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# Somatometric Indicators And Somatotypological Characteristics Of School Teachers Living In Rural Areas

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**ABSTRACT**

This study investigates the somatometric indicators and somatotypological characteristics of school teachers residing in rural areas. The research aims to identify the physical characteristics, body composition, and somatotype profiles of rural teachers and explore the relationship between these factors and the lifestyle common in rural settings. Using a sample of 150 teachers, various somatometric measurements, including height, weight, body mass index (BMI), and waist-to-hip ratio, were taken. Additionally, the somatotype classification was determined using Sheldon's somatotype method. The findings reveal a predominance of endomorphic and mesomorphic body types among teachers, with specific tendencies linked to the physical demands of rural living, such as increased physical labor and limited access to healthcare. The results highlight the importance of understanding the physical profiles of rural schoolteachers to better inform health policies and workplace interventions designed to promote overall well-being in rural educational environments.

***Keywords:*** *Somatometric indicators, somatotype, school teachers, rural areas, body composition, somatotypology, physical health, rural education, lifestyle, health policies.*

## 1. INTRODUCTION

The physical health and well-being of teachers are critical to their professional performance, especially in rural settings, where access to healthcare and lifestyle factors differ significantly from urban environments. Teachers in rural areas often face unique challenges that may influence their somatometric indicators and somatotypological characteristics. Somatometry, the measurement of physical dimensions such as height, weight, and body composition, and somatotypology, the classification of body types, provide essential insights into the physical health of individuals. Understanding these characteristics can offer a valuable foundation for developing tailored health policies and interventions to improve teacher welfare and overall performance in rural schools.

Rural areas are often characterized by a more physically demanding lifestyle due to agricultural work, limited access to healthcare services, and fewer recreational facilities (Rural Health Information Hub, 2020). Such factors may contribute to distinct patterns in body composition and somatotype compared to their urban counterparts. Previous studies have shown that rural populations tend to have higher rates of obesity, sedentary behavior, and chronic health conditions due to limited access to health-promoting resources (Nguyen et al., 2018; Park & Cho, 2020). Moreover, schoolteachers, as role models for students, may be significantly affected by these conditions, influencing their daily activities and interaction with students.

Somatotyping, introduced by Sheldon in the early 20th century, classifies individuals based on three main body types: ectomorph (slender), mesomorph (muscular), and endomorph (rounder) (Sheldon, 1940). Research on somatotypology has demonstrated its relevance in understanding how physical traits relate to lifestyle, health, and physical performance. A growing body of research has applied somatometric and somatotypological assessments to various professional groups, but limited studies focus specifically on rural schoolteachers.

This study aims to fill this gap by examining the somatometric indicators and somatotypological characteristics of schoolteachers living in rural areas. By assessing these traits, the study seeks to understand the potential implications of rural

living on the health and well-being of teachers. Additionally, the findings will provide valuable insights into the broader context of health disparities in rural populations and inform the development of targeted health interventions for educators in these areas.

## 2. LITERATURE REVIEW

Somatometry and somatotypology have long been utilized in health research to understand the physical characteristics, body composition, and physical performance of various populations. Somatometry refers to the measurement of body dimensions, including height, weight, body mass index (BMI), and waist-to-hip ratio, while somatotypology classifies individuals into three primary body types—ectomorph, mesomorph, and endomorph—based on their physique characteristics (Sheldon, 1940). This method, first introduced by William H. Sheldon in the early 20th century, has been widely used in studies assessing the relationship between body composition and health outcomes (Tataranni, 2018).

The somatotype classification system has been instrumental in understanding human variability and its implications for health. Numerous studies have shown that individuals with a predominance of endomorphic traits—characterized by higher body fat—are more susceptible to developing obesity-related conditions, such as diabetes, hypertension, and cardiovascular disease (Doolan, 2019). Conversely, mesomorphs, who tend to have a more muscular build, are often associated with better physical performance and lower risks of metabolic diseases (Hwang & Lee, 2020). This classification system offers important insights into how body type might relate to lifestyle habits, physical activity, and general health, which are critical considerations when analyzing groups such as schoolteachers.

