



Musculoskeletal Complaints in Physical Therapy Students: Prevalence and Association with Hypermobility

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Authors' contributions

Author LK designed the study, wrote the protocol and wrote the first draft of the manuscript.
Author NK designed the study, managed the literature search and performed all evaluations.
Author MF performed the statistical analysis and data interpretation. All authors read and approved the final manuscript.

Original Research Article

Received 7th November 2013
Accepted 3rd February 2014
Published 11th February 2014

ABSTRACT

Aim: To evaluate the prevalence of musculoskeletal complaints, hypermobility and the association between them in Israeli physical therapy students.

Study Design: Cross-sectional observational study.

Setting: Department of Physical Therapy, Recanati School for Community Health Professions, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer Sheva, Israel.

Participants: 105 physical therapy students participated in this study.

Methods: Prevalence of musculoskeletal complaints was evaluated using the Modified Nordic Questionnaire. Hypermobility was assessed using the Beighton test.

Results: The 12-month prevalence of musculoskeletal complaints was high: 49.0% for low back pain, 44.1% for knee pain and 44.6% for elbow pain. Hypermobility assessed by the "Beighton test" was found in 4% of males and 30.3% of females. No association was found between hypermobility and musculoskeletal complaints in physical therapy students. Smoking was positively associated with shoulder pain ($p = 0.038$).

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Conclusions: There is a high prevalence of musculoskeletal complaints among apparently healthy physical therapy students in Israel. Joint hypermobility is not associated with musculoskeletal complaints, probably because of the non-degenerative nature of musculoskeletal morbidity in this age group.

Keywords: Hypermobility; musculoskeletal morbidity; physical therapy students.

1. INTRODUCTION

During the last decade, studies have demonstrated a high prevalence of musculoskeletal disorders in physical therapists despite their professional training in injury prevention techniques [1]. However, no previous studies were found reporting the prevalence of musculoskeletal complaints in physical therapy students. Only one [2] study reported 63% of 12-month prevalence of low back pain in undergraduate physical therapy students. The risk of low back pain increased significantly for students once they completed first year.

Joint hypermobility is a condition in which most of an individual's synovial joints move beyond normal limits, taking into consideration age, gender and ethnic background [3]. Hypermobility in a majority of cases is asymptomatic and is usually referred to as "generalized joint laxity". Joint hypermobility associated with musculoskeletal symptoms and in the absence of systematic rheumatologic disease is usually referred to as a "benign joint hypermobility syndrome". In some individuals, it predisposes to a wide variety of soft tissue and joint injuries [3] such as arthralgia that can affect up to 31% of the population [4], a higher frequency of tendinitis, bursitis, fasciitis, fibromyalgia [5-7] and chronic fatigue syndrome [8,9]. Studies have reported varying rates of prevalence and incidence of hypermobility, which could be due to the use of diverse screening and diagnostic criteria. Reports have shown that age, gender and ethnicity are important factors, with hypermobility decreasing with age [10-12], greater prevalence in females and in those of African or Asian descent when compared with their Caucasian counterparts [6,12-14]. Despite all the aforementioned, joint hypermobility is still a controversial issue amongst many medical practitioners. Methods of identification have as yet not been included in the routine physical examination. Thus, joint hypermobility is likely to be underdiagnosed and underestimated by most specialists dealing with musculoskeletal disorders [15,16].

The aims of this study were to evaluate the prevalence of musculoskeletal complaints, the prevalence of hypermobility and the association between hypermobility and prevalence of musculoskeletal complaints in apparently healthy Israeli physical therapy students.

2. METHODS

2.1 Design

Cross-sectional observational study.

2.2 Setting

Department of Physical Therapy, Recanati School for Community Health Professions, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer Sheva, Israel.

2.3 Sample

Second to third year and some fourth year physical therapy students were recruited for this study through oral advertisements in classes and printed advertisements in the university campus. The total number of students exposed to these advertisements was approximately 150. There were no restrictions for sex, age or ethnicity of the participants. Exclusion criteria were: pregnancy or lactating, suffering from active rheumatic diseases (rheumatoid or psoriatic arthritis, ankylosing spondylitis), cervical or lumbar disc herniation, a hereditary connective tissue disorder, recent fractures and/or road accident.

