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V. S. UNHURIAN, A. D. KOZAK

STATURE VARIATION AMONG URBAN POPULATIONS OF THE MIDDLE DNIPRO REGION FROM THE MEDIEVAL TO THE EARLY MODERN PERIOD IN THE CONTEXT OF CLIMATE CHANGE

This research tests the hypothesis that the positive correlation between stature and environmental conditions becomes stronger as the spatial scale of the analysis increases. Notably, the early modern population was shorter than the medieval population. However, this difference became clearly apparent only when subsamples from different locations were combined into two larger samples according to the chronological principle: "medieval" and "early modern". Furthermore, changes in the stature of the Middle Dnipro population align with the general European trend of a decrease in stature from the Medieval to the Early Modern period, which has been attributed to climatic changes during the Little Ice Age.

Key words: Rus, Early Modern period, Little Ice Age, osteometry, stature.

Stature is a physical characteristic of a human resulting from the interaction of genetic, environmental, and socio-economic factors (Wurm 1986, p. 68; Bogin 1999, p. 263; Hermanussen 2013, p. 77). Although body height is 60–80 % genetically determined (Silventoinen et al. 2003, p. 400), favourable social and environmental factors play an important role in the full realisation of this genetically determined trait. Stature is considered one of the basic indicators of health in modern medicine (Tanner 1987, p. 99). Therefore, determining stature and examining its spatiotemporal changes allows us to assess living conditions in both modern and ancient populations (Larsen 2002, p. 128)

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Temporal changes in the stature of European populations in prehistoric and historical periods revealed the exceptionally low stature of early modern Europeans, showing that males and females were comparably short only during the Early Neolithic (Niskansen et al. 2018a, p. 68; cf. Cox et al. 2025, p. 3). This exceptionally low stature among early modern populations has been attributed to the adverse effects of climatic conditions (Komlos, Hau, Bourguinat 2003; Köpke, Baten 2005; Niskansen et al. 2018a, p. 67-68), which significantly disrupted Europe's economic and social life (e.g., Parker 2013). Following a warm period spanning the 10th to 13th centuries (Pfister et al. 1998, p. 546-547), Europe entered the Little Ice Age, which lasted from approximately 1300 to 1900, although its duration varied across different regions (White 2014, p. 347). Notably, the period between 1645 and 1715 marked the coldest interval of this era (Eddy 1976).

The economic and social consequences of climate change can be examined in detail using European data, which include demographic indicators, recorded male stature, air temperatures, and agricultural prices (Specht 2017). However, such anthropometric studies are impossible for early modern Ukraine, as data on the stature of male recruits from the 17th–18th centuries are lacking. Attempts to record male stature in some sections of the General Description of Left-Bank Ukraine (1765–1769) (Волошин 2012, с. 24; Казіміров 2013) did not develop into a regular practice. Moreover, historical anthropometry provides no data on secular trends in female stature. Consequently, anthropological data are crucial for studying changes in population stature in Ukraine. A further challenge is to examine the spatial dimensions of temporal changes in stature.

The correlation between climate and stature may be less apparent at the smaller spatial scale considered in this study. This may be due to specific historical factors involved in the formation of the samples and to the characteristics of the

study region. For example, Biehler-Gomez et al. (2023) found no significant change in stature among the inhabitants of Milan over a period of 2000 years. Small sample sizes often make interpretation difficult in anthropological research (Kozak, Diachenko 2023; Wyatt et al. 2024). In addition, stature estimates often have wide prediction intervals. Combined with small sample sizes, this may make it impossible to detect statistically significant differences between populations (Пежемский 2011, с. 169).

By analogy with studies of the relationships between climate and population dynamics (Freeman et al. 2018; Wirtz et al. 2024), this study proposes and tests the hypothesis that the positive correlation between stature and environmental conditions becomes stronger as the spatial scale of the study increases. To test this hypothesis, population stature was estimated using samples from the Middle Dnipro region and local subsamples representing the medieval and early modern periods. The medieval materials come from the necropolises of the Upper and Lower Towns of Kyiv and from Pereiaslav, while the early modern materials come from Kyiv and Cherkasy (fig. 1, table 1). These results are then compared with the broader European trend of declining stature over the same period to evaluate similarities or differences in the observed trends.