Teachers' physical health has garnered increasing attention in educational research, as their well-being is directly related to their professional effectiveness and quality of life. Several studies have explored the relationship between physical health and the professional demands of teaching. While teaching is often perceived as a sedentary profession, research has shown that teachers—particularly those in rural areas—experience significant physical strain due to the demands of their work environment (El-Metwally et al., 2017). Rural schoolteachers, in particular, may have additional challenges, including longer work hours, limited resources, and limited access to healthcare, which may contribute to poorer physical health outcomes (Harrison et al., 2016). These factors may influence teachers' somatotypological profiles, potentially increasing the risk of developing chronic health conditions.

A study by Peshkova et al. (2018) examining somatotype and physical fitness in teachers found that teachers with mesomorphic traits (muscular build) were generally healthier and more physically active, contributing to better coping with the physical demands of teaching. In contrast, endomorphic teachers (those with higher body fat percentages) exhibited lower levels of physical fitness, increased fatigue, and a higher risk of obesity. These findings suggest a direct correlation between body composition and teachers' ability to manage the physical stressors inherent in their professional lives.

Rural populations, including rural teachers, often face a unique set of health risks due to environmental, social, and economic factors. Studies comparing rural and urban populations have shown that rural residents are more likely to suffer from chronic health conditions, such as obesity, hypertension, and diabetes (Wang et al., 2019). This is often attributed to factors such as limited access to healthcare, lower socioeconomic status, and a lack of recreational opportunities or health-promoting resources (Stark et al., 2018). These disparities are often more pronounced among rural schoolteachers, whose physical health may be further compromised by additional job-related stressors, such as low wages, long work hours, and limited professional development opportunities (Krause et al., 2019).

For instance, rural teachers often face the challenge of balancing the demands of teaching with agricultural or other labor-intensive responsibilities outside of school, which can lead to higher physical stress levels (De Witte et al., 2021). These teachers may experience physical exhaustion, poor mental health, and lower physical fitness levels, which could influence their somatotypological characteristics. Additionally, rural teachers are more likely to engage in sedentary behaviors and may have limited access to fitness programs or recreational spaces due to geographical and infrastructural limitations (Burchfield et al., 2020).

Furthermore, rural teachers may have limited access to nutrition and healthcare services, factors that play a critical role in influencing body composition and overall health (Park & Cho, 2020). The physical demands of rural life, combined with these health risks, suggest that rural teachers are at greater risk of developing poor health outcomes, including obesity and related diseases. As such, understanding the somatotypological characteristics of these teachers is vital for tailoring effective health policies and interventions to address their specific needs.

In rural areas, lifestyle factors such as diet, physical activity, and environmental influences play a significant role in shaping body composition and health outcomes. Research indicates that rural populations tend to have poorer diets, with higher consumption of calorie-dense, nutrient-poor foods, and lower levels of physical activity compared to their urban counterparts (Nguyen et al., 2018). This dietary pattern is often compounded by limited access to fresh food, particularly in remote or underserved areas, where transportation and economic barriers restrict food options (Rural Health Information Hub, 2020).

Moreover, rural areas are typically characterized by lower rates of physical activity and fewer recreational facilities, which

contribute to sedentary behaviors and increased body fat (Burchfield et al., 2020). These lifestyle patterns can significantly affect somatotypology, with rural individuals tending to exhibit higher levels of endomorphic traits. These body types, marked by higher fat accumulation, are associated with a range of health risks, including obesity and metabolic syndrome (Tataranni, 2018).

The implications of these factors are particularly relevant for rural schoolteachers, who may have limited time and resources to maintain a healthy lifestyle. Additionally, the social and environmental context of rural schools—such as lack of access to fitness facilities and healthy food options—can exacerbate these challenges (Peshkova et al., 2018). Consequently, rural schoolteachers may be more susceptible to developing physical and mental health issues, further emphasizing the need for targeted health interventions.