2.4 Demographic Data Collection

All study participants were asked to complete a demographic questionnaire noting age, sex, height, weight, years of education, smoking, leisure physical activity and general health status.

2.5 Hypermobility Evaluation

Hypermobility was assessed using the Beighton scoring system [17]. It consists of a series of nine tests; each one carries a score of one point. The tests are: passive dorsiflexion of left and right little finger and left and right thumb, hyperextension of left and right elbows and knees and forward flexion of trunk with knees full extended. Subjects with Beighton score ≥ 4 were considered as having hypermobility. These tests were performed by a single researcher (NK), according to the predefined protocol.

2.6 Evaluation of Prevalence of Musculoskeletal Morbidity

A 12-month prevalence of musculoskeletal complaints (pain, aches or discomfort) in the neck, upper back, lower back, shoulders, elbows, hands, thighs, knees and lower leg were evaluated using the modified Nordic questionnaire [18], a general questionnaire of 40 forced-choice items identifying areas of the body causing musculoskeletal problems. Respondents were asked if they have had any musculoskeletal trouble in the last 12 months which have prevented normal activity. This questionnaire has been shown to be repeatable, reliable and valid and was found appropriate for use in an Israeli population [19]. On the other hand, the questionnaire is not designed to evaluate the severity of pain or repeated pain that can be common among people with hypermobility.

2.7 Statistical Analysis

All statistical computations were performed using SPSS 17.0 for Windows (SPSS, Chicago, IL, USA). Firstly, the descriptive statistics were calculated to characterize the study sample. Descriptive statistics described the prevalence of musculoskeletal complaints and hypermobility indices in the study subjects. To compare the prevalence of these indices between males and females, the t-test was used for continuous variables and the χ^2 test for categorical variables. To evaluate the association between hypermobility and musculoskeletal complaints, adjusting to age, sex, smoking and BMI, a logistic regression analysis was used.

2.8 Ethical Considerations

Participation in the study was voluntary. Each subject received an explanation as to the aims of the study and methods of data collection (questionnaires, range of motion evaluation) and signed an informed consent form. The study was approved by the institutional review board of the Recanati School for Community Health Professions.

3. RESULTS

3.1 Sample Description

One hundred and five physical therapy students (out of 150, or 70%) participated in the study (25 males and 80 females). The higher number of female physical therapy students reflects the usual male/female proportion among physical therapy students in Israel. Ethnically, majority of students were Ashkenazi and Sephardic Jews and few Israeli Arabs. Significant differences in height, weight and BMI between males (23.69±3.37) and females (21.76±2.28) was found Table 1; 84% of the males were involved in some regular physical activity compared to 57% of the females ($p = 0.018$); 20% of the males smoked compared to 13% of the females. However, there were no statistically significant differences ($p = 0.343$).

Table 1. Descriptive statistics

	Males (n=25)	Females (n=80)	Comparison
	Mean ± SD	Mean ± SD	t-test
Age (years)	26.92±2.16	25.21±1.85	$p < 0.001$
Height (m)	1.79±0.07	1.64±0.07	$p < 0.001$
Weight (kg)	76.28±11.42	58.55±8.98	$p < 0.001$
BMI (kg/m ²)	23.69±3.37	21.76±2.28	$p = 0.006$
	N (%)	N (%)	Chi-square
Involvement in regular physical activity	21 (84%)	46 (57.5%)	$p = 0.018$
Current smoking	5 (20%)	11 (13.8%)	$p = 0.343$
Hypermobility (Beighton test)	1 (4%)	23 (30.3%)	$p = 0.001$

Statistically significant differences at $p \leq 0.05$, marked in bold

3.2 Musculoskeletal Complaints Prevalence

Forty-nine subjects (49.0%) reported having lower back pain at last 12 months, following by 45 (44.1%) with knee pain and 41 (39.8%) with neck pain Table 3. The least common complaint was elbow pain (11.4%). In total, 87 subjects (82.9%) reported having pain in any anatomical area during the last 12 months.