Historical Background

From the 10th to the 13th centuries, Kyiv was the capital of Rus (the terms “Kyivan Rus” and “Ancient Rus” also appear in the scholarly literature). Between the reigns of Volodymyr the Great and Yaroslav the Wise (980–1054) and the Mongol invasion of 1240, Kyiv was one of the principal political, economic, and cultural centres of medieval Europe. According to P. P. Tolochko’s estimates, in the 12th–13th centuries, Kyiv covered an area of approximately 380 hectares and had a population of up to 50,000 (Толочко 1983, с. 185, 188). However, these estimates of both the city’s area (Тараненко 2016, с. 60; Вортман 2023) and population (Вортман 2023) have been considered exaggerated. Kyiv’s economic prosperity was based on extensive trade, developed crafts, and a productive agricultural hinterland (Толочко, Пачкова 2000, с. 329–330; Івакін 2009, с. 4). The largest districts were the Upper Town and Podil (Lower Town). The Upper Town was inhabited by large feudal lords, their retainers, the church elite,

artisans, and merchants serving the city’s nobility (Толочко 1983, с. 194–200). The Lower Town was the centre of trade and craft (Сарайдак 1991, с. 3), and was inhabited mainly by the non-privileged population (Толочко 1983, с. 200).

The city of Pereiaslav, the centre of the medieval Pereiaslav Principality, was founded in the late 10th century as part of a broader process of active regional colonisation and the consolidation of the southeastern frontiers of Rus. The rise and rapid development of Pereiaslav occurred in parallel with the formation of an agricultural hinterland surrounding the city, which it came to serve as the economic, political, and cultural centre (Колибенко 1999, с. 56). Archaeological evidence indicates that at the peak of its development in the 12th century, the total area of Pereiaslav, including its adjacent territories, amounted to approximately 123–125 hectares, while its population reached up to 10,000 inhabitants (Колибенко 2002, с. 172–173).

The historical background of Right-Bank Ukraine in the 17th century was marked by considerable political and social turbulence. In 1648, a Cossack uprising against the rule of the Polish-Lithuanian Commonwealth broke out under the leadership of Bohdan Khmelnytsky, resulting in the formation of a new political entity on Ukrainian territory, the Zaporozhian Host. The period following the death of Bohdan Khmelnytsky in 1657 and lasting until 1687 is commonly referred to in Ukrainian historiography as “the Ruin”. In addition to internal feuds among the Cossack elite, the population of Right-Bank Ukraine suffered from the consequences of devastating military operations conducted on its territory. In 1686, the Tsardom of Moscow and the Polish-Lithuanian Commonwealth divided the Cossack state along the Dnipro. Right-Bank Ukraine, except for Kyiv, was ceded to the Polish-Lithuanian Commonwealth, while, according to the agreement, the lands of the southern Kyiv region (including Cherkasy) became a depopulated neutral territory (Куштан, Ластовський 2016, с. 208–209).

As in the medieval period, early modern Kyiv remained an important centre of socio-political life in the Ukrainian territories. Before the Cossack uprising in 1648, Kyiv was part of the Polish-Lithuanian Commonwealth, and since the 15th century, it had the right to municipal self-government. In 1689, Kyiv became part of the Tsardom of Moscow; by 1708, it became the centre of Kyiv province and the largest trade and craft centre in the Ukrainian lands within the Tsardom.

By the first half of the 17th century, approximately 12,000–13,000 people lived in Kyiv (Білоус 2008, с. 89). By the first half of the 18th century, this number had grown to 20,000 (Перковський 1982, с. 177). The largest districts of Kyiv were the Lower Town and Pechersk Town (Перковський 1982, с. 176; Климовський 2002, с. 184; Білоус 2008, с. 70). Following the construction of the Pechersk Fortress in 1706, the Russian military contingent was accommodated either within the fortress itself or in its surroundings (Назаренко 2015, с. 150). In 1718, members of the military garrison accounted for 30.6% of the overall population in Kyiv (Перковський 1992, с. 152).

