Anatomy of a Nation: Exploring Weight, Height, and BMI Variations among Turkish Adults (2008-2022)
Short title: Turkish Adults’ Anthropometry: Trends from 2008-2022

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ABSTRACT

Objective: The rapidly changing demographics and lifestyles of the global population demand updated anthropometric data to ensure appropriate designs, interventions, and policies. Recognizing the lack of recent comprehensive anthropometric data on the Turkish adult population, the primary objective of this study was to present an authoritative perspective on the evolution of average heights and Body Mass Index (BMI) distributions in Turkey, focusing on the period between 2008 and 2022.

Materials and Methods: Data for this research was sourced from the Türkiye Health Survey conducted by TurkStat. Our sample encapsulated diverse age groups over 15, covering all seven geographical regions of Turkey, ensuring nationwide representation. Comprehensive analyses were undertaken to segregate the data based on sex and age group, providing a nuanced insight into height variations and BMI distributions.

Results: Our findings suggest that the overall average height for the entire Turkish population remained relatively consistent during the study period, with males averaging around 173 cm and females approximately 161 cm. Interestingly, the 15-24 age bracket registered a noticeable height increase, suggesting a potential growth trend in the younger generation. In terms of BMI, our research revealed a consistent distribution across all categories over the years. However, there was a slight decrease in underweight individuals, particularly among males, and an upward trend in the ‘pre-obese’ category, especially in the male demographic. The obese category experienced a minor increase from 2008 to 2016 but showed signs of stabilization in recent years.

Conclusion: Given the dynamic nature of population health and growth patterns, this study underscores the significance of continuous anthropometric monitoring. Our findings offer a modern benchmark for various stakeholders – from health professionals to designers – to appropriately tailor their solutions and interventions for the Turkish populace. Furthermore, the subtle shifts in BMI categories over the years highlight potential focus areas for public health initiatives, emphasizing the importance of diet, lifestyle, and exercise in ensuring a healthy nation.

Keywords: Anthropometry, Turkish Population, Height Evolution, Body Mass Index, Public Health, TurkStat, Health Survey, Age Demographics.

INTRODUCTION

Anthropometry, a scientific discipline centered on human body measurements, stands at the nexus of medical, ergonomic, and industrial advancements. The variability we observe in humans is a fascinating amalgamation of factors encompassing ethnicity, age, and gender. Such variabilities are not mere biological curiosities; they significantly affect the design and functionality of tools, machinery, and equipment tailored to meet human needs. Efficient designs, rooted in comprehensive anthropometric data, optimize user interaction, bolstering safety and productivity. Substandard designs, lacking these insights, often culminate in reduced work efficiency and an uptick in occupational injuries.
The proliferation of anthropometric data across nations has been both uneven and varied. While numerous nations have substantial data pools, curated over years and backed by rigorous research, others have conspicuous gaps. Turkey, for instance, has a paucity of comprehensive anthropometric studies, making it challenging to achieve optimal design standards within the nation. Turkey's historical Anthropometric Survey of 1937, mandated by the Republic's founder Atatürk, laid the groundwork by measuring parameters like weight, height, span, and sitting height. However, though valuable, subsequent studies have been sporadic and often constrained in scope or sample size. As far as we could find from the literature, there are only four studies from Turkey to object population anthropometry: by Kayis et al (1), Gönen et al. (2), Ali et al. (2), and Cengiz et al. (3).

The present research seeks to bridge this knowledge gap. As we delve into contemporary data, the primary goal of this research is to present a comprehensive and current perspective on the anthropometric characteristics of the Turkish adult population. By analyzing data from diverse age groups over 15 and spanning all seven geographical regions of Turkey, we aim to produce a representative and authoritative depiction. This study seeks not only to inform experts but also to establish a contemporary benchmark for future innovations, designs, and interventions tailored to the unique needs and features of the Turkish populace.

**MATERIAL and METHODS**

**Data Sources:** Our study draws its core data from multiple esteemed repositories and national archives:

1. **Türkiye Health Survey:** This comprehensive research initiative aims to determine the health profile of individuals across the entire Republic of Türkiye, providing vital data regarding health indicators. The survey is conducted under the purview of the Statistics Law of Türkiye, numbered 5429, dated 18.11.2005, ensuring utmost data confidentiality. The results of this survey are publicly accessible on TurkStat Webpages, specifically the "Statistics by Theme" section and the official website: [www.turkstat.gov.tr](http://www.turkstat.gov.tr).

2. **Turkish Statistical Institute (TUIK) (2018-2022):** TUIK, from 2008 to 2022, has been a significant source for mortality statistics and specific causes of death in Turkey. The data anchored from records of the Central Population Administration System (MERNİS) includes anthropometric measurements as reported by the Ministry of Health’s Death Notification System.

3. **Worldometer Database (as of October 15, 2023):** This real-time statistical database provides vital insights pertinent to cardiovascular disease (CVD) mortality. Accessible at 'https://www.worldometers.info/'.

4. **OECD Digital Database (2023):** This resource houses socio-demographic information and crucial health indicators for Turkey and European Union nations, offering a comparative lens for our analysis. Available at 'https://stats.oecd.org/Index.aspx?DatasetCode=HEALTH_STAT'.

