Archaeologia Historica Polona
vol. 31, 2023, pp. 271–296, ISSN 1425–3534, DOI: 10.12775/AHP.2023.010

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The social status of disabled individuals in early medieval Culmen in Poland

Abstract. We have investigated the social status of disabled individuals in early medieval Culmen in Poland. We have analysed textual sources from the medieval period and examined 660 skeletons and 652 burials from Culmen using quantitative analyses. Our textual analysis indicates that the cause of disability and the initial social status played a crucial role in the perception of disabled individuals, determining whether these individuals with impairments were praised, cared for, left to beg, or rejected. Statistical analyses such as the χ^2 test of independence, Mantel-Haenszel test for trend, and multiple correspondence analysis were used to test the correlation between individuals with pathological lesions, grave features, and social groups. The findings of our research show that the social identity was made up of many factors, and that disabled individuals might have had different social statuses. For example, the individuals with disabilities belonged to all the higher social groups in Culmen and not to the low one.

Keywords: mortuary archaeology, burial, Middle Ages, Poland.

Introduction

Interdisciplinary disability studies, which include palaeopathology and bioarchaeology, have developed as a response to the recognition of the rights of persons with disabilities in 1970s and 1980s (e.g., Solecki 1971; *Disability and archaeology* 1999; Barnes, Mercer 2010). The research on disability in archaeology flourished within the last decade, especially with the bioarchaeology of care and also other theoretical approaches (e.g., Tilley, Oxenham 2011; *Bioarchaeology of impairment* 2017; Boutin 2016).

Disability is defined as a sociobiological condition that results from physical impairments that significantly limit the life and functioning of an individual and by the attitude of society towards such an individual (Knüsel 1999; Roberts 1999; 2000; Tilley, Oxenham 2011; Martin, Potts 2012; Zakrzewski 2014; Boutin 2016). Researchers adopt the World Health Organisation biopsychosocial model, in which "disability and functioning are viewed as outcomes of interactions between health conditions (diseases, disorders, and injuries) and contextual factors" (*Towards* 2002, p. 10) (environment and personal factors), and we follow this path.

The perception of disability depends on the cultural context and is linked to the social norms in a given society. Charlotte Roberts (1999) distinguishes four strategies for treating disabled individuals in past societies: 1) disability was regarded as something special and was associated with a higher social status; 2) disabled individuals were accepted and cared for by society; 3) disability was accepted as long as it was not a handicap that made life harder; 4) disability was perceived as a weakness and was not accepted, with disabled individuals being disregarded. Katherine Dettwyler (1991) and other scholars (e.g., Murphy 2000) pointed out that disabled individuals could still be productive and were thus needed members of their societies. On the other hand, disability evoked fear in people causing social exclusion of disabled individuals (Murphy 2000). Perception of disabled individuals was likely connected with the valuation or devaluation of a person and the body based on the social status of the disabled person and the context of how the impairment was acquired (Knüsel 1999). Further studies show that the status of disabled individuals could have been ambiguous, as they were cared for by their families yet shunned and cursed by society (Boutin 2016). In contrast, studies on ancient Egypt show that physically challenged individuals were perceived as manifesting varying abilities instead of having a disability (Zakrzewski 2014). This means that physical impairment was accepted and perceived as yet another and/or different ability.

Studies on disability in the medieval period emphasise the care shown to disabled individuals across Europe (*Disability and care* 2024). Some disabled individuals held important social functions, e.g., they served as priests, and after death, they were buried in prestigious graves (Knüsel 1999; Knüsel *et al.* 1992). On the other