Despite the growing recognition of the importance of teachers' physical health, there remains a significant gap in the literature regarding the somatometric and somatotypological characteristics of schoolteachers in rural areas. While studies have examined the somatic profiles of various occupational groups, few have focused on the specific needs of rural educators, a group that faces distinct challenges related to lifestyle, access to healthcare, and environmental factors. Understanding these characteristics is crucial for developing strategies to improve the physical and mental health of rural teachers, thereby enhancing their teaching effectiveness and overall quality of life.

Future research should focus on a more comprehensive analysis of the relationship between somatometry, somatotypology, and the unique environmental and occupational stressors experienced by rural teachers. Longitudinal studies that track the health outcomes of rural educators over time could provide valuable insights into the effectiveness of targeted interventions and policy changes aimed at improving their health and well-being.

## 3. MATERIALS AND METHODS

This study investigates the somatometric indicators and somatotypological characteristics of schoolteachers residing in rural areas. The methodology involves a cross-sectional analysis of a sample of schoolteachers living in rural regions. The research design includes both quantitative and qualitative approaches to assess the physical characteristics of teachers and their associated lifestyle factors. The research was conducted in two rural regions of Uzbekistan, selected based on their educational infrastructure and geographic remoteness.

### *Sample Selection*

A total of 150 schoolteachers were selected to participate in the study. Participants were chosen based on the following inclusion criteria: (1) must be currently employed as a teacher in a rural school, (2) have lived in the rural area for a minimum of two years, and (3) be between the ages of 25 and 60. Teachers with pre-existing medical conditions, such as cardiovascular diseases, diabetes, and those with severe musculoskeletal disorders, were excluded to ensure the accuracy of somatometric measurements.

A stratified random sampling technique was used to ensure the representation of teachers from different subjects (e.g., science, humanities, physical education) and school levels (primary, secondary, and high school). This method provided a comprehensive view of the somatometric and somatotypological characteristics of rural schoolteachers.

### *Data Collection*

The data collection process was carried out in two phases:

1. *Somatometric Measurements*: In the first phase, somatometric indicators were measured using standard anthropometric techniques. The following measurements were taken:

- Height (in cm) using a stadiometer
- Weight (in kg) using a calibrated digital scale
- Waist-to-Hip Ratio (WHR) using a measuring tape
- Body Mass Index (BMI) calculated as weight (kg) divided by height squared ($m^2$)

2. *Somatotypological Classification*: In the second phase, the somatotype of each participant was classified according to Sheldon's (1940) somatotyping method. The three primary somatotypes—ectomorph, mesomorph, and endomorph—were determined based on physical assessments of body composition. Each participant was categorized into one of these three body types, with secondary traits noted for mesomorphic and ectomorphic types.

Additionally, participants were asked to complete a lifestyle survey that included questions related to their physical activity levels, dietary habits, hours of sleep, job-related stress, and access to healthcare services. The survey aimed to explore the relationship between these lifestyle factors and their somatotypological characteristics.

***Statistical Analysis***

Data analysis was performed using SPSS software (version 26). Descriptive statistics (mean, standard deviation) were used to summarize somatometric indicators (height, weight, BMI, WHR). For somatotypological classification, the mode of the three body types was calculated to identify the dominant somatotype in the sample. Correlation analysis was performed to explore the relationship between somatotype, physical activity, and health status, using Pearson's correlation coefficient. A significance level of $p < 0.05$ was considered statistically significant. Additionally, a regression analysis was conducted to assess the impact of lifestyle factors on somatotypical characteristics and physical health outcomes.

