



PAKISTAN JOURNAL OF REHABILITATION

ISSUE : 02
VOL : 08

ISSN: 2311-3863



PUBLISHED BY

ZIAUDDIN UNIVERSITY



PAKISTAN JOURNAL OF REHABILITATION



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EDITORIAL

SPORTS SCIENCE: ENHANCING VERSATILITY IN REHABILITATION SCIENCES

Being relatively fresh discipline, sports science has gained popularity in the last quarter of the 20th century; it reflects the seriousness with which sports and fitness are approached in the present day. Sports science is quite multidisciplinary field that sightsees the biomechanical, physiological and anatomical variations happening in sportsperson psychological effects to scrutinize the performance nutritional values to significantly prepare the body and also managing the financial and operational needs to enhance the business in sports industry.

Sports science, is a blend of multiple fields that primarily relies on the scientific principles of exercise training and performance. It inculcates the athlete with the biomechanics, anatomy, physiology, psychology, nutrition and many other elements that work in combination to enhance the sports performance.

From the past two decades Pakistan is pushing hard to create a mark internationally in sports industry, although it started approximately 60 years ago. Physical education, Health and Sport sciences have increased resourcefulness in the dynamics of rehabilitation practices. Sports has been an integral part of Pakistani culture, around sixty years back Pakistan sports board (PSB) was created to bring in structural organization and promote fields like cricket, hockey, squash and polo along with the other traditional sports. The role of PSB was only to promote the participation in sports and promote opportunity for sports activities but physical education and sport sciences as subject for education was rudimentary.

The growing trend in sports activities is proportional to health and fitness thus generating demand of advocacy in sports sciences and physical health. To promote sustainability or improvement in the performance, education in sport science has played significant role. In today's era sports is no longer just a leisure but a career, mode of treatment, way of meditating oneself and participation in sports promote socialization too. In short, it covers the physical, mental and social aspects of health.

Sport activities in Pakistan have been increasing since last few years that include participation of both men and women at national and international level but due to lack of resources, technology and experts in sports sciences the goal is yet to achieve. Most of the sports are still in their pre mature developmental phase mainly because of the lack of education, and thus Pakistan is not much successful in competing in international sports events and Olympics. The field of sport sciences is escalating with each passing year so as the need of education.

Ziauddin University, department of Rehabilitation Sciences has taken a lead and under its umbrella along with physical therapy and occupational therapy, physical education, health and sport sciences is also introduced. Physical Education, Health and Sport Science is offered as a discipline in many colleges and universities that encompasses theoretical knowledge as well as hands-on skills along with lab and field work. Ziauddin College of Rehabilitation Science offers four-year degree programme as well as two years associate degree programme. The prime ambition of the programme is to develop and harvest the students in such a way that they would be able to combat with the challenges of the modernization and continuously changing world with a focus on physical performance, activity and health. By going through the process it will enhances the human sporting exhibition at the higher level. During the academic training, students will learn basic science subjects and gain the knowledge regarding kinesiology, philosophical basis of physical education, health and sports sciences, biomechanics, anatomy, exercise physiology, basics of games and gymnastics and later involves the sports training, field work, management and psychological aspects of sports training. In the same course of time student will receive specialize training regarding the injury prevention, enhancing activities and performance and capabilities of the athlete. Specialized field trips and sports rotations will be provided to the graduates to develop versatility.

A graduate from Physical Education, Health and Sports Sciences will see themselves working as an elite sports trainer, coach, exercise and conditioning specialist in sports performance industry, and help the athletes to compete efficiently to achieve new records in various sporting events and battleships.

It has now become the most demanding profession among the health industry. The employment possibilities in this domain has a lot adaptability, from player to coach, sports manager, fitness instructor, sports journalist, athletic trainer, personal coach or an entrepreneur. There is an association between the physical health

educator and rehabilitative professionals; they may utilize their expertise in Cryotherapy, Thermotherapy, and Electromagnetic Therapy etc. They may work for all age groups across the life span.

Globally as well as locally physical education, health and sport science has multi career opportunity. The lifestyle of modern era human utmost need is to keep themselves not only in good physical shape but also healthy. Pakistan has Blue Ocean for the career of physical education, health and sport science since it's not been explored yet, all major hospitals, multinational companies, international and local firms are promoting physical educators or sport science graduates to be a part of their team. It's definite that the scope of physical health education and sport sciences has remarkable future in upcoming years with versatility in career field of rehabilitation sciences.

Muhammad Usman Khan

Assistant Professor / HOD Physical Education, Health and Sports
Sciences
Ziauddin College of Rehabilitation Sciences
Ziauddin University

LETTER TO THE EDITOR

VALIDATION OF STANDARDIZED INSTRUMENTS IN EVALUATING SPEECH-LANGUAGE DISORDERS: A CHALLENGE FOR CROSS-CULTURAL SETTINGS

Communication has a meaningful impact between clinician and client in order to comprehend each other's language for effective therapeutic recovery and health related outcomes¹. Standardized tests are considered as one of the primary assessment tools used by a speech language pathologist to evaluate and diagnose child language impairment².

Test is administered upon the child where functional performance and scores reveals either the typically developing language skills or if an in-depth evaluation is required in any of the language domains³. Making use of the data and analyzing the child's expressive/receptive language skills that lags behind when compared to norm referenced data; if the child is par their chronological age or below their mental age⁴.

Within Pakistan; Standardized tests of West are been used constructed in English language which governs specific rules and regulations⁵, as per the instructions manual it is a crucial and most important aspect to follow but those rules are often not abided when stimuli repetition is observed due to lack of understanding of conventional words (Native words or names) used; English language is changed in their native language due to cultural biasness while selecting low confidence interval eventually affects the true reliability and validity of the test administered⁶. Moreover, unstructured assessment due to self-variations of Standardized Protocol leads to unfavorable treatment planning and therapy outcomes⁶. Semantic-syntactic utterances the child elicits in critical developing language age shall be considered while keeping in mind the approximate ranges of typically developing child status relevant to our native language when compared to the same aged peers relating the chronological and mental ages of the child in our population is still undocumented⁷. Analysis of native language development packed with evidence based knowledge and practice are unfortunately still the areas needs to be thoroughly survey and to be researched upon in Pakistan.

Consecutively, I would like to draw an attention of the clinicians/ researchers for an utmost need of practicing guidelines considering norm-reference standardized tests in native language. Moreover, comprehensive analysis of language milestones in acquisition of linguistic pattern is crucial in the field. Therefore, fundamental basis of designing and formulating standardized tests should be based on prerequisites for the validation of the tool in native language across cross-cultural settings.

Zahra Ibrahim

Student BS Audiology & SLT

Ziauddin College of Speech, Language and hearing Sciences

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SYSTEMATIC REVIEW

EFFECTS OF FREQUENT KNEE BENDING AND OCCUPATION RELATED RISK FACTORS WITH KNEE JOINT PATHOLOGIES - A SYSTEMATIC REVIEW

ABSTRACT

BACKGROUND AND AIMS

Knee pathologies are one of the most common musculoskeletal ailments with high rate of prevalence of degenerative knee changes causing functional limitations and participation restriction. Number of occupational exposures has shown positive correlation to Knee OA, associated with varying occupations and their demands.

DATABASES AND ELIGIBILITY CRITERIA

The observational studies were searched on the databases MEDLINE, PubMed, Google Scholar, PEDro and Cochrane Library from April to May 2019. It was ensured that all articles were full-text in English language whereas screening was executed on relevant titles and abstracts, evaluated on the basis of occupational hazards/risk factors and its impact on knee joint.

RESULTS

Number of studies represented varying occupational clusters that lead to certain risks factors according to demand. A positive relationship was indicated between age and Knee OA, along with squatting and knee pain that may results in elevated risk of disability and knee joint pathologies.

CONCLUSION

It was concluded that occupational exposures involved certain risk factors that may altered the knee joint function and increases the risk of Knee OA for future.

KEYWORDS

Knee Joint, Knee Injuries, Occupations, Risks, Health, Osteoarthritis.

Munira Mukadam

Lecturer
Ziauddin College of Rehabilitation
Sciences
Ziauddin University
Muniraali_@hotmail.com

Mahnoor Khursheed

House Officer
Dr. Ziauddin Hospital
mahnoorkhursheed@yahoo.com

[Mukadam M, Khursheed M.
Association of frequent knee bend-
ing and occupation related risk
factors with knee joint pathologies.
Pak. J rehabil. 2019;8(2);4-11]

INTRODUCTION

Knee pathologies are one of the most common musculoskeletal ailments in male and female affecting middle or late adulthood with high rate of prevalence of degenerative knee changes¹. In this context, Knee Osteoarthritis (OA) is reported to be world's 11th most disability which causes functional limitations and participation restriction in affected individuals². Moreover, knee pain and OA are also found to be common with chronicity that may lead to loss of work/job, joint surgery or disability³. Number of studies has been conducted to identify factors causing degenerative changes in the knee, some of which include obesity, poor lifestyle, injuries and nutritional deficiency⁴. Other risk factors such as age, being overweight (BMI>26), job-related activities; elevated levels of physical activity and mal-alignment of knee joint are the most predominant risk factors⁵. In addition, studies also suggested genetic component and sex as a possible risk factor, reporting higher prevalence of knee osteoarthritis in women over the age of 45 years³⁻⁵. However, among these risk factors knee bending has been proven to show a strong association with knee pathologies that may cause cartilage damage and meniscal lesions⁴. A review suggested that multiple risk factors are associated with varying occupations such as traumatic joint injuries, either direct or repetitive trauma activities, and decreased muscles strength etc⁶. In particular, it may lead to transfer the stress and shear forces to bony structures during repetitive squatting, bending or other movements causing knee pain and joint structure deterioration⁷. Despite, mechanisms linking occupation to OA are believed to be biomechanical factors⁷⁻⁸.

Previous studies showed that many occupations required tasks that involve abnormal load bearing on the lower extremity may lead to development of hip and knee osteoarthritis⁹⁻¹⁰. Many occupation-related activities cause physiological to anatomical changes in knee joint that are usually due to changing of biomechanical characteristics of the human body⁹⁻¹¹. According to a study, occupations which require squatting, carrying, heavy weight lifting, multiple sit ups with dairy farmers, factory workers and labors lead to adaptive changes in knee joint that gradually increases the risk of degenerative changes in knee¹²⁻¹³. Moreover, it has also been observed that long distance runners are prone to development of knee pain and articular changes in knee while athletes who played soccer are at high risk of developing occupation-related knee pathologies in comparison to non-players¹⁴. Furthermore, lifting of heavy loads is reported to be one of the most common occupational risk factor leads to the development of pathologies in several anatomical locations of the body involving knee¹⁵. Although, occupational factors are extensively studied in the formation and progression of knee

osteoarthritis, synovitis and other degenerative processes which undergo the influence of high physical stress activities¹⁶. Number of studies demonstrated that under high stress conditions, frequent and repetitive knee bending during different occupational activities such as squatting and heavy lifting that occurs with manual workers causes repetitive trauma to knee structures that leads to frequent pain in knee joint¹⁷⁻²⁰. Moreover, prevalence of knee pain was highest among all the musculoskeletal pain as reported in the study²¹. Several studies reported that activities which require flexion of the knee joint beyond 90 degrees are believed to exert a greater amount of load across the whole knee joint which potentially damages the articular cartilage and other soft tissues of knee. Thus, excessive loading and frequent knee bending during any occupational or daily living activities increases the risk factors in pathogenesis of knee joint leading to occupation-related knee pathologies²². As for Knee OA, certain risk factors have been identified but are not well-established due to lack of studies according to specific occupations and its hazards. Several studies has also indicated that work-related activities increased pressure on the joint surface thereby high mechanical stress due to squatting, kneeling, lifting and stairs climbing is a crucial risk factor in an occupation²³. Moreover, considerable number of systematic reviews has evaluated increased risk of Knee OA due to varying occupational clusters and their demands. Despite of the fact, limited number of studies has analyzed dose-response relationship between occupational hazards and Knee OA that should be considered as an important argument in order to infer causality.

Several studies have proposed limited number of treatment options that predominantly included NSAIDs (Non-steroidal Anti-Inflammatory Drugs) for the management of knee pain and weight in order to reduce mechanical stress across joint²⁴⁻²⁵. Moreover, as the disease progress, surgery inclusive of total knee replacement is an optimum option for patient recovery, however the pathology is irreversible and have gradual progression therefore underscores importance of preventative measures²⁶. Consecutively, multiple options are available to consider potentially modifiable occupational risk factor as this systematic review only included observational studies that demonstrated occupational clusters, related risk factors and study outcomes. Further reviews are therefore should be conducted as limited quantitative analysis would be helpful to identify occupational activities in context of known risk factors and its impact on knee joint.

METHODOLOGY

The systematic review has followed Preferred Reporting Items for Systematic Reviews and

Meta-Analyses (PRISMA) guidelines.

Searching Strategy and Databases

The authors identified and searched studies on learning resource centers and electronic databases that included MEDLINE, PubMed, Google Scholar, PEDro and Cochrane Library. The databases were searched from April to May 2019 by using keywords such as "Knee Joint Pathologies", "Knee Pain", "Knee Osteoarthritis", and "Occupational Hazards/Risk Factors." Titles or abstracts were thoroughly reviewed and were excluded if not relevant to specified terms.

Eligible Studies and Characteristics

The observational studies included "Cross-sectional", "Cohort", "Longitudinal" and "Exploratory" designs that were selected from the tenure of 2012 to 2019 respectively. It was ensured that all articles were full-text in English language; however studies with a language barrier were excluded.

Study Selection and Data Extraction

Screening was executed on relevant titles and/or abstracts were included in the systematic review. All studies were evaluated on the basis of occupational hazards/risk factors and its impact on knee joint. Furthermore, risk and exposure (Odds Ratio/Relative Risk) was also identified in relevance to knee loading and kinematics comprised of occupational activities (squatting, weight lifting, kneeling, long sitting with bent knees, stairs climbing, running and long standing). Whereas, outcomes on prevalence, MRI, radiographs were also considered. Moreover, the sources of all the articles were assessed. Whereas list of references of all identified pertinent studies were also searched.

Quality Appraisal

The quality of the involved studies was assessed and risk of bias was measured on six domains comprised of funding and conflict of interest, outcome assessment, exposure assessment, confounding factors, attrition and analysis (adapted from Verbeek et al¹⁷).

RESULTS

Selection of Studies

A total number of 40 records analyzed from learning resource centers and databases. The articles relevant to context of objective were identified for screening on the basis of eligibility. Only 12 full-text observational studies conducted during 2012 to 2019 were included as shown in Figure-1.

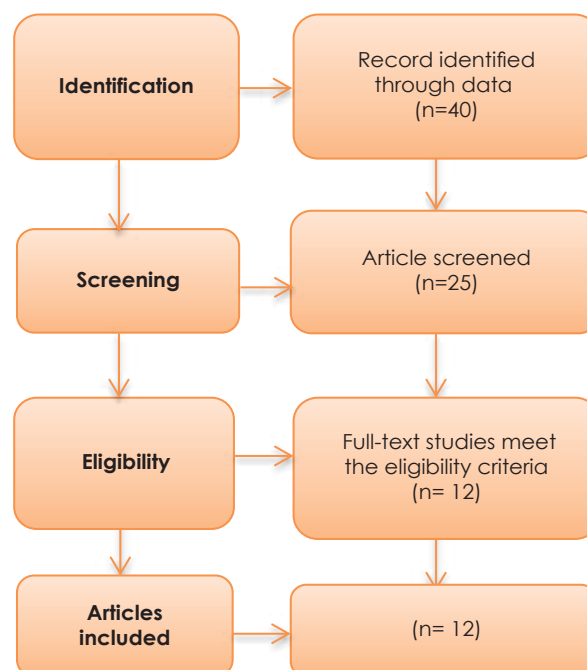


Figure.1 Flow diagram on identification and screening of eligible studies for inclusion

Study Characteristics

Total 12 observational studies were included in the study that included number of cohort and cross-sectional designs, however only one study is longitudinal and exploratory respectively. Occupational exposures in different occupations were identified and its impact on knee joint was screened to determine the outcomes related to knee joint pathologies.

Synthesis of Studies

All the studies represented large sample size except Kajakas et al¹¹ 2018 who conducted an exploratory study on a relatively small sample. A number of studies^{1,4,7,8,10,11,12,19,20,27,28,29} represented varying occupational clusters inclusive of office workers, professional players, manual occupations and labors (highest to lowest) that lead to certain risks factors according to demand while occupation was unidentified in some studies^{4,11,12,19,20}. It was observed that occupational exposures consisted of obesity, prolonged working hours, extensive workload and existing knee pathologies that may increase the risk of knee joint pathologies, in particular, Knee Osteoarthritis. Similarly, Fernandes et al⁸ and Barbour et al¹² represented high level of physical activity as a crucial risk factor that may leads to elevated risk of OA. Whereas, Ezzat et al²⁰ determined a dose-response curve on Cumulative Occupational physical load (COPL) for Knee OA that was effective to evaluate the outcome. Besides, Van et al⁴, Kajakas et al¹¹ and Virayavanich et al¹⁹ indicated that frequent knee bending, prolonged kneeling and loading may also induced the risk of meniscal lesions, cartilage damage and

synovitis that may alters gait parameters. While study of Solovieva et al²⁸, Rachmi et al²⁹ and Hawamdeh et al²⁷ indicated a positive relationship between age and Knee OA, along with squatting and knee pain that may results in elevated age-adjusted risk of

disability and OA. Although, exposures (Odds Ratio/Relative Risk) were identified but not included in the study analysis while unidentified occupation in studies also serve as limitation. The characteristics of studies are depicted in Table-1.

