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Editorial Office
Foundation University Journal of Rehabilitation Sciences (FUJRS)
Foundation University Institute of Rehabilitation Sciences (FUIRS)
Foundation University Islamabad Campus (FUIC); Defense Avenue, DHA Phase-I, Islamabad Pakistan
Tel: +92-51-5788171-602; Email: fujrs@fui.edu.pk

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EDITORIAL

Cochrane Rehabilitation: A new milestone towards making evidence-based health care decisions in rehabilitation

Farooq Azam Rathore

According to the 2011 World Report on Disability, around 1 billion people in the world have some form of disability, which limits their participation in the society.(1) Multidisciplinary rehabilitation aims at improving quality of life of the patients by improving function. This can facilitate re-integration of people with disability (PWD) in the society. Rehabilitation interventions are diverse and delivered in a variety of settings by different professionals around the globe. Many of these interventions and strategies have not been validated by rigorous scientific research including double blind randomized controlled trials. Systematic reviews of these interventions can guide physicians, rehabilitation professionals and patients to choose the most relevant, appropriate, and cost-effective interventions for the PWD. December 2021 marked the 5th anniversary of Cochrane Rehabilitation. The aim of this editorial is to provide an overview of this global collaboration which has made a positive impact on making evidence-based health care decisions in rehabilitation and to discuss the future directions.

Cochrane is an international collaborative network working for the last 28 years involving researchers, health professionals, patients, caregivers, and people passionate about improving health outcomes. It is for anyone interested in using high-quality information to make health decisions and improve health care knowledge.(2) It was established by lain Chalmers in 1993.(3) It is a global network which consists of 8 networks and 53 Cochrane review groups (CRG), working in more than 20 countries of the world.(4) It is considered as the highest standard in evidence-based healthcare resources. It is evident from the fact that 90% of the 2016 WHO guidelines contain Cochrane evidence.(5)

Affiliations: Armed Forces Institute of Rehabilitation Medicine, Rawalpindi
Correspondence: Dr. Farooq Azam Rathore
Email: farooqrathore@gmail.com
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Many CRGs have been producing evidence directly or indirectly relevant to rehabilitation professionals and interventions e.g., back and neck group, joint and muscle trauma group, breast cancer group, movement disorders group, multiple sclerosis and rare diseases of the CNS group, musculoskeletal group, neuromuscular group, wound group, and stroke group. Zaina and Negrini in 2012 identified 242 rehabilitation reviews from the Cochrane library of systematic reviews.(6) These reviews were produced by more than 28 CRGs. But none of the reviews were tagged as rehabilitation reviews. The most common were produced by the CRGs including musculoskeletal (40 reviews), stroke (30 reviews), back (26 reviews), bone, joints, and muscle trauma (20 reviews), movement disorders (18 reviews), neuromuscular (13 reviews), injuries (9 reviews) and multiple sclerosis (6 reviews) groups. The idea for the establishment of a separate Cochrane field started with the creation of an evidence-based committee in 2014 general assembly of European Society of Physical and Rehabilitation Medicine (ESPRM).(7) Brainstorming sessions were held with a diverse group of rehabilitation professionals at the Annual Congress of the International Society of Physical Medicine and Rehabilitation (ISPRM) at Berlin, 2015 and Malaysia, 2016. Official Exploratory meeting for the launch of Cochrane PRM, was held in Brescia (Italy), 19-20 September 2016. Cochrane Rehabilitation was formally approved by Cochrane on October 22nd, 2016, and launched in Dec 2016.

Cochrane Rehabilitation serves as a bridge between Cochrane and all rehabilitation stakeholders.(8) On one side, it aims to disseminate the evidence and methodologies developed by Cochrane to the rehabilitation professionals. On the other end, it conveys priorities, needs and specificities of Rehabilitation back to Cochrane. Cochrane rehabilitation aims to promote and advocate for using the best evidence within the rehabilitation world, including to inform clinical decision-making. It is a global collaboration involving different rehabilitation professionals from various countries. It has representation from physical therapy, speech and occupational therapy, prosthetics and orthotics,

psychology, and rehabilitation medicine. The Cochrane Rehabilitation headquarters are located at the "E. Spalenza" Don Gnocchi Centre, Largo Paolo VI, Rovato (Brescia), Italy in collaboration with the University of Brescia and Don Gnocchi Foundation. It is is organized into Headquarter team, directors, advisory board, advisory committee, executive committee along with a very active and vibrant global community. The collaborators and contributors of Cochrane rehabilitation are from more than 25 countries in 5 continents of the world.(9)

The work of Cochrane is especially important for the PWD, and rehabilitation professionals based in the low middle income countries (LMIC). It has provided an opportunity to these professionals to contribute to this global movement of improving health care decision making. One successful example is of tagging the reviews relevant to rehabilitation in the Cochrane database of systematic reviews. Many contributors to this tagging exercise were rehabilitation professionals based in the developing countries (Pakistan, India, Syria, Columbia and Thailand). They held online meetings to discuss the difficult decisions and, in this process, got a chance to express themselves and share their perspectives of working in rehabilitation settings in the LMIC. Two manuscripts have been published on the tagging project so far.

Cochrane Systematic Review (CSR) Summaries is an initiative in which selected rehabilitation professionals are asked to summarize a CSR related to rehabilitation for publication in an international indexed medical journal. A team of 2 rehabilitation professionals (PMR physician and PT) from Pakistan have successfully published 10 CSR in different high-ranking journals so far.

As part of assessment of the levels of evidence-based practice in Physical Therapy a cross sectional survey was conducted in one of the largest rehabilitation institutes in Pakistan by an advisory board member and a supporter of Cochrane Rehabilitation. Results are ready and the manuscript is being prepared for final submission.

Cochrane rehabilitation also offers a catalogue for important EBM courses (https://rehabilitation.cochrane.org/resources/education-and-training/ebm-courses) which can be accessed by professionals based in the LMIC. Another success story is the translation and dissemination of the blog shots.(10) More than 40 blog shots have been translated from English to Spanish during the last four years and disseminated through Latin-America, a developing region of the world.

Despite these success stories, there are some areas that need attention. Cochrane rehabilitation has been able to reach out only a handful of rehabilitation professionals based in LMIC who are already enthusiastic and excited about providing evidence-based rehabilitation services. It has been unable to engage a large number of rehabilitation professionals so far. In addition, most of the activities and planned events are led by professionals based in the Europe and the USA. These areas have rehabilitation services and challenges different from those of the developing world. For example, use of robotics and technologically advanced gadgets in rehabilitation is common in the high-income country whereas in many LMIC basic rehabilitation infrastructure is lacking and these technological advances have little relevance and interest. Another challenge for Cochrane rehabilitation has been the inconclusiveness of reviews mainly due to insufficient data and hence unspecific recommendations. This makes it difficult and quite frustrating at times for utilizing evidence in clinical practice.

I invite the readers of the journal to explore Cochrane rehabilitation and consider contributing to this global movement. This can be done as an individual as well as team in form of a Cochrane Rehabilitation Unit. This will lead both to personal learning, professional growth and global collaborations.

Disclaimer: Dr. Farooq Azam Rathore is an advisory board member of Cochrane Rehabilitation.

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RESEARCH ARTICLE

Association between obesity and academic performance among college students of Umerkot, Sindh, Pakistan

Maimuna Waseem[1], Aisha Kanwal[1], Memoona Khilji[1], Shakeela Batool[1], Bahadur Ali[1]

ABSTRACT

Background: The obesity rate among adolescents is rising, similar to that of adults. Obese teenagers face a serious potential health problem as they get older. Obesity may have direct effect on academic performance.

Objective: The purpose of this study was to determine the prevalence of obesity and its association with academic performance among first year college students of Umerkot, Sindh, Pakistan.

Methods: This cross-sectional study was conducted from November 2019 to January 2020 in the private and government colleges of Umerkot, Sindh, Pakistan, and comprised of a systematic random sample of intermediate (part one) students. Body Mass Index (BMI) was measured to determine obesity, and academic performance was assessed through detailed marks certificate (DMC) of matriculation. SPSS v20 was used for data analysis. In order to determine the association Pearson's correlation coefficient was used, with p value <0.05 taken as statistically significant.

Results: Overall, 378 students were included in the final analysis. The prevalence of obesity was only 5%. More boys than girls were obese (3.4% vs. 1.6%). The mean percentage of the students in all academic subjects was 76.4%. In addition, 5.8% overweight and 2.4% obese students received ≥80% marks. There was a significant positive association between BMI and academic performance ($r=0.13$, $p<0.012$).

Conclusion: This study showed the positive relationship between obesity and academic performance in Umerkot, Pakistan. Obese students are likely to have better academic performance. The prevalence of obesity among students is low. Male students tend to be more obese and overweight than female students. However, large-scale, longitudinal studies are recommended.

Keywords: Academic performance, Adolescents, BMI, Obesity.

