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EDUCATION OF PHYSIOTHERAPY STUDENTS IN THE FIELD OF MOVEMENT PATTERNS AND ANALYSIS OF THEIR LEVEL

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Abstract

Introduction: Physiotherapy is a physically demanding profession that requires optimal physical fitness to handle work demands. Early prevention of musculoskeletal disorders, which represent the most prevalent health issues in this profession, is crucial even during the course of study. Musculoskeletal health is significantly influenced by the quality of movement patterns. Therefore, it is essential to emphasize the development of proper movement patterns in physiotherapy students, both to support their own health and prevent injuries, as well as to ensure the long-term sustainability of their ability to meet professional demands. Methods: The research sample consisted of 42 first-year undergraduate physiotherapy students, including 33 women and 9 men, aged 19–21 years. The Functional Movement Screen (FMS) was used to analyze the students' movement patterns. FMS is designed to assess movement quality, including mobility, stability, symmetry, and overall movement patterns. The FMS consists of seven individual tests, with a maximum possible score of 21. Results: The students' average total score was 13.12. Women performed better in six out of the seven tests (except the trunk stability pushup). The highest scores were achieved by students in the shoulder mobility test (2.17) and on the contrary, they achieved the lowest score in the deep squat and trunk stability pushup (1.67). Previous studies suggest that individuals scoring ≤14 are more prone to musculoskeletal injuries and movement dysfunctions. Unfortunately, up to 78.58% of the tested students did not achieve an optimal score. Conclusion: The findings of the present study highlight the need to integrate exercise programs in the everyday life of physiotherapy students to improve their movement patterns. This study contributes to the prevention of musculoskeletal disorders, promotes lifestyle adjustments, and enhances the quality of life among university students. It also facilitates the transfer of acquired knowledge into practical applications within the students' future professional activities. Furthermore, the study enables students to gain experience in functional diagnostics of the musculoskeletal system and apply these insights in their professional practice.

Keywords: *Education, university students, musculoskeletal health, movement quality.*

1. Introduction

Physiotherapy is a physically demanding profession (Bello, Bonney & Opoku 2016; Al-Khlaifat et al. 2023). This profession requires high levels of physical fitness (Mirza et al. 2022). The work of physiotherapists includes carrying, moving a patient and performing physical exercises. Musculoskeletal disorders related to work are considered some of the most common health issues among physiotherapists (Tišlar, Starc & Kukec 2022). Therefore, maintaining a good physical fitness is necessary for mastering requirements of this profession (Taukobong et al. 2014; Boguszewski et al. 2021; Zhu et al 2021; Högstedt 2023).

Improving body posture and movement patterns can be considered as fundamental strategy in prevention of musculoskeletal injuries (Xu et al. 2022; Uzer et al. 2023; Koźlenia & Kochan-Jacheć 2024). The risk of musculoskeletal injuries increases with poor quality of movement patterns and low level of flexibility (Koźlenia & Domaradzki 2021). Improving the quality of body movements can increase their quantity, which in turn enhances overall health and quality of life (Swain, McNarry & Mackintosh 2024). The assessment of fundamental movement patterns has the task of determining the body segments with lack of mobility or stability. Among the general population can be lack of stability and mobility overlooked (Iljinaite 2024). The assessment of functional movement patterns and detection of movement imbalances play an important role in prediction of musculoskeletal injuries (Girard 2016; Monaco & Schoenfeld 2019; Alkhathami & Alqahtani 2024; Ünver et al. 2024).

The aim of the present study was to expand the professional knowledge of physiotherapy students in the field of movement patterns and their impact on musculoskeletal health. The sub-objectives included:

1. To familiarize students with the Functional Movement Screen test method as a way of analysing the level of movement patterns.
2. To enhance their understanding of the relationship between movement patterns, physical activity levels, and musculoskeletal health.
3. To emphasize the early diagnosis of movement deviations as a preventive tool for musculoskeletal disorders, with a focus on maintaining long-term work ability in the field of physiotherapy.
4. To provide students with theoretical and practical skills in developing intervention programs for the correction of poor movement patterns, which would contribute to the development of their professional competences.