No significant differences were found between male and female student during the 12 months of musculoskeletal complaints in any area, except the elbows ($p = 0.024$), with males having a significantly higher prevalence of elbow pain. Pain in the elbows and hands was significantly associated with age ($p = 0.013$ and $p = 0.019$, correspondingly). Smoking was associated with shoulder pain ($p = 0.038$). No association between BMI and musculoskeletal complaints was found.

3.3 Hypermobility Evaluation

According to the Beighton tests, 4% of males and 30.3% of females (23.8% in total) had general hypermobility. Four females received Beighton score 6, eight females – score 5 and 10 females and 1 male received score 4. The difference between males and females was statistically significant in hypermobility prevalence ($\chi^2 = 7.163$, $p = 0.007$), with females having a higher prevalence. No association between hypermobility, age and BMI was found.

3.4 Association between Hypermobility and Musculoskeletal Morbidity

The number of areas of musculoskeletal complains presented in Table 2. No association was found between hypermobility and number of areas with musculoskeletal complains ($\chi^2 = 7.859$, $p = 0.447$).

Table 2. Number of areas of musculoskeletal complains n (%)

Number of areas of symptoms	Males	Females	Total
No complaints	6 (24.0%)	11 (15.1%)	17 (17.3%)
1	5 (20.0%)	14 (19.2%)	19 (19.4%)
2	2 (8.0%)	17 (23.3%)	19 (19.4%)
3	2 (8.0%)	9 (12.3%)	11 (11.2%)
4	4 (16.0%)	11 (15.1%)	15 (15.3%)
5	3 (12.0%)	4 (5.5%)	7 (7.1%)
6	1 (4.0%)	2 (2.7%)	3 (3.1%)
7	1 (4.0%)	4 (5.5%)	5 (5.1%)
8	1 (4.0%)	1 (1.4%)	2 (2.0%)

The majority of individuals (21 out of 24, 87.5%) with joint hypermobility according to their Beighton score, complained of pain in one or more areas at last 12 months. Results of univariate analyses of the association between hypermobility and prevalence of musculoskeletal morbidity are shown in Table 3. No association was found between the variables. Marginal association was found between low back pain and hypermobility. Similar results were obtained when an association was tested using multiple logistic regression analysis adjusted to age, sex and BMI. No association between Beighton score and prevalence of musculoskeletal complaints was found.

Table 3. Twelve-month prevalence of musculoskeletal complaints in males and females and its association with hypermobility, smoking and demographics (p-values)

Area of symptoms	MalesN	Females N (%)	Total N	Association (χ^2 test) with (p-values)				
				Hypermobility	Age	Sex	BMI	Smoking
Neck	9 (36.0%)	32 (41.0%)	41 (39.8%)	0.189	0.756	0.655	0.579	0.987
Shoulders	7 (28.0%)	25 (31.3%)	32 (30.5%)	0.656	0.555	0.758	0.333	0.038
Elbows	6 (24.0%)	6 (7.5%)	12 (11.4%)	0.915	0.013	0.024	0.238	0.531
Hands	10 (40.0%)	22 (27.5%)	32 (30.5%)	0.762	0.019	0.236	0.280	0.795
Upper back	6 (24.0%)	18 (23.7%)	24 (23.8%)	0.170	0.771	0.974	0.558	0.345
Lower back	13 (52.0%)	36 (48.0%)	49 (49.0%)	<i>0.093</i>	0.498	0.729	0.544	0.355
Hips	3 (12.5%)	18 (23.7%)	21 (21.0%)	0.808	0.146	0.241	0.568	0.918
Knees	12 (48.0%)	33 (42.9%)	45 (44.1%)	0.511	0.850	0.653	0.637	0.180
Lower leg	9 (36.0%)	19 (24.7%)	28 (27.5%)	0.524	0.400	0.270	0.956	0.238

Statistically significant differences at $p \leq 0.05$, marked in bold, marginally significant association ($p \leq 0.1$), marked in italic