Cherkasy was part of the Polish-Lithuanian Commonwealth until 1793. From 1797, it became one of the centres of Kyiv province of the Russian Empire (Куштан, Ластовський 2016, с. 213). By the middle of the 17th century, more than 3,000 people lived in the town. Almost continuous military operations in the second half of the 17th century, together with several deportations, led to a significant population decline (Куштан, Ластовський 2016, с. 209, 211). The town's economic potential also began to decline. The history of Right-Bank Ukraine under the Polish-Lithuanian Commonwealth in the 18th century has been described as a “blank spot” in historiography (Яковенко 2025, с. 572). However, the economic and political crisis in the Commonwealth during the first half of the 18th century, together with the Cossack-peasant uprisings of 1768–1769 (The Koliivshchyna), points to an unstable socio-economic situation in the Ukrainian territories.

Materials and Methods

Materials

Medieval Sites. Human skeletal remains from burial sites at 2 and 4 Velyka Zhytomyrska St. (8 burials), 14 Patorzhynskoho St. (15 burials) and 8 Volodymyrska St. (6 burials) constitute a subsample representing the Upper Town of medieval Kyiv. The Lower Town of medieval Kyiv is represented by remains from burial sites at 21 Khoryva St. (11 burials), 1a and 9 Naberezhno-Khreshchatytska St. (15 burials), and the Shchekavytsia cemetery (10 burials). The burial sites in the Upper and Lower Towns date from the 10th–13th centuries (Івакін 2008; Тараненко 2009; Козак, Івакін 2022).

The population of medieval Kyiv has been the subject of extensive anthropological research.

Researchers have identified differences in morphological characteristics and health indicators between the medieval populations of the Upper and Lower Towns of Kyiv (Козак 2010, с. 275; Рудич, Козак 2021, с. 77). Based on these differences, the medieval Kyiv population can be divided into two separate subsamples for analysis.

A burial site in Pereiaslav, dated to the 11th–13th centuries, was excavated in 2004–2005 (Товкайло та ін. 2007; 2008). Archaeologists associate the cemetery with the suburb adjoining Pereiaslav (Товкайло та ін. 2008, с. 87). Т. О. Rudych (Рудич 2007; 2008) noted that both males and females buried at the cemetery exhibit similar patterns of anthropological affinities and are more closely related to the populations inhabiting the areas associated with the Severians, Radimichs, Dregovichs, and Chernihiv Polians, as mentioned in the Rus chronicles.

Early Modern Sites. The Voznesenskyi necropolis in Kyiv, dating to the 17th–18th centuries, was excavated in 2005–2007 under the direction of Н. Yu. Ivakin (Івакін, Балакін 2008). Representatives of different social groups were buried there. During the first stage of the necropolis's use (early 17th century — 1711), nuns of the Voznesenskyi monastery were buried there. According to written records, these females were of aristocratic origin. The cemetery was also used for the burial of sick people and orphans who had found refuge in the monastery (Івакін, Балакін 2008, с. 20; Мельник 2017, с. 89). During the second stage (1712–1764), the Voznesenskyi cemetery primarily served as the parish church of the Chernihiv Garrison Regiment (Назаренко 2015, с. 187), where soldiers and their families residing within the Pechersk Fortress were buried (Козак, Балакін 2020, с. 254). At the same time, the church was not exclusively a garrison church. V. M. Nazarenko states that its congregation included representatives of the Russian civil administration, members of the Kyiv burgher community, and monastery dependants (Назаренко 2015, с. 198). The pathological and morphological indicators are characteristic of a mixed urban population of diverse social status and origins (Козак 2008; Козак та ін. 2009; Козак, Балакін 2020).

Part of the cemetery of the Holy Trinity Church in Cherkasy was excavated in 2022–2023 (Куштан 2023). The wooden Holy Trinity Church was built in 1671 and remained in use until 1863 (Куштан 2023, с. 323). The absence of the cemetery from early 19th century city plans led D. P. Kush-

