A Detailed Individual-Level Analysis of Tuberculosis-Related Deaths Among Adults From Transylvania, 1850–1914

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A Detailed Individual-Level Analysis of Tuberculosis-Related Deaths Among Adults From Transylvania, 1850–1914

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ABSTRACT

In the late 19th and early 20th centuries, tuberculosis (TB) was a major public health issue across Eastern Europe, including Transylvania, then part of the Hungarian Kingdom. Nearly one million TB deaths were recorded in Hungary between 1901 and 1915, mostly among adults. This study examines TB mortality in Transylvania from 1850 to 1914 using data from the Historical Population Database of Transylvania, focusing on adults from the Greek-Catholic, Orthodox, Roman-Catholic, and Reformed (Calvinist) denominations. It explores how factors like environment, occupation, gender, age, and population movement influenced TB outcomes. Industrialization and population mobility, especially after 1881, increased the spread of TB across all denominations. Greek- and Roman-Catholics in open-type settlements had higher mortality, while Calvinists and Orthodox fared slightly better. Higher socio-economic status did not consistently protect against TB, revealing the central role of occupation and working conditions. Unlike many other studies, this analysis found that gender had minimal impact on TB deaths — likely because of women's active participation in agricultural labour in addition to their indoor responsibilities. The research shows that TB became more virulent approaching the 20th century and highlights the need for future studies incorporating urban areas and variables such as housing, nutrition, and healthcare to better understand the dynamics of this complex disease.

Keywords: Tuberculosis, Adults, Individual-level data, Transylvania, 19th Century

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1 INTRODUCTION

Tuberculosis (TB) remains a major global health challenge, closely linked to social and economic inequalities. While its burden is disproportionately felt in developing nations, wealthier and industrialized regions are by no means immune. This persistent presence of TB in modern public health echoes its long and complex history. Archaeological findings trace its origins to as early as the Neolithic period in both Eurasia and Africa. By the Middle Ages, TB had already left a visible mark on European populations. However, it was during the 18th and 19th centuries that TB evolved into a widespread epidemic. The movement of people, crowded living conditions, poor public health infrastructure, and growing industrial activity in many communities contributed to the rapid spread of the disease in countries such as England, France, Italy, and the United States, where it became endemic and had important demographic consequences. In England and Wales alone, TB accounted for about 13% of all deaths between 1851 and 1910. In 1871, one in every seven deaths in England was attributed to TB, while in cities like Stockholm, the disease claimed one in five lives between 1750 and 1830 (Johnston, 1993; Livi Bacci, 2003; Reeves, 2008). As such, the disease became a significant health issue, and the 19th century came to be regarded as "the age of tuberculosis" (Woods & Shelton, 1997).

In line with the complex nature of TB, many studies, particularly focused on the 19th century realities, have sought to address various aspects of the disease, including its demographic impact, dynamics of and influences on the living environment, gender differences, and the consequences of human mobility. While TB mostly affected young adults, the prevalence of the disease in urban settlements was often questioned, as both rural and urban living contexts faced their own distinct challenges (McNay et al., 2005; Woods & Shelton, 1997). When gender was considered as a variable, other studies indicated that the rural environment was, in many cases, detrimental to women, who were more susceptible to respiratory diseases, including TB, due to unequal access to resources and differences in work environments, with men generally working outdoors in the fields, and women predominantly indoors at home (Alter et al., 2004). For many women, particularly in rural areas, disparities in access to food and medical care increased their vulnerability to TB, especially during and after pregnancy, with this disease playing a significant role in maternal mortality (Janssens & van Dongen, 2018). Other studies show that mortality differences from TB were influenced by social and economic factors such as employment and migration patterns. As such, many women in urban areas contracted the disease while working in manufacturing factories, whereas men in rural areas were often exposed to TB through labour migration (Reid & Garrett, 2018). Other investigations indicated that gender differences in TB mortality were significant and varied across regions, highlighting the complex dynamics of the disease and underscoring the need for a deeper examination of underlying factors (Hinde, 2015), as well as an expanded focus on lesser-investigated regions.

