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Original Article

Joint Hypermobility and Musculoskeletal Pain in Paramedical Students and Staff at a Tertiary Care Hospital

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ABSTRACT

Objective: to determine the frequency of joint hypermobility in paramedical students and staff at National Hospital Lahore.
Study Design: Cross-sectional study.
Place and Duration of Study: Department of Rheumatology, National Hospital and Medical Center, Lahore Pakistan, from Mar to Sep 2021.
Methodology: Two hundred fifty paramedical students and staff of either gender, aged between 16 years to 35 years were enrolled. Localized Joint Hypermobility was defined as <3 Score and generalized Joint Hypermobility were defined as >4 scores on the Beighton Score Scale. Demographic information was obtained from each participant, and joint hypermobility was assessed by using the Beighton score.
Results: Mean age of the study participnats was 26.6±4.6 years with 146(58.24%) females. Mean BMI was 23.9±4.0 kg/m2. Generalized Joint Hypermobility was seen in 51(20.4%), and 31(12.4%) had localized hypermobility. Out of 250 participants, 33 (13.2%) had musculoskeletal pain, while among 51 patients with generalized hypermobility, 12(23.5%) had musculoskeletal pain.
Conclusion: One out of every five young healthy paramedics enrolled had generalized joint hypermobility. One-third of subjects had at least one clinically documented hypermobile joint. Almost every fourth person with generalized joint hypermobility has musculoskeletal pain compared to 1 in 10 persons without generalized hypermobility.

Keywords: Beighton score scale, Generalized joint hypermobility, Localized joint hypermobility, Musculoskeletal pain.

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INTRODUCTION

Joint hypermobility, a common physical sign, is generally ignored.[1] Joint Hypermobility has been acknowledged as a condition often seen in healthy people, gymnasts, ballerinas and acrobats.[2] and it may also be present in some hereditary diseases, including Marfan syndrome, Ehler-Danlos Syndrome, Down syndrome and Osteogenesis imperfecta.[3,4] Generally, patients complaining of musculoskeletal symptoms first consult general physicians, primary care physicians who may not recognize and diagnose joint hypermobility.[5] Joint hypermobility may be overlooked easily and not evaluated as a differential diagnosis when seen by physicians, as the main symptom is joint pain. Using the Beighton score helps in diagnosis.[6] Management options include lifestyle modification, activity education, strengthening and stretching exercises and, in certain cases, manipulative osteopathic treatment.[7] Chronic and generalized pain is the most common musculoskeletal feature of joint hypermobility.[8,9] which can result in an extreme range of joint movement resulting in joint instability and trauma by repetitive stress.[10] The objective of the present cross-sectional study was to determine the frequency of joint hypermobility in paramedical students and staff at National Hospital Lahore.

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METHODOLOGY

The cross-sectional study was conducted from March to September 2021 at the Department of Rheumatology, National Hospital and Medical Center Lahore, Pakistan. Data was collected after approval from IRB of National Hospital, Lahore (Ref No.: NHMC/1033). Keeping the expected frequency of generalized joint hypermobility 26.8% and localized hypermobility 34.7%, the sample size was calculated.[9]

Inclusion Criteria: Paramedical students, staff compromising nurses, and paramedics without any pre-existing musculoskeletal disease, of either gender, aged 16 to 35 years were included in the study.

Exclusion Criteria: Patients with previously diagnosed rheumatologic disorders (e.g. Rheumatoid Arthritis, Spondyloarthropathies, Lupus), degenerative joint disease (e.g. Osteoarthritis, Degenerative Disease of Spine), current or past bone fractures, and with history of joint replacement surgery were excluded from the study.

After taking informed consent, 250 participants were enrolled using a non-probability sampling technique. Participants were selected from paramedical students and staff at National Hospital Lahore. Demographic information, e.g. age, gender, weight, height, and musculoskeletal pain history, was obtained from each participant. Joint hypermobility was evaluated using each participant's Beighton score and the data recorded.Localized Joint Hypermobility was defined as a 1-3 score on the nine-point Beighton Score Scale. Generalized Joint Hypermobility was defined as a>4 score on the nine-point Beighton Score Scale,[11] (Table-I).

