

Epidemiology of suicides committed by the elderly in Poland between 2005 and 2013

Epidemiologia samobójstw dokonanych wśród osób w podeszłym wieku w Polsce w latach 2005-2013

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Abstract

Introduction. Over the last century, the aging of the population in Poland and other European Union (EU) countries has become an intense global phenomenon. Furthermore, according to demographic data, the aging process is likely to intensify. Numerous studies show that this coincides with a global increase in suicidal behaviours displayed by the elderly. Consequently, the steadily growing number of older individuals will lead to an increase in reported suicides and suicide attempts, which constitutes a major issue in health care. **Objectives.** The paper aims to estimate the frequency of suicidal acts committed by people over the age of 60, and to draw attention to the percentage of deaths resulting from suicidal behaviours in the context of the age structure and sex. **Material and methods.** The presented data concerning suicide deaths among people over the age of 60 in Poland in between 2005 and 2013 were obtained from the Demographic Database of the Central Statistical Office (CSO). **Results.** In between 2005 and 2013, the number of suicides committed by the elderly amounted to approximately 23% of all suicidal acts. The assessment indicated a significant positive correlation between the age and sex of respondents against the frequency of suicides. The highest rate of suicides is attributed to men. It has also been found that the number of suicidal deaths among women decreases in a statistically significant manner in each subsequent age group. Such a trend has also been observed in relation to men, albeit it is even more dynamic a process. **Conclusions.** Further studies on suicides committed by the elderly may contribute to diminishing the death rates and establishing proper mechanisms of preventive measures. (*Gerontol Pol* 2018; 26; 79-85)

Key words: epidemiology, suicides, elderly age

Streszczenie

Wstęp. Proces starzenia się społeczeństwa polskiego i pozostałych krajów Unii Europejskiej (UE) w ostatnim stuleciu przybrał miano intensywnego zjawiska globalnego. W odniesieniu do danych demograficznych, proces starzenia się społeczeństwa, będzie odnotowywany z jeszcze większym natężeniem aniżeli dotychczas. Według licznych doniesień naukowych w wielu krajach świata dochodzi także do globalnego wzrostu zachowań municypalnych popełnianych przez osoby w podeszłym wieku. W konsekwencji progresywnie zwiększająca się liczba osób starszych doprowadzi do wzrostu odnotowywanych samobójstw i prób samobójczych, które stanowią istotny problem zdrowia publicznego. **Cel.** Celem naszej pracy jest określenie częstości występowania aktów samobójczych wśród osób po 60 r.ż. Zwrócenie uwagi na odsetek zgonów wynikających z zachowań suicydalnych w zależności od struktury wieku oraz płci. **Materiał i metody.** Przedstawione dane dotyczące zgonów, spowodowanych aktem samobójczym, u osób po 60 roku życia w Polsce w latach 2005-2013 z uwzględnieniem różnych cech demograficznych, uzyskano z Bazy Danych Demografia- Głównego Urzędu Statystycznego (GUS). **Wyniki.** W latach 2005-2013 samobójstwa wśród osób w podeszłym wieku stanowiły blisko 23% wszystkich podjętych aktów suicydalnych. Wykazano istotne korelacje między wiekiem, płcią, miejscem zamieszkania respondentów a częstotliwością podejmowanych samobójstw dokonanych. W największym stopniu liczba zgonów samobójczych jest zauważalna u mężczyzn. Wykazano także, iż u kobiet liczba zgonów samobójczych istotnie statystycznie spada w każdej kolejnej grupie wiekowej. W przypadku mężczyzn tendencja spadkowa również jest zauważalna, ale stanowi ona jeszcze bardziej dynamiczny proces. **Wnioski.** Prowadzenie dalszych badań dotyczących samobójstw dokonanych wśród osób w podeszłym wieku może

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przyczynić się do zmniejszenia współczynnika zgonów oraz do wypracowania odpowiednich mechanizmów zachowań prewencyjnych. (*Gerontol Pol* 2018; 26; 79-85)