2 THE IMPACT OF TB IN HUNGARY AND TRANSYLVANIA: A DEADLY EPIDEMIC AND PUBLIC HEALTH RESPONSE (19TH-20TH CENTURIES)

Beginning in the second half of the 19th century, tuberculosis spread more rapidly across many regions of Eastern Europe, developing into a serious epidemic by the end of the century (Johnston, 1993). This growing threat was also echoed in the Transylvanian press, where reports on TB often carried an alarming tone, emphasizing the vast number of lives it claimed. TB was described as "a cruel disease, which claims hundreds of thousands of souls every year, more merciless than cholera, typhus, and other illnesses" (Gazeta Transilvaniei, 1893). The disease was viewed as "the plague of the era, sparing no one, with each person mourning the loss of a loved one who has fallen victim to it" (Dopp, 1906).

Published statistics indicated a high mortality from tuberculosis in Hungary, of which Transylvania was a part until 1918. The capital, Budapest, was severely affected, and the newspapers reported that "year after year, thousands upon thousands of lives are extinguished by consumption in Hungary. In 1903 alone, 65,724 people died from this horrible disease. In July, 6,742 people perished from tuberculosis nationwide, with 313 deaths in Budapest" (Revașul, 1905).

Tuberculosis (TB) is primarily transmitted through the air when an infected person coughs, sneezes, or speaks, with common symptoms including a persistent cough, chest pain, coughing up blood, fatigue,

weight loss, fever, night sweats, and loss of appetite. Many of these transmission routes and symptoms were already recognized by doctors in Transylvania at the time, who also warned of the risks posed by contact with objects contaminated by the faeces, sweat, saliva, or sputum of infected individuals. Press reports offered detailed accounts of the disease's symptoms and progression, noting that TB "begins with small boils and night sweats, coughing, often accompanied by blood, and in some cases diarrhoea, as the disease and its microbes penetrate almost every organ" (Chitul, 1914).

As a result, newspapers across Transylvania recommended preventive measures such as disinfecting rooms by painting, ventilating living spaces, and washing hands before meals. One of the most frequently criticized habits was spitting on the ground, and many publications advised the use of spittoons or handkerchiefs, which were to be disinfected or treated with lye to curb the spread of the numerous microbes present in the sputum of infected individuals (Gazeta Transilvaniei, 1911).

Nevertheless, TB continued to pose a major problem, and during World War I, the Hungarian Central Statistical Office began publishing a report on the devastating impact of the disease, which was seen as a serious threat to population growth in Hungary. Covering the period from 1901 to 1915, the study revealed that 967,738 people had died from TB. Over these 15 years, tuberculosis accounted for 14.4% of all deaths nationwide, with rates reaching 20.3% in Budapest and 12.7% in Transylvania (Magyar Statisztikai Közlemények, 1925).

The report also highlighted significant regional differences in TB mortality, with notable variations between counties and settlements. In terms of gender differences, the report mentioned that TB was a significantly more common cause of death among women in Hungary. However, these differences varied considerably according to residence. Men in urban areas, especially those employed in the industrial sector, experienced a higher increase in mortality due to TB. In contrast, urban women benefited more from improvements in living conditions and health care, while rural women continued to be affected by poor socio-economic conditions. The report also drew attention to the high number of deaths among Roman-Catholics, Greek-Catholics, Orthodox, and Reformed communities, noting "a great fatality in tuberculosis mortality across the four denominations". Lastly, the report emphasized that TB primarily affected adults in "the most valuable age groups from the point of view of the economy and the maintenance of the species" (Magyar Statisztikai Közlemények, 1925).

Given these factors, this study aims to analyse the patterns and determinants of TB deaths among adults in Transylvania between 1850 and 1914, focusing specifically on differences across religious denominations (Greek-Catholic, Orthodox, Roman-Catholic, and Reformed). Situating Transylvania within the broader European context of the "age of tuberculosis" and engaging with existing debates in the literature, the analysis seeks to understand how social, economic, gendered, and environmental factors influenced the spread and impact of TB. Additionally, this research will expand our understanding not only of TB, but also of the Transylvanian context, which, in the 19th century was marked by confessional and ethnic heterogeneity, with a population that grew from 2,073,737 in 1850 to 2,098,507 by the 1910 census. Historically part of the Kingdom of Hungary and later incorporated into the Habsburg Empire, the region underwent gradual economic transitions from feudalism to market-oriented agriculture and early industrialization, particularly after 1881. Urbanization increased, with the rural population declining from 93.5% in 1850 to 87.6% by 1910 (Bolovan, 2000). This complex interplay of ethnic diversity, historical governance, and evolving economic conditions significantly influenced societal and demographic behaviours, including mortality patterns of TB during this period.

