ANTHROPOLOGICAL REVIEW • Vol. 73, 21–36 (2010)
Available online at: https://doi.org/10.2478/v10044-008-0019-z

Diseases, health status, and mortality in urban and rural environments: The case of Catholics and Lutherans in 19th-century Greater Poland

Grażyna Liczbińska

Institute of Anthropology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland; E-mail: grazyna@amu.edu.pl

ABSTRACT The aim of the study is to show in the mortality measures calculated for Catholics and Lutherans from 19th-century Greater Poland: 1) stratification dependent on the size of place of residence, 2) stratification dependent on religious denomination in population centres of various size. The data on mortality are drawn from Catholic and Lutheran parish death registers: from Poznań (the poor Catholic St. Margaret's Parish, the wealthy St. Mary Magdalene's Parish, and the Lutheran Holy Cross Parish), small towns such as Leszno (the Lutheran Holy Cross Parish) and Kalisz (the Catholic St. Joseph's Parish) as well as the rural Lutheran parish of Trzebosz and the Catholic parish of Dziekanowice. Stratification in the causes of death and mortality measures among Catholics and Lutherans from 19th-century Greater Poland depends on the size of their places of residence and broadly understood ecological conditions. Smaller deleterious effects of the environment were observed in the rural areas and small towns and, therefore, a relationship between death rate values and religious denominations is more visible in these than in Poznań. The cultural benefits accruing to the Lutherans and Catholics living in 19th century Poznań were insufficient to reduce the high infant death rate.

KEY WORDS: death registers, rural/urban differences, religious differences, mortality level

It is commonly known that social stratification as measured by the size of a place of residence, degree of urbanization and industrialization, and wealth status, influenced the biological dynamics of human populations, and is reflected in health status, physical growth and biodemographic parameters. Such phenomenon has been observed with regard to historical and modern populations [e.g., Preston *et al.* 1981; Bielicki & Welon 1982; Bielicki *et al.* 1988; Bogin 1988; Hulanicka *et al.* 1990; Preston & Haines 1991; Schofield & Reher 1991; Budnik & Liczbińska 2005, 2006; van Poppel *et al.* 2005]. Recently, religious denomination as a factor impacting on demographic behaviour has also been observed in the historical and contemporary

Received 20 September 2010; accepted 23 December 2010
DOI: 10.2478/v10044-008-0019-z

world [Fauman & Mayer 1969, Leviatan & Cohen 1985, Friedlander *et al*. 1986, van Poppel 1992, Kark *et al.* 1996, McQuillan 1999, Wolleswinkel-van den Bosch *et al.* 2000, 2001, van Poppel *et al.* 2002, Kemkes-Grottenthaler 2003].

Urban - Rural Differences in Mortality

There is much evidence showing the negative influence of urbanization on mortality measures and health status in historical Europe. In England and Wales, the values of life expectancy at birth were observed to be lower and infant death rates higher in cities than in rural areas [Woods *et. al* 1988, 1989; Burnett 1991]. Urban and rural differences in the e_0 parameter and death rate values to the disadvantage of the former were observed in 19th-century Norway [Haines 1991]. A high frequency of deaths was also recorded in large 19th-century French cities: Paris, Lyon and Marseille [Preston & van den Walle 1978]. The same was true of Berlin, London, Liverpool and Manchester [Knodel 1974, Burnett 1991, Landers 1993], and in the Polish cities of Poznań [Budnik & Liczbińska 2005, 2006; Liczbińska 2009*a,b*] and Gdańsk [Budnik & Liczbińska 1997, Liczbińska 1999, Budnik 2005]. In Germany at the beginning of the 20th century, urban infant mortality in the summer months was found to be higher than in rural areas [Vögele 1998]. In Sweden, higher rates were noted among town children than among country ones [Johansson 2004].

Differences between urban and rural localities were also recorded in respect of causes of death. For example, in England and Wales in the second half of the 19th century and at the beginning of the 20th century phthisis death rates were higher among men from urban counties than from villages [Cronjé 1984]. In the same region infant mortality rates due to diarrhoeal diseases were higher in urban than in rural areas [Woods *et. al* 1988, 1989]. Woods' team [Woods *et al*. 1988: 189] called the extremely high mortality in the cities, occasioned by dysentery and diarrhoea related to poor sanitation, the 'urban-sanitary-diarrhoeal-effect'. A reverse situation was observed for infectious diseases: the highest percentages of deaths were noted in the rural areas while the lowest in the cities [*e.g*. Glass 1964, Williams & Galley 1995, Budnik & Liczbińska 2006]. Generally speaking, overpopulated and increasingly industrialized cities with their poor sanitation, poor hygiene, limited access to medical care, or dramatically poor living conditions – with a mainly working-class population concentrated in extremely overcrowded districts – posed a threat to human health and life. By contrast, rural areas still enjoyed an unpolluted natural environment [e.g., Liczbińska 1999, 2009*a*,*b*; Budnik 2005; Budnik & Liczbińska 2005, 2006].

Catholic - Lutheran Differences in Mortality

Van Poppel [1992; see also van Poppel *et al.* 2002] has stressed that a strong relationship existed not only between mortality rates and the degree of urbanization but also between mortality measures and religious denomination. With regard to Western Europe the relationship between religion and mortality measures seems to be well- established and well-documented [van Poppel 1992; McQuillan 1999; Wolleswinkel-van den Bosch *et al.* 2000, 2001; van Poppel *et al.* 2002; Kemkes-Grottenthaler 2003]. Through its norms and values religion shaped a unique way of life and attitude towards marriage, birth control and sexuality. The Lutherans were more af-

fluent and, as a result, better nourished and educated [e.g., Schmelz 1971, McQuillan 1999, Wolleswinkel-van den Bosch *et al.* 2001]. The Lutheran communities were presented, unlike the Catholics, as more receptive to novelties, cared more for hygiene and cleanliness of rooms, and coped better with illnesses, as confirmed by lower values of infant death rates in these communities than among Catholic populations [van Poppel 1992; Wolleswinkel-van den Bosch *et al.* 1998, 2001; McQuillan 1999; van Poppel *et al*. 2002; Kemkes-Grottenthaler 2003]. Moreover, among the Protestants from the Netherlands in the second half of the 19th century faster decreasing of rates of death than among Catholics was noted [Wolleswinkel-van den Bosch *et al.* 1998, 2001]. According to Wolleswinkel-van den Bosch and co-workers [2000: 1037]: "the percentage of Roman Catholics was an important determinant of infant mortality" in this country. A similar result was presented by Haines and Kintner [2000] in their study on the mortality transition in Germany in the second half of the 19th century and the beginning of 20th century. They emphasised that "a higher proportion of Roman Catholics in the population was strongly associated with higher mortality" and showed a regional phenomenon reflecting the higher than elsewhere mortality level in the eastern part of 19th century Prussia (contemporary Polish territories), Bavaria, Baden, and Wüttenberg – areas mainly inhabited by Roman Catholics [Haines & Kintner 2000: 98].