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Introduction:

Obesity is one of the world's leading health-related issues having a significant negative impact on health.(1) Over the past few decades, childhood obesity has increased significantly in developed countries.(2) In 2016, recent evidence suggests that 330 million children and teenagers aged 5–19 years were overweight or obese.(3) The prevalence of obesity has increased from much less than 10% in Russia and Eastern Europe to greater than 30% in the USA among the school-aged children and teenagers.(4, 5) The incidence of obesity and overweight ranges from 39.9% to 45.6% in male and 30.4% to 38.7% in female children and adolescents of Saudi Arabia and these numbers are still rising alarmingly.(6) According to the Asia-Pacific Region-Specific BMI cut-off values, approximately one-fourth of people in Pakistan are overweight and obese.(7) The prevalence of obesity in urban populations is higher than in rural populations, according to the Pakistan National Health Survey (NHS).(7) Pakistan is also facing a growing trend in childhood obesity, even though it is included in countries where most people are undernourished.(8) Body Mass Index (BMI) is generally defined as "weight in kilograms divided by height in meters squared", and is primarily used to measure obesity.(8, 9) In adolescents, BMI percentiles are commonly used to classify obesity.(10) The Centre for Disease Control and Prevention (CDC) suggests that children and adolescents with BMI values above the 85th percentile are classified as overweight and those with BMI values above 95th percentile are considered obese.(11)

Affiliations: [1]Institute of Physiotherapy & Rehabilitation Sciences, Peoples University of Medical & Health Sciences for Women, Nawabshah (SBA), Pakistan
Correspondence: Maimuna Waseem
Email: maimunawaseem24@gmail.com
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Poor success at school is one of the problems associated with childhood obesity.(4) A recent study showed that obese children are more likely to have poor working memory that may be closely linked with negative academic outcomes.(1) In another study, the grade point average (GPA) of normal weight students was significantly higher than that of overweight students.(12) Studies carried out in the United Kingdom, Western Europe and China found negative association between obesity in childhood and early academic performance.(1, 13, 14) Although some studies have found negative relationship between overweight and academic performance, others have demonstrated no association at all, suggesting inconsistent findings on the issue.(4, 15, 16)

There is some uncertainty about whether the obesity has an impact on academic achievement or not. However, the phenomenon underlying the relationship between obesity and academic performance remains confusing.(17) To the best of our knowledge, there was lack of studies among adolescents in Pakistan, as obesity among adolescents has become too visible to be ignored. If such students were affected by obesity academically, it was more likely to affect the admission to school/university, job opportunities and students earnings. Therefore, the purpose of this study was to determine the relationship between obesity and academic performance among 11th grade college students in Umerkot, Sindh, Pakistan.

Methods:

This cross-sectional study was conducted from November 2019 to January 2020 and comprised of a systematic sample of students, selected from four colleges including Govt. Girls Degree, Royal Public, Kainat Public and Sindh Public colleges of Umerkot, Sindh, Pakistan. In the current study the sample interval is 03, which is the result of the division of 1300 (N= size of the population) by 415 (n=size of the sample), so we selected the every 3rd student from the colleges. The study participants were 11th grade college students aged between 15 to 17 years. Students who had any chronic illness, such as diabetes mellitus, cardiovascular diseases, cancer, mental illness and infectious disease were excluded. In total, 415 students agreed to participate in the study. Of these, 378 students (response rate = 91%) were included in the final analysis.

Ethical approval for this study was sought from the Institutional Ethics Committee of the Institute of Physiotherapy & Rehabilitation Sciences, Peoples University of Medical & Health Sciences for Women, Nawabshah (SBA) (Letter No: PUMHSW/IPRS/ORS: 3111/14) and permission was taken from the principal or head of the college before approaching the participants. Consent of the parents of the students and their assent for participation in the study was obtained. Anonymity and confidentiality of the students was assured.

The BMI of each student was taken, which included body weight (in kilograms) determined through digital weight machine and height (in centimetres) measured through flexible measuring tape. Students were instructed to take off their shoes and heavy clothing, such as sweaters, and stand with their feet together, legs straight, arms at their sides and shoulders at level, looking straight ahead. On the basis of BMI, students were categorized into four groups: underweight: BMI < 5th percentile; normal weight: BMI from the 5th percentile to < 85th percentile; overweight: BMI > 85th percentile to < 95th percentile; and obese: BMI equal to or > 95th percentile, based on the CDC guidelines.(12). In order to determine academic performance, detailed marks certificate (DMC) of matriculation was taken from the administrative records. We evaluated academic performance in terms of grades: A1 (80% or >80%), A (70-79.9%), B (60-69.9%), C (50-59.9%), D (40-49.9%) and percentage in all subjects. The data was collected in the classrooms during the break time so that coercion could be avoided; this whole process took 15 minutes to complete.

The data was entered in Microsoft Excel 2016 and analysed in SPSS v20. Continuous variables were reported as means and standard deviations whereas categorical variables were expressed as frequencies and percentages. Chi Square Analyses was used to determine comparison between genders. For association between obesity and academic performance, Pearson's Correlation Coefficient was used. The significance level was set at a p value <0.05.

Results:

Of the 378 students included in the final analysis, male students were higher (74.6%) than female students (25.4%). The mean age of participants was 16±0.7 years. The overall average percentage obtained in all subjects was 76.4% (Table 1). As shown in table 2, 28 (7.4%) male students were overweight compared to 11 (2.9%) females. Moreover, obesity was observed in male 3.4% and female 1.6% (p=0.117). With respect to academic performance, 31% male students had got A1

grade (80% or above) compared to 10.1% female students (Table-2). 35.4% normal students obtained A grade, while 5.8% overweight and 2.4% obese obtained A1, (P=0.002) (Table 3). It was also found that there was a significant positive correlation between obesity and academic performance (r=0.13, p<0.012). This clearly indicates that with the increase in BMI there was increase of academic performance among adolescents.

Table 1: Demographic data of students

Variable	Category	Frequency	Percentage
Gender	Male	282	74.6%
	Female	96	25.4%
	Total	378	100%
College	Govt. Girls Degree College	33	8.7%
	Royal Public College	83	22%
	Kainat Public College	135	35.7%
	Sindh Public College	127	33.6%
	Total	378	100%
	Mean	**Standard Deviation**	
Age (years)	16	0.7	
Height (cm)	162.6	10.2	
Weight (kg)	50.5	7.9	
Academic performance (%)	76.4%		

Table 2: BMI categories and academic performance among male and female students

Variable	Male [n (%)]	Female [n (%)]	Total [n (%)]	P value
BMI (kg/m^2)	282 (74.6)	96 (25.4)	378 (100)	
Underweight	13 (3.4)	2 (0.5)	15 (4)	
Normal	228 (60.3)	77 (20.4)	305 (80.7)	0.117
Overweight	28 (7.4)	11 (2.9)	39 (10.3)	
Obese	13 (3.4)	6 (1.6)	19 (5)	
Academic performance				
A1 (80% or >80%)	117 (31)	38 (10.1)	155 (41)	
A (70-79.9%)	128 (33.9)	35 (9.3)	163 (43.1)	0.002
B (60-69.9%)	35 (9.3)	17 (4.5)	52 (13.8)	
C (50-59.9%)	1 (0.3)	6 (1.6)	7 (1.9)	
D (40-49.9%)	1 (0.3)	0 (0.0)	1 (0.3)	

Table 3: Academic performance according to BMI

Academic performance	Underweight [n (%)]	Normal weight [n (%)]	Overweight [n (%)]	Obese [n (%)]	P value
A1	6 (1.6)	118 (31.2)	22 (5.8)	9 (2.4)	0.002
A	7 (1.9)	134 (35.4)	14 (3.7)	8 (2.1)	
B	1 (0.3)	46 (12.2)	3 (0.8)	2 (0.5)	
C	0 (0.0)	7 (1.9)	0 (0.0)	0 (0.0)	
D	1 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	
Total	15 (4)	305 (80.7)	39 (10.3)	19 (5.0)	

Discussion:

To the best of our knowledge, we could not find the studies on association between obesity and academic performance in Umerkot, Sindh, Pakistan. The incidence of overweight and obesity was higher in male students compared to females (7.4% and 3.4% versus 2.9% and 1.6%, respectively) in the current study. These findings were similar to the study conducted in Oman, which found that males were more likely than females to be overweight and obese.(18) In the current study, the prevalence of overweight and obesity was lower than in Germany (15% and 6%), Portugal (20.3% and 11.3%) but higher than in Brazil (9.65% and 2.1%).(19, 20, 21) The difference might be related to difference in the sample selection, sample size and study setting. In the present study, the result indicates a positive association between obesity and academic performance $r=0.13$, $p<0.012$. Obese adolescents showed better academic performance. Normal weight students (134) received A grades (70-79.9%), whereas (22; 5.8%) overweight and (9; 2.4%) obese students received A1 (80% or >80%) of the overall marks. Although some studies found in Saudi Arabia, Kuwait andTaiwan that childhood obesity adversely impact on academic performance among students. (2, 15, 17), But our results were contradictory to the previous research demonstrating a significant positive association. Few studies indicate the uncertain association between the obesity and academic performance.(22, 23) Several cross sectional studies obtained the combined result about the correlation between weight status and academic attainment.(4, 17) Most of the studies found non-significant link between obesity and academic performance after adjusting the socioeconomic status.(24, 25) The variation in our results was may be due to risk of biasness in board system result and some other confounding factors such as family back ground, socio-economic status, parental education which were not identified. A systematic review conducted in 2011 suggested that there is no strong evidence to support the association between obesity and academic performance among school aged children.(26) There is insufficient evidence to support the positive link between obesity and academic performance among the adolescents. To clarify this issue, further research will be required.