Table.1 Characteristics of included studies (n=12)

Author (Year)	Sample Size (n)	Study Design	Occupation	Risk Factors	Outcomes
Daneshmandi et al ¹ (2017)	447	Cross-sectional	Office Workers	Prolonged sitting behavior	Knee pain
Leung et al ⁷ (2018)	63,257	Cohort	Unidentified	Extended duration of physical activity	Knee OA
Fernandes et al ⁸ (2018)	470	Cross-sectional	Retired Professional Footballers	Knee Injury	Knee OA were two to three times higher in footballers
Van et al ⁴ (2018)	594	Cohort	Unidentified	Knee OA	Hoffa/Effusion Synovitis due to prolonged kneeling
Solovieva et al ²⁸ (2018)	1,135, 654	Cohort	Manual Occupations	Education and physical workload factors	Elevated age-adjusted risk of disability retirement as a result of hip OA
Rachmi et al ²⁹ (2018)	117	Cross-sectional	Dairy Farmers	Prolonged working hours	A positive relation between knee pain and the squatting work position
Seok et al ¹⁰ (2017)	9,905	Cross-sectional	Manual labor (highest to lowest)	Physical labor can induce and develop OA	Knee OA dependent upon the occupational clusters
Kajakas et al ¹¹ (2014)	10	Exploratory	Unidentified	Knee OA	Sustained static deep-knee flexion kneeling alter knee joint gait parameters
Barbour et al ¹² (2013)	1,522	Cohort	Unidentified	Incident knee radiographic OA (ROA) and Incident knee symptomatic ROA (sROA)	Elevated risk of knee OA in individuals with highest level of physical activity
Virayavanich et al ¹⁹ (2013)	115	Longitudinal	Unidentified	Increased risk of progression of cartilage and meniscal lesion	Frequent knee bending were more likely to show progression of cartilage damage and meniscal abnormalities
Ezzat et al ²⁰ (2012)	327	Cross-sectional	Unidentified	Cumulative Occupational physical load for Knee OA	A dose response relationship between Cumulative Occupational Physical Load (COPL) and Symptomatic Radiographic Osteoarthritis (SOA)
Hawamdeh et al ²⁷ (2013)	214	Cross-sectional	Private and Government Employees	Knee OA	Moderate positive correlation between age and radiographic severity of KOA

Risk of Bias in Studies

All the studies^{1,4,7,8,10,11,12,20,27,28} showed low risk of bias in domain of funding and conflict of interest except Rachmi et al²⁹ 2018 that showed high risk. Leung et al⁷ 2018 showed high risk of bias, Solovieva et al²⁸ 2018 and Ezzat et al²⁰ 2012 showed Unclear risk in outcome assessment. Moreover, Rachmi et al²⁹ 2018, Kajakas et al¹¹ 2014, Barbour et al¹² 2013 and Hawamdeh et al²⁷ 2013 showed high risk of bias in exposure assessment. Studies of Leung et al⁷ 2018, Rachmi et al²⁹ 2018, Kajakas et al¹¹ 2014 Ezzat et al²⁰ 2012 and Hawamdeh et al²⁷ 2013 also showed high risk of bias in the domain of confounding factors. Attrition was found to lacking in nearly all the studies^{1,4,8,11,20,27,28} except Leung et al⁷ 2018, Seok et al¹⁰ 2017 and Barbour et al¹² 2013 that showed unclear risk. However, analysis was found in all studies^{1,4,7,8,10,11,12,19,20,27,28,29}, hence showed low risk of bias as demonstrated in Table-2.

DISCUSSION

This systematic review demonstrated significant occupational hazards, affecting knee kinematics that may progress to knee pain, OA or other pathologies. The analysis of total 12 studies revealed positive relationship between different occupation and knee problems. A study compared the outcomes for knee pain between physically active programmers and inactive students found high rate of knee pain among the programmers due to long term knee bending¹. Similarly, findings of another study revealed that during squatting there is a significant effect on knee angle especially at 60 and 90 degrees of squatting produces greater amount of compressive forces that act at the Patellofemoral joint^{11,19}. In addition, these forces produces friction and excessive stress on the soft tissues that leads to early osteoarthritis and bursitis of the knee, although this squatting posture is used in number of occupations that may occur as risks for knee pathologies^{11,19}. Furthermore, a study assessed the effects of occupational kneeling on specific compartment of knee joint, considering Patellofemoral joint and the Tibiofemoral joint showed that there is an association between occupational kneeling and degenerative changes in the knee joint especially in the trade seniority²⁸⁻²⁹. Similar to this, findings of another review stated that participation in certain sports can cause knee joint osteoarthritis especially in the participants who were involved in soccer; elite-level long-distance running, weight lifting and wrestling should be targeted for risk-reduction strategies as they had an increased rate of prevalence of knee pain and osteoarthritis⁸. Moreover, another study suggested an effective use of a Whole Organ MRI to detect knee cartilage lesions; this was confirmed by an experiment that analyzes the effect of repetitive knee bending due to stair climbing, knee, squatting and weight lifting on daily basis^{12,20}. It was concluded that there is a high prevalence of knee cartilage damage due to frequent and repetitive knee bending with an increased risk of progression to further damage or meniscal lesions⁸.

Knee bending activities are statistically known to cause degenerative diseases in the knee joint including synovitis⁴. The terms used to describe various sounds around the knee joint including popping, catching, clicking, snapping, crunching or grinding etc. Previous studies have investigated the mechanism related with changes in the knee leading to crepitus¹⁻⁵. However, it has been observed that long term knee bending especially during long sitting in the office workers have been reported to cause the sound⁴. This knee crepitus in such occupations is an initial indication of future knee pathologies either in the bony structures or in the synovium or soft tissues of the knee joint^{4,27}. Similarly, for manual laborers kneeling and squatting accompanied with heavy weight lifting has been reported to have routine postures for their daily life showed an increased prevalence and elevated risk of knee meniscal injuries, degenerative knee pathologies and knee cartilage wear and tear that were significantly associated with these routine postures of laborers¹⁰. This derives strong evidence regarding occupational postures that specifically involved knee bending has frequent and long term association with development and progression of knee problems¹⁰. Multiple studies have reported occupational activities as risk factors for Knee OA and pain^{1,7,4,27}. However, yet several studies were based on qualitative analysis only few are quantitative, therefore more studies required to be conducted on variety of risk factors and hazards for optimal values in the literature³⁰⁻³¹. A meta-analysis, conducted on 51 studies with more than 5 hundred thousand sample size concluded that variety of occupational factors are associated through biomechanical pathways thereby increases the risk of Knee OA up to 60%³⁰⁻³². Similarly, a smaller groups of studies in a review demonstrated a risk of persistent knee pain that may derived from different occupational exposures^{11,30}. It was observed that hospital-based studies yield increased risks of Knee OA in comparison to community-based studies³⁰⁻³³. This increased risk provides estimation may be due to occurrence of one more diseases. Therefore, where occupational risks factors were not screened as a primary outcome, the risks for Knee OA might have occurred due to secondary complications³⁴⁻³⁵. In conclusion this systematic review is entirely based on limited number of observational studies, based with varying occupational clusters and outcomes. Moreover, full-text articles in English language was included only, thus number of studies had been excluded due to language preference. Furthermore, studies also unable to report ethnic difference in occupational risk factors that may serve as an important factor in analyzing the exposure. In addition, biomechanical pathways can also be considered for an effective approach in risk factor analysis and outcome. Therefore, quantitative analysis consisted of multicenter trials or experimental studies are required considering exposure analysis and interpretation to identify occupational hazards and its impact on knee joint and related pathologies.

Table.2 Risk of bias of studies for six domains (n=12)

Studies	Funding and Conflict of Interest	Outcome Assessment	Exposure Assessment	Confounding Factors	Attrition Bias	Analysis
Daneshmandiet al ¹ (2017)	+	+	+	+	-	+
Leung et al ⁷ (2018)	+	-	+	-	?	+
Fernandes et al ⁸ (2018)	+	+	+	+	-	+
Van et al ⁴ (2018)	+	+	+	+	-	+
Solovieva et al ²⁸ (2018)	+	?	+	+	-	+
Rachmi et al ²⁹ (2018)	-	+	-	-	-	+
Seok et al ¹⁰ (2017)	+	+	+	+	?	+
Kajakas et al ¹¹ (2014)	+	+	-	-	-	+
Barbour et al ¹² (2013)	+	+	-	+	?	+
Virayavanich et al ¹⁹ (2013)	+	+	+	+	-	+
Ezzat et al ²⁰ (2012)	+	?	+	-	-	+
Hawamdeh et al ²⁷ (2013)	+	+	-	-	-	+

CONCLUSION

It was concluded that occupational exposures involved number of risks factors that may altered the knee joint function and increases the risk of Knee OA for future. The occupational clusters i.e. manual labor from highest to lowest involving frequent and repetitive knee bending also increases risk of developing knee pathologies which includes degenerative changes in the knee such as meniscal lesions, synovitis and cartilaginous damage due to stress and friction thereby reduces knee function. Further risk factors should also be considered along with more studies involving multi-center trials to approach an outcome effectively.

Strengths and Limitations

This systematic review is exclusive to analyze the occupational risk factors and its impact on knee

considering multiple occupational clusters. However, it consisted of only few observational studies, also the methodological quality of some studies was inadequate.

Future Recommendations

Large scale, multi-center trials should be considered to analyze the magnitude of occupational hazards and knee-related pathologies. Further variables must also be taken in to account in order to evaluate the study objectives more precisely.

Conflict of Interest

The authors declared no conflicting interests regarding publication or authorship of this systematic review.

Funding

No financial support was received by authors for this systematic review.

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RESEARCH REPORT

APPRAISING OF KNOWLEDGE, ATTITUDE AND PRACTICE AMONG DENTAL PRACTITIONERS REGARDING ROLE OF PHYSIOTHERAPY IN TEMPOROMANDIBULAR JOINT DISORDERS

ABSTRACT

OBJECTIVES

The aim is to assess the knowledge, attitude and practice of dental practitioners concerning physiotherapy management of Temporomandibular joint dysfunctions (TMDs.).

METHOD

61 dentists were included from Tertiary, secondary and private dental clinics of Karachi, and the study design was cross sectional.

RESULTS

Prior to survey 45.9% of did not had knowledge about physical therapy management TMD. Maxillofacial surgeons and master's degree holders had more knowledge about physical therapy (PT) management. 45.9% dentists reported that PT is non-effective treatment approach. Lack of knowledge on dentist's behalf is the foremost cause of less referral to PT 88.5%. Jaw exercises were prescribed by 83.6% of dentists. In the end of the survey 52.5% dentists were reluctant to refer, 47.5% were maybe they will refer and 96.7% dentists were eager to gain more knowledge about the benefits of PT and collaborative treatment.

CONCLUSIONS

This study concluded that the dental practitioners of Karachi lack knowledge, attitude and practice regarding physiotherapy treatment of TMD. The benefits of multidisciplinary approach while treating TMDs were not very well known to dental practitioners and its benefits to patients. This study increased the knowledge of surveyed practitioners

KEY WORDS

Dentistry, Masticatory Muscles, Temporomandibular Joint Disorders, Orthodontics, Temporomandibular Joint, Manipulation,

Arsalan Ahmed

Senior Physiotherapist

Dr. Ziauddin Hospital

arsalanahmed45@gmail.com

[Ahmed A .Appraising Of KAP, Attitude And Practice Among Dental Practitioners Regarding Role Of Physiotherapy In TMJ Joint Disorders. Pak. j. rehabil. 2019;8(2):12-18]

INTRODUCTION

Temporomandibular joint (TMJ) is one of the joint in the human body which approximately open and closed 2000 time in a day, while performing different task such as talking, chewing, breathing, swallowing, yawning and snoring even they secure the minimal consideration, so in this manner it will consider as the most commonly used joint in the body. Cervical spine alignment of jaw and teeth are fundamentally associated in dysfunction of TMJ. It is an expression used to delineate multiplicity of clinical disorders yielding in jaw pain or dysfunction¹. TMDs are representing as one of the most common chronic orofacial pain conditions. Number of studies reported prevalence that this disorder impact 10% - 25% of the^{2,3} yearly incidence rate of 2%-4%⁴. TMDs have often been an emphasis of interest among clinicians⁵. American Academy of Orofacial Pain (AAOP) states that Temporomandibular joint Dysfunction is the collective term that involves masticator muscles and its associated structures or both, hence its will present in variety of clinical complication^{1,6,7}.

Patients with TMD presents with complains of click or crackles sound and limitations in range of motion (ROM) or deviation in opening of jaw and mandibular dysfunction whilst pain in TMJ and its surrounding structure is one of the common symptom, 39% of the general population experiences at least one of the sign or indication of TMJ disorders⁸. The occurrence of continuous pain is the foremost reason that leads TMD patients look up for consultation or medical advice⁹. Many patients initially seek help from dentist's consequent to the region of their pain¹⁰. The assimilated operation between the dental practitioners and the physiotherapist helps in early diagnosis and improves the effectiveness of therapeutic interventions¹¹.

Commonly TMD is the problem that is related to musculoskeletal system; in this condition physiotherapists have variety of option to treat the dysfunction¹⁰.

Physiotherapy treatment in management of TMDs is mostly used as a conservative treatment. However the physiotherapy goal is to restore the normal mandibular function and to reduce the tenderness swelling and inflammation, by using variety of therapeutic intervention such as mobilization, manipulation, ultrasonic therapy, laser therapy with the combination of exercises that are used from many year to treat that problem¹². The principle approach in physical therapy treatment comprises of exercise and manual therapy to improve the coordination, relaxation, and enhancement in muscle strength. Ultrasound and laser therapy help in pain management by reducing the edema and inflammation by increasing the vasodilatation which also help in wound healing¹². Furthermore manipulating tech-

niques and myofascial release are beneficial for enhancement in ROM, which leads to maximum mouth opening (MMO)⁸. Consecutively, the researches show evidence that physiotherapy interventions are effective in management of TMD for pain reduction and that there is inclination towards progressed active ROM. TMD is managed by a combination of physiotherapy, splint therapy, orthodontics, pharmacotherapy, counseling, and surgery, among others. Noninvasive treatments tend to be the first option for approximately 85 to 90% of TMD patients⁸. The meta-analysis conducted in 2016 suggested that musculoskeletal manipulation approaches (MMA) are efficacious in treating TMDs. MMA yields a significant pain decrease during active mouth opening and ROM in comparison to other conservative treatments¹³.

Nevertheless, physiotherapy forms the part of a non-surgical approach for the initial management of patients with TMD¹⁴.

In Pakistan, TMJ disorders rehabilitation is a neglected domain for physiotherapist however TMD management is collaborative operations between the dental practitioners and physiotherapists. In management of TMD it is really important for dental practitioners and physiotherapist to work together for effective rehabilitation of patients. Therefore, this study will be aimed to assess the KAP (Knowledge, Attitude and Practice) of physiotherapy in the treatment of TMD in order to determine the rate of referrals to physiotherapy advocated by dental and maxillofacial surgeons in Karachi.

METHODOLOGY

Study Design

Cross-sectional study

Study setting

This study was conducted in the tertiary and secondary care hospital and at private dental clinics in Karachi.

Target population

Dental practitioners along with the Maxillofacial Surgeons

Duration of study

Study was conducted in the duration of 6 months.

Sample Size

Total number of 61 samples was collected.

Sample Technique

Sample was collected through Non-Probability Convenient Sample Technique.

Inclusion criteria

Registered dental surgeons and practitioners who have experience of >5 years and age of < 55 years.

Exclusion criteria

Dental surgeons not registered in PMDC. And all non-practicing Dental surgeons with >55 years was excluded from the study.

Data Collection Method and Instrument

The study was conducted by a group of students from Ziauddin College of Rehabilitation Sciences; the data was collected through a self-designed questionnaire.

Procedure

A total of 61 participants were enrolled in the study including 32 males and 29 females, who were registered with Pakistan Medical and Dental Council (PMDC) and having experience of 5 years or more. Six trained physical therapists were assigned for data collection. Visiting schedule for the data collection was decided keeping the peak visited days and hours by the dental surgeons under consideration's secondary and tertiary care hospitals, private dental clinics of Karachi was selected to recruit the participants. On each visit to the hospital/clinic firstly, the permission letter was displayed and written consent was taken from the participants and their questions regarding the research were addressed.

Data Analysis

Data was analysed on SPSS (Statistical Package for Social Sciences) version 20. The demographic characteristics of the participants were represented through frequency, mean and standard deviations whereas the participant responses were evaluated through frequency and percentage.

RESULT

A total of 61 participants were included in this survey with mean age was 34.21 years with range of 28 to 50 years out of which 32 (52.5%) were male and 29 (47.5%) were females. Thirty-seven of participants (60.7%) had earned their Bachelors in Dental Surgery (BDS) degree, 19 participants (31.1%) had earned their master's degree and 5 participants (8.2%) had completed their From College of Physicians and Surgeons Pakistan (FCPS, Maxillofacial Surgeons) as shown in Table 1.

Table.1 Demographic Characteristics	
No. of Participants	N= 61
Age in years (Mean±S.D)	34.21±5.13 (28-50)
Male	32 (52.5%)
Female	29 (47.5%)
Qualification	
BDS	37 (60.7%)
Masters	19 (31.1%)
FCPS	5 (8.2%)

The questionnaire is comprise of three component including Knowledge, Attitude and Practice. The detail of component as follows.

KNOWLEDGE

Twenty dental practitioners (32.8%) surveyed estimated that 15% to 25% of their patients suffered from TMD symptoms, 19 participants (31.1%) reported 5% to 15%, 18 participants (29.5%) reported 1% to 5%, 3 participants (4.9%) reported 25% to 35% of their patients suffer from TMD respectively and only 1 dental practitioner (1.6%) haven't seen patients suffered from TMD symptoms as illustrated in figure 1.

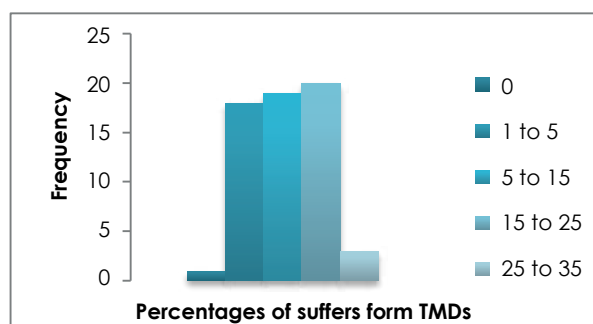


Figure.1 Percentage of participants suffering from TMDs Symptoms

Forty-five of the dental practitioners (73.8%) referred TMD patients to other health care providers, out of which 33 participants (54.1%) referred to Maxillofacial Surgeons, 11 participants (18%) referred patients to both Maxillofacial surgeons and Physical Therapist as combined mode of referrals, 1 dentist (1.6%) referred to Orthodontist and only single participant (1.6%) directly referred TMD patient to Physical Therapist. Sixteen of the dentists (26.2%) did not refer TMD patients to any other health care service provider as shown in Table.2.