3 SOURCES, VARIABLES, AND METHODS

We used the Historical Population Database of Transylvania (HPDT), which contains information from the parish death registers of Orthodox, Greek-Catholic, Calvinist (Reformed), and Roman-Catholic communities across 23 localities in six counties (for details about this historical population database, see Dumănescu et al., 2022). In many instances, TB was inadequately recorded in death registers, particularly within the Orthodox community (Rus, 2023). Additionally, it appears that TB cases among children were frequently omitted, which justifies our focus on adult populations in this analysis.

The causes of death were standardized and coded according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10). Tuberculosis (TB) was recorded in Romanian, Hungarian, and Latin, and was often noted using colloquial expressions, archaisms, and

regionalisms. As a result, it appeared in a variety of forms, such as *tuberculosa*, *gümőkór*, *phthisis universalis*, *hectica*, *oftica*, *morbu de plămâni*, and *boala uscată*. In most cases, these terms referred to respiratory tuberculosis, although in some instances they described tuberculosis affecting other organs, including *béltuberkulózis* (tuberculosis of the intestines), *gége tuberkulózis* (tuberculosis of the larynx), *tuberculosis visceris* (tuberculosis of internal organs), and *meningitis basilaris tuberculosa* (tuberculous meningitis).

We employed binary logistic regression models, aiming to capture the impact of various factors on the likelihood for a death during 1850–1914 to be a death caused by TB. The dependent variable of our logit model was 'cause of death', having value 1 for a 'TB death' and 0 for a 'death from any other cause'. Given the observed omissions in assigning TB as cause of death for children, we focused exclusively on deaths above age 14.

We differentiated the analysis by denomination, selecting the four predominant religions in Transylvania at that time. This approach also considered the unique characteristics of each death register and its specific way of recording information. Consequently, we employed four binary logistic regression models, with a working sample that included 15,655 deaths (cases with valid information for all the variables used). The independent variables used in the models are presented in Table 1, along with their manner of construction.

Table 1 *Independent variables and their construction*

Variable	Categories	Notes
Socio-economic status	1. Upper/middle class 2. Agriculturists 3. Skilled workers 4. Semi-skilled workers 5. Unskilled workers 6. Unknown	Based on occupations coded using HISCO and SOCPO. If not available, spouse's occupation used (for women).
Denomination	1. Greek-Catholic 2. Orthodox 3. Calvinist (Reformed) 4. Roman-Catholic	Based on entries by priests or cover of parish registers.
Marital status	1. Unmarried 2. Married 3. Previously married (divorced/widowed) 4. Missing/unknown	-
Gender	1. Male 2. Female	-
Age	Six 10-year groups	A decadal grouping (14–24, 25–34, 35–44 etc.).
Locality type	1. Open (7 localities) 2. Peripheral (16 localities)	Based on economic features, market access, and infrastructure. Open includes industrialized or well-connected localities; peripheral includes isolated/agricultural localities.
Time period	1. 1850–1880 2. 1881–1914	Divided by the 1881 Law 44 industrial development milestone.

Notes: For information regarding the HISCO and SOCPO schemes, see Van De Putte & Miles (2005). For more information on Law 44/1881, see Nagy (2011). The localities included in the analysis were: Ocna Mureș, Ocna Dej, Gurghiu, Glăjărie, Caşva, Uioara de Jos, Războieni, Hodac, Orșova, Solovăstru, Spini, Bucium Cerbu, Muntele Rece, Nima, Călărași, Decea, Lunca Mureșului, Chileni, Voșlăbeni, Ibănești, Moldovenești, Rusu Bârgăului, and Liviu Rebreanu.