The strengths of our study included: 1) the teachers were not directly involved in data collection which could lead to participation under coercion, 2) the use of systematic random sampling in a population from multiple settings, and 3) the measurement of BMI and determination of academic performance through administrative records. However, there are some limitations to this study that should be addressed. These limitations include small sample size, cross sectional nature of the study, inclusion of participants from a single city, and lack of data on confounding factors, such as family background, socioeconomic status, and parent's education. These limitations may be addressed in the future by conducting longitudinal studies comprising large sample size, from multiple cities. To clarify this issue, future research should consider the risk factors and interactions that may occur between them.

Conclusion:

This study showed the direct relationship between obesity and academic performance among college students in Umerkot, Sindh, Pakistan. Our data suggested that increase in BMI possibly leads to increase academic performance within college students. However, the present study found that obese adolescent performed better academically. The increase in weight

gain results in better academic performance. The prevalence of obesity and overweight were more common in male than female students.

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Conflict of interest: No competing interest declared.

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Authors Contribution:

Waseem M: Conception & design of the work, the acquisition, analysis & interpretation of data for work.

Kanwal A: Drafting the article

Khilji M: Revising the article, methodology

Batool S: Revising the article, data collection

Ali B: Refining the methodology, final approval

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RESEARCH ARTICLE

Knowledge and precautionary measures related to COVID-19 among university students of twin cities of Pakistan

Maryam Ajaz[1], Mehwish Waseem[1], Shafaq Arif[1], Naila Noor Ehsan[1], Saira Kanwal[1], Abeer Fatima[1]

ABSTRACT

Background: As group activities are integral part of education, precautionary measures are vital to be taken by students to avoid spread of new strains of COVID 19. Perceptions and knowledge of students and their behavior are helpful to restrain the spread of disease.

Objective: To assess knowledge and precautionary measures related to COVID-19 among university students of twin cities.

Methods: It was a descriptive survey which was conducted through Google forms May to December 2020. Both male and female students aged 18 to 25 years, enrolled in different universities of twin cities participated. The data for the primary survey was gathered during the first wave of COVID-19, and for the second survey during the second wave. A total number of 280 male and female students participated in the primary survey. Similarly, 250 participated in the secondary survey. A semi structured questionnaire as Google form was posted on different online platforms (Email, WhatsApp, Facebook pages) which consisted of socio-demographics information; student's sources of information and knowledge regarding COVID and precautionary measures being practiced by them for prevention of disease spread.

Results: Mean age of students participated in study was 22.26±2.58 years in primary survey and 22.68±2.28 years in secondary survey. In primary survey, 23.2% were male participants and 76.8% were females; while in secondary survey 16.8% were males and 83.2% were females. Majority of the students had sufficient knowledge and practiced precautionary measures during both waves of pandemic.

Conclusion: Students of twin cities had sufficient knowledge regarding COVID-19 spread and they were practicing precautionary measures to avoid the disease.

Keywords: COVID-19, knowledge, pandemic, precautionary measures, university students

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Introduction:

COVID-19 has had a serious impact on the dimensions of the health system to carry on with the delivery of health services (WHO). For the care of the patients, health systems in the world are being challenged by the escalating demand. Coronavirus disease is defined as the illness caused by a unique corona virus called severe acute respiratory syndrome coronavirus (SARS-CoV-2).(1, 2) Epidemic affects a mass of populations within a region, population, or community. Epidemic gave rise to pandemic that rolled out to different countries or continents. (3, 4) On January 30, 2020, World Health Organization announced the COVID-19 outbreak a "global health emergency". It has spread so rapidly to different countries that WHO declared it a pandemic. As stated in the modern proof, corona infection is principally passed on by respiratory globules and contact routes. Droplet conveyance takes place when the person is in connection (within 1meter) with someone who has breathing signs and symptoms. There's a high possibility of possessing his/her mucosa or eyes reveal to potentially infective respiratory globules. Conveyance of COVID-19 can occur by face-to-face contact with contagious people and indirectly with facets in the close environment or things used by (spoons, chopsticks) or on (stethoscope or thermometer) the contagious person.(5, 6)

Airborne transmission is distinctive as it mentions the existence of microorganisms within droplet nuclei,

Affiliations: [1]Riphah College of Rehabilitation and Allied Health Sciences, Riphah International University, Islamabad Pakistan.

Correspondence: Mehwish Waseem

Email: mehwish1waseem@gmail.com

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which are regarded to be particles <5μm in diameter. They can last in the air for a long duration of time and be conveyed to others over distances more than 1meter. Precautionary measures were taken by the people. Shops must stay closed but only supermarkets and pharmacies were opened for daily essentials. They must ensure 1meter distance between customers. Schools, colleges, and universities must remain closed and education is transferred to an online learning. Gathering in public places is forbidden in order to minimize the spread of the virus.(7) Persons with COVID-19 show an extensive range of manifestations – ranging from mild to severe. Symptoms may appear in 3-15 days after contracting the virus. Persons with these manifestations may have COVID-19; pyrexia, cough, asthmatic or struggled breathing, chills, tiredness, loss of taste, anosmia, pharyngitis, muscle spasm or throbbing body, migraine, congestion, or rhinorrhea, gagging or throw up, loose motions.(8)

Theory of the Knowledge, Attitude and Practices (KAP) suggests that compliance of society to preventive measures and improvement in their behaviors regarding problem is significantly impacted by the behaviors, understanding, and habits of that society towards the problem.(9) The Increased knowledge regarding modes of disease transmission, understanding and addressing misconceptions and adherence to preventive strategies are vital contributors to the successful implementation to constrain disease spread.(10)

People's awareness and compliance towards the recommended guidelines has a vital role to constrain the magnitude of crisis like COVID. Around the globe, health-care personnel discussed the ways of prevention, management, and minimization of COVID spread and concluded the current guidelines which emphasizes the significance of hand cleaning/washing, social distancing (at least 1 meter), avoiding crowds and not touching the mouth and nose without washing, and major emphasis on respiratory hygiene. While coughing and sneezing, the CDC also strictly recommends covering the mouth and nose, followed by immediate disinfection. As an imperative part of the youth communities are the students, they might influence the wellbeing of their family and friends. In addition, students are the most socially active members of society on social media as well as in the community so they are more vulnerable to catch COVID-19 infection and spread it. During the partial lockdown time, young adults especially student population was observed to visit community spaces such as malls etc.(11) Furthermore, informatory content regarding COVID-19 was dispatched via online platforms including university website, LinkedIn, WhatsApp groups, and Facebook pages. As students have regular access to this, it is essential to estimate whether they are paying attention to the information and adopting precautionary measures shared with them. Therefore, evaluation of their knowledge and practices is essential. This study was conducted to assess the level of knowledge and precautionary measures taken by the university students as they represent the more autonomous but less experienced part of community which may impact the risk of COVID-19 to them and the others.

Methods:

It was a cross-sectional survey, data collected at two points primarily during first wave of pandemic (April to June 2020) and during second wave (October to December 2020). The calculated sample size through Raosoft was 377, while total number of students who took part in the study was 280 [Although response rate was 89% (250/280) in secondary survey]. University students of either gender with age group: 18-30 were included. The questionnaire was adopted from literature. An online google form was created which consisted of demographics, sources of information, knowledge and precautionary measures regarding COVID-19. Permission for the study was taken from Riphah Ethical Committee (RIPHAH/RCRS/REC/01184) and consent was taken from the participant. Snowball sampling technique was employed; Google form was shared to students than they forwarded it to other students in their circle. It was mailed to the participant and link was shared through WhatsApp, Facebook etc. The responses of students were undertaken from April-20 to December-20. Data analysis and study conduction was completed in a period of 8 months. Data was analyzed by using SPSS 21v.

Results:

In current survey, data was taken at two points during 1st and 2nd waves of COVID-19. Response rate was 89% (250/280) in secondary survey. Mean age of students participated in study was 22.26±2.58 years in primary survey and 22.68±2.28 years in secondary survey. In primary survey 23.2% were male participants and 76.8% were females while in secondary survey 16.8% were males and 83.2% were females. Majority of

the students during both surveys (80% and 82%) were taking online classes. 46.8% students in 1st wave and 52.8% during 2nd wave rated their current health status as good.

Table-1: Knowledge about route of transmission

Variables		Primary Survey	Secondary Survey n (%)
Contact via Contaminated object	Agree	196 (70%)	185(74.0%)
	Disagree	35 (12.5%)	44(17.6%)
	Do not know	49 (17.5%)	21(8.4%)
Droplets	Agree	`184 (65.7%)	180 (72.0%)
	Disagree	24 (8.6%)	38 (15.2%)
	Do not Know	72 (25.7%)	32 (12.8%)
Airborne	Agree	140(50%)	123 (49.2%)
	Disagree	78(27.9%)	79 (31.6%)
	Do not know	62 (22.1%)	48 (19.2%)
The primary source of health information	Internet	110 (39.3%)	159 (63.6%)
	Television	90 (32.1%)	42(16.8%)
	Radio	5 (1.8%)	7 (2.8%)
	Family Members	73 (26.1%)	34 (13.6%)
	Other Source	2(0.7%)	8 (3.2%)
How many hours per day spent viewing information about COVID-19?	Less than 1 hour	208 (74.3%)	97 (34.6%)
	More than 1 hour	52 (18.6%)	117 (41.8%)
	2 hours and above	20 (7.1%)	5 (2.0%)

Table 2: Precautionary measures related to COVID-19.