Table.2 Responses of Participants regarding Knowledge

N (%)	
Do you refer patients with TMD to other practitioners?	45 (73.8%)
Referrals to health care providers	
• Maxillofacial Surgeons	33 (54.1%)
• Combine mode of referrals	11 (18%)
• Physical Therapist	1 (1.6%)
• Orthodontists	1 (1.6%)
Patients symptoms for referral to physiotherapy	
• Combined symptoms	13 (21%)
• Masticatory muscle tenderness	11 (18%)
• Neck pain	5 (8.2%)
• Postural alteration	2 (3.3%)
• Cervicogenic headaches	1 (1.6%)
• Headaches	1 (1.6%)

Prior to this survey, were you aware that physiotherapist can treat patients with TMD by, for example, reeducating jaw movements and restoring masticatory muscle function?	33 (54.1%)
Prior to this survey, were you aware that the evidence suggests that physical therapy can improve TMD symptoms with oral exercises, manual therapy, and postural reeducation?	37 (60.7%)

Forty-three respondents (70.5%) perceived physical therapy to be an effective management for TMD on the other hand 18 respondents (29.5%) perceived physical therapy to be non-effective in treating TMD as illustrated in Figure 2.

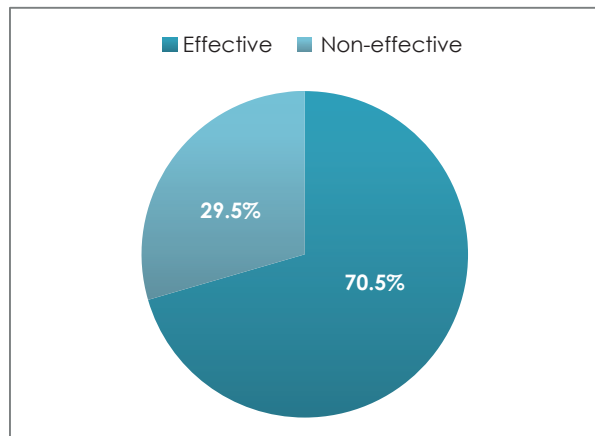


Figure.2 Perceptions of Participants regarding effectiveness of Physical Therapy in treating TMDs

Thirty-three participants (54.1%) referred patients to physical therapist, the most common reasons for referral of TMD patient to physical therapist included masticatory muscle tenderness headaches cervicogenic headaches combined symptoms sum up to 21%, masticatory muscle tenderness 18%, neck pain 8.2%, postural alterations 3.3%, headaches and cervicogenic headaches constitutes up to 1.6% and 1.6% respectively. 28 practitioners did not refer patient to physical therapist, common reason is that they feel there is no role of physical therapy and they did not know the role of physical therapy in TMD, 7 participants did not respond as illustrated in table 2.

ATTITUDE

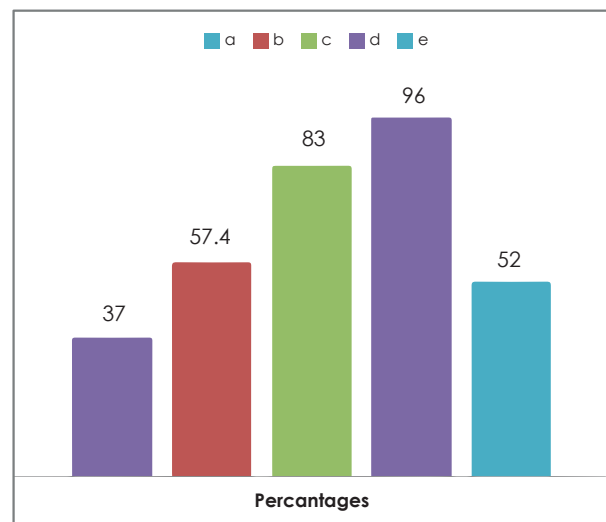
The attitude of dentists towards the effectiveness of physical therapy in treatment of TMD is depicted in Table 3.

Table 3. Responses of participants regarding Attitude

N(%)	
Do you think physiotherapy is an effective modality for TMD patients?	41 (67.2%)
Physiotherapy modalities regarded being effective	
• Combined therapeutic modalities	12 (19.7%)
• Manual Therapy	11 (18%)
• Prescription of Jaw Exercises	2 (3.3%)
• Acupuncture	1 (1.6%)
• Ultrasound	1 (1.6%)
Attribution of non-effectiveness of physiotherapy	
• Lack of knowledge by dental practitioners	15 (24.6%)
• Lack of expertise of physiotherapist	5 (8.2%)

Practice

The reference rate to physical therapy treatment by dental practitioner is illustrated in Figure 3.



*a Can you refer directly into physiotherapy?

*b Are physiotherapy services easily accessible?

*c Do you prescribe exercises to patients?

*d Would you be interested in learning more about the benefits of the collaborations with physical therapists to treat TMD patients?

*e After participating in this survey, are you more likely to refer a patient with TMD to a physical therapist when needed?

DISCUSSION

To the best of author's this is the first study to assess the knowledge, attitude and practices of dental practitioners in Karachi regarding PT treatment while managing TMD patients and benefits of collaborative approach while treating TMD pain self-administered questionnaire, 61 dental practi-

tioners were inducted in this study out of which 37 were BDS, 19 were masters and 5 were FCPS Maxillo-facial surgeons. This survey takes information regarding the patient's referral, perception of physical therapy treatment effectiveness and dental practitioners' interest to obtain knowledge for treating the pain of TMD.

Survey done in Iran supports that graduated dental practitioners have less education and less knowledge about TMD and orofacial pain¹⁵.

The knowledge and perception of effectiveness of physical therapy in accordance with this survey results as 43 dental practitioners (70.5%) responded its effective in contrast to referral to physical therapy its very high, because only 33 (54.1%) dental practitioners referred patients for physical therapy. From the surveyed dentist only 28 participants' (45.9%) had never been able to refer the patients to physical therapy and did not had the knowledge of the benefits physical therapy can provide to the patients suffering from TMD. The most common reason for not referring the patients to physical therapy was that there is no need of physical therapy treatment (50.8%) the other reason was lack of knowledge of dental practitioners regarding the benefits of physical therapy in treating TMD pain (37.7%) and the remaining (11.5%) dental practitioners who did not respond, referred TMD patients to physical therapist. A research conducted by the 16 report that dentist and physical therapist in USA referred 50% of his patients to physical therapist for the management of TMD¹⁶.

Only 8 dental practitioners surveyed assess their TMD patients for neck pain, bad neck and head postures and cervicogenic headaches and refer them to physical therapy treatment. As the preceding evidences from the researches suggests there is interrelation between TMD pain and the existence of cervical spine dysfunction^{17, 18}.

In this study survey 11 dental practitioner out of 61 are refer their patients for the masticatory muscle tenderness, physical therapy treatment help in reducing pain by manual mobilization, soft tissue massage and intra oral mobilization before guiding the exercise to patients. The patients suffering from TMD will have good treatment prognosis if dental surgeons and physical therapists work together¹⁶.

The most common referral reasons by the dentist to the physical therapist are the combine symptom including cervicogenic headache masticatory muscle tenderness and headache.

The dental practitioners were asked prior to this survey were you aware that the physical therapy can treat TMD by re-educating jaw movements and restoring masticatory muscle function, 33 of the dental practitioners (54.1%) responded that they

knew and 28 of the dental practitioners (45.9%) responded that they did not know. They were also inquired regarding the evidence of effectiveness of oral exercises, manual therapy and postural reeducation in TMD management regarding that 39.3% respond in negative answers, and 60.7% showed the positive attitude but it does not mean that they will go for the multi-disciplinary approach in treating TMD. One of low rate of referral towards the physio-therapist TMD could be the insufficiency of securable physical therapists with proficient skill and experience. In accordance with the survey conducted in India it suggested that the positive attitude was found in treating TMDs in maximal of the TMD specialists and in dental surgeons. Attitude in the surveyed participants was directed by the experience gained over the years of practice not by the level of education and knowledge¹⁹.

In this survey the In this survey attitude of dental practitioners towards the physical therapy being an effective modality for treating TMD patients was positive for 41 dental practitioners (67.2%) and negative for 20 dental practitioners (32.8%), out of that 23% were in the favors of combine therapeutic management. Systematic reviews support the incorporation of active jaw exercises, manual therapy and soft tissue relaxation techniques²⁰.

Prescription of jaw exercises were attributed with positive attitude by 18% of dental practitioners. Two systematic reviews concluded that acupuncture is positively efficacious in reducing the pain of TMD^{21,22}. Ultrasound therapy, dental practitioners surveyed showed very minor positive attitude just next to negative towards its effectiveness the response rate was only 3.3%. In accordance with a research conducted in India suggested that ultrasound therapy reduces pain and increases mouth opening in TMD and should be considered a potent modality in treating TMDs²³. Laser therapy, dental practitioner's surveyed showed negative attitude towards its effectiveness the response rate was 0%. According to meta-analysis low level laser therapy produced positive effects on TMD by reducing pain and gaining functional mobility may be these results could be temporary²⁴.

The dental practitioners responded that 37.7% could directly refer patient suffering from TMD to physical therapist and 62.3% responded that they could not refer patient directly to physical therapy. The practice of prescription of jaw exercises by the dental practitioners were found to be very persistence in numbers 51 participants (83.6%) prescribed jaw exercises and only 10 participants (16.4 %) did not prescribed jaw exercises. A randomized control trail suggested that range of motion exercises were found to be effective with a physical therapy program²⁵.

The dental practitioners who responded (32.8%)

with negative attitude give the reasons, lack of their own knowledge what physical therapy can offer and what are the benefits of physical therapy to patients suffering from TMD (24.6%) and other reason was lack of expertise, knowledge and experience of physical therapist while treating TMD. A survey conducted shows that the post-graduate training and specialized practice of physical therapist, promotes self- assurance in the management of TMD¹⁴.

After participating in this survey 52.5% dental practitioners willing for physiotherapy treatment of TMD and 47.5% are respond in maybe they refer, while at the end of survey 96.7% are very keen and interested to learn about the collaboration effect of physiotherapy in TMDS ON THE other hand only 2% are shown no interest. Hence diagnosing and managing TMD is difficult so the collaborative approach between dental surgeons and physical therapists is necessary²⁶.

CONCLUSION

In conclusion, a large percentage of the dental practitioners and surgeons were not aware of the benefits of PT in managing TMD pain and suggested very minimal referral to physiotherapist for management of TMDs. This survey helped to increase the knowledge and change perception of surveyed dental practitioners in Karachi regarding importance and effectiveness of physical therapy and benefits from the collaborative approach to treat TMD. Almost all the participants in this survey were interested to increase their knowledge regarding benefits of PT while treating TMD in multidisciplinary approach for better medical care towards the patients. In future further studies should be conducted to assess the collaboration of physical therapist and dental practitioners and benefits form multidisciplinary approach to patients with TMD.

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RESEARCH REPORT

EXPLORING THE PHYSICAL ACTIVITY KNOWLEDGE AND PROMOTION AMONG PHYSICAL THERAPISTS

ABSTRACT

BACKGROUND AND AIMS

Globally physical inactivity is recognized as a primary concern and one of the major risk factor associated with long term disability. Health professionals are expected to promote active lifestyle but are neglecting it. Therefore it is essential to explore the knowledge of physical therapist regarding activity and promotion.

METHODOLOGY

A cross-sectional survey was conducted among 153 physical therapist at different tertiary care hospitals of Karachi where dominant group was females (n=102). A self-administered questionnaire was distributed through convenience sampling after obtaining consent to evaluate their knowledge regarding physical activity recommendation by American College of Sports Medicine and there awareness among their patients.

RESULTS

Only 8.5% of physiotherapists correctly answered all three questions regarding Physical activity; guidelines. Promoting physical activity through their practice, only 54% of PT initiate conversation, 28% formally assess their patients, while brief intervention was given by only 31%.

CONCLUSION

It was concluded that knowledge regarding PA was compromised; with a lack of awareness about recommended guidelines for physical activity was also found.

KEYWORDS

Physical Activity, Knowledge, Physical Fitness, Exercise, Physical Therapist, Physical Inactivity.

Naveed Qamar

Physiotherapist

Agha Khan University Hospital

naveedqamar71@yahoo.com

[Qamar N. Exploring the Physical Activity Knowledge and Promotion among Physical Therapists. Pak. j. rehabil 2019;8(2):19-25]

INTRODUCTION

According to World Health Organization (WHO), Physical Activity (PA) is characterized by any bodily movement caused by skeletal muscles that needed energy expenditure (WHO, 2019)¹. Physical activity on the basis of daily routine reduces 20% to 30% mortality risk due to any causes, in comparison to those having inadequate activity². A study claimed that 38% of physically inactive people spend more days in hospital and use remarkably more health-care resources as compared to the active people³. The worldwide fifth leading risk of death is overweight and obesity, each year around 3 million adult populations die due to obesity⁴. As per the National Health Survey of Pakistan (1990-1994), overweight and obesity prevalence were measured at 25% and over 10% respectively⁵. Researches shows that overweight are specifically associated to cardiovascular disease⁶. However, many researchers suggested that this increase weight can be reduced significantly by physically active life style^{2,7}. Furthermore, active life style promotion in general population is an essential tool to prevent numerous consequences of metabolic syndrome that has been difficult to manage in the past⁸. Importance of PA to health is increased by evidence and it has led to the calls for worldwide physical activity policies and to the promotion of physical activity as a medicine agenda^{9,10}.

American College of Sports Medicine (ACSM) and American Heart Association (AHA) synthesize the recommended level of physical activity for the prevention of metabolic and cardiovascular disease. ACSM released the first form of physical activity recommendation for adults in 1975¹¹. Later in 1995, the physical activity was being recommended for at least 30 min moderate to vigorous, preferred on all days of week¹². Whereas in 1996, England's department of health followed the same guidelines provided by ACSM and suggest 30 min of moderate to vigorous physical activity on at least 5 days/week¹³. In 2008, federal government issued physical activity guidelines for Americans and was published after expert's review of scientific data. This was first to state recommended guidelines specifically as 150min/week with moderate to vigorous physical activity¹⁴. The recent report of UK Chief Medical Officer on physical activity has again draw attention on the possible benefits to public health if we fulfill the physical activity guidelines. The same format was also issued by World Health Organization that used in global physical activity guidelines¹. Nevertheless, health care practitioners are considerably supposed to promote the physical activity as a public health awareness measure. The health care contact is a chance to positively affect a patient's health and it is mostly done through short duration interventions. These short interventions can be done in routine health care consultations, and also it has the tendency to approach large propor-

tion of the adult population and it has also shown to be cost effective^{15,16}.

The physical therapists are primary care practitioners having pronounced potential for physical activity promotions¹⁷. Now a days, physical therapy is considered as a tertiary prevention discipline, as physical therapist are provided with special skills and potential in order to prevent the condition. Knowledge of guidelines is an essential pre-cursor to bring change in general population health and it will help in understanding the correlate of effective health promotion intervention. There is substantial literature that supports significance of physical activity that emphasizes to promote primary and secondary prevention of many chronic conditions. By knowing the importance of knowledge of physical activity guidelines provided by ACSM, previous researches mainly done in order to know the knowledge of guidelines. A survey done in UK regarding the awareness of physical activity recommendation by ACSM guidelines on 2381 participants concluded that only a third of respondents know the recommended guidelines of physical activity, more over it was demonstrated that there is no widespread knowledge of physical activity guidelines concluded the lack of awareness in 0.56-36.1% individuals¹⁸. Moreover, there was no global awareness of national physical activity recommendations. These results highlighted the requirement to promote physical activity through effective campaigns¹⁸. It is thought that physical therapist should participate in promotion of physical activity, but the views of physical therapist regarding their role in this are not well known. Thus the acceptability and feasibility of physical activity promotion is needed to be explored in physical therapy setting. To date, we have no research conducted on how much physical therapist is aware of physical activity guidelines recommended by ACSM in Pakistan, particularly in Karachi. Therefore, aim of this study is to assess the knowledge of PA guidelines among physiotherapists and how much they are promoting physical activity among patient.

METHODOLOGY

Study Setting

The Study was conducted at different tertiary care hospitals of Karachi, Pakistan.

Target Population

Qualified Physical Therapists with both undergraduate and postgraduate programs were included in the study.

Study Design

A cross-sectional design was selected for the study.

Duration of Study

Data was collected after six months of approval of synopsis.

Sampling Technique

Non-probability, convenient sampling technique was used.

Sample Selection

Inclusion Criteria

- Physical therapist with minimum one year of experience working at primary, secondary and tertiary care, community based, and working as an academician at a reputed institution¹⁹.

Exclusion Criteria

- House Officers.
- Other health care professionals.

Data Collection Procedure

A total of 153 individuals were enrolled in the study including 51 males and 102 females, working as academicians or clinicians in different health care setups of Karachi including primary, secondary and tertiary care hospitals for at least a year. Two qualified physical therapists were trained and then assigned for collecting the data. The data was collected as per the convenience of the PTs and their busy schedule. Well known Hospitals from different districts of Karachi were approached to recruit PTs. On each visit to hospital, firstly, permission letter was taken followed by signing a written consent subjected to the agreement of PT and the hospital administration. PTs were asked to fill the questionnaire that includes questions regarding the knowledge of physical activity guidelines provided by American College of Sports Medicine and its promotion to their patients. Moreover, the questionnaire also included demographic data that helped the researcher to eliminate the person not meeting the inclusion criteria. After completion of questionnaire, researcher proceeded towards the analysis.

Data Collection Tool

A self-designed questionnaire was used in the study. The first section of questionnaire consists of screening questions, to identify the participants as per our inclusion criteria. The next section comprised of 11 questions. All questions were close ended provided with multiple options. This section assessed physiotherapist's knowledge regarding physical activity guidelines recommended by ACSM and their frequency of assessment and promotion of patient for brief interventions of physical activity.

Data Analysis Strategy

Data was entered and analyzed on SPSS (Statistical Package for Social Science) version 2.0. Participant's demographic characteristics and responses were analyzed using descriptive statistics in terms of frequency and percentage.

Ethical Considerations

All participants' identity and obtained information kept confidential under researcher supervision. The

participants was respected and seen not as a passive source to be a part of this research. Before the commencement of study, informed consent obtained from each participant so that they had known the possible risks and benefits to participate as well as their potential contribution towards it.

