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Body mass index values of conscripts in the Polish lands under Prussian rule in the late 19th and early 20th centuries

Grażyna Liczbińska [a,*], Zbigniew Czapla [b], Oskar Nowak [c], Janusz Piontek [c]

[a] Department of Human Evolutionary Ecology, Institute of Anthropology, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland
[b] Department of Human Biological Development, Institute of Anthropology, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland
[c] Department of Human Evolutionary Biology, Institute of Anthropology, Faculty of Biology, Umultowska 89, 61-614 Poznań, Poland

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ABSTRACT

The Body Mass Index (BMI) of conscripts from the Polish lands under Prussian rule and its causative factors and changes over time was to characterize. A total of 9965 conscripts aged 20 were examined. Differences in the mean BMI were tested using one-way analysis of variance ANOVA and Tukey's-test (post-hoc test). Factor analysis and multiple regression were employed. The highest BMI values characterized sons of peasants, workers and craftsmen, and the lowest, sons of intelligentsia: the difference for peasants/intelligentsia −0.59 kg/m^2 ($p = 0.0004$), and that for workers/intelligentsia and craftsmen/intelligentsia, 0.48 and 0.5 kg/m^2 ($p = 0.0004$ and $p = 0.0057$, respectively). The difference in BMI of conscripts from the first and last birth cohorts was 0.61 kg/m^2 ($p = 0.0001$). The highest BMI values were noted in conscripts from villages (21.50 kg/m^2), and the lowest, in those from towns (21.15 kg/m^2) and cities (21.19 kg/m^2). The differences for village/town and village/city were statistically significant ($p = 0.0026$ and $p = 0.0026$, respectively). The BMI difference between Poles and Germans was 0.35 kg/m^2 (higher value among Poles).

1. Introduction

A discussion about the biological condition of the Polish population and its various determinants, including economic and social ones, began as early as the second half of the 19th century. The debate was initiated by a series of articles written by Jan Ludwig Popławski and published in "Głos" (*English*: "The Voice") (Nowak, 2011). The main biological characteristic discussed was height since it was fairly well documented. For example, studies of the height of recruits from the Kingdom of Poland (the Russian sector) showed that Poles were the shortest among the populations of the entire Russian Empire (Syrniew, 1886; Anuczyn, 1889). At the beginning of the 20th century anthropological studies of trends in the height of conscripts started to be conducted. The studies were examined mainly by doctors serving on military commission and their results proved that recruits from successive generations were increasingly taller (Tołwiński, 1902; Kosieradzki, 1905). This trend was associated with improvement in economic conditions of population at that time, especially after the agrarian reforms (Kopczyński, 2007). These were transformations in the system of land ownership and land tenure[3327] (Kochanowicz, 2015). Significant differences in biological characteristics (height) were also recorded among inhabitants of poor and

* Corresponding author. Tel.: +48 618295724; fax: +48 618295730.
E-mail address: grazyna@amu.edu.pl (G. Liczbińska).

[3327] In the Prussian partition serfdom was abolished in 1807, and in the years 1811–1850 peasants were enfranchised and landowners compensated in the form of land grants (Kochanowicz, 2015).

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wealthier provinces of the Kingdom of Poland: the shortest persons were observed in the poorest regions, and the tallest, in economically advanced ones (Kopczyński, 2011; Czapla and Liczbińska, 2014). In terms of socio-economic development and standards of living, the Polish lands annexed by Russia and Austria were inferior to those belonging to the Prussian partition (Łukasiewicz, 1988; Kopczyński, 2007, 2011; Nowak, 2011). This translated, among others, into differences in the height of inhabitants of those regions in favour of the latter (Welon et al., 1983; Nowak and Piontek, 2008; Nowak, 2011). On the lands under Prussian rule there was also a secular trend towards an increase in the height of conscripts, strongly associated with improvement in the population's economic conditions at that time (Nowak, 2011). In the Kingdom of Poland a rise in the body height of men conscripted was also observed. In the years 1874–1913 the trend amounted to 0.6 cm per decade (Kopczyński, 2006). In Galicia the pace of secular trend of conscripts from Pilsen was slow and amounted 0.27 cm per decade (Bocheńska, 1972).