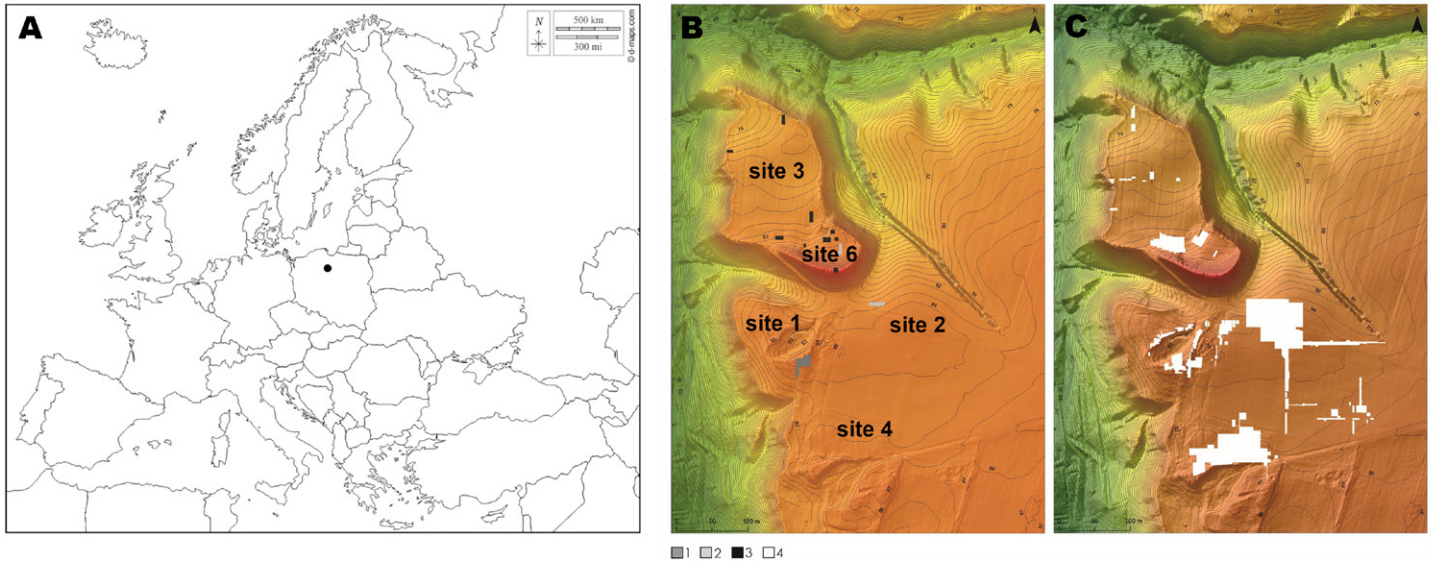

Fig. 1. A – the location of Kałdus in Poland (www.d-maps.com); B – the location of remains of the Early Medieval settlement complex of Culmen at the archaeological sites in Kałdus, Poland; the site and height guidelines plan of the settlement complex, with trenches explored in 1957–1973; C – the site and height guidelines plan of the settlement complex, with trenches explored in 1996–2015. 1 – excavations conducted in 1957 (E. Kaszewska, Museum of Archaeology and Ethnography of Lodz); 2 – excavations conducted in 1958 (H. Wiklak, Department of Archaeology, University of Lodz); 3 – excavations conducted in 1967–1973 (A. Kola, Department of Archaeology, Nicolaus Copernicus University); 4 – excavations conducted in 1996–2015 (W. Chudziak, Institute of Archaeology, Nicolaus Copernicus University) (after *Wczesnośredniowieczny zespół* 2016; drawing by M. Skrzatek, M. Weinkauf, W. Ochotny)

hand, diseases such as leprosy were associated with social stigma (Knüsel 1999). Therefore, approaches to disability in the Middle Ages were manifold.

All of these ground-breaking studies present qualitative research on disabled individuals using palaeopathology and mortuary archaeology set in a historical context based on textual sources. Traditionally, disability research within medieval bioarchaeology focuses on case studies featuring either unique individuals across various populations or individuals sharing a specific pathological lesion across several populations (e.g., Šlaus *et al.* 2012; Matczak, Kozłowski 2017; Cilione, Gazzaniga 2023). Yet, in recent years, there has been a shift towards a population-based approach. This paradigm shift is crucial for gaining comprehensive insights into the lives of individuals with disabilities. It represents the current forefront of research challenges in the discipline, aiming at constructing a more holistic understanding of disability in the medieval period. The research on the population level focuses mainly on the care, emotions, perception, and mortuary treatment of disabled individuals (Brownlee 2017; Matczak *et al.* 2021; 2023; Bohling *et al.* 2022a; 2022b; 2023; Fedorina *et al.* 2022; Tilley, Cave 2023). No studies on the socioeconomic status of disabled individuals have been conducted, unlike studies on the socioeconomic status of the diseased (e.g., Powell 1988; Robb *et al.* 2001; Peck 2013). As Christopher Knüsel (1999) has pointed out, it should be investigated whether socioeconomic status interacts with disability in periods around major social transitions.

This paper presents a study of the social status of a group of individuals who could have been disabled during a major social transition, such as the Christianisation in medieval Poland, using palaeopathology, mortuary archaeology, textual sources, and statistical methods. To date, this is the first population-based study on disability and social status in medieval period to attempt a quantitative approach. We examine the correlation between grave structures and grave goods (as indicators of social status) and evidence of pathology to consider the social status of disabled individuals. We are aware of the limitations of social status studies based on mortuary archaeology, which we discuss further in this article, as well as of the fact that disability cannot be directly identified based on palaeopathological analyses. In this study, we assume that some pathological changes observed in bone material indicate the likelihood of disability. Therefore, the specific question we ask in this article is, how did the social status of the disabled individuals materialise in their interment? We consider three possible scenarios. The first is that the disabled individuals may have enjoyed a higher social status than the others because access to material goods would have allowed them to survive longer and prolonged the progression of their ailments, whereas individuals from lower social strata with similar diseases would have died at earlier stages of their diseases without these ailments developing into disabilities. The second scenario is that the disabled individuals may have been neglected and devalued because of their ailments, thus causing them to be relegated to a lower social stratum. The third one might show

that social identity was made up of many different factors and disabled individuals might have had different social statuses. The disabled individuals could have been treated differently depending on other factors conducive to forming one's social identity. This study seeks to evaluate these disabled individuals as a group and presents quantitative approach instead of osteobiographical qualitative approach. We analyse the social status of disabled individuals against the background of the entire population, also taking into account other individuals.

Social status in mortuary archaeology

Mortuary archaeology plays an important role in assessing the social status of individuals. There are different approaches to social status in archaeology. Culture-historical and processual archaeology define social status based on the quantity and quality of grave goods and grave structures (e.g., Gąssowski 1950; Saxe 1970; Binford 1971; Tainter 1978). Processual archaeology is also interested in identifying how the social personality engaged with social rules and relationships within a social system (Parker Pearson 2011). One person could have had many social roles, and either none or all of them might have been symbolised in funerary rites (Saxe 1970; see also Parker Pearson 2011). Neo-Marxist archaeology focuses on the fact that people tend to hide inequalities by placing expensive goods in the graves of the poor (e.g., Leone 2005). Interpretative archaeology emphasises the creation of identity and commemoration of the dead through ritual funerary practices (e.g., Shanks, Tilley 1982; Barrett 1994; Meskell 1999). It is the living who commemorate the dead and use funerary practices to express how they perceive the deceased and their social status. These archaeological approaches show that burial customs are a complex phenomenon demonstrating social status, identity, memory, and care for the dead, as well as beliefs about the afterlife (Baker, Bolhofner 2014; Matczak, Kozłowski 2017).

Social status in burial practices in early medieval Poland

In pagan Slavic times, the afterlife was a continuation of life on Earth. Grave goods ensured that the deceased would have everything they needed to be transferred to the underworld, to lead a good life there and to be secure from evil. The living people wanted to facilitate all the needs of the deceased so that the dead did not have any reason to return from the underworld and cause harm to the living (Labudda 1983). Cremation was a standard type of a funeral rite in the pre-Christian period in Poland.