Słowa kluczowe: epidemiologia, samobójstwa, podeszły wiek

Introduction

Over the last century, the aging of the population in Poland and other European Union (EU) countries has become an intense global phenomenon [1], which is evident from the progressively increasing percentage of the elderly [2]. According to the Central Statistical Office, the size of the sub-population over the age of 65 will increase by 5.4 million in the year 2050. Moreover, the CSO researchers anticipate that by the year 2025 there will have been an increase in the “younger” population, aged 65-79, with a simultaneous decrease in the number of individuals over the age of 80. After 2025, however, there will likely be a considerable growth in the sub-population of people aged 80+ [3]. The issue of aging affects countries all over the world; and thus it constitutes a major element of the political agenda. This stems from an absolute global increase in the number of the elderly. The World Health Organisation (WHO) anticipates that the size of the sub-population over the age of 65 is likely to increase from approximately 524 million in 2010 to nearly 1.5 billion in 2050. Admittedly, such intensity of growth will occur predominantly in highly developed countries [4,5].

Due to the progressively increasing number of the elderly, suicide trends are believed to be of substantial importance for public health in this specific age group [6]. Numerous studies indicate a global increase in suicidal behaviours in the old age [7]. Statistically, suicide attempts frequently correlate with the occurrence of mental disorders. Moreover, older age is believed to predispose to depressive disorders [8]. It is estimated that in approx. 80% of cases, depressive disorders were the prime cause of suicidal acts [9]. In their study, Wołodźko et al., [10] presented data obtained from the Analysis Section of the Police Headquarters, which suggest that mental disorders constitute the most frequent reasons for suicidal behaviours in Poland. The PolSenior study [2], which employed the Geriatric Depression Scale (GDS), revealed that depression tends to develop with age (20% of depressive disorders were diagnosed at the age of 55-59; 25% at the age of 65-79; 33% at the age of 80+).

Owing to the aging of the society, older adults will more frequently experience depressive disorders, which in turn may implicate suicidal acts. Self-destructive behaviours ever more often become the subject of public discussion. They are believed to constitute both great

medical challenge and a grave social issue, since they affect people in different age groups. Suicidal acts are classified as one of 10 most frequent death causes reported in the global population, and as such are considered to require particular public attention [11].

The paper aims to estimate the frequency of committed suicidal acts among people over the age of 60, and to draw attention to the percentage of deaths resulting from suicidal behaviours in the context of the age structure and sex.

Material and methods

The presented data concerning suicides among people over the age of 60 in the years 2005-2013 were accessed at the CSO. The search criteria were as follows: age at the time of death, sex, place of residence and the underlying cause of death in accordance with ICD-10. All data included in this paper were obtained from the CSO Demography Database <http://demografia.stat.gov.pl/BazaDemografia/>.

The analysis involved deaths classified as suicides (ICD-10 codes: X60–X84, Y87.0). The two-way ANOVA was employed in order to assess differences in the mean number of deaths between two groups in the years 2005-2013. Correlations between the number of deaths and the year of the measurement were assessed using a regression analysis with a 95% confidence level. The Duncan’s post hoc was used in order to estimate statistical validity of significant differences. All statistics were calculated at the level of statistical significance of $\alpha = 0.05$.

Results

There was a total of 54,319 suicides reported in Poland in the years 2005-2013, of which 11,979 (23%) concerned the population over the age of 60. The number of deaths by suicidal acts in this age group amounted to an average of 1,497 per each year (mean 110.92, SD 108.02). The highest death rate was observed in 2013 with 1,562 suicides, whereas the lowest in 2007 – 1,141 cases reported. The exact figures concerning deaths by suicide in the years 2005–2013 are presented below, in Figure 1 and Table I.