Variables		Primary Survey	Secondary Survey
Covering mouth when coughing and sneezing	Always	206(73.6%)	172 (68.8%)
	Most of the time	58(20.7%)	63 (25.2%)
	Sometimes	10(3.6%)	12 (4.8%)
	Occasionally	1(0.4%)	0 (0%)
	Never	5(1.8%)	3 (1.2%)
Avoidance of sharing utensils (e.g., chopstick) during meal	Always	142(50.7%)	118 (47.2%)
	Most of the time	72(25.7%)	76 (30.4%)
	Sometimes	32(11.4%)	21 (8.4%)
	Occasionally	12(4.3%)	21 (8.4%)
	Never	22(7.9%)	14 (5.6%)
Washing hands with soap and water	Always	228(81.4%)	216 (86.4%)
	Most of the time	46 (16.4%)	31(12.4%)
	Sometimes	2(0.7%)	1(0.9%)
	Occasionally	3(1.1%)	1(0.4%)
	Never	1(0.4%)	2 (0.8%)

Variables		Primary Survey	Secondary Survey
Washing hands immediately after coughing, rubbing the nose or sneezing	Always	134 (47.9%)	95 (38%)
	Most of the time	81 (28.9%)	90(36.0%)
	Sometimes	48(17.1%)	34 (13.6%)
	Occasionally	9 (3.2%)	22 (8.8%)
	Never	8 (2.9%)	9 (3.6%)
Washing hands after touching contaminated objects	Always	184(65.7%)	144 (57.6%)
	Most of the time	67 (23.9%)	69 (27.6%)
	Sometimes	19(6.8%)	20 (8.0%)
	Occasionally	8(2.9%)	15(6.0%)
	Never	2(0.7%)	2(0.8%)
Wearing a face mask regardless of the presence or absence of symptoms	Always	142 (50.7%)	147 (58.8%)
	Most of the time	78(27.9%)	69 (27.6%)
	Sometimes	29(10.4%)	25 (10.0%)
	Occasionally	13(4.6%)	6 (2.4%)
	Never	18(6.4%)	3 (1.2%)
Feeling that too much unnecessary worry has been made about the COVID-19 epidemic	Always	59(21.1%)	48(19.2%)
	Most of the time	108(38.6%)	57(22.8%)
	Sometimes	66(23.6%)	76(30.4%)
	Occasionally	15(5.4%)	32(12.8%)
	Never	32(11.4%)	37(14.8%)
The average number of hours staying at home per day to avoid COVID-19	0-10 hours	41(14.6%)	57(22.8%)
	10-20 hours	57(20.4%)	33(13.2%)
	20-24 hours	182(65.0%)	160(64.0%)

Table 3: Perception of students regarding COVID

Variables		Primary Survey n (%)	Secondary Survey n (%)
Level of confidence in own doctor's ability to diagnose or recognize COVID-19	Very Confident	49 (17.5%)	45 (18%)
	Somewhat confident	121(43.2%)	124 (49.6%)
	Not very Confident	57 (20.4%)	32 (12.8%)
	Not at all confident	17 (6.1%)	2(0.8%)
	Do not know	36 (12.9%)	47 (18.8%)
Likely-hood of contracting COVID-19 during the epidemic.	Very likely	26(9.3%)	17 (6.8%)
	Somewhat likely	90 (32.1%)	86 (34.4%)
	Not very likely	60(21.4%)	76 (30.4%)
	Not likely at all	40 (14.3%)	26 (10.4%)
	Do not know	64 (22.9%)	45 (18%)

Variables		Primary Survey n (%)	Secondary Survey n (%)
Likely-hood of surviving if infected with COVID-19	Very likely	60 (21.4%)	45 (18%)
	Somewhat likely	120 (42.9%)	125 (50%)
	Not very likely	43(15.4%)	29 (11.6%)
	Not likely at all	19(6.8%)	14 (5.6%)
	Do not know	38(13.6%)	37 (14.8%)
Reduction of income during COVID-19 epidemic	Significant reduction	97 (34.6%)	86 (34.4%)
	Some reduction	117 (41.8%)	99 (39.6%)
	No reduction	66 (23.6%)	65 (26%)

Discussion:

In the current study, the concerns and knowledge levels linked to COVID-19 like route of transmission and preventive measures associated to COVID-19 were assessed. In the current study, the major source (63%) of details about covid-19 is internet. Majority of respondents gets regular updates or current information about COVID on internet. In the educational process, to assess practice of precautionary measures for acquiring the disease is the prime step in directing further efforts, which affects the future behaviors.(12) Precautionary measures like hand-washing (86.4%) and staying at home for most of hours (almost 80%) were practiced by students. Study done on medical students in Jordan where hand-washing (87.0%) and staying at home (83.1%) was practiced by participants.(13) Around 50 % students during 1st wave and 58% during 2nd wave considered wearing a face mask always. This is not similar to a recent study done in residents of china where almost all participants (98.0%) admitted to wearing masks before leaving home and this might be due to variation in set of laws imposed by the state and experience of this population in previous pandemics.(14) In the current study, majority of the students agreed that COVID can spread through droplets through contact via contaminated objects and through air. Also majority of the students took precautionary measures like mouth covering while sneezing and coughing, avoid sharing utensils during meal, adequately hand washing using water and soap immediately after sneezing, rubbing nose or coughing, after touching contaminated objects. A similar study was conducted in Rajshahi university students in Bangladesh. Both males and females were involved in the study. The study revealed that students had average knowledge on symptoms, protective way, and transmission of covid-19. Female students were more knowledgeable than male. More than 1/3rd of the students had negative attitude to avoiding public transport and going out to public places with friends and family. More than 1/3rd was not keen to stay at home and avoid going to crowded places.(15)

A cross-sectional study was conducted in a Jordan University to assess the level of knowledge and information sources about COVID-19. Results were similar with that of the current study as majority of students showed good knowledge about COVID-19.(16) Another study was conducted in Pakistan to compare the preventive measures taken by the students and physicians in the era of COVID-19. Results showed similar trends of precautionary measures taken by the students as the current study. There was no specific difference between their preventive measures except that the physicians were using face masks and antiseptic more often than the students.(17) A survey was conducted among Irani medical students to assess COVID-19 knowledge related to COVID, self-reported preventive behaviors and risk perception during the first week of the COVID outbreak and widespread in Iran. They reported high level of knowledge and self-reported preventive behaviors regarding COVID.(18) Current study had certain limitations. Response rate in secondary survey and male student's participation was less. Further studies are recommended for assessment of knowledge regarding new variants of COVID and weather precautionary measures are being practiced continuously or not.

Conclusion:

In this study, both the surveys showed that students of twin cities of Pakistan have sufficient knowledge about transmission of virus and they are adopting the

precautionary measures to help reduce the spread of the disease.

Disclaimer: Study is part of undergraduate thesis work titled "Impact of COVID-19 pandemic on psychological wellbeing of students of Pakistan".

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Authors Contribution:

Ajaz M: Conception, design, data collection, assembly and drafting of manuscript

Waseem M: Methodological design, data analysis, interpretation, critical revision and final approval

Arif S: Conception, design, data collection, assembly and drafting of manuscript

Ehsan NN: Conception, design, data collection, assembly and drafting of manuscript

Kanwal S: Conception, design, data collection, assembly and drafting of manuscript

Fatima A: Drafting, critical revision and final approval of manuscript

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RESEARCH ARTICLE

Self-Usage of antibiotics in medical and non-medical students of Islamabad and Rawalpindi

Najia Zainab Hashmi[1], Jannat Nawaz[2], Suman Sheraz[3], Ayesha Razzaq[3]

ABSTRACT

Background: Self-usage of drugs is defined as the use of the drugs for the treatment of self-diagnosed signs or symptoms and the continued or intermittent use of the prescribed drug for the acute or chronic signs and symptoms. Use of self-medication is normally done when people or consumers don't think the need of visiting a doctor or it might be because they think that they can handle their symptoms on their own**.**

Objective: To determine the practice and usage of antibiotics and its associated factors in medical and non-medical students of Rawalpindi and Islamabad.

Method: The comparative cross-sectional survey was conducted at medical and non-medical faculties of Riphah International University from February- July 2018, comprising students aged 20-30 years. Both genders were selected through non probability purposive sampling. A self-designed questionnaire was used to obtain the data. Data was analyzed through SPSS version 19.

Results: Out of 926 students, practice of self-medication among medical students was higher 324 (35.0%) as compared to non-medical students 261 (28.2%). Practice of antibiotics in males was higher 348 (37.6%) as compared to females 237 (25.6%).

Conclusion: The frequency of self-medication with antibiotics is higher in medical students particularly in male students.

Keywords: Antibiotics use, Medical students, Non-medical students, Self-Medication.