In 966, the ruler of the Polans Mieszko I was baptised, thus introducing Poland into the realm of Western Christianity. The early medieval period (10th–13th century) is commonly regarded as a time of transition from paganism to Christianity

in Poland. Christianisation was a long-term process that slowly impacted various spheres of Poles' lives, including funeral traditions. Inhumation and W–E orientation with the head westwards were introduced within the Christian burial rite. The 12th–13th century Polish chronicles mention that the interments of royals, noblemen, and clergy were solemn (Labudda 1983). Royals, high officials, and clergy were interred in churches and cathedrals in coffins, in sarcophagi with items that expressed their identity (Kurnatowska 1989–1990; Zoll-Adamikowa 1989–1990; Dąbrowska 1997). For example, bishops were buried attired in rich garments and with insignia, a ring, a mitre, a crosier, a seal, a chalice, and a paten (Labudda 1983; Dąbrowska 1997). Martyrs were buried in wooden coffins and in churches. A burial in a wooden coffin was very rare in the 11th century (Labudda 1983).

The textual sources from the early medieval period fail to describe the social status and interments of all inhabitants of Poland. Therefore, archaeological sources provide invaluable insights in this regard. The archaeological record shows that individuals were buried in graves with structures and grave goods, and the latter are common in many Polish cemeteries; they appear in up to 50% of burials within a cemetery (e.g., Zoll-Adamikowa 1989–1990). Chamber graves, which occurred on Polish lands between the second half of the 10th century and the first half of the 12th century, are associated with the elite. A chamber grave was "a non-portable wooden structure, shaped like a small building/chamber, erected over the deceased's body at a burial site" (Janowski 2011, p. 257; 2015, p. 25). Chamber graves were located in a specific part of a cemetery and usually contained luxury goods. Both their exceptional structure and the luxury goods they held inside suggest that chamber graves contained bodies of high-status personas. Archaeologists identified 57 graves of this kind that might have belonged to Scandinavians or Slavs across all of Poland (Błaszczyk 2016). However, significant differences between the structures and grave goods of chamber burials from Poland and Scandinavia and a stable isotopes analysis of strontium indicate that they could have belonged to elite Slavs in Poland (Błaszczyk 2017). Individuals were also interred in graves with other structures: coffins, frames, and logs, which might also indicate high social status, although lower than in the case of chamber graves.

In the first half of the 12th century, the number of grave goods decreased (Kurasiński 2015) and cemeteries started to be located next to churches. An interment in a cemetery close to the church reflected quite a high social status. In spite of all, the tradition of putting items into graves (e.g., jewellery or knives) remained strong in Poland throughout the post-medieval times up to the 20th century (e.g., Fischer 1921; Labudda 1983).

Social status of disabled people in medieval Poland

Textual sources provide many examples of people of various social statuses with disabilities acquired during combat as a result of interpersonal aggression, disease, or punishment. Knights who were mutilated as a result of a fight received praise and rewards from dukes and chroniclers in medieval Poland (*Magistri Vincentii* 1994; *Gesta principum Polonorum* 2003). For example, the first Polish chronicle ever written (*Gesta principum Polonorum* 2003) from the 12th century describes *comes* Żelisław who lost his hand during a battle. Duke Boleslaw Wrymouth appreciated his bravery and compensated for his loss by giving him a golden hand (*Magistri Vincentii* 1994; *Gesta principum Polonorum* 2003). Wounds received in a state-sanctioned battle were a reason for fame and pride. The status of knighthood and belonging to the state's elite was also crucial. This example shows a positive perception of the impairments sustained in battle by a knight, i.e., a person of a higher social status.

Liber Fundationis Claustrii Sancte Marie Virginis in Heinrichow, a chronicle of the Cistercian Order in Henryków from the 13th century entered on the list of UNESCO's "Memory of the World" volumes, is a very important and revealing source of information about the non-elite (*Liber Fundationis* 1991). It provides a description of a peasant named Kwiecik who did not have a hand, his other hand hurt with a sword so that he could not move it. Because he was destitute and old, he was receiving food from Cistercian monks at a monastery in Henryków until his death. This source shows that a man, probably mutilated during personal aggression (since the mutilation was inflicted with a sword), who came from the rural population, i.e., one of a lower social status, was poor, and for that reason, he was cared for by the Cistercian monks. These two examples show that the loss of a hand by a knight in battle was perceived in a positive way, while the loss of a hand by a peasant was a reason for his lower social status.

The *Vita sanctae Hedwigis ducissae Silesiae*, a hagiography from the beginning of the 14th century, describes that some of the families cared for their sick on a daily basis and brought them to the tomb of Saint Hedwig in Trzebnica hoping to heal them (*Vita sanctae Hedwigis* 1961). Disabled and poor people could hope to receive help, protection, and care from royals, duchesses, dukes, and monks, as in the case of the above-mentioned Kwiecik. Some of those who were not well off had to beg on the streets in front of churches; for instance, Siostromił, who was paralysed, and a man called Racław, who was a cripple (*Vita sanctae Hedwigis* 1961). In this way, their middle or low social status lowered even further. Some people with conditions that prevented them from working were perceived negatively and rejected. For example, a male called Wawrzyniec had an ulcerated wound on his chest and was paralysed, which prompted his wife to leave him. A woman called Bratumiła from a village had a paralysed hand for two years. Her husband claimed

that she was useless in the household and demanded a divorce from a bishop (*Vita sanctae Hedwigis* 1961).

A person had criminal responsibility for breaking the law. The punishment depended on the kind of the offense that was perpetrated and, usually, was similar to the offense. The law of talion was a law of retaliation, meaning that a person who injured another person was expected to be penalized to a similar degree (Bardach *et al*. 1994). People also used symbolic talion, which was a punishment related to an offense. Mutilation was the most frequent punishment; for example, people would get their tongues or noses cut off for slander (*Magistri Vincentii* 1994). This kind of punishment was administered regardless of one's social status and contributed to a number of impaired people who were perceived in a negative way (e.g., *Magistri Vincentii* 1994).

The analysis of the textual sources revealed that the perception of individuals with impairments depended on their social status and the cause of the impairment. People with disabilities were praised, cared for, left to beg, or rejected.