RESULTS

Demographic Details

There were total 153 respondents to the survey screened according to inclusion criteria, where dominance was found among females $n=102$. Most of the therapist were young adults ($n=102$) showing that they are in their initial stages of the career. Almost 30% of PTs were in the middle adulthood (Table 1).

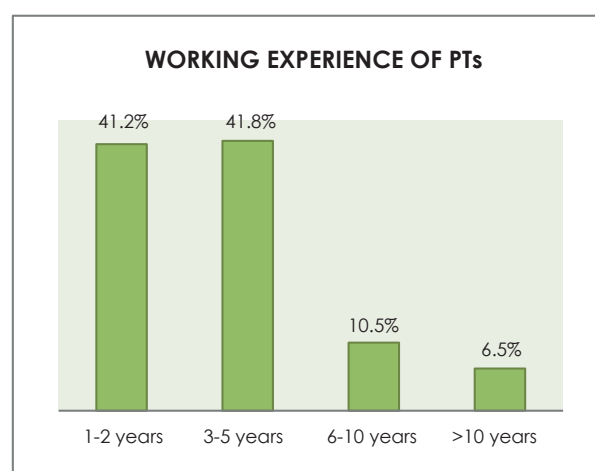


Figure.1 Years of experience of physiotherapists

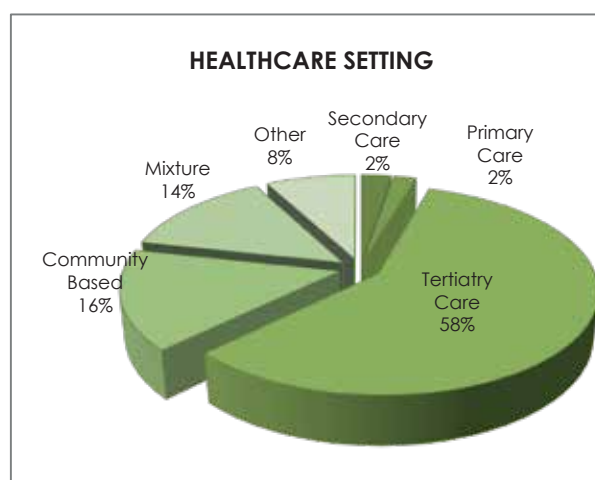


Figure.2 Percentage of Health care setting of Physical Therapists

Table 1. Demographics and professional details of Participants.

	n=153(%)
Gender	
	51 (33.3)
Female	102 (66.6)
Age	
<30	102 (66.6)
	33 (21.5)
40 -49	14 (9.1)
	4 (2.6)
Qualification	
	11 (7.1)
BSPT, ADPT	31 (20.2)
	68 (44.4)
BSPT, ADPT, MS	27 (17.6)
	16 (10.4)
Position	
	106 (69.2)
Senior physiotherapist	17 (11.1)
	15 (9.8)
Senior Lecturer	9 (5.8)
	6 (3.9)

Participants reported a range of years of experience with 41.2% (n=63) of the sample having 1-2 years of experience, 41.8% (n=64) having 3-5 years of experience, 10.5% (n=16) had 6-10 years of experience and only 6.5% (n=10) had more 10 years of experience (Figure 1).

The PTs were asked to mention the health care setting where they work. The majority of respondents 58% were working in tertiary care hospitals, 16% was working at community based, 14% were those who worked as academicians and clinicians as well, 2% of primary care and 2% of secondary care respectively and 8% comprised of others (Figure 2).

Promotion of Physical Activity

Physical therapist was asked to approximate the frequency of promotion of physical activity, and it was estimated through specific questions related to promotion as illustrated in Figure 3. It was revealed that only about 35% of physiotherapists initiate conversation about PA with their patients. On the other hand, 18% physical therapists assess the level of physical inactivity in their patients and 20% of physical therapist took essential steps for brief intervention of physical activity among physically inactive patients. Moreover 12% physical therapist spread awareness through socially connecting their patient about the physical activity.

Knowledge of Physical Activity Guidelines

Forty nine percent of respondent physiotherapist (n=75) reported that they are aware of PA guidelines given by ACSM but concluded result was found

different. Numbers of correct answers to specific questions shows that only 8.5% of respondent's physiotherapist correctly answered all three questions. The minutes of moderate intensity of physical activity per week for adults was answered correctly by only 8.5% (n=13), whereas minutes of vigorous physical activity recommended per week for adults was correctly answered by 28% (n=43) and the days per week required to do strength training for adults was correctly answered by 29.4% (n=45).

Physical Therapist Activity Level

Table 2. Showing no. of correct answers to PA guideline

Physical Activity Guideline Questions	No. of Correct responses	%
How many minutes of moderate intensity physical activity are recommended per week for adults?	13	8.5
How many minutes of vigorous intensity physical activity are recommended per week for adults?	43	28
How many days per week it is recommended that adults do strength training?	45	29.4

Physical Therapist was asked about their PA level over a week for at least 30 min per day. It was analyzed that only 12.4% (n=19) physical therapist do PA for 30 min/day for 5 days. However, 22.9% Physical therapist are not willing to perform PA throughout week, that is an alarming sign for our PTs. Figure 3 illustrated in detail the physical therapist own habit of PA.

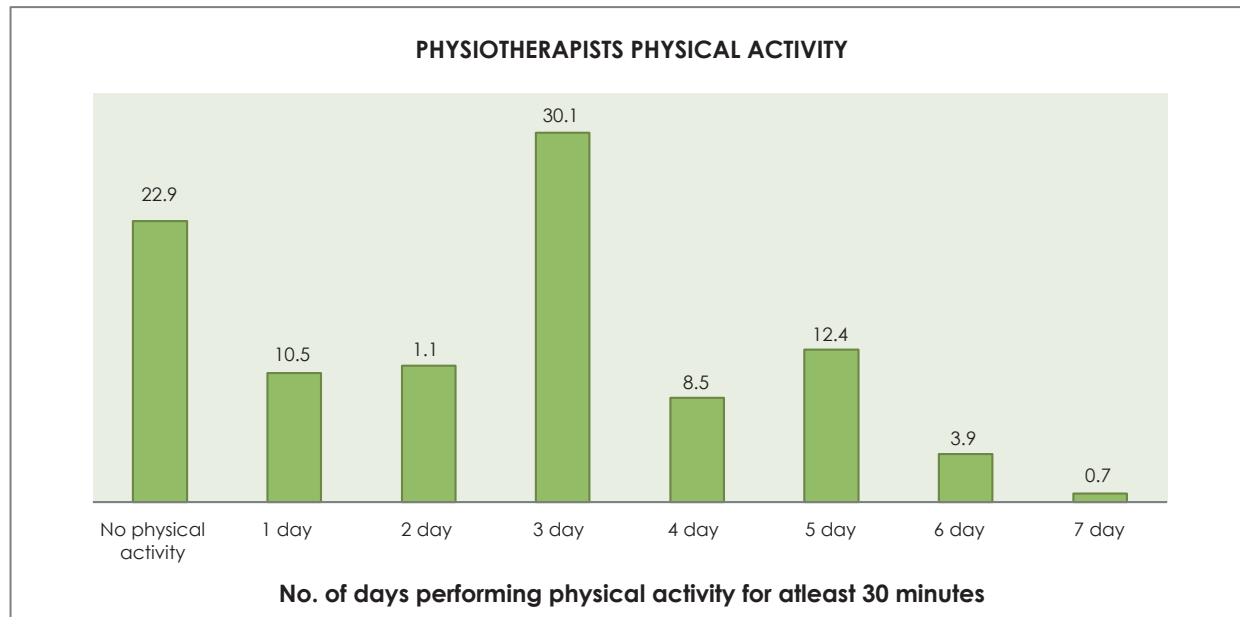


Figure 3. Representing physiotherapist's own PA during last week in percentage

DISCUSSION

The present study shows that physical therapist has an important role in prescribing physical activity to improve activity limitation and participant restriction. The brief counseling session was found to be the easy and feasible way of health promotion. Moreover, the study also revealed that role of physical therapist was compromised in prescribing as well as performing the PA. There is a significant lack of PA guideline knowledge recommended by ACSM for routine physical activity among PTs. Results from our study showed that only 8.5% of physiotherapists correctly answered questions related to ACSM guidelines for physical activity. This increases the need of adding the guidelines in either the academic curriculum or improves the evidence based clinical practice. Majority of participants incorporates some form of discussion of physical activity with their patients. However, physical activity is not regularly assessed and there is no regular delivery of brief treatments resulting in weak knowledge regarding the exercise based physical activity programs. Moreover, this actually highlights the need of evidence based clinical practice especially when prescribing physical activity. Despite the knowledge disparity, most participants reported feeling confident that they are aware of guidelines and promote the physical activity to patients. It is primarily the responsibility of public health professionals and stakeholder groups to implement these recommendations that mostly use traditional methods of health promotion. A cross-sectional survey²⁰ conducted in Ireland, assessed the knowledge of PA guidelines among general practitioners and physiotherapists, found that more physiotherapist were aware of knowledge than general practitioners who correctly

reported the minimal activity guidelines. Physical activity must be of adequate length, frequency and intensity to be effective for health. At least 150 minutes of moderate intensity of exercise that adults should do per week is recommended highly recommended in Europe²¹. Previously, in another survey the prevalence of knowledge of current guidelines (that was introduced in 2011) were compared with previous guidelines in two large samples of UK²². It was found that 18% of participants accurately know the physical activity guidelines whereas 11% of previous surveys conducted in 2007 accurately know the guidelines. Moreover, a Canadian study also emphasized on improving and creating the awareness among general adult population, revealed that almost 12.9% of Canadian adults were aware of PA guidelines²³.

On the other hand, a consistency of low level of knowledge is also found in general practitioners of England; their analysis revealed that only 20% of GP are familiar with PA guidelines²⁴ that may ultimately lead to obesity, chronic diseases, depression and anxiety. In spite of well reported guidelines and benefits of physical activity, the survey of England showed only 39% of male and 29% of female fulfill the recommended level of physical activity²⁵. Globally, sedentary life style for last decade has been alarming throughout all ages therefore the central aspect of health promotion is changing by the role of primary care and general practitioners²⁶. They are trained in their places to promote health among inactive population. However, previous literature has shown that guidelines should also be modified according to the needs and ethnicity. Our results were found to be consistent with that of Lowe et al 2017 where only 16% physiotherapist correctly answered PA guideline questions¹⁹. Almost 68% of

physiotherapist routinely provides intervention for Physical inactivity whereas in our study 31% offer intervention. This raises questions regarding health of people. It is important for our health professionals to implement ACSM guidelines that are available for all age group with or without co morbidities even. As it has been estimate that as the life expectancy is increasing that would increase more disabilities among the older aged population making them more disabled.

Researchers have been keen to not only promote the physical activity but to also implement the evidence based practice among the practitioners of health care. Since the last two decades a number of researches were conducted mostly in the western countries yet there is a lack of registered data regarding the promotion and implementation of PA on national level. A study from Pakistan²⁷ analyzes the physical inactivity in obese people and their barriers to physical activity. Lack of counseling by health care providers was among their multiple barriers. Physical activity levels of students in a medical college have also been highlighted. Only 11.5% of students were found to be physically active. This quite similar to our physiotherapist physical activity routine that is 12.4%. The consistency in decrease level of physical activity among people will raise health issues in future. This not only highlights the need of curriculum revision and counseling among these students but also to create practical sessions, workshops and conferences to implement it. Our research was only limited to few health care institutes of Karachi therefore recommendations to do it on a larger scale considering other health care professionals. According to the American College of Sports Medicine guidelines, 150 minute per week of moderate intensity of walking is highly recommended²⁸ that is unfortunately neither recommended by the practitioners nor taught by the academicians. Therefore, different campaigns and program aids should be planned to decrease the non-communicable diseases.

CONCLUSION

The results of our study found lack of knowledge among the physical therapist of Karachi, Pakistan. Although healthcare professional are expected to improve the physical fitness and motivate the patients but our study shows that this element is missing or neglected. However, the ACSM guidelines are quite old still either the therapist are unaware or are not practicing it. Therefore, it arise the need to recall the guidelines and to promote physical activity among general population. Furthermore, studies are required in context to promote the knowledge of physical activity among health professionals. Sedentary life style is increasing day by day with urban development and globalization. While considering the outcomes of this physical inactivity, it is important to promote the physical

activity in our population. The study contributed role towards the awareness among healthcare professionals about recommended guidelines of physical activity and its promotion among patients.

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RESEARCH REPORT

A CROSS-SECTIONAL SURVEY BASED ON PERCEPTION OF CAREGIVERS TO COMMUNICATION BARRIERS WITH AUTISM SPECTRUM DISORDER CHILDREN

ABSTRACT

BACKGROUND AND AIMS

Communication has been a hallmark in autistic children with verbal and non-verbal language difficulties. These challenges may lead towards the development of syntactic structure that may cause understanding issues and communication breakdown. Therefore, the purpose of this study is to determine the communicative barriers in ASD children and their parents.

METHODOLOGY

This cross-sectional survey was conducted at the special education schools of Karachi; enrolled 56 parents of ASD children using non-probability convenience sampling technique. Data was collected through 'communicative difficulties questionnaire'.

RESULTS

It was reported that 40.5% parents have difficulties with their child while 57% to 59.5% were found to be upset with communication difficulties. 24.1% parents have impression that their child doesn't understand what they say.

CONCLUSION

Varied percentage was observed in communicative domains of the questionnaire that showed high proportion of communication barriers between parents and child. Further studies are needed to analyze the communication between parents and autistic children to address its impact.

KEY WORDS

Autism Spectrum Disorder, Fragile X-Syndrome, Motivation Behavior, Caregivers, Perception

Anum Zaid

Physiotherapist

Pakistan Centre of Autism

anamayed2@gmail.com

[Zaid A. Cross-sectional Survey based on Perception of Caregivers to Communication Barriers with Autism Spectrum Disorder Children. Pak. j. rehabil.2019;8(2) :26-31]

INTRODUCTION

Autism Spectrum Disorder, referred to as ASD is a neurological and developmental disability that has been increasing worldwide from the past three decades i.e. approximately 1 out of 55 children has been diagnosed with the disorder annually¹. According to Developmental Disabilities Monitoring Network (ADDM), the current global prevalence of autism has been identified as 2.3% whereas an average prevalence of autistic children is 1-2% in developing countries². A number of studies conclude that among all the disabilities, autism is characterized as an intellectual disability that affect the communication and social interaction which may lead to behavior challenges¹⁻³. Furthermore, it was advocated that the most dominant problems in ASD individuals are functional communication and social association followed by difficulty in mainstream pattern of routine work and restricted interests⁴. In addition, these difficulties in verbal and non-verbal communication are developed due to genetic inheritance of ASD by their ancestors that may results in complex risks factors⁵. Moreover, stratification of genetic factors in Gastrointestinal Disorders among autistic children has demonstrated a similar pattern that showed association with communication and social phenotypes⁶. It was also indicated that at least two to three traits of affected domains may lead to poor sensory integration and communicative barriers⁷. A study was conducted considering the autistic children pre-natal factors revealed that maternal gestational age, number of births and insults may have strong association with developmental disabilities thereby leads to a multifunctional disease⁶⁻⁸. Individuals with communication disorder deals with the lack of speech in children younger than 3 years present with unusual feature like echolalia, contrary lack of facial expression to the straight away and absence of speech⁹. Despite, parents anti-social behavior and lack of communication skills results the dependency for their child's basic needs resulting in lifelong concern for the both children and parents¹⁰. The continuous stress of parents having autistic children is higher than those parents who have children with other disabilities like Down syndrome, behavior disorder and fragile X-syndrome etc¹¹. On the other hand, depressed parents may affect child's treatment effectiveness of early intervention due to lack of communication⁹⁻¹¹. Yet, most of the times parent do not understand the demand or need of child. One more underlying issue concerning ASD is the parent's perception about the acceptance having an autistic child by the society¹². Literature showed that accusation may end up with depression, lack of self-esteem and separation from the society¹³.

Communication has been a hallmark in autistic children with verbal and non-verbal language difficulties¹⁴. These challenges may lead towards the development of syntactic and lexical structure

that may cause understanding issues and communication breakdown¹⁵. Multiple studies revealed that most of the ASD children, in particular with the issues of non-verbal communication have shorter engagement, restricted gestures as well as difficulties in consonant production¹⁶. Although, communication in autistic children can be evaluated through variety of methods that may include formal and informal assessments using standardized tests or questionnaires, parent-children interviews, and functional language evaluation¹⁷ although, poor intent in communication and difficulty in practicality of assessment leads to unreliable results in ASD children. However, among variety of assessments, speech analysis has provided better results of functional communication in ASD children¹⁷. In clinical practice, communication between caregiver or ASD children is evaluated based on the child performance by a test or parental-report¹⁸. In context, this practice is convenient to administer and time effective as well. Despite of the fact, the precision and reliability of parental responses is ambiguous. Number of researches indicated that the communication is a challenge to assess in an unfamiliar environment due to inadequate motivation to communicate and inadequate verbal output¹⁴⁻¹⁸. In addition, evaluation of pragmatics is relatively more challenging among non-verbal children involved in a restricted environment. In this regard, Salcuni et al¹⁹ suggested that in order to gather adequate and representative sample for profiling communication of ASD children, it is evident to consider children behavior during an activity, particularly with a familiar partner that may increases the scope to promote positive behavior in collaboration such as engagement in during playing, sharing or laughing. Studies also reported a strong association between functional activity and language pragmatics that is crucial to enhance cognition in autism that may lead to better understanding of linguistics²⁰. Therefore, playing activities of 25-30 minutes is recommended to provide a better insight of child communication profile and skills for more reliable findings²¹. The communication gestures that include speech and voice intonations are influenced by the caregivers at large due to culture-developmental context. Previous studies have explored that parental attitudes and parenting aspects typically influenced the child's communicative behavior¹⁸. Such a spectrum of language pragmatics with significant communicative limitation makes it more challenging to gather a representative sample for diagnostic and intervention purposes in ASD population¹⁸⁻²⁰. However due to scarcity of studies, influence of environment, peers and caregivers on ASD children communication profile is still unknown. Therefore, the purpose of this study is to determine the communication barriers in ASD children and their parents to evaluate their interaction, needs and demands in order to facilitate the children in rehabilitation.