The aim of the study is to show in the mortality measures calculated for Catholics and Lutherans from 19th-century Greater Poland: (1) stratification dependent on the size of the place of residence, and (2) stratification dependent on religious denomination in population centres of various size.

Materials

Historical background

Greater Poland (Polish: *Wielkopolska*) is nowadays a region of west-central Poland. In the 18th century, after the first partition of Poland in 1772, Greater Poland was annexed by Prussia. First, its northern part along the Noteć River (German: *Netze*) was annexed by Prussia as the Netze District. In the second partition (1793) the whole of Greater Poland was absorbed by Prussia as part of the province of South Prussia [Chwalba 2000]. Following the Congress of Vienna in 1815, Greater Poland was partitioned again and its western part, including the city of Poznań, was ceded to Prussia. The eastern part was joined to the Russian-controlled Congress Kingdom of Poland (Polish: *Kongresówka*), where the Kalisz Governorate was formed. Within the Prussian Empire, western Greater Poland became the Grand Duchy of Poland. In the second half of the 19th century the Grand Duchy was replaced by the Province of Posen (German: *Provinz Posen*) with the city of Poznań as the capital [Chwalba 2000; Fig. 1].

Nineteenth-century Greater Poland became the target of a settlement campaign and Germanization policy of the Prussian authorities, followed by a large influx of German immigrants to Poznań. The capital of Greater Poland offered them high-income jobs and settlement concessions, and made them a more favoured group than the Poles. Members of the Lutheran community were mainly of German nationality and represented a wealthier and more privileged part of the Poznań population, while Catholics, represented by poorer social classes (the working class and the lower middle class) were mainly Poles [Trzeciakowska & Trzeciakowski 1987,

Trzeciakowski 1994]. In the villages and small towns of Greater Poland the situation of Lutheran communities was completely different. Lutheran rural and town parishes differed in terms of wealth, living conditions, educational level, awareness, and the style and quality of life [Kiec 2001].

Data

The data on the age of the deceased as well as the month and cause of their death are drawn from the 19th-century death registers of Catholic and Lutheran parishes from Poznań and selected towns and villages of Greater Poland, deposited in the State Archives in Poznań. Records were used for the following localities (Fig. 1):

- The wealthy Catholic St. Mary Magdalene's Parish (N = 6,893 deceased) from the city of Poznań, 1855 – 1874,
- The poor Catholic St. Margaret's Parish (N = 5,376 deceased) from the city of Poznań, 1855 –1874,

Fig. 1. Map of 19th-century Greater Poland (Wielkopolska) as against territory of contemporary Poland.

- The Lutheran Holy Cross Parish from the city of Poznań (German: *Kreutzkirche*, N = 7,587 deceased), 1855 – 1874,
- The Catholic St. Joseph's Parish from the town of Kalisz (N = 1,351 deceased; the death registers of this parish did not contain information on the causes of death), 1850 – 1865,
- The Lutheran Holy Cross Parish from the town of Leszno (N = 2,573 deceased), 1855 – 1874,
- The Catholic parish from the village of Dziekanowice (mortality figures and causes of death were extracted from the literature; Budnik *et al.* 2002, 2004), and
- The Lutheran parish from the village of Trzebosz (German: *Triebusch*; N = 314 deceased), 1855 – 1874.

Infant mortality and life expectancy figures for Poznań: the poor Catholic St. Margaret's Parish, the wealthy Catholic St. Mary Magdalene's Parish, and the Lutheran Holy Cross Parish were extracted from previous paper published by the author [Liczbińska 2009*b*].

Assessment of reliability and validity of the historical written sources

A common feature of historical population registrations are smaller numbers of recorded events than the numbers of real events occurring at that time. This fact resulted, among others, from poor quality clergy work and poor organization of administration. Wars and natural disasters very often contributed to the disorder in registration recording. Exacting of payment by clergy for baptisms, marriage-ceremonies, and funerals provoked people to avoid registration. For this reason it is important to assess the reliability and validity of the historical sources. The quality of statistics and population registers from territories under Prussian, Austrian and Russian partition was variable:

Researchers found that the Prussian State had the highest population statistics standard [e.g., Szczypiorski 1962; Gieysztorowa 1962, 1971, 1976, 1980; Kaczmarski 1967; Borowski 1967, 1968; Ładogórski 1969; Wojtun 1976; Henneberg 1977; Klotzke 1980; Budnik 2005; Budnik & Liczbińska 2006; Liczbińska 2009 *a*,*b*].

Very often emphasised by authors is the fact that the lack of registrations occurred, first of all, among infants and young children. According to Gieysztorowa [1976], at the beginning of the 19th century, the frequencies of children in the age category 0 – 1 year below 30 % and for the age group 0 – 5 years below 50 % should be treated with suspicion [Gieysztorowa 1962, 1976; see also Sułowski 1962; Budnik 2005; Budnik & Liczbińska 2006]. However, records of stillbirths provide a very good indicator of the validity and reliability of 19th-century registers. These should constitute between 3-7 % all births [e.g., Borowski 1967, Ładogórski 1971, Gieysztorowa 1976, Henneberg 1977, Klotzke 1980, Budnik 2005, Budnik & Liczbińska 2006]. A sex ratio control is a very simple but accurate test of registers. According to biological law the sex ratio ranged between 101 and 107, usually 105 of boys per 100 girls [Gieysztorowa 1962]. Among all registers the most reliable were the marriage ones. Out of concern of an offspring's legality, great significance was apportioned to them. Based on the assumption of relatively complete marriage registers, the ratio of numbers of births to numbers of marriages (B/M) and the numbers of deaths to numbers of marriages (D/M) should a simple but be a very good test of register accuracy [Gieysztorowa 1962, 1971, 1976; Kędelski 1992]: the first ratio should be in the vicinity of 5.0, the last approximately 3.0 [see also Sułowski 1962 - D/M: 2.5 – 4.2].

In this study the validity and reliability of the historical sources were examined and the values of the tests are presented in Table 1. As can be seen data derived from death registers of the St. Joseph Parish from Kalisz should be treated with suspicion. It can be speculated that the numbers of recorded deaths in the 0-1 age category are smaller than the numbers of real events occurring at the time under study. This is not surprising: Researchers have emphasised that up to the end of the 19th century the registers from the territory of the Kingdom of Poland, being at the time under the Russian administration, had the lowest statistical standards [Gieysztorowa 1971, 1976; Gawrysiakowa 1980; Budnik 2005; Rejman 2006].