4 RESULTS

The descriptive results of the analysis indicated that between 1850 and 1914, TB caused the deaths of 10% of adults in Transylvania. The disease primarily affected young and middle-aged adults, with a lesser impact on older individuals. In the later period, 1881–1914, there was a slight increase in deaths due to TB. These were lower in peripheral localities, suggesting that environmental factors and working conditions played a role. The disease was more prevalent among semi-skilled and skilled workers, as well as members of the upper-middle class. Interestingly, TB deaths were less common among Orthodox communities, which might suggest some level of protection, or differences in the accuracy of registering causes of death. Men and women appear to have been affected in the same way (see Table 2).

Subsequently, the results of the multivariate analysis indicate that the period between 1881 and 1914, marked by accelerated industrialization in Transylvania, was unfavourable in terms of the risk of dying from TB. The sharpest effects were found in the case of Roman-Catholics, who were most likely to lose their lives to this disease (Table 3).

Table 2 *Distribution of deaths by different characteristics*

	Tuberculosis		Other	
Male	770	10%	7,050	90%
Female	803	10%	7,030	90%
Greek-Catholic	642	9%	6,440	91%
Orthodox	145	3%	4,024	97%
Roman-Catholic	179	13%	1,239	87%
Reformed	596	20%	2,329	80%
Other	11	18%	50	82%
Open	1,006	13%	6,493	87%
Peripheral	567	7%	7,589	93%
Unskilled workers	109	10%	1,110	90%
Semi-skilled workers	193	16%	1,201	84%
Skilled workers	108	21%	523	79%
Agriculturists	300	10%	3,119	90%
Upper-middle	91	15%	622	85%
Unknown	772	9%	9,080	91%
1850–1880	646	8%	7,328	92%
1881–1914	927	12%	6,754	88%
14–24 years	316	15%	1,851	85%
25–34 years	305	16%	1,617	84%
35–44 years	269	13%	1,764	87%
45–54 years	304	13%	2,126	87%
55–64 years	231	9%	2,394	91%
65+	148	3%	4,330	97%
Total	1,573		14,082	

Source: HPDT (authors' calculation).

Table 3 *Results of the multivariate analysis, adults*

Adults (14+)		**Greek-Catholic**			**Orthodox**			**Roman-Catholic**			**Reformed**		
		Cases	Exp(B)	Sig.	Cases	Exp(B)	Sig.	Cases	Exp(B)	Sig.	Cases	Exp(B)	Sig.
Social status	Unskilled workers	243	1		254	1		330	1		275	1	
	Semi-skilled workers	682	2.352	***	88	1.497		69	1.660		349	1.540	**
	Skilled workers	89	2.676	**	22	2.811		169	1.402		234	1.670	**
	Agriculturists	1,564	1.839	**	897	1.986	*	284	1.086		373	1.613	**
	Upper-middle	180	2.437	**	46	4.598	***	154	0.876		237	1.299	
	Unknown	4,323	1.760	*	2,861	0.644		412	1.226		1,457	1.222	
Time period	1850–1880	3,830	1		1,954	1		683	1		1,494	1	
	1881–1914	3,251	1.763	***	2,214	1.635	**	735	7.457	***	1,431	1.271	**
Age group	14–24 years	1,013	1		568	1		172	1		406	1	
	25–34 years	856	1.361	**	507	0.916		164	0.639		390	1.310	
	35–44 years	964	1.134		515	0.668		187	0.743		361	0.930	
	45–54 years	1,142	0.993		596	0.674		231	0.644		437	0.984	
	55–64 years	1,217	0.763		688	0.321	***	251	0.359	***	463	0.575	***
	65+	1,889	0.282	***	1,294	0.053	***	413	0.073	***	868	0.206	***
Locality type	Open	3,904	2.197	***	509	0.055	***	1,015	2.947	***	2,017	0.798	**
	Peripheral	3,177	1		3,659	1		403	1		908	1	
Gender	Male	3,521	1		2,109	1		717	1		1,436	1	
	Female	3,560	1.147		2,059	0.748		701	0.856		1,489	1.162	
Marital status	Never married	1,062	1		583	1		166	1		291	1	
	Previously married (divorced, widowed)	1,545	0.727	*	751	0.877		289	1.330		651	0.937	
	Married	3,917	0.753	**	2,738	1.078		823	1.331		1,269	0.882	
	Missing, unknown	557	0.736		96	2.623	**	140	1.206		714	0.685	*
Nagelkerke R Square			0.086			0.166			0.249			0.110	

Source: HPDT (authors' calculation).