Materials and methods

Materials

We present materials that were excavated in 1957 and between 1997 and 2011 in Kałdus, situated on the Vistula riverbank in northern Poland (Fig. 1). At Kałdus, archaeologists discovered remains of early medieval (10th–13th century) Culmen (Chełmno in Polish), which was dated using artefactual evidence, types of grave structures, stratigraphy, and radiocarbon dates (*Wczesnośredniowieczne cmentarzysko* 2006; 2010). Culmen was initially located beyond the borders of the Gniezno state (the first Polish state); however, it later became one of the centres of the Polish state (*Wczesnośredniowieczne cmentarzysko* 2006). It was located on the border between the Polish state and the Prussian lands and at the crossroads of two main routes linking Rus' with the Baltic Sea and Scandinavia (Chudziak 2003; *Wczesnośredniowieczne cmentarzysko* 2006; 2010). In the second half of the 11th century, it became a castellany.

Culmen consisted of a stronghold, a settlement, and a cemetery. The remains of a stone church, probably from the second half of the 11th century, were discovered in the stronghold, the oldest so far known in Vistula Pomerania and Chełmno Land. A medieval document called the Mogilno Falsification issued in the mid-12th century mentions a market and an inn in Culmen, which indicates the presence of merchants who might have belonged to the high social group (Chudziak *et al.* 2016). The cemetery at Culmen contained up to 1,500 graves and it was one of the biggest in early medieval Central Europe (e.g., *Wczesnośredniowieczne cmentarzysko*

2006; 2010; Kozłowski 2012; Bojarski 2020). We analysed 660 skeletons from 652 burials. We selected graves for which we have data on the structures and grave goods to indicate social status, and enough preserved skeletons to conduct an osteological analysis. Half of the burials (N=328, 49.6%) contained grave goods with temple rings (N=288), knives (N=196), and rings (N=53) being most common (*Wczesnośredniowieczne cmentarzysko* 2006; 2010). Some of the objects were of daily use, e.g., knives, whetstones, flintstones, iron flints, ceramic whorls, ceramic vessels, and bowls (e.g., a wooden bowl); some of them had aesthetic and decorative values such as rings, temple rings, beads, and pendants. Some others had a symbolic/spiritual nature such as beads of semiprecious stones, a box pendant, a rattle, and coins. Arrow heads and a sword were of military use. However, many objects served multiple functions, e.g., jewellery had aesthetic and decorative value as well as a symbolic/ /spiritual nature, whereas a knife was of a utilitarian and a symbolical character (*Wczesnośredniowieczne cmentarzysko* 2006; Matczak, Chudziak 2018). The number of burials with grave goods is similar to other cemeteries from the 12th–13th century in Poland (*Wczesnośredniowieczne cmentarzysko* 2006). Most individuals' graves did not include any structure (N=412), while a small number of them had various structures (N=248; Table 1). Nine individuals from the local elite dating back to the end of the 10th century or the first half of the 11th century were interred in eight chamber graves (Chudziak *et al.* 2010a; 2010b; Stawska *et al.* 2010; Bojarski *et al.* 2016). One of the chamber graves held remains of two individuals. They reflect a supra-regional burial tradition widespread mainly among Scandinavian elites in northern Europe and Rus' in the 9th–10th centuries. The design of the chamber graves and the grave goods found therein (e.g., wooden plate with brown and gilded fittings, bronze bowls, wooden buckets with fittings, a sword) are characteristically

Table 1. The prevalence of individuals buried in graves with grave structures and their types, and those buried without any structures at Culmen. Note that one of the chamber graves held remains of two individuals

Different types of grave structures	Individuals	
	N	%
Chamber	9	1.4%
Frame	112	17.0%
Coffin	64	9.7%
Log	55	8.3%
Bier	4	0.6%
Type difficult to identify	4	0.6%
Total	248	37.6%
No structures	412	62.4%
Total	660	100.0%

Scandinavian (Chudziak 2001; 2012; *Wczesnośredniowieczne cmentarzysko* 2010). This conjecture is also based on the fact that two artefacts with runic inscriptions (a game pawn and a cross pendant), as well as several other relics bearing Scandinavian features were discovered under Mont Saint Lawrence. DNA analyses of bone material from several similar graves from Ciepłe confirm this supposition (*Ciepłe. Elitarna nekropola* 2019). However, the most recent stable isotope analysis of strontium has shown that five out of nine individuals came from Poland (Błaszczyk 2017), which likely indicates that they could have been Slavs. The problem is complex though, since the strontium isotope values for most of the burials from the Culmen chamber graves also fall within the parameters typical for southern Scandinavia, especially Denmark.

In our previous interdisciplinary analysis, we applied the above-mentioned multifactorial definition of disability by the World Health Organisation (*Towards* 2002) and developed the following protocol for studying disability in historical periods (Matczak *et al.* 2023). First, we reviewed the textual sources to learn which physical conditions might have been perceived as disabilities. Second, we identified pathological conditions that were observed in skeletons of the individuals from Culmen; and, based on ethnomedical, modern clinical, and palaeopathological studies, we assessed their impact on the daily life. At this stage, disability was considered a physical condition associated with diseases that were likely to hinder one's functioning and had a significant impact on their daily lives for a considerably long period of time. Next, we analysed which pathological lesions found in the skeletons could have been linked with the disabilities described in the textual sources. This way, we have identified the skeletons that belonged to individuals with disabilities. These analyses resulted in a synthesis of information on how disability was defined and which afflictions present in the textual and osteological materials were regarded as disabilities. These criteria based on which disability was identified in individuals in Culmen, as well as the way in which a given disability manifested itself, i.e., how it affected one's ability to function in everyday life, have been already discussed in detail elsewhere (Matczak *et al.* 2023). Based on this analysis, we have distinguished three groups of individuals in Culmen: those with lesions associated with disability, those with lesions associated with disease, and those without lesions associated with either disease or a disability in Culmen. Skeletons of eight individuals out of 660 display pathological lesions associated with disability. The group of 313 individuals out of the total number of 660 includes those that had lesions indicating diseases. This group does not include the ones that had pathological lesions that were either asymptomatic or could have had a very limited impact on their ability to function. The group of 339 individuals out of the 660 include those that had pathological lesions which were either asymptomatic or likely had a very limited impact on one's ability to function, or those who did not have any pathological lesions (Fig. 2). We consider as a disability conditions such as Pott's disease (tuberculosis of the spine),