Table I. Descriptive statistics of suicides in the years 2005-2013

Factor level	Factor level	N	Deaths by suicide			
			Mean	Standard deviation	-95.00%	+95.00%
Overall		108	110.92	108.02	90.31	131.52
woman		54	45.89	22.76	39.68	52.10
man		54	175.94	120.09	143.17	208.72
60-64 yrs		18	231.44	172.76	145.53	317.36
65-69 yrs		18	145.44	92.42	99.48	191.40
70-74 yrs		18	114.00	71.21	78.59	149.41
75-79 yrs		18	85.06	44.07	63.14	106.97
80-84 yrs		18	55.44	29.18	40.93	69.96
85+ yrs		18	34.11	17.93	25.19	43.03
woman	60-64 yrs	9	81.78	21.28	65.42	98.14
woman	65-69 yrs	9	57.44	8.59	50.84	64.05
woman	70-74 yrs	9	46.00	6.65	40.89	51.11
woman	75-79 yrs	9	42.89	8.16	36.62	49.16
woman	80-84 yrs	9	27.67	2.96	25.39	29.94
woman	85+ yrs	9	19.56	4.82	15.85	23.26
man	60-64 yrs	9	381.11	112.12	294.93	467.29
man	65-69 yrs	9	233.44	25.56	213.80	253.09
man	70-74 yrs	9	182.00	18.10	168.08	195.92
man	75-79 yrs	9	127.22	7.74	121.27	133.17
man	80-84 yrs	9	83.22	8.04	77.04	89.40
man	85+ yrs	9	48.67	13.55	38.25	59.08