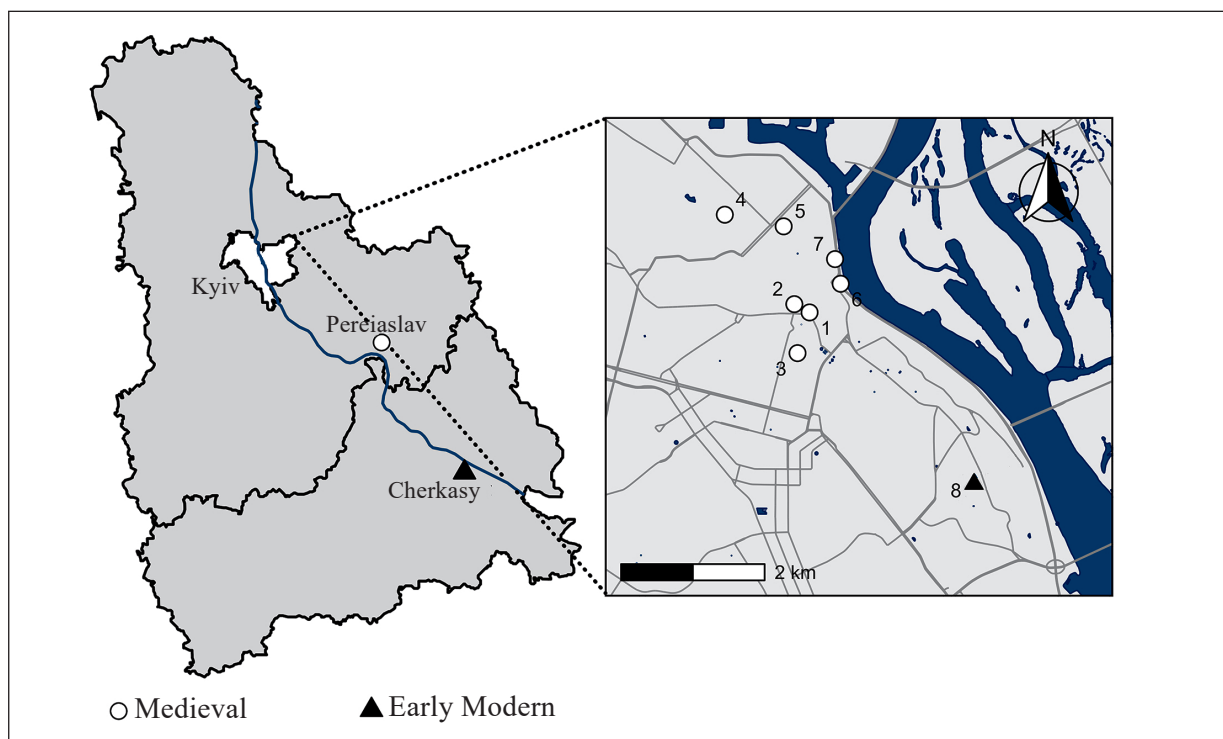


Fig. 1. Map of the medieval and early modern archaeological sites represented in the anthropological sample: 1 — 2 and 4 Velyka Zhytomyrska St.; 2 — 8 Volodymyrska St.; 3 — 14 Patorzhynskoho St.; 4 — Shchekavytsia cemetery; 5 — 21 Khoryva St.; 6 — 1a Naberezhno-Khreshchatytska St.; 7 — 9 Naberezhno-Khreshchatytska St.; 8 — Voznesenskyi necropolis

Рис. 1. Карта розташування середньовічних та ранньомодерних пам'яток, з яких походить антропологічний матеріал: 1 — вул. Велика Житомирська, 2, 4; 2 — вул. Володимирська, 8; 3 — вул. Паторжинського, 14; 4 — Щекавицький мотильник; 5 — вул. Хорива, 21; 6 — вул. Набережно-Хрещатицька, 1а; 7 — вул. Набережно-Хрещатицька, 9; 8 — Вознесенський некрополь

tan to suggest that it may have been used until the late 18th century. Preliminary anthropological and craniological studies have been conducted (Унгурян 2022; Dolzhenko, Kushtan 2025; Рудич, Куштан, Унгурян б. р.). The paleopathological and demographic characteristics of the adult individuals are typical of the period. Unlike the Voznesenskyi necropolis, the almost complete absence of male cranial injuries at this site may indicate differences in patterns of violence and socio-cultural background.