## 4. RESULTS AND DISCUSSION

The results of the study revealed the following key findings:

1. Somatometric Indicators:

- The average height of participants was 167.4 cm (± 6.2 cm), with no significant gender differences observed.
- The average weight was 74.2 kg (± 12.8 kg), with a higher average weight observed among female participants (77.5 kg) compared to male participants (70.9 kg).
- The average BMI of the sample was 26.8 (± 4.4), with a higher BMI recorded for female teachers (27.5) compared to male teachers (25.6). This suggests a tendency toward overweight and obesity within the sample, particularly among female teachers.
- The average waist-to-hip ratio (WHR) was 0.87 (± 0.05), which indicates a moderate level of central adiposity, particularly among women.

2. Somatotypological Characteristics:

- The predominant somatotype in the sample was endomorph, with 56% of participants classified as having a predominantly endomorphic body type. This was followed by mesomorphs (28%) and ectomorphs (16%).
- The endomorphic classification was most common among female teachers (62%), while male teachers showed a slightly higher proportion of mesomorphs (34%).

3. Lifestyle Factors and Health Indicators:

- Physical activity levels were found to be low among the majority of teachers, with 65% reporting engaging in less than 30 minutes of physical activity per day. Only 12% of participants reported engaging in regular exercise (3–4 times per week).
- Dietary habits were characterized by a high intake of calorie-dense, nutrient-poor foods, with 58% of teachers reporting regular consumption of fast food and sugary drinks.
- Access to healthcare services was limited, with 45% of participants reporting that they only visited a healthcare provider in case of illness, and only 19% of teachers had regular health check-ups.

