
PREVALENCE OF MUSCULOSKELETAL DISEASES IN THE STUDENT POPULATION

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Abstract: The human organism is destined for physical activity. However, technological development and lifestyles have influenced a significant reduction in physical activities, which consequently leads to signs of decline in the functions of certain organic systems. Musculoskeletal system disorders are considered to be damage to the musculoskeletal tissue or damage to the neurological system that disrupts the harmony of these systems. The start of studies is a big change in the life of young people. The start of studies is a big change in the life of young people. Changes in social and financial status can affect students' eating and physical activity behavior and lead to various diseases. By reviewing the database of scientific literature, the connection between musculoskeletal disorders and the lifestyle of the student population was investigated. Research material and methods: The paper presents a review of professional literature, various databases from journals, scientific research and scientific papers, and professional papers obtained by searching online databases: Medline, PabMed, Google Scholar, Scinece hub. All those studies that met certain criteria included: (1) students of both sexes older than 18 years; (2) quality of life; (3) musculoskeletal disorders in the student population. Professional studies and undated papers were excluded. Based on the collected data from the database, a review of the scientific literature was compiled. Results: Through a scientific review of the literature, the results on the importance of the quality of life of the student population related to musculoskeletal disorders were investigated. The keywords used for the search are: student population, musculoskeletal disorders, lifestyles. The period of the reviewed scientific literature is from 2019 to 2023. Out of a total of 4,500 works from 4 databases, which we obtained based on keywords, only those works related to musculoskeletal disorders and quality of life among the student population were taken into account. Based on that, only 317 papers that had a correlation with the research interest were included in the further processing, 66 papers were processed and read in detail, and only 7 papers satisfied the 3 criteria set for implementation in this review article. Conclusion: Studying as a special period of life brings with it a series of changes and potential problems. Factors of the modern life of the student population promote an increase in excessive body weight, insufficient physical activity, fast refined food, insufficient amounts of sleep, and numerous stressful situations, which significantly affect the health of this population.

Keywords: students, quality of life, musculoskeletal diseases.

1. INTRODUCTION

The student population, transitioning from high school to university, is faced with many changes that significantly affect the way of life of this population. Changes in social and financial status can affect the behavior of students in nutrition and physical activity and lead to weight gain and various diseases (Milković T., 2022). All this can lead to serious health problems and diseases, and even premature death. In addition to the cardio-respiratory and muscular systems, whose functions decline due to long-term physical inactivity, the skeletal system is also threatened by modern living conditions (Mededović B., et all 2015). The results of epidemiological studies show a high percentage of hypokinesia in young people between the ages of 18 and 24. Insufficient level of physical activity is a growing global problem because, in addition to negative effects on health, it causes increased costs of treatment, difficulty in performing daily activities (Privitellio S. D., 2021). Musculoskeletal disorders represent inflammatory and

degenerative changes most often localized on: muscles, tendons, ligaments, joints and supporting structures of the body. Musculoskeletal disorders form a wide spectrum of disorders that differ in intensity and symptoms, and can result in mild to moderate symptoms or lead to chronic conditions that make it difficult to perform daily life activities. Various studies have shown that in Europe, almost 40 million workers (more than 30%) have a musculoskeletal problem, which accounts for 0.5–2% of the gross domestic product of the European Union (Tavakkol R., et al 2020). Representation of musculoskeletal diseases represents a high rate of presence among students. In the research (Moodley M., et al 2020), which was conducted among the student population of undergraduate studies in Johannesburg - Africa, it was proven that musculoskeletal disorders are present in as many as 83% of the examined participants. The author (Hendi O. M et al., 2019) in a study of the prevalence of musculoskeletal disorders that were associated with physical activities among the student population concluded that as many as 64.8% of students had one of the mentioned disorders. According to the same research, the highest prevalence of musculoskeletal disorders was among medical students, 48.4%, while the most common affected region was the lower back, 33.4%. (Alqahtani NH. et al. 2020) in a study of the prevalence of musculoskeletal disorders associated with burnout syndrome among health faculty students in Saudi Arabia, on a sample of 392 students, came to the conclusion that the average age of the respondents was 21 years old, and that prevalence of musculoskeletal disorders was 64.8%, the period of onset of pain associated with musculoskeletal disorders was: during the last 12 months, 35.4%, while during the last 7 days 33.2% of respondents had pain of a musculoskeletal nature. Factors of the modern life of the student population, which promote the accumulation of excessive body mass, include insufficient physical activity, fast refined food, insufficient amounts of sleep and a large amount of stressful circumstances, all of which result in difficulty in carrying out activities, so energy consumption is further reduced. It has been shown that participation in various aerobic and anaerobic activities between the ages of 12 and 21 progressively decreases, which shows that there is a possible correlation between increased body weight and reduced physical activity (Mišković M., 2020).