*Note: * for $p < 0.1$, ** for $p < 0.05$, *** for $p < 0.01$.*

After 1881, Transylvania entered into a more accelerated phase of industrialization, during which industrial development and related occupations were regarded as major factors in the spread of tuberculosis (Magyar Statisztikai Közlemények, 1925). Besides the impact of industrialization, after 1881, the population in Transylvania underwent an increased process of mobility, which also contributed to the spread of TB. The periodical *Telegraful român* highlighted this issue in 1900, quoting the chief county physician's observations "tuberculosis spares neither palaces nor huts, whether they are in the mountains or the lowlands. As soon as commerce and communication lead to the growth of a locality, and people congregate there, all the ills of humanity inevitably follow" (Telegraful român, 1900).

In searching for the reasons behind the greater impact of TB on Roman-Catholic adherents, the mobility of people should certainly be taken into account. Additionally, the settlements of Gurghiu and Ocna Dej, classified as open localities and hosting a significant number of Roman-Catholics, experienced major developments in transportation during this period.

Gurghiu, a key economic hub in the Gurghiu Valley, was notable for hosting an important weekly fair (Irimescu-Andruș, 1982–1983). In 1898, the construction of a narrow-gauge railway line between Reghin and Lăpușna started. This 37 km stretch of railway, completed in 1905, was primarily used for forestry operations along the Reghin-Gurghiu-Lăpușna route (Rus, 2023). Between 1881 and 1914, Gurghiu attracted many Roman-Catholic settlers, including individuals from distant Transylvanian localities such as Remetea (Harghita), Acățari, and Iernut (Mureș), as well as from cities in the former Austro-Hungarian Monarchy, such as Tompa (Hungary) and Detva (Slovakia).

A significant number of Roman-Catholics also lived in Ocna Dej, an old salt-mining locality. Modernization here began in 1910, but starting in 1882 some improvements were made in salt transport with the inauguration of the Cluj-Apahida-Dej-Jibou railway line, which was later extended to the salt mine. As such, the improvements in transportation and the movement of people created opportunities for the spread of TB and the subsequent deaths of many, a significant proportion of whom were Roman-Catholics. These patterns observed among Roman-Catholics in the Gurghiu and Ocna Dej localities were similar to situations in other regions around the world, where trade and migration facilitated the spread of TB. Movement plays a significant role in the transmission of infectious diseases like TB, as people arriving from areas with high infection rates can introduce new cases into their new communities. Indeed, the chronic nature of tuberculosis often allows individuals to travel and relocate before the disease becomes debilitating (Johnston, 1993).

Living in open localities doubled the odds for a TB death in case of Greek- and Roman-Catholics, while the effect was lower in case of Orthodox and (Calvinist) Reformed individuals. The report on tuberculosis mortality in Hungary from 1901 to 1915 noted that individuals in peripheral, predominantly rural areas were more protected from this pathogen (Magyar Statisztikai Közlemények, 1925). The same study highlighted that social conditions in these rural areas were generally more favourable, providing greater security for individuals' physical health. Additionally, the natural environment in rural areas contributed to lower tuberculosis incidence, explaining why the disease was less prevalent in these settings (Magyar Statisztikai Közlemények, 1925).

On the other hand, living in open localities had negative effects only for Greek-Catholics and Roman-Catholics, but not for Orthodox and Calvinist adults. A key factor contributing to the lower number of deaths due to TB among the latter two groups was the social benefits provided to workers and their families in the railway sector, where many Orthodox and Calvinist residents of Războieni were employed. These benefits, including healthcare and housing, were offered by the Hungarian state, likely helping reduce TB incidence in these denominational groups. This trend was also observed across Hungary, as noted in the state report on TB mortality from 1901 to 1915. The report highlighted that railway workers experienced lower TB mortality due to the medical and social advantages provided by the state (Magyar Statisztikai Közlemények, 1925). While studies generally suggest that employment in certain sectors increases the risk of exposure and dying due to the TB bacteria (Reid & Garrett, 2018), the case of the Orthodox and Calvinist denominations in Războieni show that, in this instance, employment came with benefits that helped reduce TB risk.