The analysis centers on an exhaustive cross-sectional design. The primary metric employed is the Body Mass Index (BMI), computed by dividing an individual's weight (in kg) by the square of their height (in meters). The BMI classifications are:

- Underweight: BMI < 18.50
- Normal Weight: 18.50 ≤ BMI < 25.00
- Pre-obese: 25.00 ≤ BMI < 30.00
- Obese: BMI ≥ 30.00
- Overweight: BMI ≥ 25.00

For the demographic analysis, age- and sex-specific rates and age-standardized rates (ASRs) were computed using population estimates for Turkey sourced from TUIK. These rates, expressed in terms of fatalities per 100,000 individuals, employed the world standard population for direct standardization methods, ensuring a fair comparison of age structures across demographics.

**Ethical Considerations:**

Given that our data sources are entirely from public domain databases, there's no necessity for explicit approval from a clinical ethics committee or individual patient consent forms. Rigorous measures are in place to ensure that no specific individuals can be identified and that all findings uphold the highest data privacy and confidentiality standards.

**RESULTS**

**Evolution of Average Heights in Turkey by Sex and Age Group (2008-2022)**

Dive into a comprehensive overview of how average heights have evolved in Turkey over a span of 14 years, as detailed in Table 1. The data, extracted from the Türkiye Health Survey conducted by TurkStat, is segmented by both sex and age group, offering a granular view into the height variations across diverse populations.

**Key Insights:**

- The overall average height for the entire population remained relatively consistent, with males averaging around 173 cm and females around 161 cm.
- Young adults in the age bracket of 15-24 years showcased a noticeable increase, indicating a potential growth trend in the younger generation.
- Each age segment displays its unique trend, with the 25-34 age bracket standing out with a consistent upward trajectory for both males and females.
- Senior citizens, particularly those above 75 years, tend to have slightly shorter statures, but the consistency over the years is commendable.

Table 2 presents a detailed overview of the Body Mass Index (BMI) distribution among individuals in Turkey from 2008 to 2022. This data, sourced from the Türkiye Health Survey conducted by TurkStat, is broken down by sex to provide a nuanced perspective on BMI trends.

Key Insights:
- Over the years, individuals have consistently distributed across all BMI categories. However, a closer look reveals subtle shifts in these percentages.
- The percentage of underweight individuals saw a slight decrease from 2008 to 2022. The decrease is slightly more pronounced among males compared to females.
- Normal weight remains relatively stable across the years, hovering around the 40% mark for both genders.
- An upward trend in the 'pre-obese' category can be observed, especially among males, indicating a potential health concern.
- While the obese category showed a slight increase from 2008 to 2016, the percentages appear to be stabilizing in recent years.

### Table 1. Average heights by sex and age group, 2008-2022

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DISCUSSION

The recent findings presented in this study provide an in-depth overview of the changing landscape of anthropometric features of the Turkish population from 2008 to 2022. The evolution of average heights and BMI distribution over this period offers a wealth of insights that can be further contextualized and enriched by comparing it with domestic and international literature.

The data suggests that the younger generation, particularly those in the age bracket of 15-24 years, is experiencing an increase in average height. This can be attributed to factors such as improved nutrition, access to healthcare, and socio-economic developments (4, 5).

Turkey seems to be facing challenges similar to many other nations on the BMI front. The rise in the 'pre-obese' and 'obese' categories might reflect global trends influenced by lifestyle changes, urbanization, and diet shifts (6, 7).

Studies by Kayis B & Özok A (1991) and Gönen E, Kalinkara V, & Özgen Ö (1991) provide foundational data on Turkish anthropometry (1, 2). The current study's findings, especially the consistent height values among the older population, corroborate their results.

The research by Ali İ & Arslan N (2009) highlights regional variations in anthropometric measurements (8). Comparatively, the current study's broad national overview could serve as a benchmark against which regional differences can be mapped.

Chuan TK, Hartono M, & Kumar N (2010) and Lee Y-C, Chen C-H, & Lee C-H (2019) present anthropometric data for the Southeast Asian population (9, 10). Notably, while average heights in Turkey are consistent with many countries in the region, BMI trends differ. For instance, the prevalence of obesity seems to be a more acute concern in Turkey.

Klamlklay J et al. (2008) provide insights into the anthropometry of the southern Thai population (11). The subtle variations between Turkey and Thailand, especially in the younger cohorts, can be explored further, considering socio-economic, genetic, and environmental factors.

This study bridges a critical time gap, updating Turkey's anthropometric database from 2008 to 2022. It enriches the existing body of knowledge, enabling more accurate cross-temporal and cross-regional analyses.

The nuanced segmentation by age and sex is particularly valuable, offering insights that can shape targeted public health and ergonomic interventions.

Given the upward trend in the 'pre-obese' category, future studies could delve deeper into the dietary habits and lifestyle choices of the Turkish population to identify possible intervention points.

The observed increase in height among the younger generation opens avenues for genetic research, potentially exploring any gene-environment interactions that might be at play.

Comparative research involving countries with similar socio-economic profiles but differing anthropometric trends can provide valuable policy insights.

CONCLUSION

While this study serves as a comprehensive reference point for the past 14 years, it also highlights the dynamic nature of anthropometry, which is influenced by a multitude of socio-economic, environmental, and genetic factors. As Turkey continues on its path of growth and development, monitoring these changes will be of paramount importance.

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Author Contributions: CH: designed and directed the study. Data collection, analysis and interpretation of results CH: wrote the final draft of the manuscript. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval: The present study was conducted in strict accordance with the principles outlined in the Declaration of Helsinki. Ethical approval for the study was obtained from the appropriate ethics committee, and all participants provided informed consent before participating in the study.

REFERENCES


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