2. MATERIAL AND METHODS

A systematic literature search of the relevant databases, PabMed, Medline, SciHub Google Scholar, performed in accordance with the Meta-Analysis guidelines (PRISMA-P 2015) by the authors (Moher et al., 2016) keeping the main search keywords: quality of life, muscle- bone disorders, student population of published papers aged 2015 to 2023. Articles were also selected by searching relevant databases. Without any restrictions in terms of vocabulary, religiosity, all those studies that represent the criteria of this paper are included. Studies that were not correlated with this paper were excluded.

3. RESULTS

A review of the scientific literature shows the results of the prevalence of musculoskeletal disorders in the student population.

Figure 1. PRISMA diagram of the conducted procedure of sistematic review of the literature.

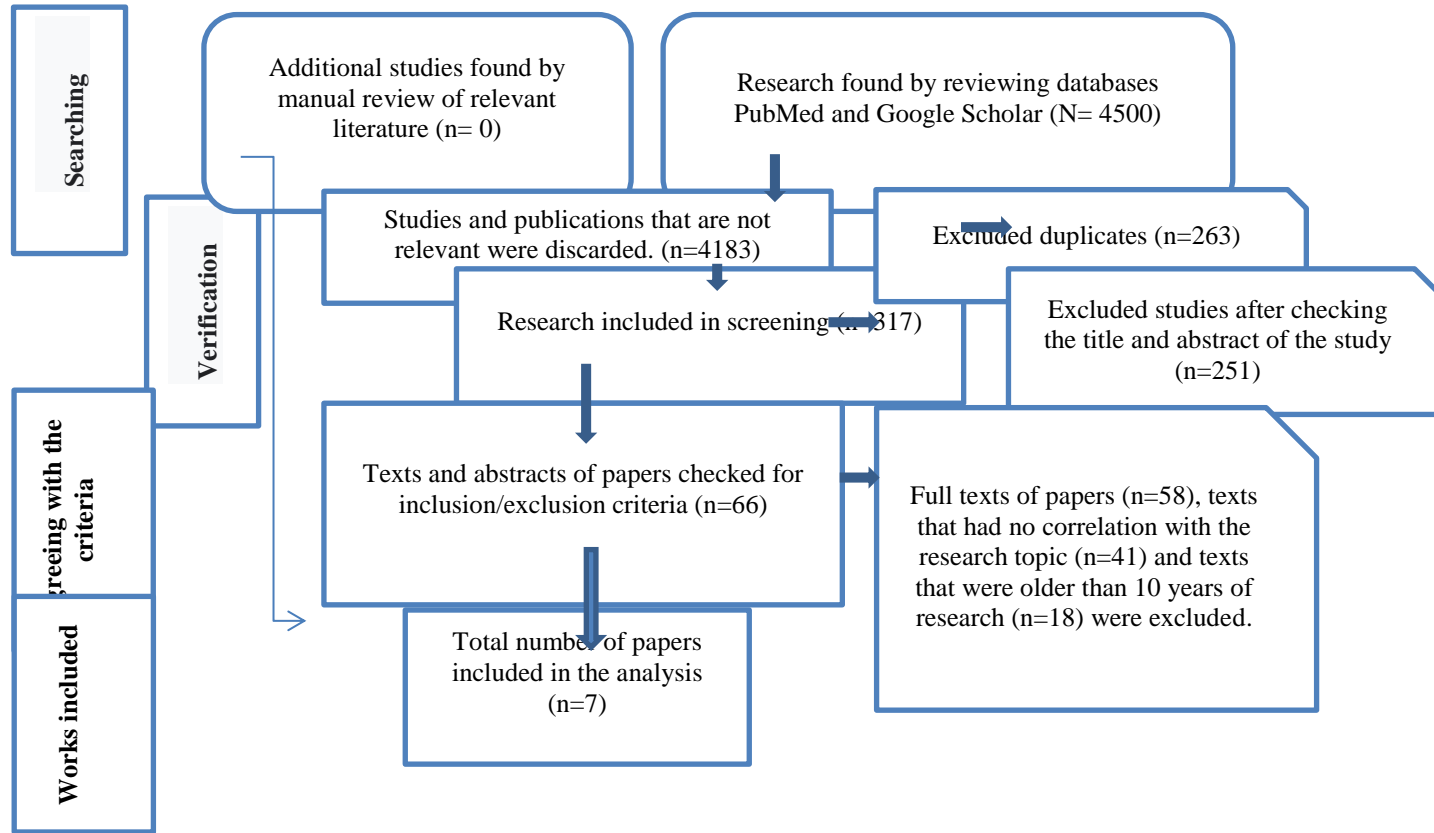


Table 1. Summary of study characteristics

Author (s).	Name of the study	Research objective/s	Research Method/s	The Results	Conclusion
Atia Doaa Tammam, et al., 2023	Prevalence of musculoskeletal disorders in students General and Technical Secondary School in Egypt	A cross-sectional study was conducted in four secondary schools in the Sharqia province of Egypt through semi-structured interviews completed by students. The study started in October 2021 and ended in March 2022.	In the research, the examined sample was 418 students of the second grade of high school, of both sexes. Of these, 221 students were general majors, while 197 students attended technical school, ages 15 to 17.	The prevalence of musculoskeletal disorders among elementary school students was 69.7%, while among technical school students it was 83.8% with a statistically significant difference between technical and elementary school students.	According to the presented results, the prevalence of musculoskeletal disorders represents a high prevalence rate among Egyptian high school students. The author's recommendation is to develop measures and strategies to overcome future complications associated with musculoskeletal disorders.

Table 2. Summary of study characteristics

Author (s).	Name of the study	Research objective/s	Research Method/s	The Results	Conclusion
