be a confidence interval along with standard deviation to compare.(1) In contrast to this fact; researchers use level of significance in the pilot study.(2) Moore and colleagues suggested that the pilot studies are preparatory studies that are actually designed either to check or to test the performance quality and the potential of study designs, measures, procedures, recruitment criteria, and operational strategies that are under consideration for use in the next and mostly the larger studies.(3) The given definition can easily explain the focused nature of pilot studies. All researchers should follow guidelines to conduct pilot studies because poorly established or underpowered research will leave investigators and readers with more questions than answers, and will not be able to produce information regarding subsequent studies.(4) However, the manuscripts reporting learned lessons from well-organized and well-conducted pilot studies should be published, that can show feasibility for further research.

Keywords: Analysis, Feasibility study, Pilot project, Statistical data.

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