Table 1. Percentage of deaths in age categories 0–1 and 0–5, percentage of stillbirths in total number of births, ratio of number of births to number of marriages (B/M), number of deaths to number of marriages (D/M), and sex ratio (number of boys per 100 girls) in the populations under study

Populations	0–1 yrs	0–5 yrs	% of stillbirths	B/M Index	D/M Index	Sex ratio
Poznań – St. Margaret*	40.0	60.9	3.7	4.5	5.0	108
Poznań – St. M. Magdalene*	30.2	43.3	6.4	4.6	5.4	102
Poznań – Holy Cross*	37.0	53.0	5.0	4.4	3.5	105
Leszno – Holy Cross	33.0	45.0	4.4	5.1	4.3	110
Trzebosz	32.0	45.0	6.1	4.2	3.9	99
Kalisz – St. Joseph	29.0	50.0	2.9	4.3	2.9	109

* after Liczbińska 2009*a,b*

Methods

On the basis of information in the death registers, infant death rates (IDR) were first calculated. The infant death rate is the ratio of mortality of children under 1 year of age to the total number of live births in a studied period. It has two components: a neonatal death rate and a postneonatal death rate. The neonatal death rate is the ratio of the number of deaths up to an infant's 28th (sometimes 30th) day of life to the total number of live births. The postneonatal death rate is the number of deaths among infants older than 28 days and under one year of age against the number of live births [Holzer 2003].

A much more complete statistical picture of mortality is offered by life tables. The most widely known and most commonly used among the life table parameters is life expectancy at birth, e_0. It is a parameter expressing in a synthetic way the mortality ratios in the population under study. Life tables have been constructed for two model situations: (1) a stationary population model based on the assumption that fertility and mortality balance out and that the sex-age structure does not change with time [Acsádi & Nemeskéri 1970], and (2) a stable population model, making an allowance for the natural increase. The rate of the natural increase was calculated as the difference between the number of live births and the number of deaths related to the number of the live population [Pressat 1966, Holzer 2003]. In the studies on the Polish historical populations (medieval and 19th-century populations from the rural regions) such life tables, computed with an assumption of stable population state with the coefficient of the natural increase 'r', were introduced by Piontek and Henneberg [1981]. Intergroup differences in the e_0 values were assessed using nomographs and tables of standard errors for these values [Henneberg & Strzałko 1975].

Subsequently, a qualitative and a quantitative analysis of death causes were carried out. Three groups of diseases were selected: airborne diseases (diphtheria, whooping cough, measles, smallpox, and scarlet fever), waterborne diseases (cholera, diarrhoea, dysentery, and typhus), and tuberculosis *(phthisis, consumption)*. The significance of intergroup differences was assessed with the *u* test [Oktaba 1976]. A single level of significance $P = 0.05$ was used.

Results

Urban and Rural Differences

Tables 2 and 3 contain infant death rates and neonatal and postneonatal death rates for the Catholics and Lutherans from the city of Poznań, and selected small towns and villages. As can be expected, the highest values of the IDR (and its components) among both the Catholic and Lutheran denominations were noted in the city of Poznań. It ranged from about 270 deaths per 1,000 live births to about 390 deaths per 1,000 live births. In the rural and small town communities, the IDR figures had the lowest values and ranged between 230 infant deaths per 1,000 live births to about 250 infant deaths per 1,000 live births.

Tables 4-5 as well as Fig. 2 show the values of life expectancy of a newly born child, e_0, and an adult, e_{20}. The most favourable situation was noted for the villages. For both Catholics and Lutherans from the rural areas the e_0 parameter had the highest values: in the Lutheran Parish from the

Table 2. Infant, neonatal and postneonatal death rates in Lutheran populations, 1855-1874 (per 1,000 live births)

Population	Infant death rate	Neonatal death rate	Postneonatal death rate
Poznań – Holy Cross*	293.10 [a,b]	99.10 [a,b]	193.90 [a,b]
Leszno – Holy Cross	230.07	71.61	158.44
Trzebosz	232.35	82.34	150.00

* after Liczbińska 2009*a*,*b*
statistically significant differences (*u* test) between: [a] Poznań – Leszno; [b] Poznań – Trzebosz

Table 3. Infant, neonatal and postneonatal death rates in Catholic populations, 1855-1874 (per 1,000 live births)

Population	Infant death rate	Neonatal death rate	Postneonatal death rate
Poznań – St. Margaret*	386.70 [a,b]	114.74 [a,b]	271.82 [a,b]
Poznań – St. M. Magdalene*	265.34 [c]	91.50 [c]	173.90 [c]
Kalisz – St. Joseph	248.12	82.50	165.00
Dziekanowice**	249.00 [d]	-	-

* after Liczbińska 2009*a*,*b;* ** after Budnik *et al.* 2002
statistically significant differences (*u* test) between: [a] – Poznań: St. Margaret – Poznań: St. Mary Magdalene; [b] – Poznań: St. Margaret – Kalisz; [c] – Poznań: St. Mary Magdalene – Kalisz; [d] – Dziekanowice – Catholic parishes from Poznań

Table 4. Values of life expectancy of a newly born child e_0 and an adult e_{20} in the Lutheran populations from Greater Poland in the second half of the 19th century

Population	Stationary population model		Stable population model		
	e_0	e_{20}	r	e_0	e_{20}
Poznań – Holy Cross*	25.44	29.01	0.0077	28.03	32.03
Leszno – Holy Cross	28.30	34.97	0.0114 [1]	38.11	38.48
Trzebosz	29.46	38.01	0.0202 [2]	47.03	42.60

* after Liczbińska 2009*b*
[1] author's calculation; the numbers of deaths, births and the living population for the towns of the Province of Poznań were extracted from the Prussian Statistics (*Preussische Statistik* 1875).
[2] author's calculation; the numbers of deaths, births and the living population for the rural areas of the Province of Poznań were extracted from the Prussian Statistics (*Preussische Statistik* 1875).

Table 5. Values of life expectancy of a newly born child e_0 and an adult e_{20} in the Catholic populations from Greater Poland in the second half of the 19th century

Population	Stationary population model			Stable population model	
	e_0	e_{20}	r	e_0	e_{20}
Poznań – St. Margaret [1]	17.99	30.50	-0.0035	16.14	29.57
Poznań – St. M. Magdalene [1]	20.24	32.35	0.0096	27.37	35.58
Kalisz – St. Joseph	22.53	31.69	0.0086 [2]	28.97	34.82
Dziekanowice [3]	23.20	34.00	0.0151	36.30	39.40

[1] after Liczbińska 2009*b*
[2] author's calculation; figures for the living population of Kalisz were extracted from *Słownik Geograficzny* [1880-1902]
[3] e_0 and e_{20}: values for the years 1851-1903 [Budnik *et al.* 2002, 2004]