Table-I: Beighton Score to Evaluate Joint Hypermobility

Joints Assessed	Joint Hypermobility		
	Present		Absent
Passive dorsiflexion & hyperextension of 5th Metacarophalangeal beyond 90°	Right	Left	Absent
Passive apposition of thumb to the flexor aspect of the forearm	Right	Left	Absent
Passive hyperextension of elbow beyond 10°	Right	Left	Absent
Passive hyperextension of knee beyond 10°	Right	Left	Absent
Active forward flexion of the trunk with the knees fully extended so that the palms of the hands rest flat on the floor	Present		Absent

Interpretation: Localized Joint Hypermobility: 1-3 score on the Nine-point Beighton Score Scale, Generalized Joint Hypermobility: >4 score on the nine-point Beighton Score Scale

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. Quantitative variables were presented as mean+SD, and qualitative variables as percentages and frequencies. The Chi-Square test was applied with the p-value of ≤0.05 taken as significant.

RESULTS

The mean age of the study participants was 26.6±4.6 years, with 146(58.24%) females. The mean weight and height of the participants were 65.2±10.9kg and 65.0±3.6 inches, respectively. Mean BMI was 23.9±4.0 kg/m2. The mean Beighton score was 1.6±2.5. Generalized Joint Hypermobility was seen in 51(20.4%) participants; 31(12.4%) had localized hypermobility, whereas 168(67.2%) had no hypermobile joints. The frequency of specific joint hypermobility is shown in Table-II. A comparison of demographic characteristics and generalized joint hypermobility is shown in Table-III.

In the interview, 33(13.2%) participants had complaints of musculoskeletal pain; 9(3.6%) had generalized body aches; 10 (4.0%) had knee pain; 6(2.4%) had back pain; 3(1.2%) had neck pain, 3(1.2%) had elbow pain, and 2(0.8%) had shoulder pain. Of the parti-cipants with generalized joint hypermobility, 12(23.5%) had musculoskeletal pain compared to 21(10.6%) without pain.

Table-II: Frequency of Specific Joint Hypermobility (n=250)

Joints Assessed	Joint Hypermobility	
	Present	Absent
5th MCPs	38(15.2%)	212(84.8%)
Thumbs	36(14.4%)	214(85.6%)
Elbows	41(16.4%)	209(83.6%)
Knees	42(16.8%)	208(83.2%)
Trunk	46(18.4%)	204(81.6%)

Table-III: Demographic Characteristics and Generalized Joint Hypermobility (n=250)

Demographic Variables	Generalized Joint Hypermobility		*p*-value
	Present	Absent	
Age			
16 to 25 years	28(21.1%)	105(78.9%)	0.785
26 to 35 years	23(19.7%)	94(80.3%	
Sex			
Male	23(19.2%)	81(80.8%)	0.570
Female	28(22.1%)	118(77.9%)	
BMI			
Underweight	6(21.4%)	22(78.6%)	
Normal	24(18.2%)	108(81.8%)	0.603
Overweight	14(20.9%)	53(79.1%)	
Obese	7(30.4%)	16(69.9%)	

DISCUSSION

Musculoskeletal pain is frequently seen in hypermobile adults leading to poor quality of life and contributing to obesity and a sedentary lifestyle.[12] In our study, 33(13.2%) participants complained of musculoskeletal pain at the time of examination. In the study on hypermobile individuals by Hudson *et al*.[10] soft tissue rheumatism was seen in 67%, fibromyalgia syndrome in 30% and inflammatory arthritis was seen in 4%, showing a link between soft tissue rheumatism to hypermobility. Sendur et al.[11] enrolled 118 women with fibromyalgia and 118 healthy women as controls, and this study showed that joint hypermobility among fibromyalgia was higher than controls (46.6 vs 28.8%). Proprioceptive functions might be adversely affected due to trauma to mechanical connective tissue receptors leading to decreased muscle strength with limb pain.[13] Precipitated by physical activity without appropriate conditioning, extreme exercise, a traumatic incident, or without any obvious cause; the occurrence of musculoskeletal pain with hypermobility might be a mere chance.[14,15]