The results show that higher socio-economic status did not offer protection against TB deaths, as deaths caused by this disease were more likely among individuals from the upper-middle class, agriculturists, and skilled and semi-skilled workers than among labourers. This situation was observed for Greek-Catholic, Orthodox, and Reformed individuals, but not for Roman-Catholics. Given that the

first three groups included large numbers of persons with unknown occupations, the results should be interpreted with caution.

TB in Transylvania did not discriminate according to socio-economic status, and being situated at the top of the social ladder did not offer protection against it. This was also confirmed by the survey on tuberculosis deaths in Hungary from 1901 to 1915, which highlighted the prevalence of deaths among clerks, including accountants, tax collectors, office clerks, and weighing clerks. Despite being regarded as "the middle class of the country and the backbone of society", and possessing significant intellectual resources, this group still experienced considerable losses. The survey emphasized that while intelligence, education, and enlightenment were crucial in combating tuberculosis, and this occupational group was well equipped with all these attributes, the widespread impact of the disease among them indicated serious deficiencies in their social conditions and living standards, particularly for public service employees (Magyar Statisztikai Közlemények, 1925). An elevated mortality rate due to TB was also observed among clerks and white-collar workers in Scotland, who mainly performed sedentary office jobs in crowded and poorly ventilated spaces (Reid & Garrett, 2018).

The upper-middle-class Greek-Catholics and Orthodox in Transylvania were primarily composed of teachers and priests, who were especially vulnerable due to their frequent interactions with others and their work in crowded, poorly ventilated spaces during teaching activities and religious services. Press reports during that time noted that members of the teaching profession were especially vulnerable to respiratory illnesses such as "hoarseness, angina, weakness of the lungs, and even TB" (Elefterescu, 1894). Similarly, priests were at risk of "pulmonary inflammations and other conditions that could rapidly lead to death" (Cionca, 1905).

In the case of the Greek-Catholic adults, town accountants, tax collectors, clerks, shoemakers, hairdressers, barbers, painters, and salt mine workers, classified as in the upper-middle class, agriculturist, skilled, and semi-skilled categories, faced a higher risk of dying from tuberculosis. This reinforced the idea that in many instances tuberculosis spared no one, regardless of social position, power, or wealth (Telegraful român, 1910).

On the other hand, the category of unskilled workers mainly included day labourers and factory workers. Day labourers typically depended on agriculture for their livelihood and resided in areas with an agro-industrial profile, such as Ocna Dej. In Hungary, there were industrial localities where people combined industrial work with agriculture. Many day labourers, who maintained an agrarian background, benefited from working outdoors, as it allowed for more exposure to fresh air. Furthermore, in various parts of Hungary, factory working conditions — regarding space, lighting, and health facilities — were often superior to those in small workshops (Magyar Statisztikai Közlemények, 1925). A notable example is the soda factory in Ocna Mureș, which, funded by Belgian and Austrian capital, began operations in 1896 and employed 148 workers by 1900 (Holom et al., 2018). While many factories, particularly those involved in textiles and mining, were overcrowded and exposed workers to harmful dust and irritants that compromised respiratory health and increased susceptibility to infections, including TB (Hinde, 2015; Reid & Garrett, 2018), there were cases where improvements in factory working conditions had positive effects in reducing TB risk.

In terms of age, the results show that older age groups (55+ and 65+) were more likely to experience a TB death than younger ones across all denominations, with the exception of Greek-Catholics, where age group 25–34 was also more likely to experience a TB death. Our results are consistent with patterns observed in other populations, where young adults up to the age of 34 were the most impacted (Reid & Garrett, 2018; Woods & Shelton, 1997). Advancing age reduced the odds of death from TB across all religious denominations analysed in Transylvania, a trend similar to that observed across the entire Hungarian Kingdom. Between 1901 and 1915, it was noted that after the age of 60 the impact of disease began to weaken, as numerous other natural causes of death emerged, reducing the significance of TB (Magyar Statisztikai Közlemények, 1925).