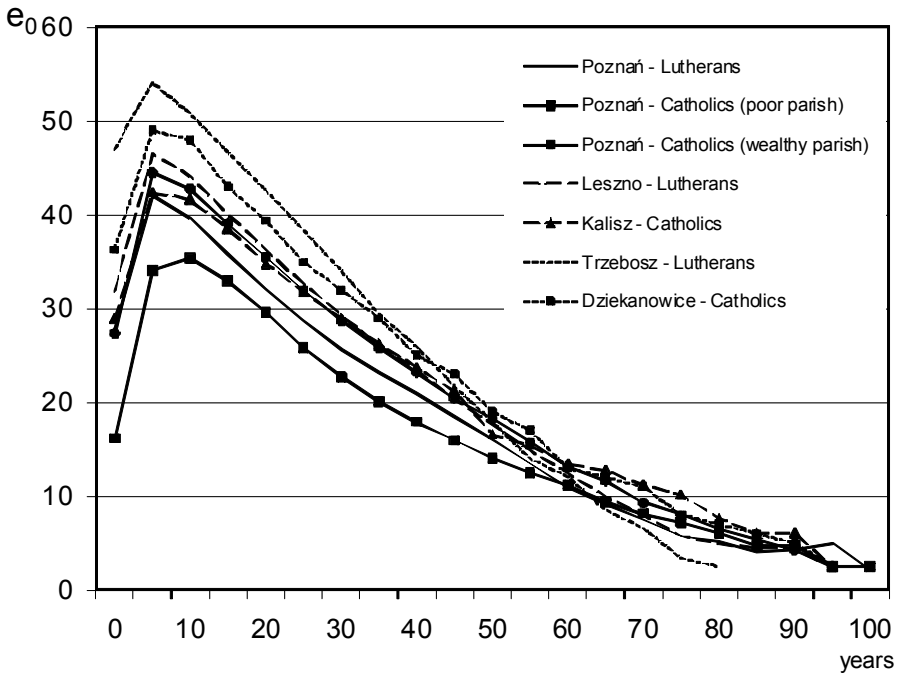

Fig. 2. Values of life expectancy e_x in the studied populations (stable population model) (data for Poznań after Liczbińska 2009b; data for Dziekanowice after Budnik *et al*. 2002, 2004).

village of Trzebosz an average newly born child had a chance to live 47 years, while its peer living in the St. Mary Magdalene and Holy Cross Parishes from Poznań – 20 years less, or in the St. Margaret Parish, 30 years less (stable population model). The life expectancy of an adult person from Trzebosz was 42 years, while the e_{20} value calculated

for an average adult from Poznań was about 10 years less (stable population model). In the Catholic Parish from the village of Dziekanowice a newly born child's life expectancy was 36 years [after Budnik *et al.* 2002, 2004; stable population model], which was 8 years more than for the city's parishes: the wealthy Catholic and the Lutheran one. Moreover, this was also 20 years more than for the poor Catholic St. Margaret's Parish from the city of Poznań.

Causes of death also had a specific character depending on the size of the place of residence. Three groups of diseases were selected for examination: airborne diseases (diphtheria, whooping cough, measles, smallpox, and scarlet fever), waterborne diseases (cholera, diarrhoea, dysentery, and typhus), and tuberculosis. Both the Lutheran and Catholic rural communities suffered from a high toll of airborne diseases: the proportion of deaths was twice as high as in the city of Poznań. Poznań, in turn, had the highest mortality rates due to waterborne diseases and tuberculosis (Fig. 3).

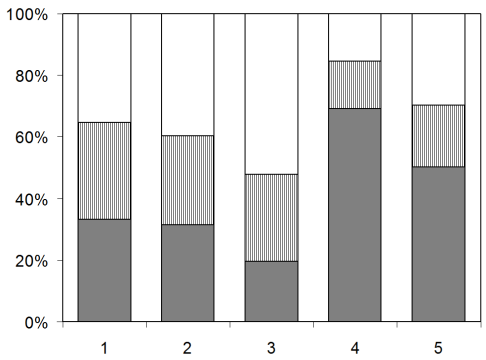

Fig. 3. Causes of death in the studied populations: (1) Poznań – poor Catholic Parish; (2) Poznań – wealthy Catholic Parish; (3) Poznań – Lutheran Parish; (4) Trzebosz – Lutheran Parish; (5) Dziekanowice – Catholic Parish (author's calculations based on Budnik *et al*. 2002, 2004).

Religious Differences

Certain differences in mortality measures between Catholics and Lutherans from the above-mentioned places of residence were also observed. The Catholics from rural areas and small towns had the highest infant mortality, while the Lutherans from the same type of localities the lowest (Tables 2-3). Even more distinct differences are apparent in the values of e_0. An average Lutheran newly born child from of the village of Trzebosz had a chance to live 11 years longer than their Catholic peer living in the village Dziekanowice. A similar situation was observed with regard to the towns. Among the Lutherans from Leszno a newly born child's life expectancy was 10 years longer than the same measure calculated for the Catholics from Kalisz (Tabs. 3-4, Fig. 2; stable population model).

With regard to the city of Poznań differences in the values of infant mortality rates and life expectancy between the Catholics and the Lutherans in favour of the Lutherans are not completely unequivocal. The highest value of IDR occurred in the poor Catholic Parish of St. Margaret. In turn, in the other Catholic population from the more affluent City Centre, the Parish of St. Mary Magdalene, infant death rates and its components were the lowest. In the Lutheran Parish of St. Cross infant death rate attained values significantly higher than in the Parish of St. Mary Magdalene but significantly lower than in the poor Catholic Parish of St. Margaret (Table 3). The life expectancy e_0 had the least favourable values in the Catholic Parish of St. Margaret. In turn, in the Catholic Parish of St. Mary Magdalene from the City Centre and the Lutheran Parish of Holy Cross life expectancy at birth e_0 was as many as 12 years more than in the Parish of St. Margaret (Tabs. 3-4, stable population model).

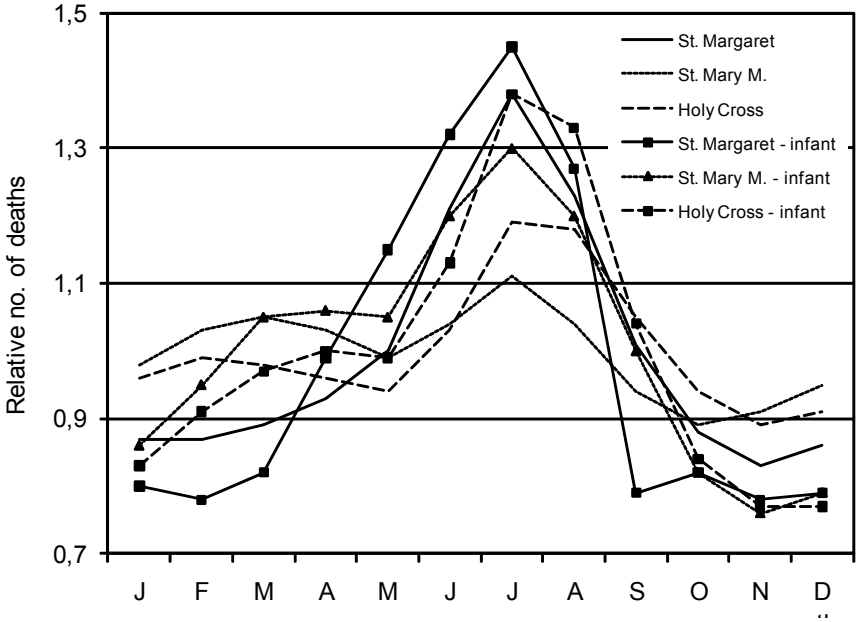

Fig. 4. Annual rhythm of deaths against seasonality of infant deaths in the Catholic and Lutheran parishes from Poznań (data from Liczbińska 2009*b*).