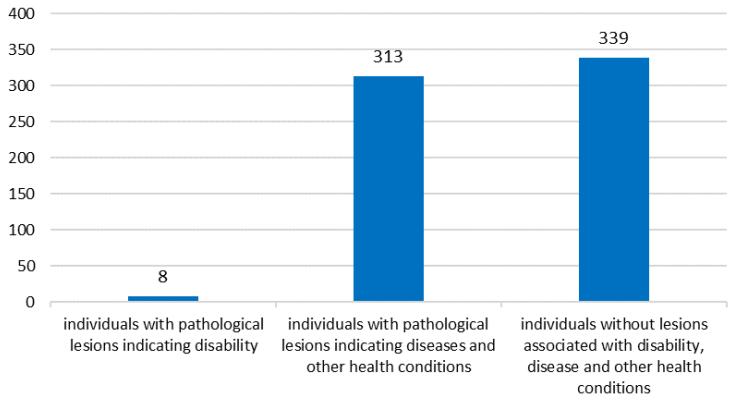

Fig. 2. Number of individuals with pathological lesions indicating disability, pathological lesions indicating diseases and other health conditions, and without lesions associated with disability, disease and other health conditions (developed by M. Matczak)

poliomyelitis, leprosy, osteomyelitis, a probable case of multiple myeloma, and an amputation. On the basis of medieval texts, we have distinguished disability due to mobility difficulties, an abnormal posture, and blindness, and then linked those types with the specific diseases and health conditions identified as disability in osteological materials from Culmen (Table 2). Afflictions such as scurvy, rickets, degenerative joint disease, periosteal reactions, tuberculosis, meningitis, hyperostosis frontalis interna, injuries (including fractures), *osteochondritis dissecans*, osteochondrosis, spondylolysis, spondylolisthesis, enthesopathy, hip dysplasia, and metatarsal "compression" might have been treated as diseases[1].

Table 2. The prevalence of disability types in Culmen

Disability due to mobility difficulties	Disability due to an abnormal posture	Disability due to blindness
N= 8	N=3	N=1
spinal tuberculosis (Pott's disease) leprosy lower limb paralysis (after poliomyelitis) osteomyelitis neoplasm (multiple myeloma) amputation	spinal tuberculosis (Pott's disease) lower limb paralysis (after poliomyelitis) amputation	leprosy

[1] Some of them may have had a very limited impact on one's ability to function, e.g., *osteochondritis dissecans* and enthesopathy. For the discussion – see Matczak *et al.* (2023).

Methods

Age, sex and palaeopathology. Biological sex was determined based on skull and pelvis morphology (Acsádi, Nemeskéri 1970; White, Folkens 2005), while age at death in adults was estimated based on pubic symphyseal surface morphology (Brooks, Suchey 1990), *facies articularis* of the pelvis (Buikstra, Ubelaker 1994), the fusion of cranial sutures (Steckel *et al.* 2006), dental attrition (Lovejoy 1985), and sternal rib end (Krogman, İşcan 1986; Bass 1987). The age of subadults was additionally estimated based on the ossification of long bones, pelvis, and vertebrae (Buikstra, Ubelaker 1994). The age at death of children was estimated based on the dental development stage of deciduous and permanent teeth, and tooth buds (Ubelaker 1989), the long bone lengths of limbs, and the size of the pelvis and the scapula (Florkowski, Kozłowski 1993). A palaeopathological analysis was performed as part of the European Module of the Global History of Health Project using the "Data collection codebook" (Steckel *et al.* 2006; Kozłowski 2012).

Determination of socioeconomic status. People acquire their social identities through participation in the structures of a social system. Death and mortuary rituals are an occasion for the individuals who had entered into structural social relationships with the deceased to perform various activities (Tainter 1977; 1978). Therefore, "the representation in mortuary ritual of the deceased's social identities simultaneously conveys information concerning the structural components in which the individual held membership" (Tainter 1977, p. 329). As such, a mortuary ritual "incorporates the symbolic representation of a greater range of the deceased individual's social identities" and relations than any other occasion in their lifetime (Tainter 1977, p. 329). The amount of involvement and the degree of activity will positively correspond to the amount of human labour expended in the mortuary act. A higher social rank of a deceased individual corresponds to a greater involvement and activity, and this should result in the expenditure of a greater effort in the interment ritual. Labour expenditure should be reflected in such features of burial as size and elaborateness of the interment facility, method of handling and disposal of the corpse, the nature of grave goods and, in the case of medieval burials, location (distance of burial to the church).

Traditionally, a grave location, a grave structure, and grave goods are indicators of social status in medieval Poland (Zoll-Adamikowa 1989–1990). Burial in a church was a privilege for clergy and nobility and is an indicator of higher status (Dąbrowska 1997; see also Stewart, Vercellotti 2017). Grave structures reflect a greater investment of time and resources as indicated by, for example, burials of the Polish elite in the crypts of main churches or chamber graves (Błaszczyk 2016). For those reasons, chamber graves themselves and the presence of grave structures might be indicators of higher status. The presence of grave goods is considered as an indicator of social status (Kurasiński 2015). Even if,

after Christianization, grave goods were put into graves because of sentiment, archaeologists still observe differences in the quantity and quality of grave goods in the early medieval period (e.g., *Wczesnośredniowieczne cmentarzysko* 2006; 2010). The reason for this might be that individuals included grave goods that were connected with the social status of the deceased. Being buried far away from a church or without grave structures and grave goods is an indicator of lower social status (Stewart, Vercellotti 2017).