The results on marital status show that being involved in a marital relationship, even a previous one, seems to have mattered only in the case of Greek-Catholics. For other denominations, such differences were not observed. The Hungarian authorities who conducted research on TB stated that it was not marital status that mattered, but rather youth, vitality, and a body and mind unaffected by work and other fatigues, which were important factors influencing TB mortality (Magyar Statisztikai Közlemények, 1925).

Regarding gender, some research shows that TB generally caused more deaths among women, particularly in rural settings (Hinde, 2015; Johnston, 1993; Woods & Shelton, 1997, p. 97), due to unequal access to food, resources, and healthcare, reduced resistance to infection during childbearing years, and greater exposure to indoor pathogens through performed domestic activities (Alter et al., 2004; Janssens & van Dongen, 2018). However, our results show no significant difference by gender. We believe that the socio-professional structure of Transylvania, and particularly of the localities in our sample, that can be described as a transitional (agro-industrial), wherein many people continued to earn a living from agriculture (including many females), contributed to this similarity between genders. Although Transylvania was undergoing a process of industrialization and urbanization, these developments were still in their early stages. In 1910, 73.3% of the population continued to work in agriculture, and 87.6% lived in rural areas.

4 CONCLUSIONS

Just as the 19th century came to be known as "the age of tuberculosis" in many parts of the world, this characterization was equally applicable to Eastern Europe, particularly during its latter half. In Hungary, of which Transylvania was a part until 1918, TB became a serious issue, prompting authorities to intensify their scrutiny of the disease's impact. A report on tuberculosis-related deaths from 1901 to 1915 documented nearly one million fatalities, emphasizing that adults were particularly vulnerable, with notable variations across regions and socio-demographic groups.

Our analysis was focused on the lesser-known realities of adult TB deaths in Transylvania between 1850 and 1914, while engaging with existing debates in the literature on the complex nature of the disease and emphasizing the importance of factors such as environment, age, gender, occupation, and population movement, alongside the specific characteristics of the province and localities studied.

Using data from the Historical Population Database of Transylvania, this investigation focused on the four major denominations in the province: Greek-Catholic, Orthodox, Roman-Catholic, and Calvinist (Reformed). It revealed both similarities and differences among these groups, shaped by the environments in which they lived as well as by the social and economic factors characteristic of the period under study. During the phase of accelerated industrialization between 1881 and 1914, all denominational groups experienced an increased risk of tuberculosis-related death. Population mobility and industrial development further facilitated the spread of *Mycobacterium tuberculosis*, significantly impacting community health. This situation was also seen in other European contexts, such as in Hungary, England, and Scotland, suggesting that industrial growth universally heightened TB risks, however TB risk also operated through locally specific socio-economic and demographic pathways.

In open-type localities, Greek-Catholics and Roman-Catholics had a higher likelihood of dying from tuberculosis, while Calvinists (Reformed) and Orthodox individuals in the same areas faced lower risks. This reconfirms the crucial role played by occupations in understanding the historical geography of TB (Hinde, 2015; Reid & Garrett, 2018). Similar to realities in Hungary and Scotland, higher socio-economic status did not offer consistent protection against TB, underscoring again the complex interplay between occupation, working conditions, and disease vulnerability (Magyar Statisztikai Közlemények, 1925; Reid & Garrett, 2018).

An interesting finding that contrasts with much of the existing literature (Hinde, 2015; Johnston, 1993; Woods & Shelton, 1997, p. 97) is that gender did not have a significant impact on TB deaths in this sample. This is likely due to the agro-industrial structure of the province and localities studied, where women continued to play an active role in agricultural labour in addition to their typical indoor activities.

Our data confirmed that tuberculosis became progressively more virulent in Transylvania as the 20th century approached, affecting people across all denominations. While the factors we analysed help explain some of the dynamics of this complex disease, there is still a need to incorporate data from other localities, particularly urban areas, and to extend the observation period to include the interwar years to better understand when we can identify a decline in TB-related deaths. Additionally, variables such as housing conditions, nutrition, and access to healthcare for people from Transylvania's past should also be considered in future research endeavours.

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