METHODOLOGY

This cross-sectional survey was conducted at the special education schools of Karachi. A total sample of 56 parents or caregivers of ASD children were enrolled using non-probability convenience sampling technique in the tenure of 6 months based on the following criteria:

INCLUSION & EXCLUSION CRITERIA

Primary caregivers such as parents or guardians of ASD children enrolled in rehabilitation for >1 year will be included whereas parents of those children who are not enrolled in rehabilitation program will be excluded.

DATA COLLECTION TOOL²²

Data was collected through the questionnaire about communicative difficulties between parents and ASD children. The questionnaire is a likert type scale comprises of 24 questions that are divided in 4 domains, 1st and 3rd domain represents the personal level and personality whereas 2nd and 4th domain represents the perception of parents/guardians regarding interaction between their children and society. Further the responses of the questions will be answered in four categories consisted of "completely agree", "agree", "completely disagree" and "disagree".

and "disagree".

DATA COLLECTION PROCEDURE

Participants were given consent forms prior to study for voluntarily participation. The information regarding questionnaire and survey was delivered to ensure their understanding whereas it was ascertained that participants' identity or shared material was kept confidential and shall not be disclosed or used without permission.

DATA ANALYSIS

Data entry and analysis was conducted on SPSS (Statistical Package for Social Sciences) version 20. Furthermore, descriptive statistics consists of Mean $\pm$ S.D. will be used to demonstrate participant's characteristics whereas participant's responses on questionnaire will be represented as frequencies and percentages.

RESULTS

A total number of 56 participants consist of 20 males and 36 females with mean age of 41.1 $\pm$ 7.5 years enrolled in the study. The responses of parents of children with ASD were taken on the 4 domains of questionnaire.

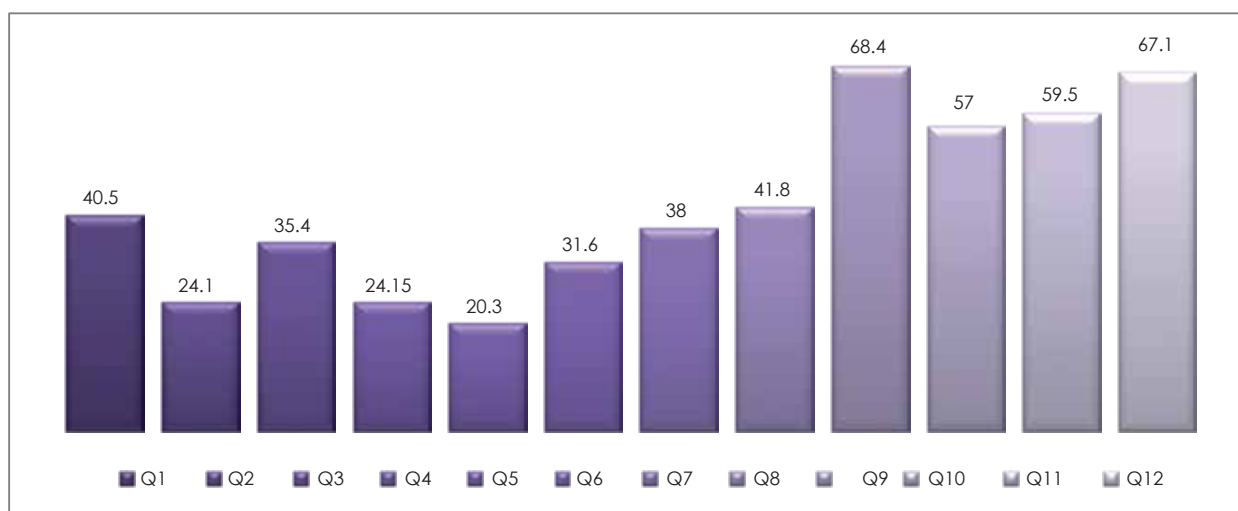


Figure-1 represents parent's/caregiver's impression about them regarding their child

Q1 I have difficulties communicating with my son/daughter

Q2 I have difficulties communicating with my son/daughter when there are just the two of us

Q3 I have difficulties communicating with my son/daughter when there are other persons in the same room

Q4 I have difficulties playing with my son/daughter

Q5 I have difficulties to understand what my son/daughter wants

Q6 I have difficulties to understand what my son/daughter feels

Q7 I don't know what to do when my son/daughter doesn't understand me or when I don't understand him/her

Q8 I am not at ease with my son/daughter in public places

Q9 I worry about my son's/daughter's future

Q10 I get upset when I notice my son/daughter doesn't initiate communication

Q11 I get upset with my son's/daughter's apathy or agitation

Q12 I would like to receive more information about how to communicate with my child

The 2nd domain of questionnaire comprised of 4 questions regarding parent's perception about people acceptance of their child stated that 59.5% parents do not understand what their child want to express. However, 40.5% parents have the impression that people avoid their child. It was also reported that 53.2% parents noticed that people think their child is strange as shown in Figure-2.

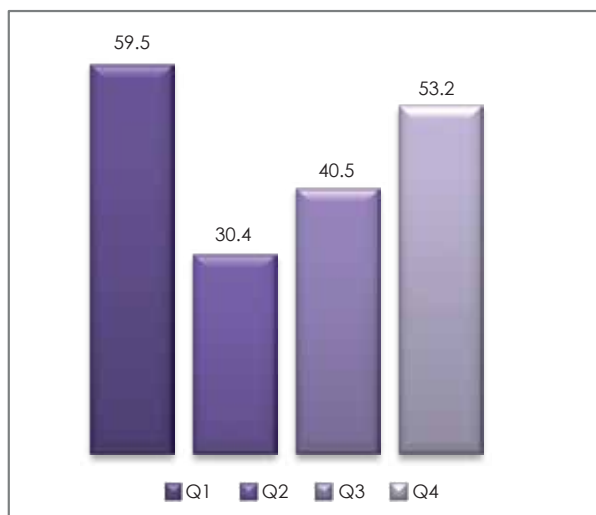


Figure 2. Represents parents' perception about other people's acceptance of their child

Q1 I feel that other people do not understand what my son/daughter wants to express
 Q2 I notice that some people make fun of my son/daughter when he/she tries to express something
 Q3 I have the impression that people avoid my son/daughter
 Q4 I notice that people think my son/daughter is strange

Similarly, 3rd Domain included 4 questions about parents' attitude regarding their child reported that 48.1% parents don't know how to act with their child's behavior as well as 64.6% has difficulty to interpret their child needs whereas 20.3% are unable to taught new things to their child as depicted in Figure-3.

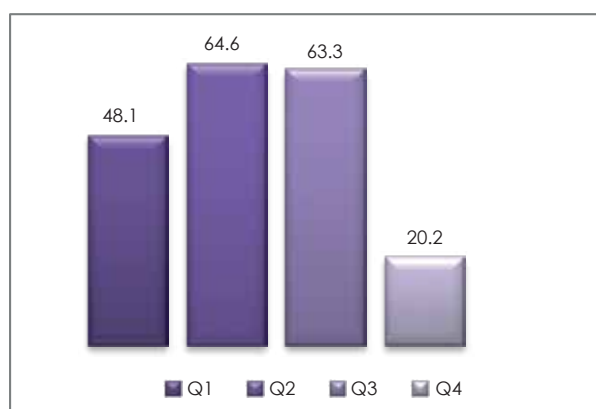


Figure 3. Represents parents' attitude regarding their child

Q1 I don't know how to act with some of my child's behavior
 Q2 I reach the objects that my son/daughter points to
 Q3 I always talk to my son/daughter even if he/she doesn't talk to me
 Q4 I can't teach new things to my son/daughter

The last domain of communicative difficulties, parent's impression about their child was reported. It was observed that 24.1% parents have impression that their child did not understand what they say. Further, 41.8% parents noticed that their child speak things that are not adequately to the moment while 51.9% parents reported that their child has few friends. The details are represented below in Figure-4.



Figure 4. Parents impressions about their child

Q1 I have the impression that my son/daughter doesn't understand what I say
 Q2 I have the impression that my son/daughter doesn't understand what other people say
 Q3 I notice that my son/daughter speaks things that are not adequate to the moment or the context
 Q4 I have the impression that my son/daughter has few friends

DISCUSSION

This cross-sectional study was conducted to determine the communicative disorders between parents and children of ASD. Upon evaluation, it was revealed that varying percentage of difficulties exists between communication of children with parents or vice versa. It was concluded that a language barrier was one of the most potent finding in communicative disorders among ASD children that showed certain verbal and non-verbal difficulties. Several studies indicated that there are certain underlying environmental and genetic factors that are markers for the language barrier assumption in ASD children¹⁸⁻²⁰. It was advocated that language pragmatics is poorly developed in

children. This may be due to neurophysiological abnormalities in the brain structures, although the pathogenesis is still unknown²².

Literature stated that several differences in language development and communication are the hallmarks in ASD children¹⁸⁻²⁰. These differences may occur due to absence or delay in the language, conversational deficits, repetitive languages or stereotypes, inappropriate use of grammar and pronouns or play imitation²². However, some individuals with ASD may have specific impairment or other limited comprehensive deficits in gestures or verbal forms of communication that exhibits generalization of language disorders. These findings of our study was consistent with the study of Kleinhans et al (2016)²⁴ that language is important for understanding between parent and child, moreover it has been stated that language impairment is one of the main purpose for the behavior issues in ASD children. Another study revealed that scores of non-verbal ability of receptive may vary in communication in presence of language impairment that may leads to behavioral issues, anxiety and depression in the child and parents²⁵.

Several studies reported that communicative barriers lead to unbounded relationship between parents and the child. However, it was also observed in our study as majority of parents find it hard to understand their children needs and communication²⁰⁻²⁴. Also, stress is found to be more prevalent in parents with ASD children as compared to those with normal development. Number of studies observed that parental stress increased after diagnosis of autism in their children that eventually leads to communication difficulties, therefore certain interventions are required to focus on strategies that reduces these difficulties. Moreover, lower efficacy, in-efficient role in child's development, culture or community interference has been reported¹⁸⁻²². Similarly, our study reported varied perception of their child in understanding that needed to address. Furthermore, some evidence suggested that parent sensitivity not only benefit the child but also reduce parental ignorance towards the diagnosis of the condition²⁵.

Evidences from the researchers reported that therapy consisted of parent-child interaction or child-directed may be effective to deal with communicative disorders²⁵. These approaches are structured and disciplined-oriented thus effective for the management of disorders although, these programs are implemented limitedly. Also, these approaches are pivotal to reduce parental stress as well as gap between parent-child thereby strengthen their bond through directed interaction and reinforcement that may lead to progress a healthy relationship and understanding. Literature showed that parenting-mediated interventions are essential for parent and child for beneficial health outcome¹⁹⁻²². Another study revealed that maternal parenting behaviors are crucial for the child to develop responsiveness there-

by decrease the behavior disruption and reduces the maternal stress²⁻¹⁰. Therefore, these approaches must be taken in to account for effective implementation.

Despite of the fact, these interventions showed positive gain in language skills, expression and language comprehension thus, decreases the severity of autism characteristics²³⁻²⁴. On the contrary, verbal-based interventions are found to be effectively sound to enhance pronunciation, verbal strategies, comprehend expressions through child-centered and pragmatic approaches, including didactic methods, pre-linguistics or milieu communication²². Although, these methods uses modeling of communicative behavior based on the child responses and interests. Further these approaches address time delay i.e. waiting for the child to initiate response in natural environment and behavioral corrections²⁰⁻²⁴.

Subsequently, number of approaches is viable to be implemented in ASD rehabilitation, however only few are used to address the ASD characteristics. This is due to limitation of resources or sample constraint that causes barriers to use the tools. Moreover, it is also important to screen for the disorders through standardized and reliable scales/questionnaires for effective evaluation. It is also suggested that parent-child interaction should be incorporated as a part of rehabilitation curriculum to make their understanding clear, as parents participation may influence the child motivation to perform language pragmatics with efficiency. Also, peer relationship should be promoted to prevent child from isolation thereby reducing the disorder stress. Therefore, large scale surveys are recommended to evaluate communicative difficulties through standardized approaches and address the child needs.

CONCLUSION

It was concluded that varied percentage was observed in communicative domains of the questionnaire that showed high proportion of communication barriers between parents and child. Further studies are needed to analyze the communication between parents and autistic children to address its impact. Thus, parent-child interaction approaches should be used for beneficial outcomes.

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RESEARCH REPORT

ESTIMATION OF ODDS RATIO AMONG CERVICAL RADICULOPATHY PATIENTS WITH MIGRAINE

ABSTRACT

OBJECTIVES

To estimate the probability of migraine among cervical radiculopathy patients by using odds ratio.

STUDY SETTINGS & PARTICIPANTS

This study was carried out at two tertiary care hospitals of Karachi, Out-Patient Department (OPD) of Rehabilitation Sciences, Ziauddin Hospital North and Liaquat National Hospital.

METHOD

Cross-sectional study was performed on participants aged between 25 to 45 years with both diagnosed and undiagnosed cervical radiculopathy to estimate the risk of migraine in comparison to healthy individuals. The characteristics features of migraine were assessed on migraine assessment scale while odds ratio was calculated to determine the odds.

RESULTS

The patients with CR are at higher risk for developing migraine as compared to the healthy individuals (odds ratio 1.2, 95% confidence interval).

CONCLUSIONS

The study concluded that patients cervical radiculopathy have increased risk of migraine. Therefore, evaluation of the condition in cervical radiculopathy patients for assessing the susceptibility for migraine is crucial for the effective management of migraine.

KEY WORDS

Radiculopathy, Migraine Disorder, Odds Ratio, Spondylosis, Migraine, Cervicogenic Headache.

Najma Zehra
Physiotherapist
Dr. Ziauddin Hospital
Dia.zahra@gmail.com

[Zehra N. A Estimation of Odds Ratio among Cervical Radiculopathy Patients With Migraine. Pak. j. rehabil.2019;8(2):32-37]

INTRODUCTION

Cervical radiculopathy is an age-related disorder which occurs due to compression of cervical nerve roots. A population-based analysis reported an annual incidence of cervical radiculopathy of 107.3 per 100,000 for men and 63.5 per 100,000 for women with a peak at 50 to 54 years of age¹. Due to age-related degenerative changes, spinal wear and tear increases which cause neck pain and disability¹. In young individuals, a sudden injury could cause cervical radiculopathy that untimely leads to a herniated disk. According to annual reports about the incidence of CR, the incidence rate of this disease is 83.2 cases per 100,000 persons and its prevalence rate is 3.5 cases per 1000 people. In most of the cases of cervical radiculopathy, C6/C7 or C5/C6 motion segments are damaged². The patients with CR complaint suffers from severe neck pain which radiated to arm and hand due to which sensory and motor functions of arm and hand are disturbed³. Migraine imparts considerable effects on the patient's quality of life. It imposes a significant socioeconomic burden as well⁴. Patients with cervical radiculopathy complain of neck pain and radiating pain in the arm sometimes combined with sensory and motor disturbances in the arm and/or hand⁴. These symptoms are accepted as being caused by the nerve root compression. Headache, if asked for, is frequently reported by patients with cervical radiculopathy but in general not discussed in terms of nerve root compression in the lower cervical spine. On the other hand, affection of nerve structures in the upper cervical spine, including the C2 and C3 nerve roots and the occipital major nerve, are accepted as a cause of occipital headache⁴⁻⁵. The term cervicogenic headache, is often mentioned in the literature. It is not related to nerve root compression, but described as being caused by musculoskeletal structures in the upper cervical spine and the pathogenic mechanism is unclear⁵. The criteria for cervicogenic headache are recurrent and strictly unilateral headache without side shift. It starts in the neck and spreads to the fronto-ocular area and is elicited by certain movements or awkward position of the head. Clinical investigation reveals reduced mobility of the neck and external pressure tenderness is present⁵. Studies suggested that headache in patients with cervical radiculopathy is more disabling for the patient than the radicular pain in the shoulder/arm. Many hypotheses have ascertained that there is a causal relationship between migraine and its triggering factors⁵⁻⁶. Among these triggers, cervical pathologies may initiate the sequence of events that results in migraine symptoms. The extensive functional convergence of upper cervical spinal cord from the descending fibers in the trigeminal nucleus caudalis, which terminates within the trigeminocervical nucleus, and the afferent fibers from the upper cervical roots, which communicate in this region, accounting for

the bi-directional pathway of pain between the neck and head. This interaction refers the cervical pathologies to the head, which is the activity also proposed to cause cervicogenic headache⁶. Constantly noxious cervical afferent irritation via this pathway is a possible key element in causing migraines. Moreover, cervicogenic headache is caused by the cervical pathologies to the head that leads to constant harmful irritation of cervical afferent which is the most important factor for causing migraine. According to the musculoskeletal anatomy, muscle tension and neck pain could be consequences of neck injuries⁶. Neck pain and cervical muscle tenderness are common and prominent symptoms of primary headache disorders. Less commonly, head pain may actually arise from bony structures or soft tissues of the neck, a condition known as cervicogenic headache. Cervicogenic headache can be a perplexing pain disorder that is refractory to treatment if it is not recognized⁵⁻⁶. The condition's pathophysiology and source of pain have been debated, but the pain is likely referred from one or more muscular, neurogenic, osseous, articular, or vascular structures in the neck. Moreover muscle tension is another common migraine symptoms and both could be sequelae of neck injuries, according to the musculoskeletal anatomy⁶. Moreover, administering multiple injections in targeted head and neck regions is sometimes considered important for the management of migraines, cervicogenic headaches, and myofascial referred pain⁶⁻⁷ indicating that headache and neck pain may share some common pathways. Although a previous report indicated that cervical spondylosis (CS) accounts for 15.9% of migraineurs⁷, until now epidemiological evidence of a link between CS and the risk of migraine is minimal. Therefore, we conducted this nationwide retrospective cohort study to investigate the longitudinal causal relationship between CS and migraines and CS severity in relation to the risk of developing a migraine⁷.