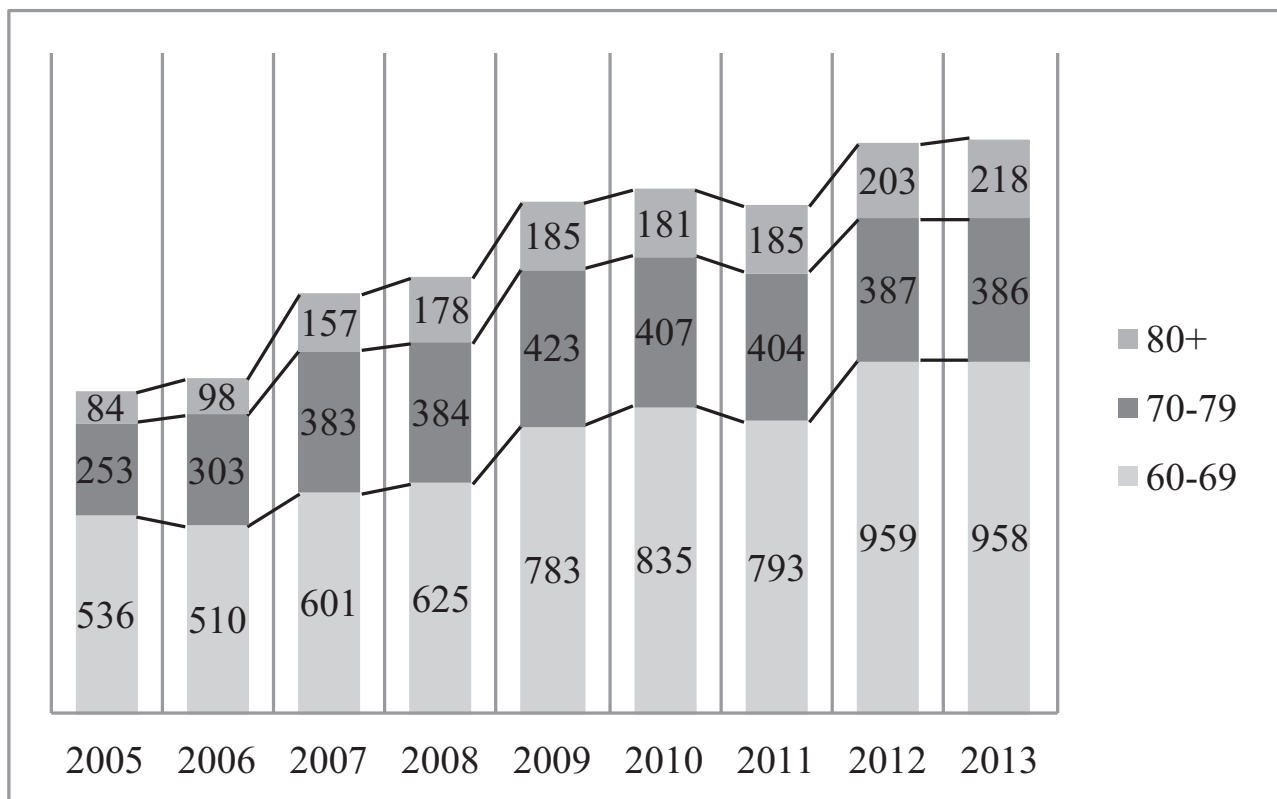


Figure 1. Deaths by suicide in the years 2005-2013

Table II. Two-way Anova variance analysis regarding the number suicide deaths in the years 2005-2013 according to sex and age

	SS	Degrees of freedom	MS	F	p
intercept	1328671	1	1328671	1097.403	< 0.01
Sex	456690	1	456690	377.199	< 0.01
Age	456726	5	91345	75.446	< 0.01
Sex*Age	218843	5	43769	36.150	< 0.01
Error	116231	96	1211		

Table III. Duncan's post hoc analysis regarding the number of suicide deaths in the years 2005-2013 according to sex and age

No.	Sex	Age	{1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}
			81.78	57.44	46.00	42.89	27.67	19.56	381.11	233.44	182.00	127.22	83.22	48.67
1	woman	60-64 yrs		0.141	0.048	0.035	0.003	0.001	< 0.01	< 0.01	< 0.01	0.009	0.930	0.058
2	woman	65-69 yrs	0.141		0.516	0.427	0.109	0.044	< 0.01	< 0.01	< 0.01	< 0.01	0.142	0.594
3	woman	70-74 yrs	0.048	0.516		0.850	0.297	0.146	< 0.01	< 0.01	< 0.01	< 0.01	0.044	0.871
4	woman	75-79 yrs	0.035	0.427	0.850		0.356	0.184	< 0.01	< 0.01	< 0.01	< 0.01	0.031	0.743
5	woman	80-84 yrs	0.003	0.109	0.297	0.356		0.622	< 0.01	< 0.01	< 0.01	< 0.01	0.003	0.250
6	woman	85+ yrs	0.001	0.044	0.146	0.184	0.622		< 0.01	< 0.01	< 0.01	< 0.01	0.001	0.118
7	man	60-64 yrs	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
8	man	65-69 yrs	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.002	< 0.01	< 0.01	< 0.01
9	man	70-74 yrs	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.002		0.001	< 0.01	< 0.01
10	man	75-79 yrs	0.009	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.001		0.009	< 0.01
11	man	80-84 yrs	0.930	0.142	0.044	0.031	0.003	0.001	< 0.01	< 0.01	< 0.01	0.009		0.056
12	man	85+ yrs	0.058	0.594	0.871	0.743	0.250	0.118	< 0.01	< 0.01	< 0.01	< 0.01	0.056	