Table 1. Anthropological materials used in the study

Таблиця 1. Антропологічні матеріали, використані для дослідження

Site	Date	N	Males	Females
Kyiv, Upper Town	10 th –13 th	29	21	8
Kyiv, Lower Town	10 th –13 th	36	24	12
Pereiaslav	11 th –13 th	12	9	3
Kyiv	17 th –18 th	78	29	49
Cherkasy	17 th –18 th	47	31	16
Total N of individuals		202	114	88

Anthropological materials of the medieval and early modern periods are far from limited to those used in this study. The focus on urban sites was intentional because early modern rural burial sites are poorly represented in the anthropological record. At present, the medieval urban sample consists only of sites from Kyiv and Pereiaslav. The early modern Kyiv and Cherkasy series are among the most representative and best archaeologically documented necropolises in the Middle Dnipro region. Readers may question the limited use of available material, especially given the published data from other researchers that could potentially be used for comparison. Our sampling criteria require individual-level baseline data on the lengths of the long bones, which are necessary for subsequent stature estimation using the new procedure applied (Unhurian w. y.). This requirement limits the use of comparative data from publications that provide mean bone measurements for a series (e. g., Козак 2010).

Methods

The stature of males and females was estimated according to the research procedure proposed by

V. S. Unhurian. The procedure consists of three stages: selection of the appropriate equations, calculation of individual stature indicators, and calculation of the mean stature for each subsample (Unhurian w. y.).

The male and female equations developed by M. Trotter and G. Gleser (1952, 1958) were selected for stature estimation. Despite the population-specific nature of stature estimation equations — that is, their optimal applicability to the populations from which they were originally derived — we rely on the Trotter and Gleser equations. First, selecting appropriate stature estimation equations for specific ancient populations is methodologically challenging. Second, the Trotter and Gleser equations are among the most widely used worldwide and, in particular, in Ukrainian anthropological research (Potekhina 2011, p. 475-476; Márquez-Grant et al. 2016, p. 1083), which facilitates comparative analysis with other skeletal series.

At the stage of individual stature estimation, stature is calculated from the lengths of multiple long bones, typically ranging from two to six, depending on the number of applicable equations and the preservation and representativeness of the skeletal remains. Finally, the mean stature of each subsample is calculated from the individual stature estimates, together with the corresponding prediction intervals.

To determine the statistical significance of differences in mean stature between the medieval and early modern populations, Welch's t-test was used, with a significance threshold of $p < 0.05$.

Results

The results of the mean stature estimates for the male and female subsamples calculated using the Trotter and Gleser (1952, 1958) equations are presented in table 2.

The mean stature of medieval males was 172.3 (± 5.3) cm, while that of females was 162.7 (± 3.8) cm. In the early modern period, the mean stature was 170.4 (± 4.8) cm for males, and 160.1 (± 4.2) cm for females (fig. 2). Comparison of males and females across the two periods revealed statistically significant differences in stature for both sexes ($p = 0.048230$ for males and $p = 0.009053$ for females).

Tables 3 and 4 present the results of Welch's t-test comparing males and females from the medieval and early modern subsamples. Among males, statistically significant differences were observed between the medieval Pereiaslav and Kyiv Upper Town subsamples and the early modern Cherkasy subsample. Among females, a statistically significant difference was observed only between the medieval Kyiv Upper Town and the early modern Kyiv subsamples.

Discussion

The results support the research hypothesis. Combining the local subsamples into broader “medieval” and “early modern” groups revealed a statistically significant difference in stature. In contrast, this difference was not apparent when local medieval and early modern subsamples were compared.

The early modern population exhibited lower mean stature (170.4 (± 4.8) cm for males and 160.1 (± 4.2) cm for females) than the medieval population (172.3 (± 5.3) cm for males and 162.7 (± 3.8) cm for females). A similar pattern of declining stature has been documented in other European regions, including Scandinavia (Steckel 2004; Niskansen et al. 2018b), Latvia (Gerhards 2005), England (Ruff, Garofalo, Niinimäki 2018), the Netherlands, Belgium (Maat 2005), Portugal (Cardoso, Gomez 2009), Germany, the Czech

Table 2. Mean stature of males and females in the medieval and early modern subsamples (S μ — mean stature, sp — prediction interval)

Таблиця 2. Середній зріст чоловіків та жінок в середньовічних та ранньомодерних підвибірках (S μ — середній зріст, sp — довірчий інтервал)