For many years, headaches related to neck grabbed the attention of many researchers. According to Pearce, headaches related to neck disorders were being diagnosed since 1860⁷. Previous studies have shown that middle-aged and young females with cervical radiculopathy were highly susceptible to develop migraine as compared to other individuals⁸. The MRI examination of these patients verified that due to degenerative diseases their cervical spines were damaged at one or more levels of lower cervical spine. Moreover, it was also reported that patients were able to distinguish headache from migraine⁹. Regarding the classification of headache, it may be difficult to distinguish migraine without aura, tension type headache and cervicogenic headache in patients with neck pain¹⁰. The researchers performed a retrospective cohort study from 2000 to 2011 in which 27,930 patients with cervical spondylosis participat-

ed in the study. For evaluating the relationship between cervical spondylosis and migraine, the researchers applied multivariate and univariate proportional hazard regression analysis. The findings of the study ascertained that patients with cervical spondylosis were highly susceptible to migraine as compared to those without cervical spondylosis. Furthermore, the incidence rate of migraine was also higher in patients' with cervical spondylosis¹¹. It was also reported that headache disorders such as migraine and cervical musculoskeletal abnormalities had bi-directional comorbidity. The pain clinics reported migraine in 25% of patients with cervicogenic headache and two-third patients with neck pain¹². Likewise, Riina et al (2009) determined the postoperative effects of headaches in patients with cervical radiculopathy. The findings revealed that about 90% of patients with cervical radiculopathy had headaches including migraine. Similar findings were consistent with the previous studies that predicted the incidence of migraine in CR patients¹³, however the findings were not generalized with respect to different population therefore more evidence needs to be established in this regard.

METHODOLOGY

A cross-sectional study was performed on participants aged between 25 to 45 years with both diagnosed and undiagnosed cervical radiculopathy to estimate the risk of migraine in comparison to healthy individuals. The characteristics features of migraine were assessed on migraine assessment scale while odds ratio was calculated to determine the odds.

Inclusion Criteria

Both male and female patients aged between 25 to 45 years with diagnosed cervical radiculopathy of C4-T1. Normal individuals without cervical radiculopathy with similar age group.

Exclusion Criteria

Individuals with vertebral fractures, congenital vertebral anomalies, surgical interventions and pregnancy.

Data Collection Tool

The self-designed questionnaire consists of enquiries to assess migraine in the participants with diagnosed radiculopathy and normal individuals. The questions were related to the severity and duration of pain, if the pain is severe and for more than 72 hours which was triggered by light, stress or weather change and patient also feels nauseated then it was considered highly suggestive of migraine. Other questions were helpful to evaluate either the headache was due to migraine or not. Further the probability of migraine was calculated by the Odds Ratio.

Data Collection Procedure

Data was collected through a self-designed questionnaire following their informed consent that was taken to maintain the ethical consideration of confidentiality. The questionnaire was used to assess migraine in the participants based on the inclusion criteria. Moreover, the questionnaire contained the demographic information, gender and occupation questions are related to the severity of pain, pattern of headache, factors that trigger their headache and its effect on their activities of daily living. The total score of the questionnaire was 21 i.e. the individuals scoring a maximum of 10 score were considered as positive sign of migraine.

Data Analysis Procedure

Data was entered and analyzed on SPSS (Statistical Package for Social Sciences) version 20. Participants demographic details were demonstrated through descriptive statistics consists of frequency, mean and standard deviations whereas ratio of migraine in exposed and unexposed population with cervical radiculopathy will be calculated by Odds Ratio.

RESULTS

A total number of 50 participants were included in this study (20 male and 30 females) comprised of 27, 19 and 9 cases of healthy, patients with cervical radiculopathy and spasm respectively 30.3 years. Furthermore, participants were belonged to different occupations/professions or other work as shown in Table-1.

Table.1 Demographic Characteristics

Participants	(n=50)
Males	20
Females	30
Age in Years Mean (SD)	30.3 (4.6)
Occupation	
Doctors	3
Physical Therapist	14
Occupational Therapist	2
Office Workers	17
Others	14
Musculoskeletal Disorder	
Cervical Radiculopathy	19
Cervical Spasm	4
Normal	27

On Migraine Assessment Scale, it was found that migraine severity varied among individuals from mild (16%), moderate (52%) and severe (32%) with least duration of <1 hour in 16% while more than 2-4 hours in 46% patients as illustrated in Figure-1. Furthermore, 64% participants reported triggering of headache due to stress, change of weather or chocolates. Although, medicine (54%) and rest (34%) was found to be effective in relieving pain as shown in Table-2.

Table.2 Migraine Assessment Scale	
Headache Referred to Neck	35 (70%)
Severity of Pain	
Mild	8 (16%)
Moderate	26 (52%)
Severe	16 (32%)
Nausea in Headache	25 (50%)
Effect of Light during Headache	21 (42%)
Triggering of Headache due to Stress, Weather Change and Chocolates	32 (64%)
Effect of Headache on Speech	6 (12%)
Effect of Headache on Physical Activity	28 (56%)
Duration of Headache	
Less Than 1 Hour	8 (16%)
1 Hour	7 (14%)
2 to 4 Hours	23 (46%)
More Than 4 Hours	12 (24%)
Migraine in Family	6 (12%)
Relieve in Headache	
Medicine	54
Exercise	6
Rest	34
Massage	6

Table.3 Risk Estimation			
	Value	95% CI	
Odds Ratio of Migraine (Cervical Radiculopathy /Healthy)	1.2	Upper	Lower
		0.9	0.4

The Odds Ratio of risk estimation for migraine is 1.2. Therefore, an odds ratio of 1.2 with a confidence

interval of 0.4 to 0.9 suggested that there is a 95% probability that odds ratio would lie in the range of 0.4 to 0.9 if there are no confounding or biases as shown in Table-3.

DISCUSSION

This study determined the risk of estimation of migraine in patients with cervical radiculopathy. The pathophysiological mechanisms underlying many of the classifications of headache are not well understood⁴. In terms of research evaluation, migraine has received the most attention, and it is believed to involve abnormal brain function, but the pathophysiology is still not clearly defined¹⁵. CGH arises primarily from musculoskeletal dysfunction in the upper three cervical segments¹⁶. The pathway by which pain originating in the neck can be referred to the head is the trigemino cervical nucleus which descends in the spinal cord to the level of C3/4, and is in anatomical and functional continuity with the dorsal gray columns of these spinal segments¹⁷. Hence, input via sensory afferents principally from any of the upper three cervical nerve roots may mistakenly be perceived as pain in the head a concept known as convergence¹⁸. The findings ascertain the hypothesis examined in this study that patients with cervical radiculopathy are highly susceptible to develop migraine as compared to healthy individuals. Headache disorders and musculoskeletal abnormalities of head and neck were bi-directional comorbidities. According to previous studies, about 90% of symptoms with cervical radiculopathy or myelopathy had anterior cervical surgery for relieving headache¹⁴. Moreover, studies reported that patients with headache disorders presented areas of muscle tenderness, postural changes and the myofascial trigger points when they were compared with healthy individuals or individual without headache¹⁵. Cervical musculoskeletal abnormalities and headache disorders were a bi-directional comorbidity, with nearly two-thirds of migraineurs coexisting with neck pain or stiffness, and one-fifth of patients with cervicogenic headache in pain clinics¹⁵. Previous studies have disclosed that almost 90% patients with headache accepted anterior cervical operation for the treatment of symptoms with cervical myelopathy or radiculopathy¹⁵. Furthermore, the authors observed that patients with headache disorders presented the myofascial trigger points, clear-cut areas of muscle tenderness, and posture changes, when compared with non-headache control^{14,15}. Thus linking between cervical spine disorder and migraine, emphasizing the importance of assessment for migraine at first and follow-up period in CS patients due to the increasing risk for the development of migraine. Previous studies have shown that middle-aged and young females with cervical radiculopathy were highly susceptible to develop migraine as compared to other individuals¹⁶. On the other hand, cervical radiculopathy affects verte-

brae and discs of the spinal cord that is an age-related disorder¹⁷. In addition, the neuroplastic changes in the brain and spinal cord produced by persistent peripheral nociceptive impulses lead to pain and central sensitization. Thus, the development of migraine requires a combination of central disinhibition and of tonic nociceptive input¹⁸. Therefore, it has been suggested to ascertain the severity of radiculopathy with the help of advanced imaging¹⁹. According to Allison and Ditor, the actual mechanism cause pathogenesis of cervical spondylosis myelopathy that leads to the migraine attack is the activation of the inflammatory cascade. The excessive release of the pro-inflammatory molecules into the bloodstream stimulates the hypothalamic-pituitary-adrenal axis that leads to hypothalamic dysfunction²⁰. According to previous studies, as a result of the degenerative processes of spinal cords vertebrae in the neck, the capsular ligaments of facet joints is damaged which leads to the hypermobility of upper cervical vertebrae²¹. Further, this dysregulation of the vertebrobasilar arteries results from such cervical instability which produces migraine headache²². Besides, the symptoms of migraine could be reproduced when myofascial trigger points are stimulated²³. The prolonged and recurrent irritated inputs associated with pain could worsen and provoke migraine attacks²⁴. There are several clinical implications of the study in public health. The physicians must assess the patient with cervical radiculopathy for migraine as early as possible because minimizing the risk for developing migraine disorder²⁵. Moreover, our findings demonstrated that incidence rate of migraine was higher among the patients with cervical radiculopathy as compared to the healthy individuals, which suggest that further studies could be conducted on evaluating the influence of cervical radiculopathy severity for determining the severity of migraine headache.

CONCLUSION

The study concluded that patients cervical radiculopathy have increased risk of migraine. Therefore, evaluation of the condition in cervical radiculopathy patients for assessing the susceptibility for migraine is crucial for the effective management of migraine. Moreover, further studies are needed to analyze the associated risk factor related to cervical radiculopathy for the estimation of risk among patients that is potential to predict patient's prognosis.

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RESEARCH REPORT

ANALYSIS OF SENSORY PROCESSING ABILITIES AMONG AUTISM SPECTRUM DISORDERS CHILDREN

ABSTRACT

BACKGROUND AND AIMS

Autism is characterized by the complex paradigm of intellectual disabilities that leads to impairment in sensory integration, communication barriers and social interaction. Therefore, the purpose of this study is to analyze the sensory processing abilities among autism children. Further the study will be helpful in identifying difficulties faced by autistic children in multidimensional aspects.

METHODOLOGY

A cross-sectional study was conducted at special education institute/schools of Karachi among the Autism Spectrum Children to evaluate the patterns of sensory integration by using Short Sensory Profile.

RESULTS

A total of 50 children, 23 males and 27 females with mean age of 9.5 ± 1.84 years included in the study. On SSP, the mean scores of participants were 17.89 ± 7.61 in tactile sensitivity, 16.66 ± 6.90 in Under-responsive/Seeks Sensation, 14.45 ± 5.75 in Visual/Auditory Sensitivity, 17.77 ± 7.04 in Auditory Filtering, 19.57 ± 7.91 in Low Energy/Weak while lowest scores were reported in Taste/Smell Sensitivity and Movement Sensitivity.

CONCLUSION

It was concluded that definite difference is more prevalent among children with autism whereas varying percentages are found on different items on Short sensory profile. Further studies are required to assess the sensory processing issues for more useful outcomes.

KEYWORDS

Sensory Integration, Autism, Behavior, Social, Cognition, Developmental Disabilities, Hypersensitivity

Sundas Khan

Physiotherapist

Hayat-e-Nau Rehabilitation Center for
Disable Children

sundaskhan_2013@hotmail.com

[Khan S. Analysis of Sensory Processing Abilities among Autism Spectrum Disorders Children. Pak. j. rehabil.2019;8(2):38-43]

INTRODUCTION

Autism is characterized by the complex paradigm of intellectual disabilities that leads to impairment in sensory integration, communication barriers and social interaction¹. Centre for disease control and prevention formed the Autism and Developmental Disabilities Monitoring (ADDM) System to gather facts and figures which provide estimates of the prevalence of Autism Spectrum Disorder in the United States. But tracking and determining the prevalence of ASD give rise to distinctive challenges like lack of biologic diagnostic markers, heterogeneity day to day changing in diagnostic criteria². ADDM provide data on ASD prevalence among children aged 8 years that shows increase number from approximately one in 150 children in 2002 to one in 68 in 2012 in multiple United State communities, more than doubling in this period³. However, there is no cure for autism as some of the studies showed that regular treatments may be effective to make the child independent with improved quality of life but not meaningful to control the disability⁴. Moreover, therapies like music, speech and physiotherapy leads to the betterment of the child in order to enhance interaction and social well-being⁵. However, there are domains that are severely being affected in autism, particularly sensory integration process is found to be impaired among children with intellectual disabilities⁶.

Sensory system evaluation is important for the diagnosis of autism. It was highlighted in one of the study that autistic children develops hypersensitivity in response to any stimuli due to sensory processing overload that ultimately affect their social interaction and disturbs the normal functions thereby leads to sensory dysfunction⁷. These aspects lead to adverse consequences of intellectual disability. An empirical investigation based on sensory dysfunction and impairments in autistic children was conducted using a sensory profile. It was determined that marked frequent responses to sound were observed in autism associated dysfunctions whereas no response has been observed in first two years of autistic children⁸. Moreover, sensory profile was helpful to discriminate the autism based on the ranking of 8-10 that has been significantly scored among autistic individuals. In contrast, it was reported that autism children possessed higher rate and great differences in sensory-perceptual abnormalities in comparison to Down syndrome and normal children⁹.

A retrospective study reported that approximately 200 children are annually diagnosed with autism with severe pattern development¹⁰. Moreover, Weider and Greens described that most of the autistic participants experienced difficulties in the auditory response or problems while some children may suffer from auditory hypersensitivity¹¹. Another study observed that auditory stimuli is a strong tool that helps to distinguish between children with or without autism as it is substantial to assess sensitivity in infancy¹². Further-

more, another study described that there is a disturbance in the pattern of sensory modulation and processing thus affecting the whole sensory process or systems. It was found that 80% children aged less than 6 years diagnosed with autism had findings that 51% had no response to sound, 81% had sensitivity to loud noises, 53% showed visual inspection on hands or fingers, whereas 62% children showed arm flapping¹³.

Previous studies reported that some of the parents might face difficulties with their children that indicated the first sign of autism. Furthermore, it was observed that infants with autism do not response to certain sounds and sensitive to taste and pain as well. However, a difference was observed among infants in sensory processing that either they were sensitive to touch, showed no interest or over excitement, showed no interest in communication and like or dislikes the moving objects. These responses helped the parents to identify the difference between children with autism sensory disorder¹⁴. Furthermore, the children who were commonly developing mannerisms, lack of sensations, interest and inability of identifying objects were preceded for the diagnostic interview of autism. Moreover, studies concluded that these behaviors with respect to social, sensory and communication aspects are helpful to categorize the difference between autistic and children with developmental delay¹⁵.

According to Hobnon, the responses in autism are dependent upon the quality of sensory stimuli either from the environment, events or individuals. Therefore effective sensory integration therapy is recommended in autism as number of studies demonstrated that interventions that enhances the sensory integration are useful for the autistic children to improved their sensory processing, so that they could easily interact with the environment thereby learn effectively to accomplish functional tasks. On the contrary, most of the individuals of autism exhibit complex sensory behavior disorders that included inappropriate skills performance, poor socialization, loud screaming or shouting, frequent urination or harming their body part by biting their own body skin¹⁶.

Therefore early interventions are indicated for sensory disorders in autism. As sensory processing is crucial to help in reasoning and play important role in concentration or cognitive functioning. Moreover, a duplicative attitude causes deficiency in sequence imagination that in particular form is a group of synchronous stimuli ultimately lead to alters behavior¹⁷. Despite the fact, an individual must be able to integrate sensory inputs for processing either filtering or screening out or suppressing others in functional or operational way. It was observed that most of the brain areas are engage in procession, modulating, and integrating sensory information while the main parts of brain i.e. frontal lobe, cerebellum, superior colliculus having particular focus on quick understanding and rapid multidimensional flow of information, intermediated

by attentional demands and resources¹⁸. However, as autism is a mental disorder, the brain processing activity alters in response to the condition. Moreover, this multidimensional sequence of information is impaired in individual of ASD, perhaps this disturbance in the communication of cortical the individual is unable to communicate with their surroundings thereby unable to participate and express their feelings¹⁹. Though, there would be more interest beyond the influence of attention with autism sensory disorder as an autistic individual faces difficulties with sensory and cognitive domains²⁰. Furthermore, people with autism experience more difficulties in automatic processing of knowledge and information that may leads to over loaded attention and stressed working memory therefore when the stimuli reaches and exceeded beyond its capacity, strength and power, thus the processing system fails²¹. Therefore, the purpose of this study is to analyze the sensory processing abilities among autism children. Further the study will be helpful to identify the difficulties faced by autistic children in multidimensional aspects.

METHODOLOGY

Study Setting

The study was conducted at special educational schools and institutes of Karachi, Pakistan.

Target Population

Children diagnosed with Autism Spectrum Children (ASD) aged between 8-12 years.

Study Design

Cross-sectional Study.

Duration of Study

The study was conducted in the period of 6 months duration.

Sampling Technique

Non-probability Convenient Sampling Technique.

Sample Size

A Sample Size of 50 was calculated using open EPI calculator.

Sample Selection

Inclusion Criteria

- Children diagnosed with Autism Spectrum Disorders aged 8-12 years
- The children shall be enrolled at Special education school/ institute.

Exclusion Criteria

- Children with Autism Spectrum Disorders having motor disabilities were excluded.
- Children with associated problems like cerebral palsy, down syndrome

Data Collection Procedure

Data of 50 participant of age between 8-12 years was collected from special education schools after initial screening based on the given inclusion/ exclusion

criteria. Participants were known case of Autism Spectrum Disorder. Consent was taken from their parents/guardians. Procedure of research was explained to them along with the advantages and disadvantages. Short sensory profile was used by the therapist to take information regarding sensory abilities of participants whereas the classification of difference in sensory patterns was analyzed on the total scoring of the profile.

Data Collection Tool

• Short Sensory Profile

Data was collected by short sensory profile, consisting of 7 items on tactile sensitivity, taste/smell sensitivity, movement sensitivity, under-responsive/seeking sensation, auditory filtering, low energy/weak, and visual/auditory sensitivity. Each of the items is based on total raw score on the responses of 5-point likert scale i.e. "always", "frequently", "occasionally", "seldom" and "never". The total scoring of each individual was classified on typical, probable and definite difference respectively based on the analysis of sensory processing abilities. The reliability of short sensory profile is 0.70-0.90 whereas the construct validity of the SSP total and section scores ranges from (0.25-0.76)²²⁻²³.