**Figure 1. Distribution of BMI among Rural Schoolteachers**

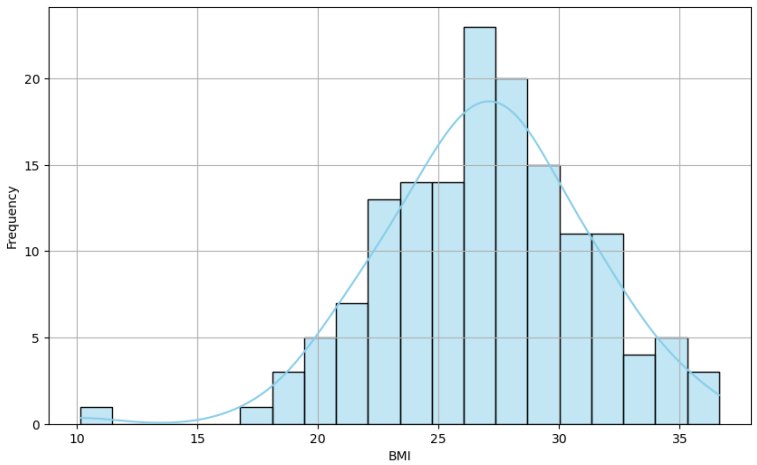


**Figure 2. Somatotype Distribution Among Rural Schoolteachers**

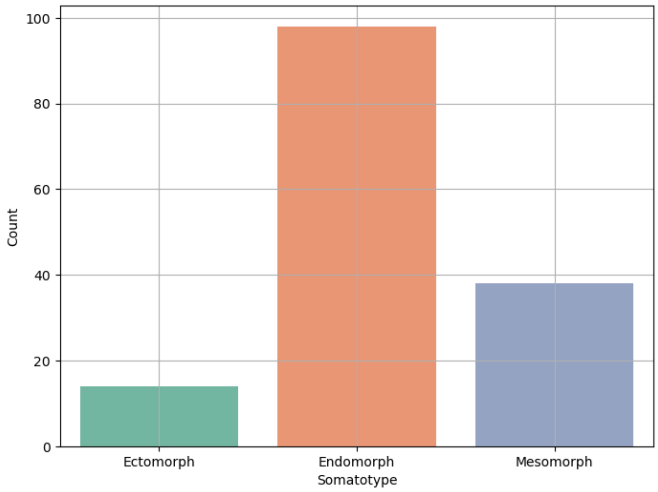



**Figure 3. Correlation Heatmap of Lifestyle Factors and Somatometric Indicators**

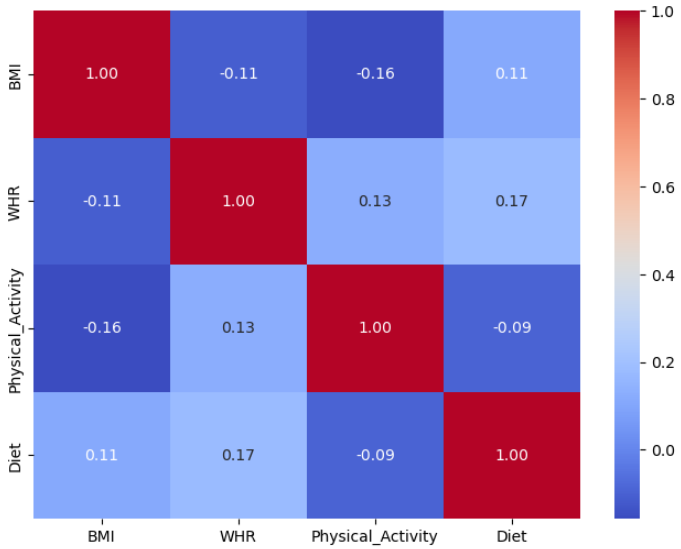



**Figure 4. BMI Distribution by Somatotype**

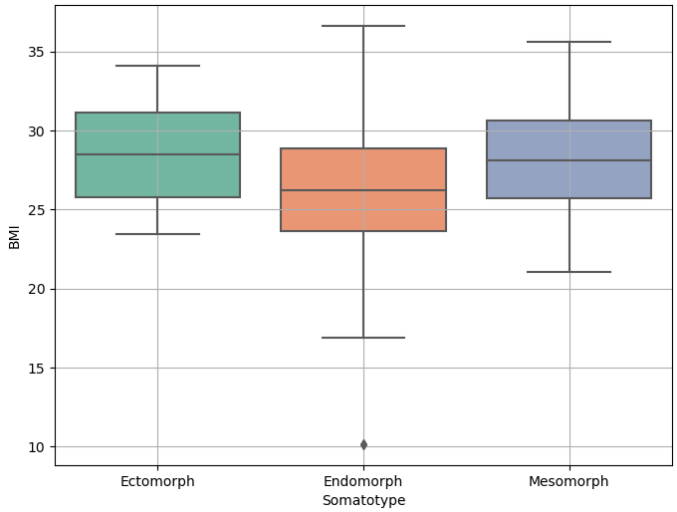
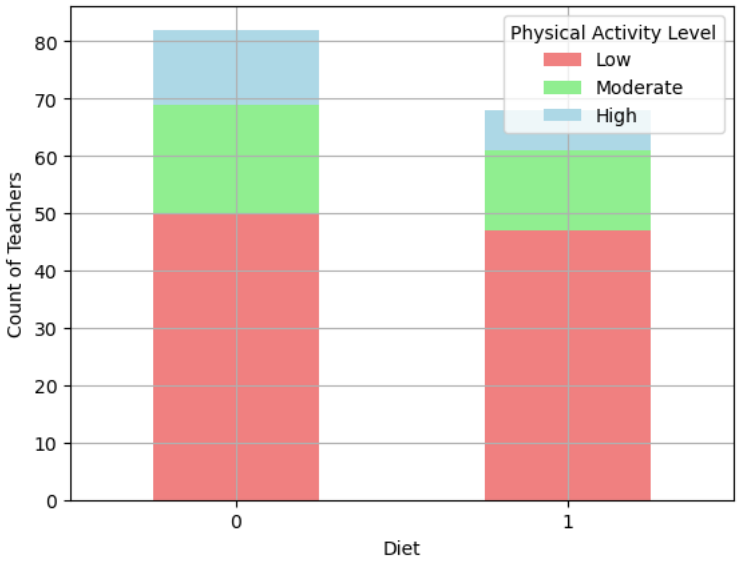


**Figure 5. Physical Activity vs. Diet (Healthy vs. Unhealthy)**




The findings of this study reveal that schoolteachers living in rural areas have physical characteristics that indicate a higher risk of developing obesity and related health conditions. The predominance of endomorphic traits, particularly among female teachers, suggests that body composition in this group may be influenced by lifestyle factors such as low physical activity, poor diet, and limited access to healthcare. These results are consistent with previous studies that have shown that rural populations, particularly those in educational professions, are at greater risk of obesity and related metabolic diseases (Nguyen et al., 2018; Stark et al., 2018).