Site	Date	Males			Females		
		N	S μ	sp	N	S μ	sp
Kyiv, Upper Town	10 th –13 th	21	172.8	5.33	8	164.1	4.07
Kyiv, Lower Town	10 th –13 th	24	171.3	5.33	12	161.7	3.80
Pereiaslav	11 th –13 th	9	174.2	4.96	3	162.6	3.70
Kyiv	17 th –18 th	29	171.1	4.94	49	159.9	3.93
Cherkasy	17 th –18 th	31	169.7	4.62	16	160.7	4.84

Republic (Sládek et al. 2018), Romania (Marcu Istrate, Constantinescu, Soficaru 2015, p. 177), Poland (Kopczyński 2016), and the European part of Russia (Negasheva et al. 2025). The broad geographic scope of this decline has led researchers to attribute it primarily to disruptions in the economic and social life of European populations during the Little Ice Age. Although systematic weather data for Ukraine were not collected until the 19th century (e.g., Воейков 1884), historians have recorded an increasing number of references to extreme weather events. Earlier eyewitness accounts report exceptionally cold winters in the 1670s, the drought of 1680 (according to Борисенков, Пасецкий 1983, с. 111), the dry year of 1708 (ред. Павленко 2007, с. 246), “desert-like” weather in July 1711 (according to Вирський 2022), and the exceptionally cold winter of 1748 (according to Петровъ 1905, с. 115).

Previous studies have also estimated the stature of urban populations, particularly those of medieval Kyiv and Pereiaslav. Some discrepancies between previously published estimates and new data require explanation.

The stature estimates for the Kyiv population obtained in this study differ slightly from those reported earlier (Козак 2010, с. 352), which can be explained by broader prediction intervals obtained for males and the apparently higher mean female stature in the present study; however, the difference between the values is not statistically significant ($p = 0.09743$). In particular, for the Upper Town, according to preliminary data, these indicators are 172.8 (± 6.07) cm for males and 161 (± 4.18) cm for females. For the Kyiv Lower Town subsample, we observe an apparent but statistically insignificant difference ($p = 0.1502$) between the male stature reported by O. D. Ko-

zak (168.9 (± 6.01) cm) and that obtained in the present study (171.3 (± 5.33) cm). Welch’s t-test likewise revealed no statistically significant difference ($p = 0.1971$) between the female stature estimates: 158.7 (± 6.1) cm and 161.7 (± 3.8) cm. The discrepancy in the data for the Lower Town of Kyiv may be explained by the selection of an earlier sample, which includes individuals buried in the Shchekavytskyi cemetery. This group appears to have been significantly shorter than the average Kyiv population (Козак 2010, с. 41).

The mean stature estimates for medieval Pereiaslav — 173.5 cm for males and 163.2 cm for females (Рудич 2007; 2008) — were not accompanied by prediction intervals for the mean values. This presents an additional challenge, as apparently distinct values cannot necessarily be interpreted as statistically significant differences. For this reason, we recommend that further publications report both prediction intervals and the sample size used for stature estimation, thereby ensuring the validity and comparability of the results.

The observed differences in mean stature between local subsamples may, at first sight, suggest genuine variation in stature between medieval and early modern local populations (table 2). However, the results of the statistical tests do not provide sufficient evidence to confirm statistically significant differences between the local subsamples (tables 3–4).

Because stature is substantially genetically determined, differences in the genetic composition of populations may have contributed to the observed variation in stature between medieval and early modern populations. For instance, T. O. Rudych suggests that the relatively tall stature of individuals in medieval cities may be partially attributed to substantial immigration

Table 3. Comparison of stature indicators in male subsamples using Welch’s t-test. Statistically significant results are shown in bold

Таблиця 3. Порівняння показників зросту в чоловічих підвбірках за допомогою t-критерію Велча. Статистично значущі результати виділено жирним шрифтом

Site	Kyiv (17 th –18 th)	Cherkasy (17 th –18 th)
Kyiv, Upper Town (10 th –13 th)	0.25780	0.03624
Kyiv, Lower Town (10 th –13 th)	0.88880	0.24840
Pereiaslav (11 th –13 th)	0.12460	0.03114

Table 4. Comparison of stature estimates in female subsamples using Welch’s t-test. Statistically significant results are shown in bold

Таблиця 4. Порівняння показників зросту в жіночих підвбірках за допомогою t-критерію Велча. Статистично значущі результати виділено жирним шрифтом