Part, D.N., Wong, A.Y. and Macedo, L., 2023.	Prevalence of musculoskeletal disorders associated with risk factors in Canadian university students	Through a multi-year cross-sectional survey of McMaster University students in 2018, 2019, 2020 and 2021 with the aim of conducting a longitudinal study. By filling out student questionnaires in 2018, students are invited to fill out the same questionnaires for the next 3 years. In order to perform a cross-sectional analysis of the study.	The aim of the study was to establish a link between the prevalence of musculoskeletal disorders and their risk factors among students at McMaster University through a multi-year cross-sectional survey. The research was conducted online in the period 2018–2022 with the aim of showing the prevalence of musculoskeletal disorders in the last 7 days and the last 12 months.	298 respondents participated in the 2018 survey, the number of respondents gradually decreased with each sampling year. Approximately 70% of respondents were women. The average age of the participants was 21.9 years. The lower back was the most common site of pain in all four years. The prevalence of low back pain was 40.5–55.2% over the past 12 months.	The most common pain associated with musculoskeletal disorders is the lower back and neck. Poor mental health, increased pressure, lack of sleep, lack of sports activities and student health care are associated with an increased prevalence of musculoskeletal disorders in students.

Table 3. Summary of study characteristics

Author (s).	Name of the study	Research objective/s	Research Method/s	The Results	Conclusion
Zare, M., et al. 2022	Prevalence of musculoskeletal disorders in primary school students on Abu Musa Island	The aim of the study is to investigate the prevalence of musculoskeletal disorders in primary school students on the island of Abu Musa, Iran.	Descriptive cross-sectional study conducted among students of two primary schools on the island of Abu Musa, Persian Gulf - Iran. The prevalence of musculoskeletal disorders was determined using a body map with submitted photos of the body, the subjects were asked to locate in which part of the body they felt pain of a musculoskeletal nature.	The research included 269 elementary school students of both sexes. The prevalence of musculoskeletal disorders was 73% of female subjects and 75.5% of male subjects. Out of the total number of respondents, 74.3% of respondents reported at least one of the musculoskeletal disorders.	Taking into account the fact that, according to this research, the prevalence of musculoskeletal disorders is very high among students. Educational interventions and screening programs of this generation would have a significant effect for early diagnosis and planning of appropriate treatment programs.