Discussion

The fortified and overpopulated city of Poznań with its huge infrastructure deficits posed a threat to life and health. It seems that the higher mortality level among the Lutherans and Catholics of Poznań, compared to the rural areas and small towns, was a result of poor sanitary and hygienic conditions as well as a shortage of clean water provision in the city. The poorest epidemiological conditions were noted in the Catholic St. Margaret's Parish, encompassing the poorest, most dilapidated districts of Poznań [Karolczak 1997*a*,*b*; Liczbińska 2009*a*,*b*]. A better situation was observed in the more affluent Catholic St. Mary Magdalene's Parish situated in the city centre near the Market Square. It enjoyed a higher standard of living and was privileged in terms of infrastructure, which translated into more favourable mortality measures than elsewhere in Poznań [Kędelski 1994; Karolczak 1997*a*,*b*; Kaniecki 2004; Liczbińska 2009*a*,*b*]. The Lutherans from the Parish of Holy Cross lived in different parts of the city, and some of them also in villages and small towns near Poznań. This resulted in a whole spectrum of environmental conditions and varying access to civil amenities across the parish. Only the Lutherans living close to the city marketplace had access to wells with uncontaminated water, while the rest of the population used contaminated sources available in the vicinity of their dwellings [Kaniecki 2004]. In 19th century Poznań unequal access to the city's infrastructure

and poor ecological conditions were the most important factors for high mortality among Catholics and Lutherans, rather than religious denomination. In this study mortality measures calculated for Poznań's parishes were divided according to environmental conditions in different districts of the city. The Lutherans from the Holy Cross Parish, despite their better economic position, better education, and hence higher awareness, were unable to cope with poor sanitary and hygiene conditions in the city, and as a result were unable to reduce their high infant mortality rate.

In contrast, the figures calculated for both Catholics and Lutherans from the villages and small towns were the most favourable. Nineteenth-century Greater Poland villages and towns were devoid of such dangers as Poznań faced, and were characterized mainly by less deleterious ecological conditions: a smaller population density and a still unpolluted environment by rapidly developing industry [Budnik & Liczbińska 2005, 2006]. Hence, the denomination factor, related to the differences in the quality of life and lifestyle and effected through socio-economic variables, affected mortality measures to a considerable degree. Therefore, the relationship between mortality level and religious denominations are more visible there than in the city of Poznań.

Stratification, depending on the size of place of residence rather than between Catholics and Lutherans, was also observed in the distribution of selected categories of causes of death. Researchers have noted that religious observances and traditional patterns of behaviour among Lutherans manifesting, among others, in forms of activity that promoted good health, resulted in lower incidence of illness, especially in digestive system diseases among infants [e.g., van Poppel 1992, McQuillan 1999, van Poppel *et al.* 2002, Kemkes-Grottenthaler 2003]. Kemkes-Grottenthaler [2003] mentioned that as early as the 17th century the Protestant Church, aware of the problem of high child mortality, published special instructions advising on how to cope with illnesses and encouraged women to breast feed their babies for as long as possible [McQuillan 1999, Kemkes-Grottenthaler 2003]. This study indicates that infectious diseases took a heavy toll among both Catholics and Lutherans inhabiting the rural areas of Greater Poland. It is worth mentioning that a similar pattern of rural and urban distribution of infectious diseases was noted earlier with regard to the Poznań Province (*Provinz Posen*) in the second half of the 19th century and the beginning of the 20th century [Budnik & Liczbińska 2006]. Although in 1815 and 1835 regulations stating how to deal with infections in a professional manner were issued [Karaśkiewicz 1936-1937, Budnik & Liczbińska 2006], awareness of them in the rural areas was probably very limited. The percentages of waterborne diseases were, by contrast, higher among the Lutherans and Catholics from the city of Poznań, which reflected the poor hygiene and sanitation, and lack of access to clean water in the overcrowded rapidly industrializing city. In the capital of Grater Poland a modern water-supply system was only completed in 1866, and the sewage system was constructed as late as the end of the 19th century [cf. Trzeciakowska & Trzeciakowski 1987; Kędelski 1994; Liczbińska 2009*a*,*b*]. In the city of Poznań, typhoid, dysentery and cholera were more frequent than in the rural areas. Sanitation problems in Poznań were very severe especially in the summer months as confirmed by a higher summer mortality in both Catholic and Lutheran communities (Fig. 4). The mortality increases arose mainly from high postneonatal mortality

due to infectious diseases and gastric infections, such as diarrhoea and dysentery, being higher in summer than in the other months [Liczbińska 2009*a*,*b*]. Researchers have attributed such postneonatal mortality increase among Catholics babies to early weaning. According to them, due to an unjustified shame complex, women in Catholic families breastfed their babies for only a short time [McQuillan 1999, Kemkes-Grottenthaler 2003]. The conclusions of this paper is that an infant mortality peak resulted from poor ecological conditions in the city rather than early weaning. The abovementioned summer mortality increase related to airborne and waterborne diseases was not observed in the rural populations of either denomination (see also Borowski 1976). Deaths due to tuberculosis were linked mainly with industrialization and urbanization, which has been borne out by studies on this subject [e.g., Cronjé 1984; Puranen 1991; Landers 1993; Liczbińska 2009*a*,*b*]. The highest death rates due to tuberculosis were recorded among the inhabitants of Poznań, irrespective of their denomination (Fig. 3). Poor living and working conditions as well as malnutrition, mainly among unskilled workers, were associated with a higher mortality due to tuberculosis in Poznań than in the rural areas of Greater Poland [Cronjé 1984; Trzeciakowska & Trzeciakowski 1987; McFarlane 1989; Puranen 1991; Landers 1993; Bryder 1996; Karolczak 1997*a,b*; Wolleswinkel-van den Bosch *et al.* 1998, 2000, 2001; Budnik & Liczbińska 2005, 2006; Liczbińska 2009*a*,*b*].

Concluding remarks

The effect of size of place of residence on the demographic measures and causes of death among 19th-century Lutherans and Catholics from Greater Poland was studied. The analysis showed that biological conditions among the Catholics and Lutherans from the city of Poznań were unfavourable in comparison to the rural areas. The industrialized and overpopulated city with a shortage of free space and lack of infrastructure presented threats to life and health. On the other hand, rural and small-town communities were characterized by an unpolluted environment and a low population density.