For the reason that the frequencies of each type of grave structures and especially chamber graves are too low (Table 1) to perform statistical analysis, we use all grave structures together to distinguish high status at Culmen. The quality and quantity of grave goods could have indicated high social status. Helena Zoll-Adamikowa (1989–1990) mentions that it is hard to distinguish the highest social class in cemeteries, where around 50% of burials contain grave goods, like the one in Culmen. The reason for this is that grave goods are too frequent and it is hard to assess the quality and quantity of grave goods that could have belonged to the highest or higher social classes. Thus, we do not distinguish social groups based on the quality of grave goods, but we consider the presence of any grave good as a sign of high social status. The basilica has never been completed at Culmen (Chudziak 2003). Thus, no individuals were buried inside or around it. As a result, burial location cannot be treated as a proxy for distinguishing social status at Culmen. Therefore, we focus on grave goods and grave structures as indicators of social status.

We consider high social status as a greater energy expenditure, middle social status as a middle energy expenditure, and low social status as a low energy expenditure. "These distinctive levels of labour expenditure can be viewed as reflecting distinctive levels of social involvement in the mortuary act" (Tainter 1977, p. 340). As a result, in this study, we assume that the presence of grave goods and structures indicates the highest social status. Graves with grave goods but without structures would indicate middle social status 1. Graves without grave goods but with structures would indicate middle social status 2. The absence of grave structures and grave goods would indicate low social status. These levels of labour expenditure might reflect the degree of social involvement in the act of interment, which indicates the rank in the hierarchy. Therefore, the society of Culmen appears to have been consisted of four hierarchical ranks.

Statistical analysis. The χ^2 test of independence, Mantel-Haenszel test for trend and multiple correspondence analysis were applied in order to observe the correlation between grave goods and grave structures and three groups: the individuals with disabilities, the individuals with pathological lesions indicating diseases, and the individuals without lesions associated with disability and disease. All analyses were conducted using PS IMAGO PRO 9.0 (based on the analytical engine IBM SPSS Statistics 29) and Python 3.11.8 with libraries: prince (0.13.0) and statsmodels (0.14.1).

Results

We tested the dependence between the individuals with pathological lesions and grave goods and structures to determine the social group that the disabled individuals belonged to. The χ^2 test indicated that with a significance threshold of p=0.05, there is no statistically significant dependence between individuals with pathological lesions and grave structures (5.119(2); p=0.077; Table 3). However, the obtained value of p=0.077 is borderline and could prove significant with a larger research sample. As we can see, relatively many disabled individuals (N=5, 62.5%) were buried in graves with structures, while relatively few (N=3, 37.5%) were buried in graves without structures. The opposite is true for individuals with pathologies indicating disease. Twice as many of them were buried in graves without a structure than with a structure. For burials containing individuals without lesions associated with disease or disability, this ratio is lower. However, as already noted, the main problem is the small group of individuals with pathologies indicating disability. The χ^2 test indicated that there is no statistically significant dependence between pathological lesions and grave goods (0.571(2); p=0.752; Table 4).

More often than not, graves without grave goods have no structures and only a relatively small number of burials with grave goods have grave structures (χ^2=6.929(1), p=0.008; Table 5). We have distinguished four social statuses (Table 6). The first one is associated with high social status and refers to graves with grave goods and structures (N=140). The second social status (middle 1) includes graves with goods but without structures (N=189). The third social status (middle 2) includes graves without goods and with structures (N=108). These two represent individuals from the middle social status category. The fourth includes burials without grave goods or structures, representing the lowest status (N=223). The disabled individuals belonged to the high (N=2), middle 1 (N=3) and middle 2 (N=3) social statuses (Table 6). This means that the disabled individuals belonged to all higher social status categories but not to the low social status category. The χ^2 test indicated that there is no statistically significant correlation between the individuals with pathological lesions and the categories of social status (χ^2=8.135(6), p=0.224). Additionally, the Mantel-Haenszel test for trend tested dependence between the individuals with pathologies, grave goods, grave structures, and social status, but no statistically significant association was shown (Table 7).

Multiple correspondence analysis shows no dependency between the categories of variables (Fig. 3, Table 8). This means that the disabled individuals did not have any specific social status. Table 9 presents in detail the social status of the disabled individuals.

Table 3. The prevalence of individuals with pathologies indicating disability, with pathologies indicating disease, and without lesions associated with disability or disease by graves with and without structures

Grave structures	Individuals						Total	
	Pathologies indicating disability		Pathologies indicating disease		Without lesions associated with disease or disability			
	N	%	N	%	N	%	N	%
Present	5	62.5%	106	33.9%	137	40.4%	248	37.6%
Absent	3	37.5%	207	66.1%	202	59.6%	412	62.4%
Total	8	100.0%	313	100.0%	339	100.0%	660	100.0%

Table 4. The prevalence of individuals with pathologies indicating disability, with pathologies indicating disease, and without lesions associated with disability or disease by graves with and without grave goods

Grave goods	Individuals						Total	
	Pathologies indicating disability		Pathologies indicating disease		Without lesions associated with disease or disability			
	N	%	N	%	N	%	N	%
Present	5	62.5%	157	50.2%	167	49.3%	329	49.8%
Absent	3	37.5%	156	49.8%	172	50.7%	331	50.2%
Total	8	100.0%	313	100.0%	339	100.0%	660	100.0%

Table 5. The prevalence of grave goods in graves with and without structures

Structures	Grave goods				Total	
	Present		Absent			
	N	%	N	%	N	%
Present	140	42.6%	108	32.6%	248	37.6%
Absent	189	57.4%	223	67.4%	412	62.4%
Total	329	100.0%	331	100.0%	660	100.0%

Table 6. The prevalence of individuals with pathologies indicating disability, with pathologies indicating disease, and without lesions associated with disease or disability by social status

Social status	Individuals						Total	
	Pathologies indicating disability		Pathologies indicating disease		Without lesions associated with disease or disability			
	N	%	N	%	N	%	N	%
High	2	25.0%	60	19.2%	78	23.0%	140	21.2%
Middle 1	3	37.5%	97	31.0%	89	26.3%	189	28.6%
Middle 2	3	37.5%	47	15.0%	58	17.1%	108	16.4%
Low	0	0.0%	109	34.8%	114	33.6%	223	33.8%
Total	8	100.0%	313	100.0%	339	100.0%	660	100.0%

33.3% of the cells (4) have an expected abundance of less than 5; the minimum expected abundance is 1.31.