• Data Analysis Strategy

Data was entered and analyzed on IBM SPSS (Statistical Package for Social Sciences) version 20. Descriptive statistics was used to represent the participants' demographic characteristics in terms of frequency, whereas; participants' responses were presented through frequency and percentages chart.

• Ethical Considerations

Consent from parents/ Guardians was taken before enrolling the participants in the study. They were also informed about the details, possible risks, benefits and their right to withdraw. A secluded area was provided to the participants. Assurance of confidentiality of data was given. Permission from head of the department was also taken for data collection.

RESULTS

A total of 50 children were recruited after initial screening based on inclusion/exclusion criteria including 23 males and 27 females with mean age of 9.5 $\pm$ 1.84 years. The demographic characteristics of participants are represented in Figure-1.

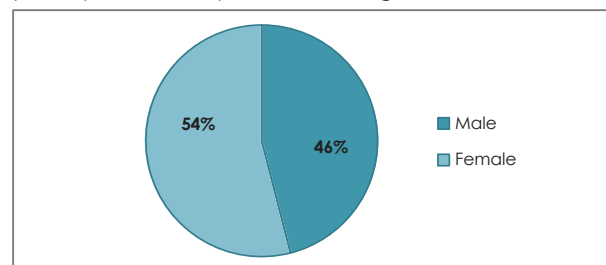


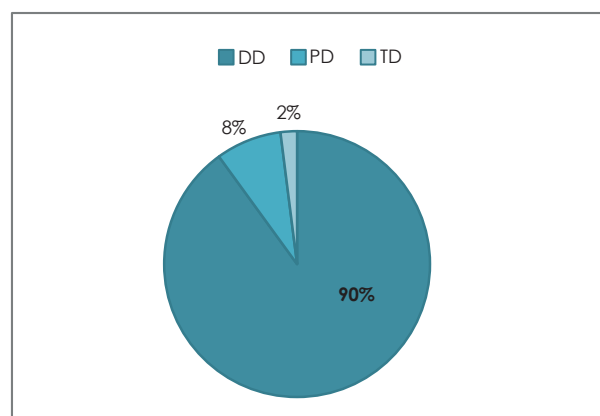
Figure.1 Percentage of Male and Female Participants are represented in pie chart

Scores on SSP

On each item of SSP, the mean scores and standard deviation was calculated as shown in Table-2.

Table.2 Mean Scores of Participants on Short Sensory Profile Items	
Items	Mean $\pm$ SD.
Tactile Sensitivity	17.89 $\pm$ 7.61
Taste/Smell Sensitivity	11.01 $\pm$ 5.93
Movement Sensitivity	9.32 $\pm$ 3.88
Under-responsive/Seeks Sensation	16.66 $\pm$ 6.90
Auditory Filtering	17.77 $\pm$ 7.04
Low Energy/Weak	19.57 $\pm$ 7.91
Visual/Auditory Sensitivity	14.45 $\pm$ 5.75

Upon analysis, it was observed that no participants were evaluated with probable and typical difference whereas, definite difference was found to be more common. The reported frequency of definite difference is as shown below in Figure 2.



*DD: Definite Difference, PD: Probable Difference, TD: Typical Difference

Figure.2 Percentage of participants having different patterns on SSP

DISCUSSION

The results of this study identified that the children with Autism Spectrum Disorder showed varied responses in sensory integration on Short Sensory Profile. Moreover, definite difference in sensory patterns was observed than probable and typical difference in autism children. These results were consistent with the findings of a study that showed higher prevalence of sensory processing issues in ASD children as compared with normal children²⁴. Our study examine the different sensory integration issues with ASD children on Short Sensory Profile on various domains, it was observed that majority of children have low energy, further high scores were found to be in tactile sensitivity, visual and auditory sensitivity that showed the need to address the sensory component in autism children.

Previous studies showed that Autism Spectrum Disorder is associated with more sensory issues as well as poor adaptive functioning that showed the compromised socialization of ASD in activities of daily living and with other people²⁵. It was also evident that most of the children with this disorder have atypical presentation on under responsive sensation-seeking item on SSP that revealed that children had no idea regarding their surroundings and they might be lacking in generating the sensory input²⁶⁻²⁷. However, limited studies are found to assess the sensory processing abilities of ASD children with respect to reliability and validity of each item.

Autistic individuals showed varied sensory experiences that include weak or strong responses to certain situations, events or stimulations. Although, the uncomfortable sensory experiences are due to sensory hypersensitivity leads to high or low neurological thresholds causes difficulty in sights, balance, touch, tastes, sound and proprioception. The high neurological threshold causes exaggeration that is worse response in reality whereas low neurological threshold leads to unresponsiveness. Therefore, adequate sensory profile analysis provides possible relationship between behavioral outputs and sensory process abilities to analyze sensory inputs by visual, auditory, olfactory nerves as well by Golgi tendon, tactile receptors and muscle spindle fibers and make connections with cerebral efferent pathway including psychological and emotional junctions²⁸.

Furthermore, Lord and Colleagues revealed presence of X-syndrome that is associated with tactile, auditory, taste and smell sensitivity in comparison to other developmental disabilities²⁹. Whereas, evidence has been established that stated that sensory symptoms are highest in children with autism. However, limited evaluation measures are available to for comprehensive sensory analysis. Moreover, one of the mechanisms of sensory dysfunction is defensiveness in such a way that they neglect sensory signals to an excessive degree or may refuse it unconsciously that leads to unsupported bodily function and coordination, often observed as difficulties in performing activities in sequential way³⁰.

Another study revealed that sub-scales of SSP are strongly associated with autism and sensory processing difficulties; it was also observed that social interaction is the main problem in autistic children are compared to other domains³¹ whereas; our study did not assess the social domain in ASD. The previous studies have reported negative associations between under responsiveness, language and socio communicative symptoms severity score³². However, our study did not address the association but majorly highlighted the sensory issues on Short Sensory Profile. On the other hand, Sensory-Seeking patterns have also been related to a higher prevalence of repetitive behaviors³³. Sensory processing disorder is the condition which affects the ability of brain and nervous system

to integrate the stimulus, either from the environment or an individual. Therefore, typical responses are observed in affected population. Likewise, children with Autism Spectrum Disorder have altered sensory processing abilities that may affect their senses such as hearing, taste and integration. Therefore, it has been concluded that both under responsive and sensory seeking patterns of interest can have an adverse impact on the performance of individual. The sensory output or responses are interpreted based on child behavioral response to the sensory input from the environment. Our study assessed the sensory measures used in clinical settings but as per the author more interpretation of the behavior pattern and difficulties by the parent or therapist needed to investigate³⁴. The study is significant by providing comprehensive assessment of sensory processing abilities of autism spectrum children that is helpful in their rehabilitation. Further, the results difference will provide therapists an area to work in order to improve sensory integration in children with ASD.

The limitations of this study were small sample size and limited age ranges, therefore age-related confounders may vary the sensory profiles. Furthermore, trials must be conducted to investigate the sensory profiles among children with developmental disabilities for more useful outcomes.

CONCLUSION

It was concluded that definite difference is more prevalent among children with autism whereas varying percentages are found on different items on Short Sensory Profile. Further studies are required to assess the sensory processing issues for more useful outcomes.

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RESEARCH REPORT

CORRELATION OF FLEXIBLE FLATFOOT AND Q-ANGLE AMONG SECONDARY SCHOOL STUDENTS BY USING DENNIS METHOD

ABSTRACT

BACKGROUND AND AIMS

Flat foot has been reported as the most occurring clinical foot complication among pediatrics with more than 40% prevalence worldwide. This rate of prevalence is increasing by 21% to 57% in children aged 3-6 years respectively. Therefore, aim of this study is to determine the correlation between flexible flat foot and Q-angle among secondary school students by using Dennis method.

METHODOLOGY

This cross sectional study was conducted on 52 participants, aged 11-16 years. Screening of flat foot among participants was determined through navicular drop test. The jack toe rising test was also used to discriminate in flexible and rigid flat foot. The participants having flexible flat foot were then recruited and evaluated on Dennis method of flat foot grading.

RESULTS

The demographic characteristics of participants were represented through frequency, mean and standard deviation. Moreover, strong correlation between flat foot and Q-angle was observed on right side, whereas moderate correlation was detected on left side of flat foot respectively ($p < 0.05$).

CONCLUSION

It was concluded that flexible flat foot has strong association with Q-angle. However, future studies must be taken in to consideration for further assessment of flat foot.

KEYWORDS

Flat Foot, Quadriceps Muscles, Traumatic, Obesity, Knee Joint, Mechanics, Pediatrics

Hakim Ullah

Senior Lecturer
Ziauddin College of Rehabilitation
Sciences
Ziauddin University
hakimullah@zu.edu.pk

[Ullah H. Correlation of Flexible Flat Foot and Q-angle among Secondary School Students by using Dennis Method. Pak. J. Rehabil. 2019; 8(2): 44-49]

INTRODUCTION

Flat foot, also known as fallen arches or pes planus is a postural deformity that results in a collapse of the foot arches. Flat foot has been reported as the most occurring clinical foot complication among pediatrics with more than 40% prevalence worldwide¹. Although this rate of prevalence is increasing by 21% to 57% in children aged 3-6 years respectively². In Pakistan, the prevalence of flexible flat foot in school going children is approximately 17% Majority of flat foot suffering children is 7 years of age¹ However, the prevalence for flat feet significantly diminishes with age² such that infant born with flat feet is normal and medial longitudinal arch develops naturally by age 5-6 years³.

It is more common in males than females; moreover bilateral involvement is more frequent. The risk factors for flexible flat-foot include ligament laxity, male gender, young age, overweight, and obesity⁴. According to a study conducted in 2015 concluded that flexible flat foot is a critical part of foot evaluation as it is associated with adverse changes to the body due to structural deformity of lower extremity joint, change in muscle activity and decrease muscular strength and balance among children⁵. It was also claimed that flexible flat foot results in the stiffness of ankle dorsiflexors, asymmetric foot posture and associated locomotion difficulties that may results in balance deficits and motor control loss in children⁵⁻⁶. Another study reported that 30% of children have a calcaneovalgus feet deformity which is not painful and may resolve on its own during the developmental stages⁷.

On the other hand, flexible flatfoot deformity differs from a rigid flat foot on the basis of the arch collapse that will be evident when the patient bears weight resulting in the re-appearance of a normal medial longitudinal arch in toe standing or with the ankle passively plantar flexed⁷. Moreover, the evaluation of either type of flat foot is based on the direct and indirect clinical approaches that may involve footprint measurements, anthropometric and radiographic techniques⁸. A recent survey conducted by Aenumulapalli et al in 2017 quantified flexible flat foot occurrence among children using a reliable and valid method i.e. the navicular drop test to determine the degree of flat foot by height of Medial Longitudinal Arch (MLA)⁹. However, the results concluded that significant correlation between height and weight with Right Side Navicular Drop (RND) in comparison to left was found to be insignificant. It was also indicated that high percentage of flat feet leads to a reduction in the longitudinal arch that may resulted in the musculoskeletal disorders of lower limb as well as an impaired gait⁹. Recent studies have also shown the impact of flat foot on the Q-angle and its association with tibiofemoral mechanics i.e. a Q-angle of >20° imposes a risk of the patella getting pulled by the quadriceps muscles, increasing the chance of knee disorders⁸⁻¹⁰ In addition, the American Orthopedic

Association (AOA) considers 10° to be normal and 15-20° to be abnormal. Another study conducted in 2017 determined the relationship between Q-angle and flat foot among school going males revealed insignificant differences among subject's Q-angle between both their knees. It was also concluded that the presence of a flat foot deformity may also result in an increased Q-angle in the individual¹¹. Consecutively, more evidences in this regard are needed to determine the associated factors imposed by the flat foot deformity. Therefore, the rationale of our study is to determine the correlation of flat foot and Q-angle by using Dennis method. This study will also serve as the basis of the clinical evaluation of the foot assessment and may predict the onset of associated risks related to deformity.

METHODOLOGY

Study Design

Cross-sectional Study

Study Setting and Participants

The study was conducted among secondary school students with flexible flat foot of Central District, Karachi.

Duration of Study

This study was completed for the duration of 6-8 months after approval of synopsis

Sampling Technique

Non-Probability Convenient Sampling Technique

Sample Size

Sample size was calculated by considering a study reference, conducted by Armin Abtahian MD in 2016 entitled as "A study of the prevalence of flatfoot in high school children". At 95% Confidence Interval with bound of error 5%, the calculated sample size was 52 .

Inclusion Criteria

- Students with flexible flat foot.
- Both boys and girls aged 11-16 years.

Exclusion Criteria

- Rigid Flat Foot.
- Knee Deformity¹².
- Patellar Instability¹³.
- In-toe gait and Out-toe gait¹⁴.
- Traumatic/surgical records.

Data Collection Procedure

Data was gathered based on the participant's physical characteristics, special tests and Dennis method of the right and left foot, respectively. At first, student's flat foot was diagnosed by using the Navicular Drop Test. A difference of >10mm was considered as positive test. After the diagnosis, students were assessed for flexible flat foot through Jack's toe-raising test. The test was performed while the patient in a weight bearing while clinician dorsiflexes the big toe

and watched for an increasing concavity of medial longitudinal arch the foot. A positive result included the formation of arch on medial side of foot indicate a flexible flat foot whereas lack of arch formation indicate negative result in a rigid flat foot as shown in figure-1.



Figure.1 shows Jack Toe-rising Method

Afterwards, the students who had flexible flat foot were assessed through Dennis method. The foot print was determined by using photopodogram of each participant. The sole of foot was painted with paper developer liquid and then asked each participant to stand in a bipedal position on white paper on a smooth area. The sole of the foot is printed on the sheet. Accordingly, the diagnosis and the severity of the flexible flat foot will be assessed using the following grading of Dennis method as shown in figure-2.

- Grade-1: Central zone of forefoot support is half that of metatarsal support.
- Grade-2: Central zone of forefoot support is equal to metatarsal support.
- Grade-3: Central zone of the foot support is greater than width of the metatarsal support.

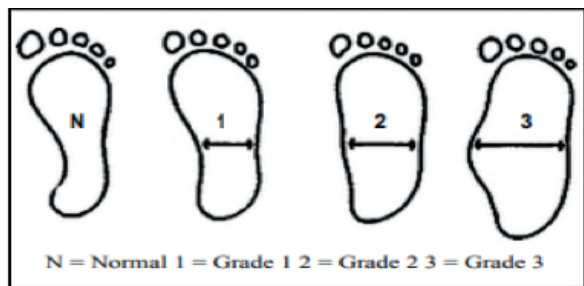


Figure.2 Dennis Method of Flat foot Grading

After the measurement of the grades of flat foot, the Q-angle of each participant will be assessed by drawing an imaginary line between the anterior superior iliac spine to the mid of the patella while another line will be drawn between tibial tuberosity towards the mid of patella, the angle is formed and measure through goniometer such that to determine the correlation between the associated variables.

Data Analysis

Data entry and analysis was done on Statistical Package for Social Sciences (SPSS) version-20. Baseline

characteristics were represented through mean, frequency and percentage chart. Further, Pearson correlation of coefficient was applied to assess the correlation between flatfoot and Q angle.

RESULTS

A total of 52 participants recruited in the study consisted of 22 males and 30 females with mean age of 12.98 ± 1.075 . Further, the demographic characteristics of participants including age in years (%), prevalence of flexible flat foot, mean height, weight and Q-angle (Right and Left) is depicted in Table-1.

Table.1 Demographic Characteristics of the Participants

No. of Participants	52 (22 Males, 30 Females)	
Flexible Flatfoot n (%)	52 (20.8%)	
Age (Mean$\pm$S.D)	12.98 $\pm$ 1.07	
Age in years (%)	11 (3%)	
	12 (16%)	
	13 (16%)	
	14 (14%)	
	15 (2%)	
	16 (1%)	
Height	58.83 $\pm$ 4.46	
Weight	48.34 $\pm$ 10.74	
Q-angle	Right Side 18.65 $\pm$ 1.32	Left Side 18.84 $\pm$ 1.10

The non-parametric chi-square test of association was applied to determine the association between Q-angle and flat foot in right and left side respectively. The association was evaluated between the Dennis method of flat-foot grading and Q-angle that showed significant association ($p < 0.05$) of right flat foot. Similarly, strong association was found on between the left flat feet with Q-angle in all the Dennis grades as shown in table-2.

Table.2 Chi-square Test of Association

Right Side			
Dennis Method	n	Chi-Square	*P -value
Grade-1	20	14.40	0.002
Grade-2	20	10.80	0.013
Grade-3	12	11.33	0.010
Left Side			
Grade-1	20	22.00	0.001
Grade-2	21	10.57	0.005
Grade-3	11	4.45	0.035
<i>Significant p-value *(<0.05) in association with flat foot grading and Chi-square testing values</i>			

Pearson correlation was run to determine the coefficient of correlation between flat foot and Q-angle. On right side, strong correlation is observed whereas moderate correlation was determined on left side of flat foot in relation to Q-angle as shown in Table-3.