Site	Kyiv (17 th –18 th)	Cherkasy (17 th –18 th)
Kyiv, Upper Town (10 th –13 th)	0.02302	<i>0.08865</i>
Kyiv, Lower Town (10 th –13 th)	0.16240	0.54570
Pereiaslav (11 th –13 th)	0.33250	0.48860

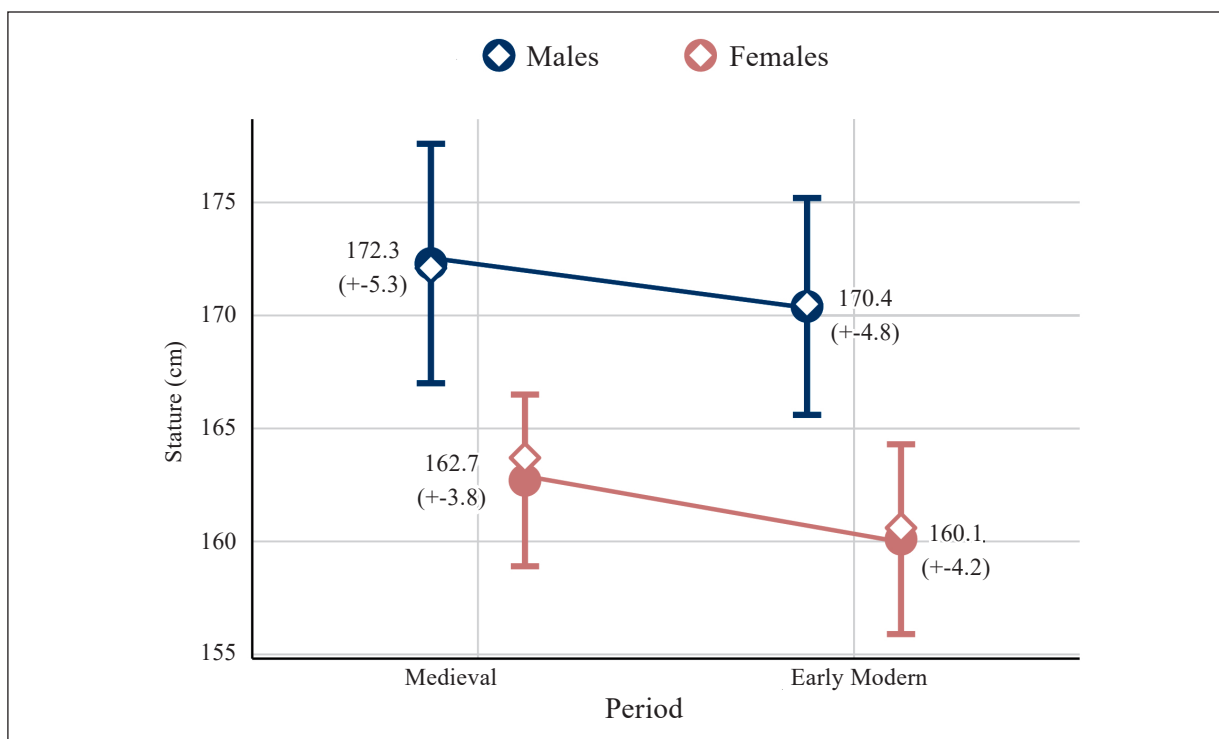


Fig. 2. Comparison of mean male and female stature in the medieval and early modern periods

Рис. 2. Порівняння середнього зросту чоловіків і жінок у середньовічній і ранньомодерній періоди

from neighboring territories characterised by populations of relatively tall stature (Рудич 2022, с. 441). In particular, a Baltic genetic substrate has been identified in the male population of the medieval Kyiv Upper Town (Рудич 2014, с. 135). Males from rural settlements, whose inhabitants are traditionally regarded as representing the “autochthonous” population, exhibit significantly lower mean stature compared to males from medieval cities (Danilova 1979, p. 96; Сегеда, Покас 1985, с. 92; Козак 2010, с. 42; Рудич 2022, с. 441). Researchers have noted that females’ stature in urban and rural sites does not show significant variation (Рудич 2022, с. 441). In Northern Europe, whose populations contributed to the anthropological composition of medieval Kyiv, a similar trend of declining stature during the early modern period has been documented (Meinzer et al. 2018, p. 238). This trend is also evident in other European regions without historical connections to Ukrainian territories. Consequently, genetic factors should be considered when interpreting differences between local sub-samples. However, as the spatial scale of analysis increases, the relative influence of local genetic factors on the overall pattern is reduced.