In our study, Generalized Joint Hypermobility was seen in 51(20.4%) participants; 31(12.4%) had localized hypermobility, whereas 168(67.2%) had no hypermobile joints. Antonio *et al*.[9] enrolled 388 volunteers aged 18-25 years from medical and physiotherapy courses at Sao Paulo State University; of these, 299(77.06%) were females, 89(22.94%) were males, and the median age was 23. Generalized hypermobility was reported in 104(26.8%), & localized hypermobility in 135(34.79%). However, in those with localized hypermobility, generalized hypermobility or no hypermobility, the results of the SF-36 questionnaire were similar to the normative data of the adult population in Brazil and no notable variation was reported in the outcomes of each domain and the mental and physical indices.[9] Employing the Beighton scale with the same threshold of>4 scores in the pediatric population, another study found generalized hypermobility in 27.5% of girls and 10.6% of boys in the cohort aged<14 years of English adolescents.[16]

Another study reported fifth finger hypermobility in 45% and 29% of boys. This is in contrast to the findings of our study in which truncal hypermobility was most common, seen in 46(18.4%) participants, followed by knees in 42(16.8%), elbows in 41(16.4%), fifth finger in 38(15.2%), and thumbs in 36(14.4%). These authors described no association of hypermobility with body mass index, physical activity or maternal education level.[17,18] In our study, generalized joint hypermobility was not associated with age, sex and BMI, but its relation with pain at the time of examination (*p*-value: 0.015) was significant. A recent study reported generalized hypermobility in 50% of Korean females, with the frequency being inversely proportional to age, 36.5% in adult women and 59.0% in girls.[19] The lower frequency of hypermobility for age transpired on bilateral thumbs symmetrically. However, it was more marked on the fifth finger of the dominant hand, more often on the right side.

Furthermore, a vast gamut of extra-articular features in hypermobile individuals is recognized, including poor wound healing, predisposition to ecchymosis, valvulopathy, inguinal hernia, early onset of osteoarthritis and osteoporosis, vesicoureteral reflux and gastrointestinal dysmotility.[20] Pediatric population studies have been reported, but information about the frequency, outcomes and sequela of hypermobility in young adults have been unusual.[21,22] Although prior clinical studies might not reflect disease patterns as observed in our general population, our results propose a link of hypermobility with soft tissue rheumatism and can benefit the clinician.

LIMITATIONS OF STUDY

This study has a few limitations that are required to be considered. First, our sample did not represent the general population as we enrolled only young participants aged 16 to 35 years. Secondly, it was done in an institutional setting. We do not have substantial knowledge about the demographic attributes of hypermobile individuals in our ethnic population, so the implications of hypermobility are not properly understood.

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CONCLUSION

Joint hypermobility is often an asymptomatic benign condition but may cause musculoskeletal pain. This study highlights that one out of every five young healthy paramedics enrolled had generalized joint hypermobility. Furthermore, one-third of the subjects had at least one clinically documented hypermobile joint. Almost every fourth person with generalized joint hypermobility has musculoskeletal pain compared to 1 in 10 persons without generalized hypermobility. We suggest a link between joint hypermobility and musculoskeletal pain, and an examination for joint hypermobility should be done in soft tissue rheumatism.We suggest community-based studies to determine the exact prevalence of joint hypermobility and associated musculoskeletal pain.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

NIB & MQKT: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

FA: Study design, drafting the manuscript, data interpretation, approval of the final version to be published.

UIB: Critical review, data analysis, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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