The study also underlines the importance of comprehensive education for physiotherapy students, which prepares them for effective diagnosis, prevention, and intervention in the field of musculoskeletal health.

2. Methodology

This research was approved by the Ethics Committee of the University of Presov in Presov (No. ECUP062024PO). The research sample consisted of 42 university students (33 women and 9 men) from the Faculty of Health Care at the University of Presov, who study in the Physiotherapy study program. The average age of tested students was 19,95±0,79. The average body weight of women was 65,55±11,87, of men 82,32±12,47. The average body height of women was 168,22±6,75, of men 181,08±4,12. The Functional Movement Screen (FMS) was used to analyze the students' movement patterns. FMS is designed to assess movement quality, including mobility, stability, symmetry, and overall movement patterns. The FMS consists of seven individual tests, with a maximum possible score of 21. Data analysis was subsequently performed. Based on the data obtained about the level of their movement patterns, the students were introduced to the possibility of correcting any potential deviations.

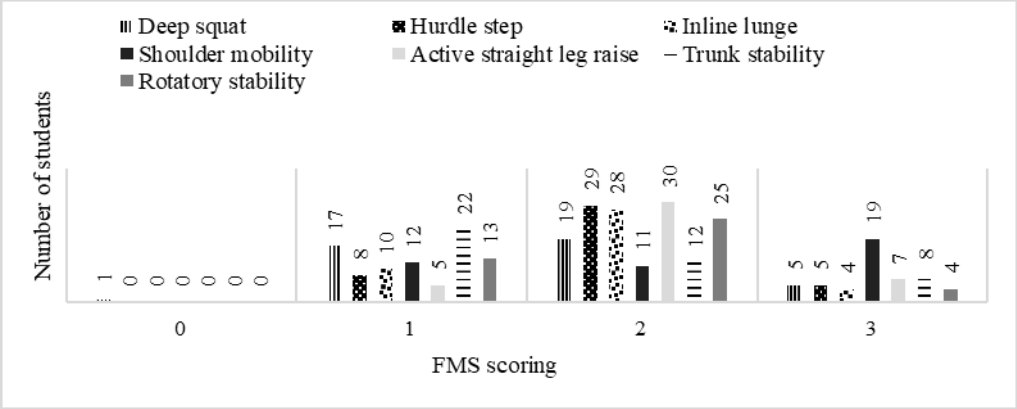
Figure 1. Functional movement screen (adapted from Vithanage et. al 2018).

3. Results

Previous studies suggest that individuals scoring ≤14 are more prone to musculoskeletal injuries and movement dysfunctions (Kiesel, Butler & Plisky 2007). In the sample of tested physiotherapy students, up to 78.58% did not achieve the established optimal score, which represents a high risk of developing musculoskeletal disorders, consequently leading to pain and injury.

The graphical representation in Figure 2 shows the score of the students in each of the FMS tests. From the data obtained, we can see that the highest score was achieved by the students in the shoulder mobility test, with 19 students achieving the highest possible score (3). On the other hand, the lowest score was obtained by the students in the deep squat and trunk stability tests.

Figure 2. Distribution of FMS score in individual tests.



In Table 1, we present the descriptive statistics of FMS score for each test, with a focus on gender differences. The analysis of the FMS results revealed that women achieved better score in 6 out of the 7 tests, namely the deep squat, hurdle step, inline lunge, shoulder mobility, active straight leg raise, and rotatory stability. In contrast, women scored lower than men in the trunk stability test.

Table 1. Descriptive statistics of FMS scoring.