Table 7. Mantel-Haenszel test for trend between the individuals with pathologies, grave goods, grave structures, and social status

Variable	Test statistics	z-score	p-value
Grave structures	217	−1.717	0.086
Grave goods	319	0.232	0.817
Social status	857	−0.452	0.651

Table 8. Variance by the components obtained as a result of the multiple correspondence analysis algorithm

Component	Eigenvalue	% of variance	% of variance (cumulative)
0	0.527	30.12%	30.12%
1	0.475	27.16%	57.28%

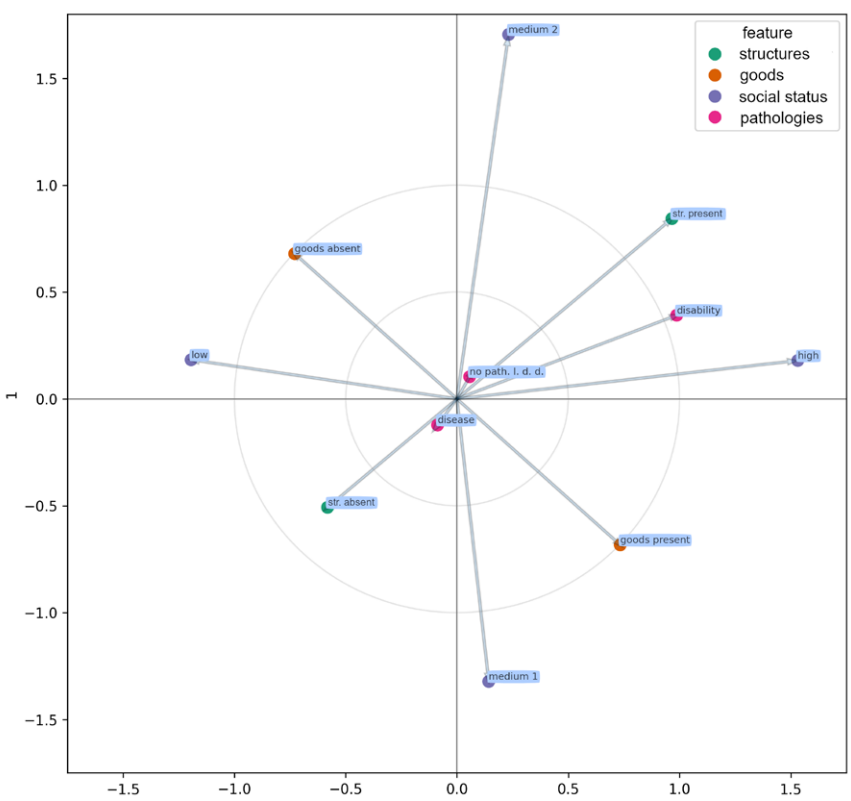

Fig. 3. Plot showing the outcome of multiple correspondence analysis. Abbreviations: no path. l. d. d. – no pathological lesions associated with disability or disease; str. present – structures present; str. absent – structures absent (developed by M. Matczak)

Table 9. Social status of the disabled individuals at Culmen

Grave no.	Sex and age	Pathology	Social status	Date
5/03	female 30–40	post-paralytic lesions (after poliomyelitis)	high – grave structures: traces of a coffin; iron knife	2nd half of the 11th century–2nd half of the 12th century
56/98	female 35–45	osteomyelitis	high – grave structures: streak of a darker charcoal marker along the edge of the grave pit (frame); bronze ring; four temple rings	the 12th century–1st half of the 13th century
31/04	male 50–60	osteomyelitis	middle 1 – a horn frame was uncovered, but it is not certain whether it is related to the burial	2nd half of the 11th century–2nd half of the 12th century
101/98	female 25–30	leprosy	middle 1 – iron knife, bronze ring	the 12th century–1st half of the 13th century
122/99	female 25–30	neoplasm (multiple myeloma)	middle 1 – iron knife	the 12th century–1st half of the 13th century
52/00	male 30–40	osteomyelitis	middle 2 – grave structures: traces of a frame	10th/11th–1st half of the 11th century
41/00	male 40–50	amputation	middle 2 – grave structures: traces of a frame	1040s – turn of the 12th century
42/00	unknown 7	spinal tuberculosis (Pott's disease)	middle 2 – grave structures: traces of a frame	2nd half of the 12th century – turn of the 13th century

Discussion

Social status of the disabled individuals

Our research, which takes into consideration individuals with disabilities, individuals with pathological lesions indicating disease, and individuals without pathological lesions associated with disability and disease, revealed that there was no difference in their social status in Culmen. This stands at odds with the observations made by other researchers, such as Judyta Gładykowska-Rzeczycka (2012), who argues that poor individuals buried around Saint John's Church in Gdańsk (Poland) in the 14th–19th centuries suffered from more pathological lesions than those who came from a higher social class and were buried inside the church. The previous research on the social status of the diseased in Culmen, in which grave structures were used as an indicator of social status, suggested that the diseased belonged to the lower social rank (Matczak 2016). The differences between the findings obtained in previous research and the results of this study are likely caused by the fact that we have chosen two indicators of social status, namely, grave structures and grave goods. This shows that employing both grave structures and grave goods as indicators of social status is important when conducting comprehensive research based on materials for which we do not have directly written records that would indicate the burials of individuals

associated with a specific social status. Our studies (Matczak *et al.* 2021) did not reveal that society feared disabled individuals and thus marginalised them or rejected them, contrary to what was found to be true in other societies (e.g., Murphy 2000). Furthermore, they have not confirmed any scenario where the disabled individuals belonged to a specific social status (e.g., Roberts 1999; Tubb 2000).