Table 4. Summary of study characteristics

Author (s).	Name of the study	Research objective/s	Research Method/s	The Results	Conclusion
Ikenna, U. C., et al., (2022)	Correlation between the development of musculoskeletal	This study aimed to determine the relationship between academic stress, physical activity	A cross-sectional, quantitative research method was used to investigate the relationship between the development of	The prevalence of musculoskeletal disorders in the selected population was high at 66.02%, while among the examined group of students it was	This study proved that there is a significant relationship between academic stress and the development of

disorders, physical activity levels and academic stress among undergraduate students of the University of Nigeria	index and the development of musculoskeletal disorders in a selected Nigerian population.	musculoskeletal disorders and academic stress among undergraduate students. 256 respondents participated in the survey between February 10 and May 6, 2021. The age group of the respondents was from 15 to 30 years old.	statistically significantly higher at 75.2%. There was a statistically significant association between stress and musculoskeletal disorders. The average age of the examined group of this study was from 20 to 25 years old.	musculoskeletal disorders, and that the prevalence of musculoskeletal disorders is statistically significant in the student population.
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Table 5. Summary of study characteristics

Author(s).	Name of the study	Research objective/s	Research Method/s	The Results	Conclusion
Srirug Ph., et al. " 2023.	Prevalence of musculoskeletal disorders with students' work in virtual classrooms.	This study aimed to examine the prevalence of musculoskeletal disorders among 1st to 4th year students at Walailak University.	The study, which used convenience sampling, was conducted between March and April 2022. The number of respondents included in the study is 382 students studying at Walailak University in Thailand, selected by convenience sampling. The average age of the respondents was from 18 to 23 years, they studied in virtual classrooms for more than three months. The subjects were never diagnosed or treated for musculoskeletal disorders.	The most frequently reported problem of musculoskeletal disorders are shoulders, head, neck and lower back in 1 week, 1 month and 3 months, respectively. Correlation with psychosocial factors was statistically significant in subjects within one week and one month, and after 3 months musculoskeletal disorders were associated with personal factors such as body mass index.	This research showed that musculoskeletal disorders among students in virtual classrooms were at the highest prevalence in one week. The results and background information can be used as guidelines for further research.

Table 6. Summary of study characteristics

Author(s).	Name of the study	Research objective/s	Research Method/s	The Results	Conclusion
Almeida, M., el B., de, and Marion M., A. 2023.	Sexual dimorphism in the prevalence of musculoskeletal disorders among dental students	The aim of the study is to correlate the prevalence of musculoskeletal disorders between dentists and students of the fourth and fifth year of the integrated master's study of the Faculty of Dentistry at the Egas Moniz School of Health & Science.	The participants of this study were fourth and fifth year students who used the intuitive and easy online form of the Nordic Musculoskeletal Questionnaire to collect data. A questionnaire that has proven to be good and valid for use in epidemiological studies	Out of a total of 117 students who were contacted to participate, 66 of them were included in the research. In total, there were 81% women and 19% men with an average age group of 22.54. Descriptive statistics by gender are described in Over a period of 12 months, the most frequently reported symptoms in women were in the neck (68.6%) and lower back (66.7%)., while in men they were in	The importance of dealing with musculoskeletal disorders in dentists, even among students, has a high rate of representation. Preventive programs and interventions in this population aimed at their different etiologies and sexual differences could promote better outcomes and possibly reduce the prevalence of musculoskeletal disorders in dental students.

				the lower back (58.3%) and shoulders (41.7%).	
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Table 7. Summary of study characteristics

Aut hor (s).	Name of the study	Research objective/s	Research Method/s	The Results	Conclusion
Janc, M., et al. 2023	Ergonomic assessment of work units for e-learning among University students and the prevalence of musculoskeletal disorders	A cross-sectional study was conducted in Poland. The criterion for inclusion in the study was student status at one of the three universities. The questions covered two time periods, the period before the COVID-19 pandemic and the period from October 2020 to June 2021 (hereinafter the pandemic period).	The study was based on a survey that was completed anonymously online. Fully completed questionnaires included in the analysis were obtained from 914 respondents.	According to the received data 64% of respondents were female, the average age was 21.7 kg, body weight assessment had no statistical significance. From the total sample of examined students, the prevalence of musculoskeletal disorders before the pandemic was 68%, while during the Covid-19 pandemic, the prevalence of musculoskeletal disorders is significantly higher at 75%, with given that these are young people who have not yet started their working life.	Given that many aspects of life have changed with the COVID-19 Pandemic. In the examined group of this research, a high rate of representation of musculoskeletal disorders was observed due to the lack of planned ergonomic work units used for online teaching. After analyzing this and more research papers on a similar topic, a detailed study should be carried out in the future, and changes are needed according to the recommendations of the ROSA method.