In regard to historical populations, the influence of socio-economic factors on body weight is also well documented (e.g. Komlos, 1987; Jordan, 1993; Komlos and Brabec, 2010, 2011; Staub et al., 2010; Staub and Rühli, 2013; Carson, 2012, 2013). Membership of a particular social class, per capita income, family size, size of the place of residence, or level of education are factors most often cited in the literature (Komlos, 1987; Jordan, 1993; Cole, 2003; Carson, 2005, 2009, 2012, 2013; Staub et al., 2010; Schoch et al., 2012; Staub and Rühli, 2013).

With regard to Poland, the discussion about the relationship between Body Mass Index and broadly understood cultural factors has continued. The literature has emphasized an important role for socio-occupational and economic status in influencing the Body Mass Index value of the inhabitants of contemporary Poland (e.g. Kozieł et al., 2004, 2006). Unfortunately, the Polish lands of the 19th and early 20th centuries have very poor documentation of body weight and therefore of the BMI of their residents, hence there are virtually no records of its changes over time, the incidence of underweight and obesity, and the social and economic determinants of this phenomenon.

It has been emerged from the above literature that the socio-economic status of human groups translated into their biological condition, measured by such biological characteristics as: height, weight and the BMI. The aim of this paper was to characterize the level of body mass fatness as measured by Body Mass Index its social and economic determinants and the changes over time in conscripts from the Prussian sector.

2. Economic characteristics of the Polish lands under Prussian rule

On the decision of the Prussian authorities dated January 1, 1846 the Poznań province was created from the lands of the Grand Duchy of Poznań (Kozłowski, 2004; Matwiejczyk, 2009; Nowak, 2011). The Polish lands belonging to Prussia were economically more advanced than those under Austrian and Russian rule. The differences concerned not only cereal production, animal production, or the amount of meat consumed per capita, but also the level of medical care and the annual per capita income (Sobczak, 1961, 1968; Łukasiewicz, 1988; Fijałek, 1979; Chwalba, 2000; Nowak, 2011; Czapla and Liczbińska, 2014). The standard and quality of life in the Prussian sector was higher than in Galicia and the Kingdom of Poland and translated into mortality measures being lower here than in the latter provinces (Szulc, 1920; Gieysztorowa, 1983; Wojtun, 1976; Janczak, 1986, 1994; Liczbińska, 2011, 2015a; Nowak, 2011; Liczbińska and Stachura, 2013).

Although the Polish territories annexed by Prussia were economically more advanced than those in the Russian and Austrian partitions, here too one could note differences in the standards of living. In the second half of the 19th century the consumption of cereals, potatoes and meat gradually increased. Better nutrition, including a growing share of plant and animal protein in diet, contributed to improvement in the health status of the population. In Silesia, where the population was employed mostly in industry, incomes were higher than in the other regions of Prussia. The economy of Greater Poland, East Prussia and Pomerania was of an agricultural character. Especially Greater Poland was called the bread basket of Poland. As early as in the mid-19th century, the region was known for its very high level of agriculture and cultivation techniques, much higher than regions annexed by Austria and Russia (Borowski, 1962; Budnik and Liczbińska, 2006). However, here per capita income was slightly lower than in industrial Silesia (Łukasiewicz, 1988). At the beginning of the 20th century, in Prussian-owned Greater Poland (administratively the Poznań province) the annual per capita income amounted to 563 marks, as against 567 marks in Pomerania and 603 marks in Upper Silesia (Chwalba, 2000). Along with improvement in sanitary, housing and working conditions, there was a gradual decrease in morbidity and mortality, also from epidemic infectious diseases and tuberculosis. All these resulted in lower mortality, mainly of infants and young children, and a longer human life. At the end of the 19th century there was further improvement in economic situation of the population of the Polish lands under Prussian rule, which translated into an increase in the quality and standard of living (Borowski, 1962, 1963, 1967, 1968, 1969; Kędelski, 1985; Liczbińska, 2011, 2015a; Nowak, 2011).

3. Material and methods

In this research use was made of the material housed in the archives of the Institute of Anthropology of Adam Mickiewicz University in Poznań. It had been collected by a team headed by Professor Andrzej Wokroj. The material was in the form of measuring cards containing anthropometric data (height and weight) and questionnaires of conscripts aged 20, born in the years 1860–1895 and conscripted in the years 1880–1915. Conscription to the Prussian army was introduced on the decision of the Prussian authorities dated 3 September, 1814. Military service lasted three years. Each man of the German Reich aged between 17 and 45 was liable for military service (Kozłowski, 2004). Conscript censuses embraced the