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Introduction:

Self-medication is obtaining and ingesting one (or more) drug (s) without physician advice either for diagnosis or prescription to treat the self-diagnosed disorders and symptoms.(1) The main reasons for self-usage are acute illness, past experiences, socioeconomic status and the availability of drugs.(2) The antimicrobial agents used for the management of bacterial infections are referred to as antibiotics.(3) In the treatment of the viral infection such as flu and cold, antibiotics are ineffective. Antibiotics effectively work either by bactericidal or bacteriostatic action i.e. by destroying the bacterial microorganism, or by inhibiting their growth respectively.(3) Antibiotics misuse/abuse is inconsequential use of antibiotic which is a key factor responsible for the emergence of antimicrobial resistance.(4) As bacteria can reproduce rapidly, resistance can arise quickly . WHO defines antibiotic resistance as “resistance of a microorganism to an antimicrobial drug that was originally effective for treatment of infections caused by it”. This hinders the control of infection and enhances the cost as well as mortality.(3) Antibiotics are of different groups and classes with some side effects. These include nausea, vomiting, cramps and diarrhea, fever, photosensitivity, allergic reactions, blood reactions and the heart problems.(4)

Although antibiotics are available as prescription-only medications, yet they are still used for self-medication. Hence, antibiotics could be supplied from an incomplete treatment course as leftovers, or could also be obtained from relatives or friends.(4) Antibiotics' self-medication practice among university medical undergraduates is significant since they belong to the educated class having access to information regarding health.(5)Literature on antibiotic misuse has revealed that it is neither linked to the education status of individuals, nor it is dependent on the health care

Affiliations: [1]Prime Institute of Health Sciences, [2]Riphah Rehabilitation Center, [3]Riphah College of Rehabilitation & Allied Health Sciences, Riphah International University, Islamabad.

Correspondence: Najia Zainab Hashmi

Email: najiahashmi@yahoo.com

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level of the countries.(6) Infact, nearly 60% of the world's population in developed countries is unaware of the ineffectiveness of antibiotics against viral microorganisms. Different research studies have depicted self-medication as a common issue among college level students in the developing countries, where there is negligence in the firm implementation of the laws related to assigning of prescription only medicines.(6)

Easy access and limited knowledge about self-medication in these groups is likely to carry out antibiotic misuse. Health sciences students are the upcoming generation of health educationists and drug prescribers, and hence it is essential to ensure awareness regarding usage of antimicrobials, particularly antibiotics.(7) Current study was conducted to highlight the practices and self-usage of medicines particularly antibiotics among students of health care sciences as compared to the non-medical students.

Methods:

This comparative cross-sectional study was conducted at 8 different departments of Riphah International University that included Riphah College of Rehabilitation Sciences (DPT/MS), Riphah Institute of Pharmaceutical Sciences (Pharmacy), Islamic International Medical College (MBBS), Islamic International Dental College (BDS), Riphah Faculty of Management Sciences, Riphah faculty of Media Sciences, Riphah College of Social Sciences, Riphah Faculty of Computing. The study was completed in 6 months starting from February-July 2018. Using purposive non-probability sampling, 926 students of both genders participated in this study. The study included the students from the age group of 20-30 years. Medical students of DPT/MS, Pharmacy, MBBS and BDS students whereas non-medical students from Faculty of Computing, Dept. of Sociology, Management sciences and Media sciences participated in the study. The study excluded any person having medication with already diagnosed disease, having communication problems or cognitive problems. Ethical approval (Ref: RIPHAH/RCRS/REC/00442) for study was obtained from research ethics committee of Riphah college of rehabilitation sciences. Informed written consent was taken from the students. After taking informed consent and explaining about the study to the participants, self-structured questionnaire was utilized to obtain data from the participants. Data was analyzed on SPSS version 19. Descriptive analysis was done by computing frequency and percentages of categorical variables. Chi square test was applied for comparing the usage among male and female students

Results:

Out of 926 participants, frequency of the females was 390(42.1%) and the males was 536(57.9%). Mean age of participants was 20.58 ± 1.95 years. Medical students were 495 (53.4%) and non-medical students were 431 (46.4%). A significant association (p value <0.001) was found between non-medical and medical students taking antibiotics with a higher frequency in medical students (Table 1). The most common ailments for the use of antibiotics were cough 5.6%, sore throat 6.0%, fever 12.0%. The selection of antibiotics of the participants was mainly based on recommendation by community pharmacist 8.3%, opinion of family members 11.9% (Table 2). The dosage of antibiotics that the participants knew were by checking the package insert 7.3%, by consulting a doctor previously 23.9%, from previous experience 6.4%. The time when the participants normally stopped using antibiotics was after few days (3-5days) irrespective of the results 13.4%, after symptoms disappeared 20.5%, few days after recovery 12.0%. The common reasons for self-medication were convenience of participants 26%, lack of trust in prescribing doctor 13.5% and 7.5% used them because they were cost saving. Only 23% participants always checked the instructions with the package insert of antibiotics, 32.2% checked sometimes, and 8.3% never checked. Because of using antibiotics, 25.5% participants had an adverse reaction. Out of them, 21.7% participants stopped taking antibiotics because of adverse effects, 5.9% switched to another antibiotic, 19.3% consulted a doctor and 16.6% who did nothing. (Table 2)

Table 1. Frequency of self-medication of antibiotics among medical and non-medical students

Self-medication with antibiotics	Yes	No	P value
Medical students	324 (35.0%)	171 (18.5%)	<0.05
Non-medical students	261 (28.2%)	170 (18.4%)	

Table 2: Descriptive data regarding the usage of antibiotics in medical and non-medical students

For which of the following complaint(s) did you use antibiotics?	
runny nose	35 (3.8%)
others	13 (1.4%)
multiple complaints	231 (24.9%)
skin wounds	27 (2.9%)
nasal congestion	8 (.9%)
cough	52 (5.6%)
sore throat	56 (6.0%)
fever	111 (12.0%)
aches and pain	39 (4.2%)
diarrhea	5 (.5%)
vomiting	10 (1.1%)
Your selection of antibiotics was based on…	
recommendation by pharmacist	77 (8.3%)
opinion of family members	110 (11.9%)
opinion of friends	44 (4.8%)
my own experience	137 (14.8%)
recommendation by net citizens	4 (.4%)
previous doctor's prescription	114 (12.3%)
the advertisement	6 (.6%)
multiple reasons	95 (10.3%)
How did you know the dosage of antibiotics?	
by checking the package insert	68 (7.3%)
by consulting a doctor	221 (23.9%)
by consulting a pharmacist	51 (5.5%)
by consulting family members/friends	41 (4.4%)
from the newspapers, magazines, books, or TV	10 (1.1%)
from the internet	36 (3.9%)
from previous experience	59 (6.4%)
by guessing the dosage, myself	17 (1.8%)
multiple factors	88 (9.5%)
When did you normally stop taking antibiotics?	
after few regardless of the outcome	124 (13.4%)
after symptoms disappeared	190 (20.5%)
a few days after the recovery	111 (12.0%)
after antibiotics ran out	29 (3.1%)
at the completion of the course	69 (7.5%)
after consulting a doctor/pharmacist	38 (4.1%)
others	24 (2.6%)
What was (were) your reason(s) of self-medication with antibiotics?	
cost saving	69 (7.5%)
convenience	241 (26.0%)
lack of trust in doctor	125 (13.5%)
multiple reasons	4 (.4%)

Did you ever check the instructions come with the package insert of antibiotics for self-treatment?	
yes, always	214 (23.1%)
sometimes	298 (32.2%)
never	77 (8.3%)
What did you do for the adverse reactions?	
stopped taking antibiotics	201 (21.7%)
switched to another antibiotic	55 (5.9%)
consulted a doctor	179 (19.3%)
nothing	154 (16.6%)

Discussion:

This study showed that self-medication practice is very common among medical and non-medical students. A lot of studies have been conducted on self-medication which showed the significant use of over-the-counter drugs.(8,9) The current study was carried out to evaluate the knowledge of self-medication among undergraduate medical and non-medical students.

Results of the current study showed a significant difference in practice of practicing self-medication among non-medical and medical students, which was relatively high in medical students. This was supported by another study which concluded that the ratio of self-medication is high in medical students.(10) Another study contradicted the findings of the current study and concluded that the self-medication among the non-medical students was more probably because the study was about the usage of analgesics; however, current study inquired about self-medication with antibiotics usage which is higher in medical students.(11)

Current study showed that most common class of drugs for self-usage is antibiotics and males are more prone to self-medication as compared to females.(12) Most of the studies concluded with same results and reported a direct proportional relation between the percentage of antibiotic self-medication and the level of study and is most common in males as compared to females.(8,13,14)

As mentioned earlier in the current study, frequency of the self-medication is alarmingly high in the medical students as opposed to the non-medical students, the probable reason for this is medical students are more exposed to extensive knowledge of drugs and pharmacology, so they don't think that there is a need to visit a doctor for medicine and lack of time to meet a doctor which is also described as common reason to self-medicate in another study.(15,16)

It has been concluded that medical students have extensive information regarding usage of drugs as compared to non-medical students; still there is high percentage of students who are indulged in the practice of self-medication which necessitates the need of initiating awareness campaigns in Pakistan by health-care providers to address the current problem of self-medication. A fair amount of literature about self-medication in Pakistan is available and still no steps have been taken to resolve this issue. Pharmacists can and should contribute to the counseling of patients when handing out drugs from pharmacies. There were certain limitations of the study; the students were only from a single university and secondly percentage of female participants was low as compared to male participants. The study recommends awareness and learning by health-care providers regarding the consequences of self-medication.

Conclusion:

This study concluded that the frequency of self-medication with antibiotics is higher in medical students. Most common reasons reported by the students for antibiotics usage were multiple complaints, fever, sore throat, and cough. Health-care providers should start awareness and learning campaign regarding the consequences of self-medication with antibiotics. Moreover, and if this study is to be designed in future, researchers must go for a multi-centered study, encapsulating larger number of participants.