Despite their better economic position and, education, and hence higher awareness, the Lutherans living in Poznań were unable to cope with all the infrastructure deficits in the city and, as a result, to reduce mortality. Rural areas and small towns were characterized by less deleterious environmental effects and here, therefore, differences in mortality level between the Catholics and Lutherans are more marked than for the city of Poznań.

Notes

Acknowledgements I would like to express my appreciation to my students: Kamila Stachura, Katarzyna Lica and Monika Maciejewska, who made their data on Kalisz available to me.

This paper was presented as a poster at 17th Congress of the European Anthropological Association "Biological, Social and Cultural Dimensions of Human Health", in Poznań, Poland, in August 2010.

References

Acsádi G., J. Nemeskéri, 1970, *History of Human Life Span and Mortality*, Akadémiai Kiadó, Budapest

Bielicki T., H. Szczotka, J. Charzewski, 1988, *Wysokość i względny ciężar ciała poborowych polskich w dziesięcioleciu 1976-1986: zmiany sekularne i gradient urbanizacyjny*, Prz. Antropol., **54**, 27–32

Bielicki T., Z. Welon, 1982, *Growth data as indicators of social inequalities: The case of*

Poland, Am. J. Phys. Anthropol., **25**,153–67
Bogin B., 1988, *Rural – to – Urban migration*, [in:] C.G.N. Mascie – Taylor and W.G. Lasker (eds.), *Biological aspects of human migration*, Cambridge Univ. Press, Cambridge, pp. 90–129
Borowski S., 1967, *Zgony i wiek zmarłych w Wielkopolsce w latach 1806-1914*, Przeszłość Demograficzna Polski, **1**, 111–30
Borowski S., 1968, *Emigracja z ziem polskich pod panowaniem niemieckim w latach 1815-1914*, Przeszłość Demograficzna Polski, **2**, 139–67
Borowski S., 1976, *Procesy demograficzne w mikroregionie Czacz w latach 1598-1975*, Przeszłość Demograficzna Polski, **9**, 95–156
Bryder L., 1996, *Not always one and the same thing: The registration of tuberculosis deaths in Britain, 1900 – 1950*, Soc. Hist. Med., **9**, 253–65
Budnik A., 2005, *Uwarunkowania stanu i dynamiki biologicznej populacji kaszubskich w Polsce. Studium antropologiczne*, Wyd. Naukowe UAM, Poznań.
Budnik A., I. Gumna, G. Liczbińska, 2002, *Dynamika biologiczna XIX-wiecznych populacji wiejskich z parafii Dziekanowice jako efekt sytuacji społeczno – politycznej w mikroregionie Ostrowa Lednickiego we wczesnym średniowieczu*, Studia Lednickie, **VII**, 95–110
Budnik A., G. Liczbińska, 1997, *Mortality in the populations of Danzig and the District of Danzig (Regierungsbezirk Danzig) in the second half of the nineteenth century*, Prz. Antropol., **60**, 13–24
Budnik A., G. Liczbińska, 2005, *Ecological causes of health status and mortality among the inhabtants of historical Poland*, [in:] J. Jerzemowski, M. Grzybiak, J. Piontek (eds.), *Wszystkich rzeczy miarą jest człowiek*, Tower Press, Gdańsk, pp. 565–69
Budnik A., G. Liczbińska, 2006, *Urban and Rural Differences In Mortality and Causes of Death In Historical Poland*, Am. J. Phys. Anthropol., **129**, 294–304
Budnik A., G. Liczbińska, I. Gumna, 2004, *Demographic Trends and Biological Status of Historic Populations From Central Poland: The Ostrów Lednicki Mikroregion*, Am. J. Phys. Anthropol., **125**, 369–81
Burnett J., 1991, *Housing and the Decline Mortality*, [in:] R. Shofield, R.D. Reher, A. Bideau (eds.), *The Decline of Mortality in Europe*, Clarendon Press, Oxford, pp. 158–76
Chwalba A, 2000, *Historia Polski. 1795-1918*, Wydawnictwo Literackie, Kraków
Cronjé G, 1984, *Tuberculosis and mortality decline in England and Wales, 1851-1910*, [in:] R. Woods, J. Woodward (eds.), *Urban Disease and Mortality in Nineteenth-Century England*, Batsford, London, pp. 79–101
Fauman S. J, A.J. Mayer, 1969, *Jewish Mortality in the U.S*, Hum. Biol., **3**, 416–26
Friedlander Y., J. D. Kark, Y. Stein, 1986. *Religious orthodoxy and myocardial infarction in Jerusalem – A case-control study*, Int. J. Cardiol., **10**, 33–41
Gawrysiakowa J, 1980, *Realizacja zasad rejestracji ruchu naturalnego ludności różnych wyznań w latach 1797-1900*, Przeszłość Demograficzna Polski, **12**, 7–45
Gieysztorowa I, 1962, *Badania demograficzne na podstawie metryk parafialnych*, Kwartalnik Historii Kultury Materialnej, **X** (1-2), 103–21
Gieysztorowa I, 1971, *Niebezpieczeństwa metodyczne polskich badań metrykalnych XVII – XVIII wieku*, Kwartalnik Historii Kultury Materialnej, **XIX** (4), 557–603
Gieysztorowa I, 1976, *Wstęp do demografii staropolskiej*, PWN, Warszawa
Gieysztorowa I, 1980, *Niewiarygodność statystyki demograficznej ziem polskich w XIX w. i potrzeba jej korekty*, Przeszłość Demograficzna Polski, **12**, 179–90
Glass D.V., 1964, *Some Indicators of Differences between Urban and Rural Mortality in England and Wales and Scotland*, Population Stud., **17** (3), 263–67
Haines M.R.,1991, *Conditions of Work and the Decline of Mortality*, [in:] R. Shofield, R.D. Reher, A. Bideau (eds.), *The Decline of Mortality in Europe*, Clarendon Press, Oxford, pp. 177–95
Haines M.R., H.J. Kintner, 2000, *The Mortality Transition in Germany, 1860-1935*, Hist. Metod., **33** (2), 83–104
Henneberg M, 1977, *Ocena dynamiki biologicznej wielkopolskiej dziewiętnastowiecznej populacji wiejskiej. I. Ogólna charakterystyka demograficzna*, Prz. Antropol., **43**, 67–89
Henneberg M., J. Strzałko, 1975, *Wiarygodność oszacowania dalszego przeciętnego trwania życia w badaniach antropologicznych*, Prz. Antropol., **XLI** (2), 295–309
Holzer J. Z., 2003, *Demografia*, Państwowe Wyd. Ekonomiczne, Warszawa
Hulanicka B., C. Brajczewski, W. Jedlińska, T. Sławińska, A. Waliszko, 1990, *City town-village. Growth of children in Poland 1988*,

Monographs of the Institute of Anthropology 7, Polish Academy of Science, Wrocław

Johansson K., 2004, *Child Mortality during the Demographic Transition. A Longitudinal Analysis of a Rural Population in Southern Sweden, 1766-1894*, Lund University Press, Lund