For example, our previous research on the social status of a woman with leprosy in Culmen shows that she was not perceived in a negative way, nor was she socially rejected. She was buried in a W–E-orientated burial in a supine position, with grave goods (a knife and a bronze ring), and with other graves around, which might indicate her high social status (Matczak, Kozłowski 2017)[2]. The fact that lepers were interred in the company of others and enjoyed a relatively high social status can be observed at other medieval sites, such as Suraż (Poland) and Polis Chrysochous (Cyprus) (Gładykowska-Rzeczycka 1976a; Donoghue *et al.* 2002; Baker, Bolhofner 2014).

Textual sources revealed that the perception of disabled individuals was likely based on their initial social status, the context of how they acquired a given disability, and family relations in medieval Poland. This can explain why the disabled individuals were not classified as part of a specific social group in Culmen. This observation is consistent with the findings made by other researchers (Knüsel 1999). Most likely different approaches were applied to different individuals depending on their personal histories, with various factors affecting the social status of a disabled individual in Culmen. These can include a reason for becoming disabled and the cause of death, the initial social status that an individual had before becoming disabled, their occupation, age, sex, and family situation.

Possibly, individuals with various types of disabilities should be investigated separately to observe how they were treated in the past. The criteria set by Roberts (1999), which consider how communities may have responded to individuals affected by disabilities in the past, are most appropriate for individual case studies. The criteria set by Roberts (1999) should not be applied across a population to assume that all the diseased or disabled were treated the same, disregarding all other social factors. It is possible that individuals with different disabilities were perceived as having different abilities, as the definition of disability has changed over time and space, and was most probably different to ours.

[2] A qualitative study, such as an osteobiography, might shed more light on other personal stories in Culmen. However, this is beyond the scope of this paper.

Constraints

The texts from the early medieval period in Poland mostly focus on the kings, dukes, royal court, knights, and the clergy. In cases where we do not have any written sources that would provide a direct description of the inhabitants of early medieval settlements and the individuals buried at cemeteries (as in Culmen), grave goods and grave structures are the best indicators of social status. However, this kind of research has some limitations, such as the decay of grave structures and grave goods made of organic materials (Urbańczyk 1986; Penny-Mason, Gowland 2014). From the moment of death to the moment of excavation, organic material decay leads to loss of data. This hinders assessment of a given person's status when they were alive based on their treatment after death. However, interdisciplinary research might help gain more information, thus providing a more plausible interpretation of the past (e.g., Vercellotti *et al.* 2011; Reitsema, Vercellotti 2012; Stewart, Vercellotti 2017).

Another issue is the problem of assessing disability. Disability is a modern concept that developed in Western culture, and what is perceived as disability in Western culture may not have been perceived as such in the past (e.g., Barnes, Mercer 2010; Horstmanshoff 2012; Jones 2012). Additionally, disability is often assessed based on the most apparent symptoms, e.g., blindness or lameness (Ginsburg, Rapp 2013). However, diseases affecting the soft tissue and acute infections leave no trace on the bones, thus rendering the identification of all ailment impossible (Roberts 2002). Only chronic diseases leave traces on bones, while many acute and inflammatory diseases last for a short period of time and do not leave any traces on bones (Gładykowska-Rzeczycka 1976b; Wood *et al.* 1992; Roberts, Manchester 2010). Paradoxically, individuals whose skeletons bear no pathological lesions could have been in worse health than those whose skeletons show pathological lesions (Wood *et al.* 1992). As a result, we do not have comprehensive data on the whole set of diseases and disabilities in the past population. Therefore, osteological materials and material culture found at cemeteries do not literally represent the living population and its culture. The eight disabled individuals are a small statistical sample that represents those people whose skeletons have been preserved to our times and show pathological changes indicative of disability. Thus, it does not fully represent the group of disabled individuals because it does not include those whose skeletons have decomposed and those who had disabilities related to soft tissue rather than bone. Nevertheless, our study has revealed certain trends.

Conclusions

Textual sources indicate that the perception of individuals with various impairments depended on their personal histories connected with social status, the cause of impairment, and family situation in medieval Poland. Depending on this, such individuals were praised, cared for, left to beg, or rejected. Statistical analyses such as the χ^2 test of independence, Mantel-Haenszel test for trend, and multiple correspondence analysis using osteological and archaeological materials from medieval Culmen indicate that there is no grounds for assuming that disabled individuals were associated with a specific social status more often than with others. The disabled individuals enjoyed all higher social statuses. The impaired individuals might have held different social positions, and this was dictated by the social status they had had before they acquired a given disability, as well as by their personal history. We have a relatively large sample of 660 individuals, but individuals with disabilities should be treated as a fact of an event defined in statistics as a rare event. It can be stated on the basis of this sample that there are no relationships that should be defined as strong. Some of the results obtained have high numbers for each category pair.

Our study on the social status of the disabled individuals in Culmen remains preliminary. Further studies will benefit from additional analyses of the social status of individuals with certain afflictions (e.g., anaemia, rickets, etc.).

Acknowledgements

We would like to thank Joanna Karłowska-Pik and Krzysztof Leki from the Centre for Statistical Analysis, Nicolaus Copernicus University in Toruń, Poland, for the stimulating discussion. This work was supported by the National Science Centre of Poland as part of the project "The Ill and the Impaired in Early Medieval (10th–13th century) Poland. A case study of the sites from Kałdus (Kuyavian-Pomeranian voivodship)" under grant no. UMO-2014/13/N/HS3/04602 and as part of the project "The Early Mediaeval Settlement Complex at Kałdus – Chełmno' Sedes Regni Principalis (Project 5)" under grant agreement no. UMO-2022/45/B/HS3/01572. Declarations of a conflict of interest: none.

Data availability statement

The authors confirm that the data supporting the findings of this study are available in *Wczesnośredniowieczne cmentarzysko szkieletowe w Kałdusie (stanowisko 1)*, 2006; *Wczesnośredniowieczne cmentarzysko szkieletowe w Kałdusie (stanowisko 4)*, 2010; Kozłowski 2012; Bojarski 2020.

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