Table.3 Coefficient of Correlation between Q-angle and Flat-foot

Relationship between	r	*P-value
Rt. Flat foot -Q-angle	0.80	<0.05
Lt. Flat foot -Q-angle	0.50	
<i>Significant p-value *(<0.05) of coefficient of correlation</i>		

DISCUSSION

The findings of our study showed that flexible flat foot have moderate to strong correlation with Q-angle. Although number of students have varying flat foot grades according to Dennis method of grading. Majority of studies has taken Q-angle in to consideration as an important clinical parameter that is shown to have substantial biomechanical effect on knee¹⁵. Recently, a study conducted by Raveendranath et al in 2019 stated that females have greater significance of Q-angle as compared to male as a result of greater lateral tibial tuberosity¹⁶. Recently, a study reported that females have been reported to have larger Q-angles in comparison to their male counterparts. However, according to a trigonometric evaluation conducted by Grelsamer et al a mean difference of 2.30° degrees between the Q-angles of males and females were reported. Furthermore, it was found that both the genders of equal height had established similar Q angles¹⁷. Moreover, it was stated that Q-angle is a vital aspect for the positioning and movement of patella¹⁵⁻¹⁶. It has also been anticipated that an increased in Q-angle may be related with an increased risk for knee injury since excessive lateral forces of knee could adversely influence the knee's mechanical alignment¹⁷. Recent studies demonstrated that the association between lower limb alignment and rate of injuries among athletes and recreational players showed that larger Q-angles are impactful in sustained knee injuries¹⁵⁻¹⁷. On the contrary, a number of studies reported that quadriceps contraction may cause alteration in Q-angle measurements, thus making it challenging to establish a direct connection between static Q-angle measurements and knee injury¹⁷. Moreover, certain studies also observed that Q-angle had negative correlation with height. It was also reported that Q-angle had negative association with height, length of lower limb and femur respectively¹⁸. On the contrary, a study conducted by Grelsamer et al found significant association between the Q angle and height. Besides, study suggested that with respect to

age-adjusted, weight, pelvic-width, and gender the Q-angle decreases by 0.2° degrees for each individual's centimeter of height¹⁸. Furthermore, another study compared the effect of lifestyle on Q-angle between male students and laborers. It was revealed that the mean Q-angle in laborers was less than in comparison with students. This difference could be due to varied quadriceps muscle tone, strength and morphology. Whereas, another study also compared Q-angle in individuals with sedentary lifestyle and soccer players reported that activities performed causes a change in quadriceps tone and strength that produced a remarkable effect on Q-angle resulting in decrease Q-angle¹⁸⁻²⁰. However, limited researches have been conducted to investigate the association of Q-angle with flat foot, in particular to flexible type¹⁶⁻¹⁹. Shibuya et al (2010) stated that pes planus is a deformity that is considered by complete or partial loss of medial longitudinal arch that may leads to influence the skeletal maturity and other posture related difficulties. In this regard, our study found that flexible foot is common in school going adolescents¹¹⁻¹⁶ years with varying grades on Dennis method with 8.7% prevalence. It has been speculated that these individuals may have poor posture or foot deformities with aging¹⁸. The findings are consistent with the study of Pourghasem et al that concluded that prevalence of flat foot was overall 16%, although decrease with age. Moreover, the occurrence of flatfoot is highest among obese and overweight boys that are (30.8%)¹⁹. Previous researches have used different methods to investigate the flat foot that has been expensive and non-reliable. Similarly, Sachini et al in assessed the asymptomatic flat foot among participants with navicular height and arch index as well as with AP and lateral radiographs²⁰ whereas in our study; the flat foot among the participants was identified through navicular drop test while jack test was used to differentiate between rigid and flexible types of flat foot. Therefore, the screening of participants takes place by the use of reliable tools. Moreover, the measurement of Q-angle among participants was determined through goniometer similar to the study of Raveendranath et al that recorded the footprints of participants by Foot Print Mat and Staheli Arch Index. While some other author used three footprint measurements consisted of the Chippaux-Smirak Index (CSI), Clarke's Angle (CA), and Staheli Arch Index (AI), for relationship with clinical diagnosis with static foot prints of adolescents²¹. Further, it was revealed that children having flat foot posture are more likely to have pain or discomfort at the back, hip and knee but the mechanisms of the proximal joint problems still remain unclear²¹. In particular to our study, foot prints were recorded with Dennis Method Grading of flat foot. Moreover, our results showed that the Q-angle is strongly correlated with flat foot among young adults. To the best of author's knowledge, the study is the first to be conducted in Pakistan as it deter-

mined that varying grades of flat foot. It was showed that most of participants have grade-1 and grade-2 flat foot on right and left sides respectively while minimum number of participants lies in grade-3 flat foot. On contrary, study of Pourghasem et al revealed significant differences in flat foot grades among different age groups. Similar to our context, it was showed that grade-1 and grade-2 flat foot were more prevalent in age 6-10 years while grade-3 was observed only in a 13-year-old girl. Consecutively, our study showed significantly strong correlation between Q-angle and flat foot on both right and left sides. While a comparative study conducted by Shih et al showed insignificant results of the correlation²⁰⁻²⁴. There are certain limitations encountered in this study that is small sample size. Also, numerous participants with unilateral or rigid flat foot have been excluded from the study that leads to sample constraint²³. Therefore, large-scale studies with adequate sample size are recommended to investigate the relationship of Q-angle with flat foot, also multi-center trials should be directed to observe the response of related foot deformities²³⁻²⁵. Also, there were difficulties with participants schedule has been encountered, moreover lack of time and unidentified etiological factors also leads to observer bias in data collection²⁴. Therefore, future studies must take all the aspects in to consideration to avoid such consequences related to the assessment of flat foot. Further, it is suggested that investigator must look out for the elements inflicting the flat foot and changes related to Q-angle. Despite, postural corrections and different body biomechanics should also be taken in consideration in future studies to govern the deformity at initial stage.

CONCLUSION

The study concluded fair to strong correlation is present between flatfoot Q-angle in right and left flatfoot respectively. Furthermore, large scale studies should be conducted among individuals of higher age group and larger scale areas for the early prevention of musculoskeletal disorders and structural deformities.

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CASE STUDY

OCCUPATIONAL THERAPY FOR CHILDREN WITH FEEDING DIFFICULTIES AND PICKY EATING HABITS - A CASE STUDY

ABSTRACT

Feeding and eating are basic activities of daily living (B/ADL) thus it is one of the major occupation domain of occupational therapy. The role of an occupational therapist at this domain is to evaluate occupational performance and develop feeding skills that includes sensory-motor, fine motor, oral motor and processing skills. Moreover behavior pattern, habit and routine along with contextual factors during the mealtimes that facilitate feeding mechanism.

Picky and fussy eating is also called choosy eating which is most common form of feeding difficulties [2] among both typically developed and delayed milestone children.

The aim of case study is to promote the effectiveness of occupational therapy in picky eater children who have attained developmental milestones within typical ranges but healthy eating habits are not developed. The occupational performance of the 5 year old picky eater child was monitored through ABLLS-Assessment of Basic Language and Learning Skill. Feeding issues of the child were affecting her physical and behavioral health eventually leading to struggle in functions for BADL- basic activities of daily living and social participation.

It is observed that continuous occupational therapy session with individualized intervention plan, inculcate healthy eating habits and improve results at ABLLS.

KEYWORDS

Feeding Behavior, Daily Living, Occupational Performance, Play Therapy, Developmental Milestone, Reinforcement Schedule, Pretend Play

Sobia Haroon

Occupational Therapist
CS School and Thinkmatic
sobia.haroon7@gmail.com

[Haroon S, Occupational Therapy For Children With Feeding Difficulties And Picky Eating Habits - A Case Study.Pka.J.rehabil.2019;8(2):50-53]

INTRODUCTION

Feeding is one of the self-help and motor skill 1 which is defined as the sequence of steps required to take food into mouth that requires fine motor skills, eye hand coordination, cognitive and visual perceptual skills. Whereas eating is defined as the process takes place to the food once it is in the mouth, mainly involve oral motor skills and processing².

Feeding difficulties include; inability or refusal or reluctance to eat different foods or a variety of food textures, swallowing and chewing difficulties, fussy eating, decreased appetite, limited interest in feeding and mealtime behavior³.

Some children face eating issues such as picky eating, intolerance to different textures, tastes or smells and chewing the food. Feeding issues are often related to developmental delays, cognitive or emotional problems or other medical diagnosis. It is exhibited in the form of functionality difficulties, behavioral disorders with poor occupational performance⁴.

Occupational therapy provides intervention to children who have difficulty in feeding by focusing on improving their occupational performance and implementing technique to enhance caregivers about strategies of developing child's interest and curiosity to solid food items⁵.

Occupational therapist also address emotional component, focusing on children to overcome their food related anxiety by applying techniques of play and cognitive behavior therapy.

CASE PRESENTATION

A 5 years old girl was referred to outpatient clinic of the school with feeding issues underlying anxiety and discomfort feeling while eating solid food, although the child has attained developmental milestones in the typical range. This study observe the improvement that occurred during a study in period of individualized occupational therapy sessions comprise of sensory integration therapy, cognitive behavior therapy techniques and play therapy.

According to the parents, child refused solid form of any food and vomits if she tries to eat or is force to eat. Parents reported their child's temper tantrum, behavioral issues and functionality impairment in BADL such as lack of interest and motivation to participate and perform self-help skills.

Initially, the child's food preference was same as that of infant. Her diet was restricted to meshed food or blended texture. Parents also reported that she had not practiced chewing or biting any kind of

solid food. So out of habit, she was eating all kind of foods in the grinded form for all her meals in a day that are were fed by the mother or her baby-sitter. Her poor eating habit accompanied by dependence in her BADL as well as poor fine motor skills which was required spoon or fork eating and taking food to the mouth. During travelling also her parents would carry a hand grinder machine with them and would provide her food in grinded form.

Consequently, the eating behavior of the child impedes social and emotional development of the child. Emotional outburst was more evident during snack time at school which further affected her play behavior. It turned serious concern for the parents when they observed that due to emotional disturbance, the child started to avoid play with peers.

METHODOLOGY

Assessment tool

The child was initially assessed on the following tools

- ABLLS: Assessment of Basic Language and Learning Skill, it is used to assess the understanding of basic language and identify deficiency in self-help and motor skills. It also rules out motivational strength, attention span and other factors that inhibit child from learning. It is criterion referenced assessment tool that gives broad analysis of 544 skills from 25 skill areas.

- Short Sensory Profile: It has around 38 items grouped in three main sections; sensory processing, modulation and emotional responses

The sessions were scheduled as four days a week. Initially 20 to 30 minutes for rapport building and promotion of familiarity from environment and therapist. Once the child adjusted the sessions were stretched to 45 minutes.

Intervention Plan

The customized intervention plan is based on sensory integration specifically oral motor massage, play and cognitive therapy. Oral facial sensory massage was conducted to improve oral muscles health. Tongue movement was encouraged during different play therapy to attain the movement of food in mouth. She also had anxiety issues related to chew the solid food and aversive with trying few texture and smells.

Behavior therapy techniques were applied to increase the compliance by pairing non-preferred item with preferred item to increase the compliance and positive reinforcement was introduced during session such as playing with her favorite activities and toys⁵.

Behavior issues related to eating habits were addressed by role modeling and pretend play with plastic toys of vegetables and fruits, also drawing and painting the pictures of different fruits modified

the child's behavior and reduced her resistance of eating solid food items.

In play therapy, social stories were also introduced to set up the plot for meal time and exposure to variety of food. This strategy significantly reduced the anxiety and unwillingness to experience variety of food.

Family centered therapy model was applied to train and empower parents in managing eating behavior issues of their child. Through parent support program, both the parents were train to apply same

plan at home. Play therapy strategies were effectively applied by parents at home by involving other siblings and scheduled reinforcement⁶.

RESULTS

The ABLLS skill tracking system showed marked progress in the area of social interaction, play and leisure and generalized responding with the betterment in eating habits. Figure 1 shows the initial assessment and progress in scoring after the regular sessions for six months four days a week.

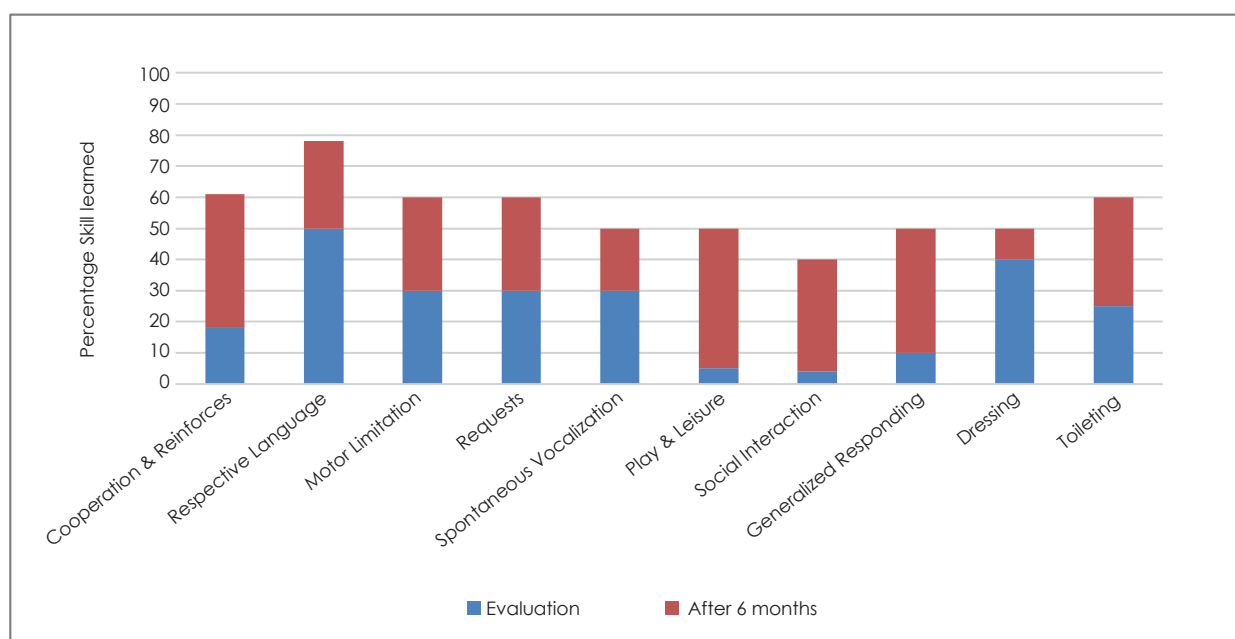


Figure.1 showing the baseline with the progress

Whereas at SSP she ranged in probable difference for taste smell sensitivity, only the oral motor processing segment from the sensory profile was assess that showed lower range of probable difference. At reevaluation on sensory profile for the oral motor sensitivity and processing, the child scored upper range of probable difference. With such differences in the revaluation score, child also showed improvement in the chewing of food, interest in different form of edible along with.

DISCUSSION

This case study describes that children with picky eating behavior or chewing difficulty can be facilitated through occupational therapy sessions. It also emphasized that occupational therapy just not help children with developmental delays or with presenting any medical problems but it also help children who have achieved their milestones within time but face anxiety and behavioral issues.

It has been observed that in addition to oral motor

exercises, play therapy was identified as a reward and a method to engage and teach children. The interventions and strategies should age and client appropriate⁷.

The present case demonstrates the efficacy of holistic approach to target behavior. The child's behavior was modified by combining the play therapy intervention, behavior modification strategies, sensory integration therapy and family centered approach. Pairing desired behavior with positive reinforcement strengthen the desired behavior. Playing with toy vegetables and social stories significantly reduced food anxiety, and parental involvement accelerated the process⁸.

CONCLUSION

Occupational therapy, individualize treatment plan plays significant role in shaping behavior of picky eater and developing good eating habits. Poor integration of oral sensory motor and processing may lead to eating problems.

ACKNOWLEDGMENT

I would like to pay deepest gratitude to Ms Neelum Zehra, senior occupational therapist, whose guidance and advice helped me in writing my case study and proved monumental towards the success of this study.

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- d) The font size of the heading should be '16' and the subheadings should be '14'.
- e) On the main page, the abstract should be clearly indicated.
- f) The line spacing 1.0 should be used and page numbers should be mentioned.
- g) The use of apostrophes is not appreciated in the journal.

- h) Avoid repetition of words.
- i) Augmentation should precede the abbreviation initially.
- j) The alignment of the manuscript should be 'Justified'.
- k) Ensure that each new paragraph is clearly indicated, by adding single line space before new paragraph.
- l) The tables and figures should be clearly defined and labeled.

5) Title Page

The title page should contain the following contents in given order:

Title:

- Title should be clear, concise with a limit of 150 characters. Abbreviations are not appreciated in the title.

Author Names:

- Authors' complete name, designation, institution, email and their corresponding address should be given in the sequence of their authorship.

Word Count:

- The word count of the article should be mentioned, excluding the abstract, tables and references.

6) Abstract

A comprehensive abstract is appreciated for the article. This includes either Structured or Unstructured Abstract. The words limit is given below:

- Structured Abstract: 200 words
- Unstructured Abstract: 250 words

Preferred Sub-Headings for Structured Abstract:

- Objectives
- Study Design and Sampling Techniques
- Study Settings & Participants
- Interventions / Data Collection Tools
- Outcome Measures (if applicable)
- Results
- Conclusions

7) Keywords

After the abstract 6-8 keywords are appreciated. These words should be Medical Subject Headings (MeSH) and should reflect the topic of the article.

8) Introduction

It should briefly describe the study moving from a broad perspective to a narrow one. It should include background and literature reviews about the topic. Relevant references are appreciated. Always remember to mention the purpose of the study and the objectives of the study. Provide operational definitions of terminologies where required.

Methodology

- 9) Mention all the components of methodology including study design, study settings, duration, sampling method, inclusion and exclusion criteria and apparatus/tools/intervention. Mention clearly the procedure and the follow-up of the study. Always mention the implemented statistical test and the reasons of application.

Questionnaires

When mentioning a questionnaire, the format of survey and the questions included in the questionnaire should be given.

10) Ethical Concerns

Approvals are required from the Ethics Committee of the Board of the Universities or Hospitals or the place where the data is collected. Ensure that the anonymity of the participants is maintained. Personal information is not appreciated.

11) Results

Present the results in a logical sequence in the text as well as tables. Results should be specific and needs to interpret all variables providing the evidence of the study.

12) Outcome Measures

The primary as well as secondary outcome measures should be given, including the details of the validity and reliability.

13) Discussion

Start the discussion with the summary of major findings. Relate the study with previous researches by giving a comprehensive review of literature and show results favourable/contrast with previous work. Always mention the drop outs of the study as well as outliers found.

14) Conclusion

It should highlight essential points learnt from the study in a summarised paragraph including 3-4 sentences.

15) Acknowledgement

It may be added at author's choice, it include the expression of thanks and a token of appreciation to any organization or personnel.

16) References

It should be numbered consecutively throughout the article beginning with 1 for the first-cited reference. All references are appreciated in Vancouver Style. It should be listed at the end of the paper in order in which they appear in text (not listed alphabetically by author and numbered as previously).

Author Surname initials. Title of article. Title of Journal abbreviated. Date of Publication; Volume number (Issue Number); Page Numbers.

For example:

[1] Alam JM, Farooqui SI, Hussain A, Mahmood SR. Correlation of creatine kinase and myoglobin concentrations in patients suffering from debilitated conditions related to myopathies. Pak. j. rehabil. 2012;1(1):13-17