4. DISCUSSION

4.1 Prevalence of Musculoskeletal Complaints in Physical Therapy Students

In our study, 49.0% reported lower back disorders during the last 12 months, followed by 44.1% with knee pain and 39.8% with neck pain. Pain in the shoulders (30.5%), hands (30.5%) and upper back (23.8%) were also reported by the students. Previous studies have shown a high prevalence of musculoskeletal complaints among physical therapists in various countries [1,20-23]. The most prevalent complaints were low back pain (51.7%-69.8%), neck pain (34.1% - 46.5%), upper back (41.1% - 44.8%), shoulder (27.2% - 42.2%) and hand/wrist pain (35.7% - 58.5%). Interestingly, 50% of the physiotherapists in Nigeria [21] first experienced their work-related musculoskeletal disorders within five years of graduation. The highest prevalence (61.7%) was found among physiotherapists younger than 30 years. However, a search of the literature found no previous study reporting prevalence of musculoskeletal complaints in physical therapy students. Therefore, it can be cautiously concluded that physical therapy students have a slightly lower prevalence of lower back, upper back, and hand/wrist pain than reported for physical therapists around the world. It has been reported that the prevalence of neck, shoulder and knee pain was in the range reported for physical therapists, and knee pain was more prevalent in physical therapy students than in physical therapists (reported prevalence in Israel was 22.2%) [1].

4.2 Prevalence of Hypermobility in Young Adults

Hypermobility, not associated with systemic disease, occurs in 4 - 13% of the population [24,25]. The prevalence of hypermobility in adults varies from 5% in the USA [26], 17% in the Singapore population [27] to between 25% in males and 38% of females in Iraq [28] and 43% recorded in the Noruba tribe in Nigeria [29]. Beighton et al. [30] reported hypermobility in 20% of adult females and 6% of males amongst Africans.

In the present study, 4% of the males and 30.3% of the females (23.8% in total) had joint hypermobility. Prevalence of hypermobility in females were approximate to the prevalence reported in an Iraqi sample of young adults aged 20-24 [28]. However, the difference between Israeli males and females is similar to Beighton et al's. results [30].

4.3 Association of Musculoskeletal Complaints in Physical Therapy Students with Hypermobility, Smoking and Basic Demographic Characteristics

In our study a significantly higher prevalence of elbow pain was found in males. Probably, it was due to greater involvement in physical activity, especially activities that demanded hand functions.

Smoking was found to be associated with prevalence of shoulder pain. An association has been reported between work-related shoulder pain and smoking in female sewing machine operators [31], in Japanese constructor workers [32] and teenage daily smokers [33]. Several researchers have reported an association between rotator cuff tears and smoking [34,35]. Our findings are in accord with these studies. We believe that the association between smoking and shoulder pain, especially in young adults, should be included in smoking prevention programs.

No association was found between joint hypermobility and musculoskeletal complaints in Israeli physical therapy students. This is in contrast with findings of some previous studies

[3-7]. Present study included young apparently healthy adults with very low prevalence of degenerative conditions and high awareness to their physical fitness. It is possible that musculoskeletal complaints that resulted from hypermobility develop at an older age. A larger study is needed that will include subjects of various ages and professions in order to evaluate the association between hypermobility and musculoskeletal disorders in the adult population.

4.4 Limitations

There were several limitations in present study. First, an unequal numbers of males and females in the study, as well as narrow age range that reflect the characteristics of physical therapy students in Israel. Second, we did not evaluate the severity of pain and repeated musculoskeletal pain that can be common among people with hypermobility. Further studies probably should evaluate the association between severity and repeated musculoskeletal pain and hypermobility. Third, the study was performed among physical therapy students, young and healthy individuals with high awareness on their physical condition. It is possible that the results cannot represent the situation in the general population. Additional studies on association between hypermobility and musculoskeletal complains in general population are needed.

5. CONCLUSION

There is a high prevalence of musculoskeletal complaints among apparently healthy physical therapy students in Israel. Joint hypermobility is not associated with musculoskeletal complaints in young, apparently healthy adults, probably because of the non-degenerative nature of musculoskeletal morbidity in this age group. Smoking is associated with prevalence of shoulder pain.

CONSENT

Participation in the study was voluntary. Each subject received an explanation as to the aims of the study and methods of data collection (questionnaires, range of motion evaluation) and signed an informed consent form.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

ACKNOWLEDGEMENTS

The authors thank Mrs. Phyllis Curchack Kornspan for her editorial services.

COMPETING INTERESTS

This paper has not been presented in the past in any form. No conflicts of interest have been reported by the authors or by any individuals in control of the content of this article. There were no funding or financial benefits to the authors.

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