		Total		Men		Women	
		Average	**SD**	**Average**	**SD**	**Average**	**SD**
Deep squat		1,67	0,72	1,56	0,73	1,70	0,73
Hurdle step	**P**	2,07	0,56	1,78	0,83	2,15	0,44
	L	2,07	0,51	2,22	0,44	2,03	0,53
Inline lunge	**P**	1,93	0,59	1,67	0,71	2,00	0,50
	L	2,02	0,60	1,78	0,67	2,09	0,58
Shoulder mobility	**P**	2,24	0,82	1,78	0,97	2,36	0,74
	L	2,36	0,76	2,00	1,00	2,45	0,67
Active straightleg raise	**P**	2,14	0,52	1,89	0,33	2,21	0,55
	L	2,17	0,58	2,00	0,5	2,21	0,60
Trunk stability		1,67	0,79	2,44	0,88	1,45	0,62
Rotatory stability	**P**	1,86	0,61	1,89	0,78	1,85	0,57
	L	1,81	0,63	1,89	0,92	1,79	0,55
Composite score		13,12	2,06	12,78	2,33	13,21	2,01

Legend: P- right limb; L – left limb; SD – standard deviation

4. Discussion

Several studies (Korpi, Piirainen & Peltokallio 2017; O'Connor et al. 2023) confirm that practical education is essential for the development of skills and competencies that are critical for physiotherapy practice. Studies by Mahmmod et al. (2019); Sawczyn (2020); Boguszewski et al. (2021); Al-Khlaifat, et al. (2023) also call for greater awareness of the physical demands of the physiotherapy profession. By familiarizing students with FMS, we have contributed to the acquisition of new professional competences of students. The most common mistakes made by students in the deep squat, hurdle step and inline lunge tests were flexion or extension of the trunk, insufficient range of motion, medial knee displacement and poor balance in asymmetric movements. These mistakes are caused by limited mobility of the lower limbs (hip, knee and ankle joints), upper limbs (shoulder joint) and also the spine (especially the thoracic spine). Another cause may be insufficient dynamic stability of the core, pelvis, knee and ankle joints. In the shoulder mobility test, the lack of range of motion may be due primarily to the shortening of the pectoralis major, latissimus dorsi, and rectus abdominis muscles. In addition, poor mobility of the shoulder girdle may also contribute. Low active straight leg raise test score may reflect shortened knee flexors and poor core stability and strength. Spinal extension and pelvic rotation are the two most common compensatory movements in trunk stability and rotatory tests. To limit these movements, it is necessary to improve the stability of the trunk, shoulder girdle and pelvis. Neuromuscular coordination and upper body strength are also essential.

By actively participating in the FMS, students learned how to correctly position the starting and ending positions of each test, how to assess the correct technique of movement execution during the tests, and how to evaluate the execution of proper movement patterns. They have acquired practical skills to identify lack of mobility and stability in the musculoskeletal system. Based on these findings, they can then apply appropriate compensatory exercises to correct the impairments.

The FMS is one of the most accessible methods available, allowing even undergraduate students the opportunity to use it in their future professional practice to assess potential injury risks (Zhang et al. 2024). Additionally, students can develop compensatory movement programs for potential patients to improve movement quality and correct movement patterns. Participation in these compensatory programs can lead to improved FMS score and enhanced movement quality in individuals (Boucher et al. 2021).

5. Conclusion

The findings of the present study highlight the need to integrate exercise programs into the everyday lives of physiotherapy students to improve their movement patterns. The study contributes to gaining experience in functional diagnostics of the musculoskeletal system and transferring the acquired knowledge to future professional practice. Additionally, study focuses on the ability to create compensatory exercise programs that aim to correct any deviations that may appear. The knowledge gained will enable students to effectively diagnose and prevent musculoskeletal disorders or impairments in the musculoskeletal system in their future practice, thereby contributing to injury prevention and the improvement of patients' motor functions. The study also contributes to the prevention of musculoskeletal disorders, lifestyle modification, and the enhancement of the quality of life for the participating students.

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