Kaczmarski B, 1967, *Ocena spisów ludności na Śląsku z pierwszej połowy XIX wieku*, Przeszłość Demograficzna Polski, **1**, 33–63

Kaniecki A., 2004, *Poznań. The History of the City Written with Water*, Wyd. PTPN, Poznań

Karaśkiewicz A.M., 1936–1937, *Stosunki sanitarne i epidemiczne w Bydgoszczy*, Archiwum Historii i Filozofii Medycyny, **16**, 59–106

Kark J. D., G. Shemi, Y. Friedlander, O. Martin, O. Manor, et al.,1996, *Does Religious Observance Promote Health? Mortality in Secular vs. Religious Kibbutzim in Israel*, Am. J. Public Health, **86** (3), 341–46

Karolczak W., 1997*a*, *Chwaliszewo przełomu XIX/XX wieku. Przemiany oblicza dzielnicy,* Kronika Miasta Poznania, **1**, 100–37

Karolczak W., 1997*b*, *Życie codzienne mieszkańców Śródki w XIX i na początku XX wieku,* Kronika Miasta Poznania, **1**, 160–86

Kemkes-Grottenthaler A., 2003, *God, Faith and Death: The impact of Biological and Religious Correlates on Mortality*, Hum. Biol., **75** (6), 897–915

Kędelski M., 1992, *Rozwój demograficzny Poznania w XVIII i na początku XIX wieku*. Wyd. Akademii Ekonomicznej, Poznań

Kędelski M., 1994, *Stosunki ludnościowe w latach 1815-1918,* [in:] J. Topolski J., L. Trzeciakowski (eds.), *Dzieje Poznania, 1793-1918, t. 2*, Wyd. Nauk. PWN, Warszawa, pp. 222–70

Kiec O., 2001, *Protestantyzm w Poznańskiem 1815-1918,* Wyd. Nauk. Semper, Warszawa

Klotzke, Z, 1980, *Ludność obwodu Urzędu Stanu Cywilnego Luzino w latach 1874-1918,* Przeszłość Demograficzna Polski, **12**, 65–104

Knodel J., 1974, *The decline of fertility in Germany, 1871-1939*, Princeton Univ. Press, Princeton

Landers J., 1993, *Death and the metropolis. Studies in the demographic history of London 1670-1830*, Cambridge Univ. Press, Cambridge

Leviatan U., J. Cohen, 1985, *Gender differences in life expectancy among kibbutz members*, Soc. Sci. Med., **21**, 545–51

Liczbińska G., 1999, *Biological and social reasons of child mortality in the Danzing district in the second part of the 19th century*, Prz. Antropol., **62**, 85–92

Liczbińska G., 2009*a*, *Infant and child mortality among Catholics and Lutherans in nineteenth century Poznań*, J. Biosoc. Sci., **41** (5), 661–83

Liczbińska G., 2009*b*, *Umieralność wśród katolickiej i ewangelickiej ludności historycznego Poznania*, Biblioteka Telgte, Poznań

Ładogórski T., 1969, *Złudzenia pruskiej statystyki ludności pierwszej połowy XIX w. i próby jej korekty na Śląsku*, Przeszłość Demograficzna Polski, **3**, 3–27

Ładogórski T., 1971, *Ruch naturalny ludności Śląska w latach 1816-1849*, Przeszłość Demograficzna Polski, **4**, 61–100

McFarlane N., 1989, *Hospitals, Housing, and Tuberculosis in Glasgow, 1911-51*. Soc. Hist. Med., **2** (1), 59–85

McQuillan K., 1999, *Culture, Religion, and Demographic Behaviour: Catholics and Lutherans in Alsace, 1750-1970*, Mc Gill-Queen's University Press, Montreal

Oktaba W., 1976, *Elementy statystyki matematycznej i metodyka doświadczalnictwa*, Wyd. Nauk. PWN, Warszawa

Piontek J., M. Henneberg, 1981*, Mortality Changes in a Polish Rural Community (1350-1972) and Estimation of Their Evolutionary Significance*, Am. J. Ph. Anthropol., **54**, 129–38

Pressat R., 1966, *Analiza demograficzna*, PWN, Warszawa

Preston S. H., H.R. Haines, 1991, *Fatal Years. Child mortality in late nineteenth–century America*, Princeton Univ. Press, Princeton

Preston S. H., M.R. Haines, E. Panuk 1981, *Effects of industrialization and urbanization on mortality in developed countries*, International Population Conference in Manila 1981, *Proceeding*, **2**, 233–53

Preston S. H., E. van de Walle, 1978, *Urban French Mortality in the Nineteenth Century*, Population Stud., **32** (2), 275–97

Preussische Statistik. Die Bewegung der Bevölkerung. Die Geburten, Eheschliessungen und Sterbefälle. Herausgegeben in zwanglosen Heften vom Königliche Preussischen Statistischen Bureau in Berlin, **XLII**, 1875, Berlin.

Puranen B., 1991, *Tuberculosis and the Decline of Mortality in Sweden*, [in:] R. Shofield, R.D. Reher, A. Bideau (eds.), *The Decline of Mortality in Europe*, Clarendon Press, Oxford, pp. 97–117

Rejman S., 2006, *Ludność podmiejska Rzeszowa w latach 1784-1880,* Wyd. Uniwersytetu Rzeszowskiego, Rzeszów

Schofield R., D. Reher, 1991, The Decline of Mortality in Europe, [in:] R. Shofield, R.D. Reher, A. Bideau (eds.), *The Decline of Mortality in Europe*, Clarendon Press, Oxford, pp. 1–18

Słownik geograficzny Królestwa Polskiego i innych krajów słowiańskich, 1880-1902, F. Sulimierski (ed.), Nakładem W. Walewskiego, Warszawa

Schmelz U.O, 1971, *Infant and early childhood mortality among the Jews of the diaspora,* The Institute of Contemporary Jewry, The Hebrew University of Jerusalem, Jerusalem.

Sułowski Z., 1962, *O właściwą metodę wykorzystywania metryk kościelnych dla badań demograficznych*, Kwartalnik Historii Kultury Materialnej, **X** (1–2), 81–101

Szczypiorski A., 1962, *Badania ksiąg metrykalnych a obliczenia ludności Polski w wieku XVII – XVIII*, Kwartalnik Historii Kultury Materialnej, **X** (1–2), 53–75

Trzeciakowska M., L. Trzeciakowski, 1987, *W dziewiętnastowiecznym Poznaniu*, Wyd. Poznańskie, Poznań

Trzeciakowski L., 1994, *Społeczeństwo i jego życie codzienne i kultura materialna*, [in:] J. Topolski, L. Trzeciakowski (eds.), *Dzieje Poznania, 1793-1918, t. 2*, Wyd. Nauk. PWN, Warszawa, pp. 296–427

van Poppel F., 1992, *Religion and Health: Catholicism and Regional Mortality Differences in Nineteenth-Century Netherlands*, Soc. Hist. Med., **5**, 229–53

van Poppel F., J. Schellekens , A. Liefbroer, 2002, *Religious differentials in infant and child mortality in Holland, 1855-1912*, Population Stud., **56**, 277–89

van Poppel F., M. Jonker, K. Mandemakers, 2005, *Differential infant and child mortality in three Dutch regions, 1812-1909*, Econ. Hist. Rev., **LVIII** (2), 272–309

Vögele J., 1998, *Urban Mortality Change in Britain and Germany 1870-1913*, Liverpool Univ. Press, Liverpool.