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Authors Contribution:

Hashmi NZ: Concept, design, data collection, write up

Nawaz J: Concept, data collection, data analysis

Sehraz S: Data interpretation, critical review, draft, final approval

Razzaq A: Data interpretation, critical review

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RESEARCH ARTICLE

Incidence and etiology of traumatic spinal cord injury in Khyber Pakhtunkhwa from 2010 to 2020: A cross-sectional study

Muhammad Jaffar[1], Mahnoor Ayaz[2], Farhan Haleem[1], Fizah Mahnoor Khan[3], Muhammad Irfan[1], Zohaib Khalid[1]

ABSTRACT

Background: Spinal cord injury (SCI) is a traumatic occurrence that causes motor and sensory deficits for the rest of one's life. Despite many investigators' best attempts to establish genuine therapeutic interactions, traumatic SCI is a traumatic experience after which recovery of function is restricted. Quadriplegia occurs when an injury occurs above the first thoracic vertebra, so both the upper and lower limbs are paralyzed. However, if the lesion occurs below the first thoracic vertebra, paraplegia occurs, and the patient's condition can range from limited lower-limb mobility to total paralysis of both lower limbs.

Objective: To determine the incidence rate and etiology of traumatic spinal cord injuries in Khyber Pakhtunkhwa from 2010 to 2020.

Methods: This is a descriptive cross-sectional study, which was performed at different rehabilitation centers of KPK from September 2010 to November 2020. Patients with traumatic SCI between 2010 and 2020, who were residents of Khyber Pakhtunkhwa, were included while patients with other etiology of SCI or residents of other provinces were excluded from the study. Secondary data was collected through self-structured performa. Using SPSS version 23, the collected data was analyzed to obtain the collected data regarding our topic.

Results: Total of 2022 patients were included in the study; their mean age was 33.3 years. Males were 1631 patients (80.6%), while females were 319 patients (19.3 %). Fall from the height (33.1 %) was the most common cause of SCI which was followed by RTA (26.8%) and fire arm injury (FAI) (21.5 %) respectively. Thoracic (55.29 %) was the most common level injured. Complete injuries were 1588 (78.5 %) and incomplete ones were 429 (21.21 %). Most patients were from Peshawar District (20.7 %).

Conclusion: This study concludes that fall from height was the main cause of Traumatic Spinal Cord Injury, followed by road traffic accidents and firearm injuries. Males were at higher risk of Traumatic Spinal Cord Injury.

Key words: Etiology, Khyber Pakhtunkhwa, Spinal Cord Injury, Traumatic

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Introduction:

Spinal cord is extension of brain stem which runs down to the end of spine within a canal.(1) The spinal cord varies in length, in male it is about 45 cm and 43 cm in female and width ranges from 1.27 cm in cervical region, in thoracic region it is 64 mm and in lumber region it is 1.27 cm. The spinal cord is responsible to controls all the voluntary muscles of trunk and extremities and it receives sensory messages from these parts of body.(2) Spinal Cord Injury (SCI) is a traumatic event that is distressing and results in lasting motor and sensory impairments.(3) Traumatic SCI is a traumatic incident after which recovery of function is limited, in spite of the best efforts did by many investigators to develop realistic therapeutic effects.(3) If injury is above first thoracic vertebra, it results in quadriplegia, i.e. both upper and lower limbs are paralyzed. But if injury is below the first thoracic vertebra then it results in paraplegia and the patient condition can be different from impairment of the lower limb movement to a complete paralysis of both lower limbs. Complete spinal cord injury refers to a complete loss of the body function beneath the injury level. In incomplete injury, there is some movement or feeling still present beneath

Affiliations: [1]City University of Science and Information Technology, Peshawar, [2]Iqra National University, Peshawar, [3]Riphah College of Rehabilitation & Allied Health Sciences, Riphah International University, Islamabad.
Correspondence: Farhan Haleem
Email: farhan.haleem002@gmail.com
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the injury level.(1) Patients with Spinal Cord Injury (SCI) are prone to a variety of medical issues, and almost 95% of patients had at least one medical issue in the previous year. One of the most prevalent problems is a pressure ulcer, which is believed to occur in roughly 25–30% of people with spinal cord injury within the first 5 years, with a lifelong incidence of up to 80%.(1) Pneumonia, septicemia, heart disease, and suicide were among the top reasons of mortality in these investigations, albeit the incidence of each differed significantly between tetraplegia and paraplegia.(4) Pulmonary embolism was another common cause of mortality shortly after an accident.(4) Pressure Ulcers (PU) are a common and expensive secondary consequence of spinal cord injury. It has been identified as one of the leading causes of morbidity and death in people with SCI.(3) Traumatic Spinal Cord Injury (TSCI) can cause motor, sensory, and autonomic dysfunction, all of which can be socially and financially draining for the person.(5) Many factors influence risk of spinal injuries, such as crash type, vehicle type and age.(6) A large ratio of global occurrence data is from developed nations such as Spain and the United States of America.(7) Most cases of TSCI, admitted to acute care hospitals in Netherland, were the Falls 53%, in Spain the road accidents were 39% and in USA sports/leisure activities were 8.39%.(8-10) The epidemiology of TSCI in developing countries is renowned to include transfer associated injuries 41.4% and falls 34.9% respectively.(11,12) In India, electric shock was 4% followed by fall of weighty object transparency is 3%.(13) In Pakistan, 600-700 new concerning cases happened because of the 2005 earthquake, the maximum figure ever reported in natural disaster.(14) Information and data about the causes of SCI is very insignificant but it is quite essential because of higher socioeconomic cost of spinal cord injury. Need of current study is to uncover the etiology of spinal cord injury in Khyber Pakhtunkhwa (KPK) region in the time period of 2010 and 2020. The purpose of this study is to know about the new cases of traumatic spinal cord injury along with their causes which will ultimately draw the government and health authorities' awareness to do some valuable works for the avoidance of spinal cord injury which will ultimately decrease burden of disease on society.

Methods:

This observational cross-sectional study was conducted in Paraplegic Centre Hayatabad Peshawar, Rafsaan Rehabilitation Centre Peshawar, and Helping Hand Institute of Rehabilitation Sciences (HHIRS), Mansehra. After getting ethical approval of study from research ethical committee (Ref No. NCS/PT&R/201/20), secondary data of traumatic spinal cord patients was taken from hospital records with a self-structured performa. Duration of the study was 6 months. Patients with traumatic SCI between September 2010 and November 2020, who were resident of Khyber Pakhtunkhwa, were included, while patients of any other aetiology of SCI or those who were residents of other provinces were excluded from study. A total of 2022 participants were included in study. A total of 1714 patients' secondary data was taken from Paraplegic Centre Peshawar, 256 from Rafsan Rehabilitation Centre and 53 patients from Helping Hand Rehabilitation Centre Mansehra. Data was analysed by SPSS v23. Normality of data was checked by Shapiro-wilk test. Descriptive statistics of all variables were performed on all variables to find frequency and percentage of the mentioned variables.

Results:

A total of 2022 participants were included in the current study. Among which 1631 were males and 391 were females as shown in table 1. The mean age of participants was 33.3 years. Most of the participants ranged from 20 to 40 years. Most of the patients were from Peshawar, 420 out of 2022. Second high rate was from Swat district with a frequency of 166, belonging to Mardan district was on third with a frequency of 158.

Table 1: Demographics

Gender	Frequency(Percentage)
Male	1631(80.66%)
Female	391 (20.34%)
Total	**2022(100%)**

Table 2: shows gender distribution among different causes of SCI

Causes of SCI	Distribution of Gender		
	Male	Female	Total
Road Traffic Accident	467 (23.9%)	74 (3.65%)	541(26.75%)
Ground Fall	12 (0.59%)	9 (0.44%)	21 (1.03%)
Coal Mine	39 (1.92%)	0 (0%)	39(1.92%)
Crush Machine	3 (0.14%)	0(0%)	3(0.14%)
Fire Arm Injury	347 (17.16%)	87 (4.30%)	434 (21.46%)
Natural Disaster	14 (0.69%)	4 (0.19%)	18 (0.89%)
Diving in Shallow Water	50(2.47%)	1 (0.0004%)	51 (2.52%)
Height Fall	520 (25.71%)	150 (7.41%)	670 (33.13%)
Object Fall	163 (8.06%)	56 (2.76%)	219 (10.83%)
Bomb Blast Injury	9 (0.44%)	9 (0.44%)	18 (0.89%)
Animal Hit	7(0.34%)	1(0.04%)	8 (0.39%)
Total	**1631(80.66%)**	**391 (20.34%)**	**2022 (100%)**

The most common SCI cause from 2010 to 2020 in KPK was fall from height 670 (33.1%). The second common cause of SCI was road traffic accidents, 541 (26.8%). fire arm injury was third most common cause of SCI with a frequency of 434 (21.5%) cases. The least causes of SCI were animal hit and machine crush with a frequency of 8 and 3 cases respectively as shown in (Table 2).

Out of total 2022 participants, the highest incidence rate of TSCI was 302 (14.9%) in the year of 2013. Second most cases were registered in 2014 with frequency of 293(14.7%) patients followed by 262 (13.0%) cases, registered in 2011. The least number of cases were found in 2019 with frequency of 21 (1.0%) patients as shown in (Table 3). According to ASIA impairment level, severity is mentioned in complete, incomplete and E (normal) (Table 4).