The relationship between climate and stature as an indicator of health may initially appear

indirect. The extent to which a community is affected by climate change depends on its social structure, levels of inequality, and ideological factors, rather than on weather conditions alone (Schug, Parnell, Harrod 2018). Nevertheless, weather conditions affect numerous factors essential for the stable functioning of societies, including crop yields, livestock viability, and the activity and spread of pathogens that may cause epidemics (Post 1984, p. 1). Crop yields and the resulting prices of agricultural products most closely correlate with the changes in male stature in the 17th and 18th centuries (Specht 2017, p. 78). Although historical data on crop yields in the Right-Bank Middle Dnipro region are currently unavailable, the population of the neighboring Left-Bank Pereiaslav Regiment, particularly during the second half of the 18th century, frequently experienced crop failures (Замура 2014, с. 60).

Conclusions

The results support the hypothesis that average stature within a population is associated with climate conditions and are consistent with a broader European trend of declining stature from the medieval to the early modern periods. The inclusion of samples from different locations

is essential for identifying such temporal trends, as analyses limited to a single city or settlement may obscure the factors underlying variation in stature. At the micro-level, differences in stature may reflect variation in population composition and living conditions, whose effects may overlap. This study provides a basis for future research on

temporal trends in the stature of prehistoric and historical populations inhabiting the territory of present-day Ukraine.

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ЗМІНИ В ЗРОСТІ МІСЬКИХ МЕШКАНЦІВ СЕРЕДНЬОГО ПОДНІПРОВ'Я ВІД СЕРЕДНЬОВІЧНОГО ДО РАННЬОМОДЕРНОГО ЧАСУ В КОНТЕКСТІ КЛІМАТИЧНИХ ЗМІН

У статті порівнюється зріст населення міст середньовічного (X–XIII ст.) та ранньомодерного часу (XVII–XVIII ст.) в Середньому Подніпров'ї. Середньовічні підвибірки представлені похованнями з Верхнього та Нижнього Кисва, ранньомодерні — похованими на некрополях Києва та Черкас. Головною метою статті було з'ясувати, чи фіксується на українських теренах тренд до зменшення зросту в Малий льодовиковий період (XIV–XIX ст.), і якщо так, то на яких просторових масштабах.

Для порівняння були сформовані як окремі локальні різночасові підвибірки, так і вибірки, поділені лише за хронологічним принципом. Зріст чоловіків та жінок обраховувався в три етапи: визначення оптимальних наборів формул для обрахунку зросту, обрахунку індивідуального зросту за розмірами декількох довгих кісток та середнього значення для кожної підвибірки. Для з'ясування статистичної значущості у різниці між середнім зростом населення доби середньовіччя та раннього модерну застосовувався t-тест Велча із пороговим значенням $p < 0.05$.

Об'єднання локальних підвбірок в загальні «середньовічну» та «ранньомодерну» вибірки дозволило виявити статистично значущу різницю в показниках зросту. Зріст середньовічних чоловіків становив 172.3 (± 5.3) см, жінок — 162.7 (± 3.8) см. У ранньомодерний період — 170.4 (± 4.8) см для чоловіків та 160.1 (± 4.2) см для жінок. Нижчий зріст ранньомодерного населення у порівнянні з середньовічним є загальноєвропейською тенденцією, яку пояснюють кумулятивним ефектом Малий льодовикового періоду, який негативно вплинув на соціальне та економічне життя тогочасної Європи.

Різниця у показниках зросту є менш очевидною за результатами зіставлення локальних середньовічних та ранньомодерних підвибірок. Причиною цього є невелика кількість залучених до них індивідів, широкі довірчі інтервали середніх показників зросту, внаслідок чого статистично значущу різницю виявити важче. Також на малих просторових рівнях середній зріст популяції пояснюється багатьма факторами, як-от різний етнічний склад населення, умови життя, але ці пояснення можуть бути рівноцінними.

К е у в о р д с: Русь, Ранній модерн, Малий льодовиковий період, остеометрія, зріст.

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