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Article

An Analysis of The Body Mass Index (Quetelet Index) of Technical Personnel in Higher Education Institutions of Qarshi City

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Abstract: This article is about assessing the health status of technical staff working in Karshi higher education institutions and examining the indicators of the Ketle index. In the course of the study, based on the height and weight of technical personnel of Karshi State University and Karshi State University, body mass index is determined, cases of overweight, obesity or underweight are analyzed. Based on the results obtained, recommendations will be developed on the formation of a healthy lifestyle, increasing physical activity and proper nutrition among technical personnel. This study has important implications for the health promotion and disease prevention of higher education workers.

Keywords: Ketle Index, Technician, Intellectual, Body Weight, Physical Activity, Anthropometrik

Introduction

In recent years, the growing number of higher education institutions, the expansion of student enrollment, and the development of new academic buildings, laboratories, and technological infrastructure have led to an increased demand for technical personnel. In addition, the quality of technical services has a significant impact on the stability and effectiveness of the educational process. From this perspective, examining how the number of technical staff and the demand for them change over time is an important issue.[1]

In the statistical analysis of structural changes among technical personnel, the use of sequential indices is considered one of the most effective approaches. These indices allow for a clear assessment of year-by-year dynamics in the number of technical staff, including trends of growth or decline, as well as changes in labor productivity indicators. Moreover, such indices serve as an important analytical tool in decision-making processes, optimization of technical staff composition, and planning of labor resource requirements.[2]

This article is devoted to the study of the composition, number, qualification level, and labor efficiency of technical personnel working in higher education institutions in Qarshi city, as well as to the calculation and analysis of their Quetelet index. Several major higher education institutions operate in Qarshi city, each maintaining its own technical staff structure. Examining how these personnel have

changed over the years, along with identifying the causes and consequences of these changes, further highlights the relevance and significance of this research topic.[3]

Literature Review

Anthropometric indicators of technical staff in higher education institutions in Qarshi city play an important role in assessing their level of physical development, health status, and adaptation to working conditions. In particular, it is essential to examine the anthropometric measurements of technical personnel—such as laboratory assistants, maintenance workers, electricians, and other support staff—employed at Qarshi State University and Qarshi State Technical University from the perspective of occupational hygiene.[4]

Since the work activities of technical personnel often involve prolonged sitting, extended periods of standing, or varying degrees of physical workload, their somatometric characteristics have a direct impact on working conditions. Therefore, it is important to conduct regular anthropometric assessments, promote healthy lifestyle practices, and implement workplace exercise programs (industrial gymnastics). These measures contribute to maintaining work capacity, preventing occupational diseases, and improving overall health status.[5]

The scientific study of human physical development began to take shape in the mid-19th century as a result of the research conducted by French scientist Paul Broca and Belgian scientist Adolphe Quetelet [6]. Their work laid the foundation for the systematic study of anthropometry and human body measurements. In Russia, the first scientific studies focused on children's physical development emerged in the 1890s. Subsequently, the "individualized method," based on continuous observation, was developed in scientific research. This approach enabled the long-term dynamic monitoring of the same group of individuals and was proposed by A.O. Karshinsky in 1926.[7]

In 1925, a collection of guidelines titled *"Methodology of Anthropometric Research"* was published. In 1926, the Central Anthropometry Bureau was established under the State Institute of Social Hygiene, where it carried out its scientific activities [8].

Materials and Method

The study was conducted during the winter season of 2025 among technical staff of Qarshi State University and Qarshi State Technical University. The anthropometric characteristics of the participants were assessed in order to evaluate their level of physical development, health status, and adaptation to working conditions. A total of 72 respondents were selected for the study and divided into three age groups: 18–29 years, 29–39 years, and over 39 years of age.[9]

The observations were based on key anthropometric indicators, including body height and body weight measurements [10]. The obtained data were processed using Microsoft Excel software under the Windows XP operating system [11].

Results and Discussion

The obtained results showed that, depending on age and gender, indicators of physical development among technical staff—particularly body weight and the Quetelet (Body Mass Index, BMI)—exhibited an increasing trend. According to the study, in the 18–29 age group, the BMI values among females ranged from 23.25 to 27.6, indicating that in some cases the values exceeded the normal range and reached the overweight category. A similar trend was observed among males, where BMI increased from 24.6 to 27.0, suggesting the presence of excess body weight even among younger individuals.[12]

In the 29–39 age group, both body weight and BMI showed a further increase. Among females, BMI ranged from 24.9 to 27.1, while among males it ranged from 25.6 to 26.5, with overweight status prevailing in most cases. This may be explained by a slowdown in metabolic processes and a decrease in physical activity during this age period.

In the group aged 39 years and older, the changes became even more pronounced. Among females, the BMI reached 26.5–28.0, approaching the threshold of obesity. Among males, BMI values ranged from 26.6 to 27.3, indicating a stable state of excess body weight. In addition, a slight decrease

in body height was also observed with increasing age, which can be explained by physiological changes.[13]

The obtained results are consistent with the Body Mass Index concept proposed by Adolphe Quetelet, confirming that an increase in body weight with age represents a general biological pattern. Furthermore, the findings are in agreement with modern hygiene and anthropometric studies, indicating that a sedentary lifestyle and improper nutrition are among the main causes of excess body weight.[14]

The study revealed that the tendency toward overweight and obesity increases with age among technical staff. This highlights the need to promote a healthy lifestyle, increase physical activity, and improve nutritional habits. In addition, a sedentary lifestyle, irregular dietary patterns, and insufficient physical activity during work may be contributing factors. It was also found that a small proportion of respondents had BMI values of 30 kg/m² and above, indicating obesity and increasing the risk of cardiovascular, endocrine, and musculoskeletal disorders.[15]

The Table 1. below presents the Quetelet index indicators of technical staff at Qarshi State University and Qarshi State Technical University according to age groups.

Table 1. Quetelet Index (BMI) indicators by age groups among technical staff of Qarshi State University and Qarshi State Technical University

Age group	Height (QSU) cm	Height (QSTU) cm	Weight (QSU) kg	Weight (QSTU) kg	BMI (QSU) kg/m²	BMI (QSTU) kg/m²
Women 18–29 years	166.25	164.9	64.3	74.8	23.25	27.6
Men 18–29 years	170.3	166.5	72.3	74.8	24.6	27.0
Women 29–39 years	163.3	165.8	66.1	74.9	24.9	27.1
Men 29–39 years	171.3	169.8	76.3	77.0	25.6	26.5
Women 39+ years	164.8	166.25	72.0	77.25	26.5	28.0
Men 39+ years	173.2	167.4	80.4	76.9	26.6	27.3

Conclusion

The results of the study indicate that the Quetelet index among technical staff varies to a certain extent across different age groups. With increasing age, a gradual rise in body mass index is observed, which can be explained by a slowdown in metabolic processes and a decrease in physical activity.

In the middle-aged group (29–39 years), the Quetelet index is generally within or close to the normal range, whereas in the older age group (above 39 years), a higher tendency toward overweight and obesity is observed. This situation may be associated with the nature of work activities, a sedentary lifestyle, and improper dietary habits.

Overall, the Quetelet index serves as an important criterion for assessing the level of physical development and can be used to evaluate the health status of staff and develop preventive measures.

Based on the results, it is recommended to promote a healthy lifestyle among technical staff, increase physical activity, and ensure rational nutritional habits.

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