Williams N., C. Galley, 1995, *Urban – rural differentials in infant mortality in Victorian England*, Population Stud., **49**, 401–20

Wojtun B.S, 1976, *Ocena jakości pruskiej statystyki ludnościowej przy użyciu równań bilansujących*, Przeszłość Demograficzna Polski, **9**, 27–40

Wolleswinkel-van den Bosch J.H., F.W.A. van Poppel, C.W.N. Looman, J.P. Mackenbach, 2001, *The role of cultural and economic determinants in mortality decline in the Netherlands, 1875/1879 – 1920/1924: A regional analysis*, Soc. Sci. Med., **53**, 1439–53

Wolleswinkel-van den Bosch J.H., F.W.A . van Poppel, J.P. Mackenbach, C.W.N. Looman, 2000, *Determinants of infant and early childhood mortality levels and their decline in the Netherlands in the late nineteenth century*, Int. J. Epidemiol., **29**, 1051–40

Wolleswinkel-van den Bosch J.H., F.W.A. van Poppel, E. Tabeau, J.P. Mackenbach, 1998, *Mortality decline in the Netherlands in the period 1850-1992: A turning point analysis*, Soc. Sci. Med., **47** (4), 429–43

Woods R. I., P.A. Watterson, J.H. Woodward, 1988, *The causes of rapid infant mortality decline in England and Wales, 1861-1921. Part I*, Population Stud., **42**, 343–66

Woods R. I., P.A. Watterson, J.H. Woodward, 1989, *The causes of rapid infant mortality decline in England and Wales*, *1861-1921. Part II*. Population Stud., **43**, 113–32

Streszczenie

Celem pracy było zbadanie, czy mierniki umieralności i przyczyny zgonów w populacjach katolików i ewangelików z XIX-wiecznej Wielkopolski: 1) rozwarstwiają się w zależności od wielkości miejsca zamieszkania 2) rozwarstwiają się w zależności od wyznania w ośrodkach różniących się wielkością. Wykorzystano dane o umieralności z parafialnych ksiąg zgonów dla parafii katolickich i ewangelickich z następujących ośrodków: Poznania (katolickie parafie: św. Małgorzaty; $N = 6893$ i św. Marii Magdaleny; $N = 5376$, ewangelicka parafia św. Krzyża;

N = 7587), małych miast: Leszna (ewangelicka parafia św. Krzyża; *N* = 2573) i Kalisza (katolicka parafia św. Józefa; *N* = 1351). Tereny wiejskie reprezentują: ewangelicka parafia Trzebosz (*N* = 314) oraz katolicka parafia Dziekanowice.

Scharakteryzowane współczynniki zgonów niemowląt, wartości oczekiwanego dalszego życia noworodka i osoby dorosłej oraz główne przyczyny zgonów silnie rozwarstwiają się na niekorzyść Poznania. W Poznaniu II połowy XIX wieku umieralność niemowląt zamykała się w przedziale od 270 do 390 niemowląt na 1000 żywo urodzonych. Na terenach wiejskich wartości współczynnika zgonów dzieci do 1. roku życia wynosiły od 230 do 250 ‰ (Tabele 2 i 3). Podobnie różnice na niekorzyść Poznania obserwujemy w wartościach e_0 i e_{20} (Tabele 3 i 4). Przeciętny mieszkaniec Poznania w momencie urodzenia miał szansę żyć 28 lat, a w ubogich robotniczych dzielnicach nawet 16 lat, gdy tymczasem jego rówieśnik z terenów wiejskich 20, a nawet 30 lat więcej.

Ów niekorzystny obraz umieralności katolików i ewangelików z Poznania, w porównaniu z mniejszymi ośrodkami, na który złożyła się głównie wysoka śmiertelność niemowląt i małych dzieci, odbijał szeroko rozumiane warunki ekologiczne. Poznań w II połowie XIX wieku był miastem zaniedbanym i pozbawionym infrastruktury: do połowy lat sześćdziesiątych XIX wieku nie posiadał nowoczesnych wodociągów, a dopiero pod koniec wieku doczekał się kanalizacji. Braki ujęć czystej wody pitnej, kanalizacji i niski poziom opieki medycznej przyczyniały się do częstych epidemii chorób zakaźnych, które bez względu na wyznanie i pochodzenie społeczne, zbierały ogromne żniwo. W II połowie XIX wieku tylko w rynku miejskim znajdowały się studnie z czystą wodą oraz działały prymitywne kanalizacje odprowadzające nieczystości. Inaczej rzecz się miała w wioskach i małych miastach, które w XIX wieku charakteryzowały się przede wszystkim mniejszą gęstością zaludnienia i nieskażonym jeszcze środowiskiem.

W odniesieniu do XIX-wiecznej Europy Zachodniej, badacze niejednokrotnie podkreślali różnice w miernikach umieralności między katolikami i ewangelikami. Ewangelicy byli, w przeciwieństwie do biednych i konserwatywnych katolików, zwykle lepiej wykształceni i zaawansowani ekonomicznie, co podnosiło jakość ich życia, a otwarta na zdobycze cywilizacyjne religia ewangelicka nakazywała im podejmowanie wszelkich form aktywności w trosce o zdrowie. Wszystko to przekładało się na mniejszą umieralność niemowląt z rodzin ewangelików w porównaniu z katolikami oraz szybsze spadki umieralności ogólnej w czasie. W XIX-wiecznym Poznaniu różnice między katolikami i ewangelikami w poziomie umieralności są niejednoznaczne: najwyższe wartości umieralności niemowląt odnotowano tak wśród ewangelików, jak i ubogich katolików. Z kolei, wartości oczekiwanego dalszego trwania życia noworodka e_0 (miernika wyrażającego w syntetyczny sposób stosunki wymieralności) wypadły jednakowo korzystnie wśród katolików mieszkających w uprzywilejowanym pod względem infrastruktury rynku miejskim, jak i ewangelików, najgorzej – w ubogiej parafii katolickiej. Na wsiach i w małych miastach negatywny wpływ czynników środowiskowych był zdecydowanie słabszy niż w przemysłowym, przeludnionym i cierpiącym na niedostatki w zakresie infrastruktury Poznaniu, stąd też silniej zaznaczyły się różnice w miernikach umieralności pomiędzy katolikami i ewangelikami.