From a total of 4,500 papers from 4 databases, articles and scientific works related to musculoskeletal disorders in the student population were taken into account. The period of reviewed scientific literature is works published in the period from 2019 to 2023. After completing the review of the scientific database, studies and publications not correlated with the research domain were excluded. Out of 317 papers, 66 papers were processed in detail, and only 7 papers met the 3 criteria for implementation in the scientific literature review. The studies were of different nature, nationally representative research, cross-sectional study, longitudinal cross-sectional and correlational research.

4. DISCUSSION

The group of respondents investigated by the review article is the student population, through various studies a total of 2,600 students with an average age of 15 to 30 years were included, considering the sensitivity of the population and the most common onset of musculoskeletal diseases and their causes at that age, the research aims to the goal of creating intervention plans for the target population as one of the best preventive models. In the research of Tavakkol R. et al., in Europe almost 40 million workers (more than 30%) suffer from musculoskeletal disorders (Tavakkol R. et al. 2020). In Britain, the estimated number of cases of musculoskeletal diseases between 2011 and 2015 was \$170,000, which further contributed to the total costs of self-reported injuries and ill-health, while in 2016 and 2017 this amount was \$15 billion (Amit L. M., T. Malabarbas, G. 2020). The characteristics of pain in musculoskeletal disorders is closely related to the work duties of everyday life, in 2013, in North America as much as 62% of all occupational diseases were musculoskeletal diseases with treatment costs estimated at about 25 billion USD per year (Bonanni R., et al 2022). Some of the research indicates a trend of increasing negative lifestyle habits among students that are risky for health Nešić M. et al. unequivocally show that healthy lifestyles are not equally and to a greater extent represented among young people, especially not among students (Nešić M. et al. 2019). Moodley et al., in a study conducted on the student population of undergraduate studies in Johannesburg - Africa, points out the fact that there is a high prevalence of musculoskeletal disorders, even in 83% of the examined participants. In the same paper, it was shown that the most common disorder was in the lower back region in the last

12 months and during the lifetime of the participants (Moodley et al. 2020). The author Hendi O. M et all in the study of the prevalence of musculoskeletal disorders in correlation with physical activities among students, based on the results presented, concludes that the prevalence of these disorders is present in even 64.8% of the examined group, and that the highest prevalence was among medical students 48.4%, while the most frequently reported region was pain in the lower back, 33.4% (Hendi O. M et all 2019). Alqahtani NH. et al., in a study of the prevalence of burnout syndrome and its association with musculoskeletal disorders among students of health faculties in Saudi Arabia, based on a sample of 392 students, came to the conclusion that the prevalence of musculoskeletal disorders is also high in the student population, with 64.8% of students who participated in the research (Alqahtani NH. et al. 2020). A cross-sectional study by the author Hashim R. and associates shows that musculoskeletal disorders among dental students in the United Arab Emirates is a more prevalent disorder in women, 75.2%, than in men (Hashim R. et al. 2021). Mohamed H.S.I. found in the research that the prevalence of musculoskeletal diseases among medical students, who study and work in hospitals in Egypt, was 82.97%, compared to a study among Malaysian medical students, the prevalence of musculoskeletal diseases was 50%, from of that, 64% representation was among students of health specialties at the University of Taif (Mohamed H.S.I. 2021). Using a multi-year cross-sectional survey, author Parto D. N et al investigated the prevalence and risk factors of musculoskeletal disorders in students at McMaster University. Depending on the year and outcome of the study, 59-67% of participants reported neck/lower back pain in the last year, and 43-49% of respondents reported musculoskeletal pain in the last 7 days (Parto D.N. et al 2023). A comparative study examined the prevalence of musculoskeletal diseases among dentists and dental students in three time periods. According to the presented data of the study, the overall prevalence of musculoskeletal disorders was statistically significant, increasing from 7 days 65.6%, to 12 months 92% to the constant presence of pain in one of the regions, namely 95.8% (Ohlendorf D. et all. 2020).

5. CONCLUSION

Studying involves various challenges that can disrupt homeostasis, and some of these challenges are the burden of studying, the desire for academic achievement, and studying while working. The musculoskeletal system is influenced by various factors, it is subject to deformations, because in addition to hereditary factors, external loads, lifestyle and lifestyle habits can significantly affect the occurrence of musculoskeletal diseases, both in the working population and in the student population. The success of prevention and early diagnosis in a scientific research sense brings many benefits to the younger population, which is also the most numerous, considering the sensitivity of the population where the most common onset of musculoskeletal disorders and their causes at this age is of great importance, and this the scientific article aims to raise awareness for the target population as one of the best preventive models.

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