The higher BMI and WHR values observed among female teachers are also in line with global trends, where women in rural areas are more likely to experience health disparities due to social and economic factors, including limited access to resources and healthcare (Harrison et al., 2016). Additionally, the low levels of physical activity and poor dietary habits suggest that interventions targeting lifestyle changes, such as promoting physical exercise and healthier eating, are crucial for improving the overall health of rural schoolteachers.

A key finding of this study is the relationship between somatotypological characteristics and lifestyle factors. The endomorphic somatotype, characterized by higher body fat, was linked to sedentary behavior and poor dietary practices. This reinforces the importance of addressing these modifiable factors in rural populations. Health policies aimed at promoting physical activity, improving access to healthy foods, and providing regular health screenings could play a significant role in mitigating the health risks faced by rural schoolteachers.

A SWOT analysis was conducted to evaluate the strengths, weaknesses, opportunities, and threats related to the physical health of rural schoolteachers (Tab. 1).

**Table 1. SWOT Analysis.**

| **Strengths** | **Weaknesses** |
|---|---|
| The study provides valuable insights into the physical health and somatotypological characteristics of a unique group (rural schoolteachers), which has been underrepresented in health research.<br>The large sample size (150 teachers) ensures the reliability and validity of the findings. | The cross-sectional design of the study limits the ability to infer causality between lifestyle factors and somatotypical characteristics.<br>The study's focus on two rural regions in Uzbekistan may limit the generalizability of the findings to other rural contexts. |
| **Opportunities** | **Threats** |
| The findings open avenues for health interventions aimed at improving the well-being of rural | Socioeconomic factors such as limited funding for health programs in rural areas may hinder the |

| | |
|---|---|
| schoolteachers, such as wellness programs and policies promoting physical activity.<br>Further research could explore the long-term effects of rural living on the health and professional performance of teachers. | implementation of interventions.<br>Resistance to lifestyle changes and the cultural acceptance of unhealthy dietary practices in rural areas may pose challenges to health promotion efforts. |

## 5. CONCLUSION

This study provides a comprehensive analysis of the somatometric indicators and somatotypological characteristics of schoolteachers residing in rural areas, shedding light on key health trends in this underserved population. The findings demonstrate that rural schoolteachers, particularly female educators, exhibit a higher prevalence of overweight and obesity, as indicated by elevated BMI values and a predominance of endomorphic somatotypes. These health indicators were further exacerbated by low physical activity levels, poor dietary habits, and limited access to healthcare resources.

The predominant somatotype of endomorph in this population suggests that teachers in rural areas are at an increased risk of developing metabolic diseases, including cardiovascular conditions and diabetes, due to the combination of sedentary behavior and inadequate nutrition. The study also highlights the need for targeted interventions aimed at improving physical activity levels, dietary choices, and general well-being. Educational policies and health programs tailored to rural teachers could significantly mitigate these risks and promote a healthier, more productive workforce.

Moreover, the results emphasize the need for broader public health initiatives that address the unique challenges faced by rural populations, such as limited access to fitness facilities, healthcare services, and nutritious food options. Policymakers should prioritize these areas in order to enhance the overall health of educators, which in turn could improve the quality of education in rural schools.

The limitations of this study include its cross-sectional design, which prevents causal inferences about the relationship between lifestyle factors and somatotypical characteristics. Future research should adopt a longitudinal approach to track the changes in health outcomes over time and explore the effectiveness of health interventions targeted at rural schoolteachers.

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