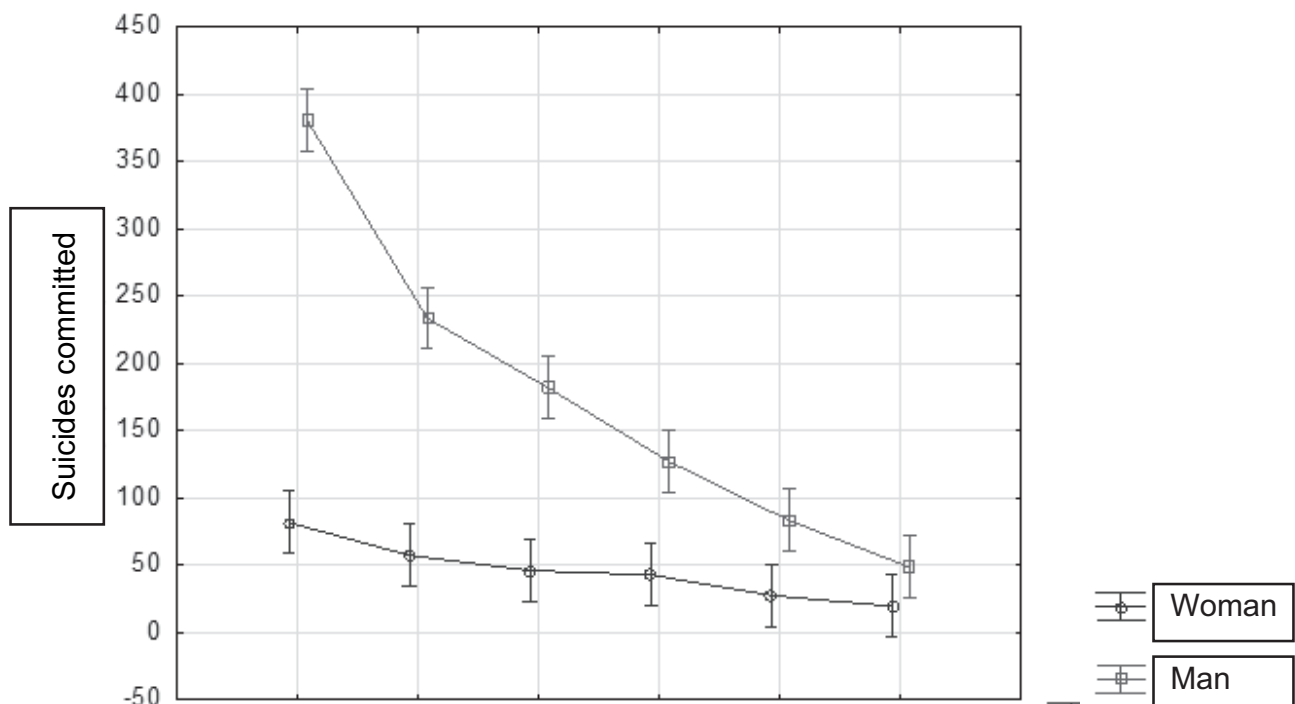


Figure 2. Chart of mean values at 95% confidence interval for the average value for suicides by age and sex

A statistically significant relationship was found between age and sex of the analysed subjects in terms of the number of deaths in the years 2005-2013 ($p < 0.01$). One can also note that sex and age alone diversify the number of suicidal deaths (Table II). The Duncan's post hoc was used in order to estimate statistical validity of significant differences (Table III).

In the case of women, the highest number of deaths occurs at the age of 60-64, (av. = 81.78) and it does not statistically differ ($p = 0.141$) from women aged 65-69 (av. = 57.44). However, it was noticed that suicide rates among women decline with age in a statistically significant manner in each subsequent age group (to 19.56 in women aged 85+). As far as men are concerned, the decreasing trend has also been observed, albeit it is much more dynamic. The highest suicidal rate is noted among men aged 60-64 (av. = 381.11) and decreases in each subsequent group in a statistically significant manner ($p < 0.05$) down to 48.67 in men aged 85+. For men aged 80-84 and 85+, the decrease is merely statistically significant ($p < 0.07$). The chart below clearly illustrates that men are at the highest risk of suicides when compared to women in each age group. A regression analysis with a 95% confidence level (Figure 2) was performed in order to assess correlations between the number of deaths and sex.

Discussion

Suicides among the elderly are becoming an increasingly severe public health issue. Finding exact determinants of suicidal ideation among older adults poses a major challenge. Afflicted with several cooccurring diseases, disability and loneliness, the elderly are often inclined to commit suicide [6]. In the years 2005-2013 in Poland, there was a total of 11,979 suicide cases among the elderly, which constituted 23% of all suicidal acts in the study years across all age groups. In 2013, the suicide rate for men amounted to 37 deaths per 100 000 citizens, and under 6 in the case of women. Studies conducted by the World Health Organization show that there are 10-15 attempts per one committed suicide, however, the ratio is believed to be higher in the case of the elderly – 4:15 [12]. According to the Eurostat study conducted among people over the age of 65, suicide rates in Europe amounted to 31 and 8 deaths per 100 000 citizens for men and women accordingly [13]. Studies by Zhong et al., [14] found that suicides among the elderly constituted 38.2% of all suicides. In the years 2013-2014, the rate of deaths by suicidal acts in the age group in question amounted to 34.5 per 100 000 citizens. According to another study performed in Queensland by Koo et al., [7] the rate of suicidal deaths among the elderly amount-