Table 3: Shows frequency of new cases (incidence) from 2010 to 2020

Year	Frequency
2010	182 (9.0%)
2011	262 (13.0%)
2012	231(11.4%)
2013	302(14.9%)
2014	293(14.7%)
2015	209(10.3%)
2016	183(9.0%)
2017	151(7.5%)
2018	141(7.0%)
2019	21(1.0%)
2020	47 (2.3%)

Table 4: Shows different causes and Severity of SCI as per ASIA scale

Causes of SCI	Severity (According to ASIA Scale)		
	Complete SCI	Incomplete SCI	ASIA E
Road Traffic Accident	423	116	2
Ground Fall	12	8	1
Coal Mine	36	3	0
Crush Machine	2	1	0
Fire Arm Injury	363	71	0
Natural Disaster	13	5	0
Diving in Shallow Water	31	20	0
Height Fall	509	159	2
Object Fall	181	38	0
Bomb Blast Injury	15	3	0
Animal Hit	3	5	0

Discussion:

In the current study, fall from height was the most common cause resulting in TSCI. Many of other researchers have also reported falls as most common cause of traumatic spinal cord injuries such as a study conducted in Netherlands by Marcel W.M. et al stated that about 53% of cases in 2010 were registered with spinal cord injury with a cause of falls.(10) While in the current study, there were 670 (33.1%) cases with history of falls out of 2022 cases. Most of the cases of fall belonged to the hilly areas like from Shangla, Swat, Malakand, Lower Dir, Chitral, Bunir, Upper Dir, Mansehra, etc. Avellanet et al in Spain reported that falls was the most common cause of traumatic spinal cord injuries.(11) Another study conducted by Bilal reported that fall was the most common cause of injury in KPK, Pakistan.(15) A study performed by Ning et al in Tianjin, China falls were the commonest cause of TSCI, accounting 56.9% of the total.(16) A study conducted by N.Mathur in an Indian State also reported falls as the most common cause of TSCI.(8) These aforementioned studies support results of the current study as the current study also found that fall is the most common cause of traumatic spinal cord i.e. 33% as reported by the current study. On the other hand, in some of the studies road traffic accidents (RTAs) were reported as the major cause of traumatic spinal cord injury (TSCI). Similarly, in a study conducted by Dryden et al described that in Alberta, Canada, the most common cause of spinal cord injury was RTA, while they reported falls as the second leading cause in Alberta, Canada.(17) In a study by Zulfiqar et al in Peshawar, Pakistan, reported that the most common cause of traumatic spinal cord injury was RTA, which accounted 50% of the total of their study.(16,18) These studies also are in favor of the current study as the current study also concluded that road traffic accident is the second most common cause of traumatic spinal cord injury which is around 27%. This difference on percentage of cases could be due to different criteria used. The third leading cause in the current study was firearm injury after RTA and fall from height. There is limited literature which reported firearm injury as cause of TSCI. In only one study conducted by Bilal et al concluded that firearm injury could be the third common cause of TSCI.(15) This study supports results of the current study as the current study also concluded that there were 21% reported cases of TSCI which was caused by firearm. The other causes mentioned in current study are object fall with a frequency of 219. There were 39 cases with the cause of coal mine, this included the miners. Ground fall were the cause of 21 cases, diving in shallow water accounted 51 cases, and about 36 cases were registered with TSCI with the causes of bomb blast injuries and natural disasters collectively. Most of the above-mentioned causes are described in many studies from different countries.(14)

There were certain limitations to the current study,

Firstly, there were no proper information provided about the segment injured of spinal cord, only levels were mentioned; secondly, there was no system to avoid duplication of the registered patients as all data was in hard form in hospital records. Additionally, patients injured outside KPK were not included in the study; furthermore, patients, who were dead, were not included in the study. Apart from limitations of studies, there are some recommendations which could really improve our health-care facilities and can also help in decreasing burden of disease over society. First of all, data of spinal cord injury must be stored in soft form to avoid any repetition in data and could manage duplication. Secondly, such kind of the study should be conducted at national level so that the incidence and aetiology could be documented which could really help further in taking positives to overcome those problems. Moreover, Educational seminars should be conducted on TSCI and its causes to increase awareness among people. The last but not the least, every tertiary care hospital should have a proper spinal cord injury unit which could really help in early management and rehabilitation of such patients

Conclusion:

Current study concluded that the common causes of traumatic spinal cord injuries in Khyber Pakhtunkhwa are falls from height, followed by RTA (road traffic accidents) and firearm injury respectively. This might be because most of the patients belonged to the Northern areas of KPK. Machine crush injury in the spinal cord injuries remains a distinguishing cause in KPK. According to gender wise distribution, male gender was at a higher risk of TSCI as mostly males were responsible for outdoor activities and had a greater exposure to the risk factors as compared to the females

Disclaimer: Study is part of thesis work titled "Incidence and etiology of traumatic spinal cord injury in Khyber Pakhtunkhwa from 2010 to 2020: A cross-sectional study".

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Authors Contribution:
Jaffar M: Conception & design of the work.
Ayaz M: Collection and assembly of data
Haleem F: Analysis and interpretation of data
Khan FM: Drafting of article
Irfan M: Critical revision of article for important intellectual content
Khalid Z: Statistical expertise

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RESEARCH ARTICLE

Effects of sensory stimulation training on gross motor abilities in hemiplegic cerebral palsy

Imran Arshad[1], Maria Razzaq[2], Jawad Naweed[2], Sonia Wali[1], Sumaiyah Obaid[2], Falak Hameed[3]

ABSTRACT

Background: Cerebral palsy is treated by various techniques but still more advancement is needed to find out the effects of sensory stimulation training on gross motor abilities in patients with hemiplegic cerebral palsy.

Objectives: To determine the effect of sensory stimulation training on gross motor abilities in hemiplegic cerebral palsy.

Methods: A single-blind randomized control trial was conducted at Al Rehman Hospital Phase II, Gulraiz Rawalpindi, spanning over 06 months from Feb 2019 to Jun 2019. The sampling technique was non-probability purposive sampling, Total sample size was 40, calculated through open epi, and randomly allocated into two groups equally by lottery method. Diagnosed hemiplegic cerebral palsy patients between 4 to 14 years of age, of both genders, did not receive special education and were not treated with sensory stimulation therapy, were included while any medical or surgical treatment before or during the study period was excluded. The Control group received Bobath Neurodevelopmental treatment, while the experimental group received sensory stimulation training by using Rody, swivel Cars, Foam Pogo Stick, Wobble Deck, Platform swing, trampoline, and Spooner board training five days a week for 6 weeks. Data was analyzed by SPSS 21, a Normality test was applied and results showed that data was normally distributed as the p-value of Shapiro-Wilk was <0.05.

Results: Out of 40 hemiplegic cerebral palsy patients, 20 were in the experimental while 20 were in the control group among them 23(57.5%) were females and 17(42.5%) were males. GMFCS before the training in the experimental group was 3.65 ± 0.67, while in the control group was 3.55 ± 0.60 with the P-value of 0.62. After the exercise program, the experimental group was 3.60 ± 0.75, and the control group was 3.60 ± 0.50 with the P-value of 1.00. Within-group analysis showed before and after training P-value was <0.01 in both experimental and control groups.

Conclusion: It is concluded that sensory stimulation training improves gross motor abilities in hemiplegic cerebral palsy.

Key words: Cerebral Palsy, Gross Motor Abilities, Hemiplegic, Sensory Stimulation Training

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Introduction:

Cerebral palsy (CP) is defined as a group of disorders that affect the individual's ability to move and maintain posture. CP is the most common motor disability in childhood. Cerebral means brain and palsy means paresis, weakness.(1) Sign and symptoms of CP can change from patient to patient; however, there are some common disabilities like vision, hearing, speaking and motor control on muscles. Motor loss can be observed by loss of roll, sit, stand, and walk. Other symptoms which are associated with loss of motor control are seizures and the problem with intellectual thinking or reasoning.(2) Mostly CP is due to a complicated pregnancy, delivery and sometimes it is due to a viral attack after the birth.(3) CP can be prevented by immunization of the mother and by the selection of a safe mode of delivery. In addition, it could be prevented by the protection of traumatic brain injuries to avoid neural complications and disabilities.(4)

CP is classified by the motor impairments of the limbs or organ and by restriction to the activities an affected person may perform. To describe the mobility

Affiliations: [1]Abasyn University Islamabad Campus, [2]Riphah College of Rehabilitation & Allied Health Sciences, Riphah International University, Islamabad, [3]Rehman Medical Institute Peshawar.