ed to 15.27 deaths per 100 000 citizens. Rahimi et al., [15] indicated that 7.1% of all suicides is committed by the elderly. A report by Li et al., [16], on the other hand, show that the suicide rate among people over the age of 65 is at 44.3 – 200 deaths per 100 000 citizens. The authors emphasise that the rate is 4-5 times higher compared to the entire population of China. Moreover, the study concluded that suicidal thoughts are common among the elderly. It is believed to be a major determinant leading to suicidal attempts, and as such should cause anxiety amid family and medical staff [17]. The study conducted by Kim et al., [18], which involved 5,795 women and 3,758 men aged 65 and more, indicated that approx. 1 out of 12 individuals had had suicide thoughts. Admittedly, no statistical significance was found in the correlation of sex and suicide ideation. However, another research by Shin et al. [19] conducted among the elderly showed that women are considerably more likely to have suicide ideation (27.7%) than men (15.8%). Furthermore, epidemiological study performed by Na et al. [20] revealed that 14.7% of older adults ($N = 1116$) have had suicidal thoughts. In order to provide a more detailed assessment of respondents, the study employed a Korean version of the Patient Health Questionnaire (PHQ-9K). Research performed by Sirey et al. [21] in the context of the elderly also showed the occurrence of suicide ideation at the level of 12.2%. Park et al. [22] indicated correlations between age, economic status, sleep disorders, chronic diseases, and the experience of suicide ideation. The authors pointed to a statistical decrease in the frequency of suicidal thoughts corresponding to an increase in the age and economic status of the respondents. Sleep disorders, chronic diseases, and depression were indicated as determinants of suicide ideation. Furthermore, in their study involving 420 elderly respondents, Bernert et al. [23] indicated that sleep disorders considerably correlated with an increase in suicide risk by 40%, and by 30% in the case of depressive symptoms. Similarly, Pigeon et al. [24] demonstrated that sleep disorders tend to correspond with an increase in the occurrence of suicide ideation, suicide attempts and suicides. Nevertheless, no correlation was found between depressive symptoms and sleep disorders or suicides. Furthermore, study by Bishop et al. [25] also indicated a statistically significant influence of drugs commonly used when. It was also found that drugs commonly used for treating insomnia have a statistically significant influence on the increase in suicide rates. Kim et al. [26] point to obesity as a determinant of suicide ideation among women, and overweight in the case of men. Furthermore, Innamorati et al., [27] notes that suicide rates are typically higher among lonely and widowed seniors.

Our analysis indicates that the highest percentage of suicide deaths is observed among elder men (average = 175.94 in men, 45.89 in women). It is also worth noting that with age, the number of suicidal deaths among women decreases in a statistically significant manner in each subsequent age group. Such a trend has also been observed in men, albeit it is more dynamic. Similar conclusions were drawn by Rahimi et al. [16], who pointed out that 70% of all suicides among the elderly were committed by men. This was confirmed in the work of Koo et al. [7].

Conclusions

The presented paper shows that suicidal behaviours among the elderly constitute a widespread problem. It has been demonstrated that there is a statistically significant interaction between age and sex of the respondents in relation to the rate of deaths in the years 2005-2013. Suicide ideation and hopelessness are increasingly more associated with the aging process. Scientific studies indicate a progressive growth of the elderly in the society, which in turn correlates with an elevated rate of suicidal thoughts and behaviours. Therefore, development and implementation of preventive measures towards tackling the problem of suicides among the elderly should be seen as a priority objective in public health.

Conflict of interest

None

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