Correspondence: Maria Razzaq

Email: maria.razzaq1@hotmail.com

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and manual dexterity of people with CP Gross Motor Function Classification System (GMFCS) and the manual ability classification system (MACS) are used. There are three main classifications like Spastic, Ataxic and Dyskinetic, CP. In addition to these three, a mixed type also exists which is the combination of the other three types of CP. The prevalence of CP is high as it occurs in about 2.1 per 1000 live births while the prevalence of CP is lower in pre-term births as it is at 1 per 1000 live births. The prevalence of CP is almost similar in both developing and developed countries across the globe. It has a strong association with poverty as it is more often in poor people. 1.3 times more commonly male child affected with CP as compared to the female child.(5)

According to the international classification of functioning, disability, and health's goal, CP child has multiple disorders and disabilities, so for better treatment, it is treated by a multidisciplinary team approach. Team members are pediatrician, orthopedic surgeon, neurologist, neurosurgeon, physiotherapist, occupational therapist, social worker, a teacher specializing in helping children with visual impairment, educational psychologist, and speech & language therapist.(6) A study was done by Streba JA et al. in 2002, which concluded that GMFM Dimension E (Walking, Running, and Jumping) extended for 12 weeks, following 18 weeks, and remained raised at a month and a half after HBRT. This proposes HBRT which might increase net motor work in CP children, which might diminish the dimension of motor inadequacy.(7,8)

A study was done on properties of a focused treatment package on motor abilities of cerebral palsy children. Treatment improved more than the motor abilities of children in the control group whose active recovery depended on the guideline of standardization of the nature of development. The study concluded improvements in vital gross motor abilities, as estimated by the GMFM in a traditional condition.(9) Limited studies were done on the effects of sensory stimulation training on gross motor abilities in CP; however, no single study was done on sensory stimulation training on gross motor abilities in hemiplegic CP. This study aims to fulfill this gap and introduce sensory stimulation training as a treatment plan for hemiplegic CP patients.

Methods:

A Randomized Control Trial was conducted at Al Rehman hospital Phase II, Gulraiz, Rawalpindi spanning over 06 months from February 2019 to June 2019. The total sample size was 40, calculated through open epi with a 95% level of confidence and 5% risk of error. The non-probability purposive sampling technique was used & randomly allocated into two groups equally (20 in the experimental group, 20 in the control group) by lottery method. Diagnosed hemiplegic CP patients between 4 to 14 years of age, both gender (male and female), CP Child who did not attend a school for special education and CP Child not being treated with sensory stimulation therapy at rehabilitation center were included, while any medical or surgical treatment before or during the study period, and whose parents or guardians, who do not understand the Urdu and English language, were excluded. The Control group received Neuro-Developmental Treatment (NDT) of Bobath which was based on the facilitation of normal postural alignment, movement patterns, developmental and functional activities and sensory feedback (manual contact, visual integration, and somatosensory reinforcement) is essential to recovering function. While the experimental group received sensory stimulation training by using Rody, Swivel Cars, Foam Pogo Stick, Wobble Deck, Platform Swing, Trampoline and Spooner Board training. All these exercises were given five days a week for 6 weeks and assessment was done only before and after the training program. Gross motor function measure (GMFM) is a tool that is used to diagnose the motor functional abilities of children. Data was collected on GMFM through the patient's parents. Approval was taken from Riphah College of Rehabilitation Sciences, the ethics committee of Riphah International University (Ref No. RIPHAH/RCRS/ REC/00428), and the Physiotherapy department of Al Rehman Hospital Phase II, Gulraiz, Rawalpindi. Consent from guardians was taken before enrolling them in the study. Data was analyzed by SPSS 21, a normality test was applied and results showed that data was normally distributed as the p-value of Shapiro-Wilk was <0.01. According to this independent sample t-test and paired sample, t-test was applied. For the assessment of between-group analyses, an independent t-test was applied.

Results:

A randomized control trial was conducted at Al Rehman Hospital Phase II, Gulraiz, Rawalpindi from Feb 2019 to Jun 2019. 40 hemiplegic with CP patients were registered and randomly allocated into experimental and control groups. 20 were in the

experimental while 20 were in the control group and among them, 23(57.5%) were females and 17(42.5%) males. GMFCS before the training in the experimental group was 3.65 ± 0. 67, while in the control group was 3.55 ± 0.60 with the P-value of 0.62. After the exercise program, the experimental group was 3.60 ± 0.75 and the control group was 3.60 ± 0.50 with the P-value of 1.00. (Table 1) between-group analysis for the Gross motor functional measure is given in table 2. Within-group analysis showed significant difference (P<0.001) for GMFCS and GMFM (all areas of motor ability) in experimental and control groups.

Table 1: independent sample t test for gross motor function classification scale

Assessment Time	Group	N	Mean ± Std. Deviation	Sig. (2-Tailed)
Before Exercise Program	Experimental	20	3.65 ± 0. 67	0.62
	Control	20	3.55 ± 0.60	
After Exercise Protocol	Experimental	20	3.60 ± 0.75	>0.05
	Control	20	3.60 ± 0.50	

Table 2. Independent sample t test for gross motor functional measure

	Group	N	Mean ± Std. Deviation	Sig. (2-Tailed)
Lying And Rolling Before	Experimental	20	43.75 ± 2.045	<0.001
	Control	20	46.90 ± 2.62	
Sitting Before	Experimental	20	51.20 ± 2.49	0.45
	Control	20	51.95 ± 3.60	
Crawling Before	Experimental	20	35.85 ± 3.01	0.96
	Control	20	35.85 ± 3.37	
Standing Before	Experimental	20	30.45 ± 2.55	0.20
	Control	20	31.80 ± 3.85	
Walking Running Jogging Before	Experimental	20	64.65 ± 2.57	0.08
	Control	20	66.40 ± 3.56	
Lying And Rolling After	Experimental	20	48.25 ± 2.17	0.14
	Control	20	47.10 ± 2.62	
Sitting After	Experimental	20	55.90 ± 2.85	1.00
	Control	20	55.90 ± 2.85	
Crawling After	Experimental	20	38.90 ± 2.32	0.28
	Control	20	38.10 ± 2.32	
Standing After	Experimental	20	35.90 ± 2.32	0.28
	Control	20	35.10 ± 2.32	
Walking Running Jogging After	Experimental	20	69.05 ± 2.17	0.89
	Control	20	68.95 ± 2.31	

Discussion:

The current study has included 40 hemiplegic CP patients and found the positive effects of sensory stimulation training on gross motor functions. Sensory stimulation was given by the bobath NDT technique and by using Rody, Swivel Cars, Foam Pogo Stick, Wobble Deck, Platform Swing, Trampoline, and Spooner Board. The results prove that sensory stimulation

improves motor strength on GMFM and GMFCS. In a recent investigation, 42.5% were male and 57.5% were female children. GMFCS after treatment plan just an exploratory gathering demonstrates p value< 0.01 and mean ± SD was 1.85 ± 0.67. A previous study was done with the title of "Effect Evaluations in Children with Cerebral Paralysis, Part I: enlightening qualities of GMFCS Levels I to III" by Oeffinger D et al. in 2007, and they concluded that gross sensory training indicates more improvement with GMFCS and GMFM having p-value <0.01, as its outcomes are critical to current examination.(10)

Another study was done by Mintaze Kerem Gunel, Akmer Multu et.al. in 2009 which concluded that sensory training increases the gross motor function abilities as GMFM indicates huge improvement with GMFCS having a p-value <0.01, as its outcomes are noteworthy to the current examination. Recent study indicates improvement with GMFCS after treatment plan just in experimental group with p-value < 0.01 and mean ± SD was 1.85 ± 0.67. Previous study results are significant to the current investigation.(11)

In the same way, another study was done by Cheweihsu, Yi-No Kung et.al. in 2019 with the title of The Impact of Therapeutic Exercise Intensity on Cerebral Palsy. GMFM scores in the children, who got the corrective intervention, did not demonstrate altogether more prominent improvement than those of the children who got standard consideration. In the current investigation, just standard consideration was evaluated by GMFM and showed more improvement with p-value < 0.01 and mean + SD was 1.85 + 0.67. Results of the previous study correlate with the current study.(12)

Another investigation done by Jonathan Noble, Martin Gough et all in 2018 with the title of "specific motor control and gross motor work in reciprocal spastic cerebral paralysis" concluded that GMFM was associated with SCALE (r=0.90, p≤0.001) and lower limb muscle volume standardized to weight (r=0.750, p=0.008). MAS was altogether connected with GMFM-66 (r=−0.69, p=0.01). The present study's GMFM indicates more improvement in the experimental group as compared to the control group with a p-value < 0.05. This study concluded that they included particularly spastic CP children while in the present study hemiplegic CP children were combined effects.(13)

Another previous study was done by Derek John Curtis, Pauline Holbrook et.al. in 2018 with the title of functional change in children with cerebral palsy and concluded that more improvement in all results. GMFM improvement increases those expected from the distributed reference, particularly for the children with a progressively life-threatening cerebral paralysis. Better improvement increases the normal standard, particularly in those children with increasingly serious gross motor function handicaps. A recent study proves significant functional improvement as well. The previous study's results are similar to the current study, the significance of the current study having p-value < 0.01and mean ± SD were 1.85 ± 0.67.(14)

It is very difficult for the patients to follow up the session properly on time. As the study population was drawn from one hospital, the population is quite homogenous, and any generalization of the results has to be made cautiously. It is recommended that the study should include a larger sample size so generalizability of results could be achieved.

Conclusion:

It is concluded that sensory stimulation training on gross motor abilities shows significant improvement in hemiplegic CP especially in sitting and standing.

Disclaimer: Study is part of thesis work titled “Effects of sensory stimulation training on gross motor abilities in hemiplegic cerebral palsy”.

Conflict of interest: None to declare.

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Authors Contribution:
Arshad I: Conception & design of work.
Razzaq M: Drafting of article
Naweed J: Collection and assembly of data
Wali S: Analysis and interpretation of data
Obaid S: Critical review of article for important intellectual content
Hameed F: Statistical expertise

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