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Prevalence of tobacco smoking among participants of PURE Poland study

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ABSTRACT

Introduction: Smoking is the largest avoidable health risk factor in Europe. The aim of this paper is to assess the attitude towards tobacco smoking among participants of PURE Poland Study.

Material and methods: Analysis of attitude towards tobacco smoking was carried out between 2007 and 2010 in a cohort consisting of 2,036 subjects aged from 30 to 85, living in Wroclaw and surrounding municipalities, enrolled in the PURE (Prospective Urban and Rural Epidemiological) Study. We analyzed percentage of current smokers, ex-smokers, and never smokers in the study population. The collected data was analyzed according to sex, age, place of residence, and education. The significance level was $p \leq 0.05$.

Results: Among surveyed, 21.0% were current smokers, 31.7% were ex-smokers, and 47.3% have never smoked. 26.4% of rural population were current smokers, while in urban population it was only 17.2%. Place of residence in the rural area increases the risk of being a current smoker 1.7-fold (OR = 1.7269, CI 1.3924 to 2.1418); on the other hand, living in an urban area, increases the chance of quitting smoking 2.3-fold (OR = 2.3044, CI 1.7897 to 2.9671). 15.1% of people with higher education were current smokers in comparison to 30.2% with vocational education. Men have taken on smoking significantly earlier (19.2 SD ±4.6) than women (20.4 SD ±4.4), and smoked more cigarettes a day than women (17.5 cigarette a day SD ±9.1 vs. 13.1 cigarette a day SD ±9.0).

Conclusions: The percentage of current smokers is much higher among rural than urban dwellers. Recently, more people quit smoking in urban than rural areas.

KEY WORDS: tobacco, urban, rural, PURE study.

KEY FINDINGS

1. The percentage of current smokers is much higher among rural than urban dwellers.
2. Place of residence (rural) became more significant differentiating factor of smoking than sex, unlike several decades ago.
3. Recently, more people quit smoking in urban than rural areas.
4. The percentage of current smokers is the highest among the youngest age group (30-44 years).
5. Age of initiation of smoking depends on birth cohort (initiation is earlier along with decreasing age of study population).
6. Women initiate smoking later than men.

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INTRODUCTION

According to the European Commission, smoking is the largest avoidable health risk factor in Europe, causing more problems than alcohol, drugs, high blood pressure, excessive weight, or high cholesterol put together [1]. Every year, nearly 700,000 Europeans die prematurely of tobacco-related diseases. It is estimated that in terms of economic impact, smoking costs the EU countries at least €100 billion per year [1]. Tobacco smoking is a major avoidable single cause of premature mortality in Poland. Almost one in three Polish men do not live to the age of 65, and almost half of this premature mortality can be associated with much higher prevalence of smoking in Poland than in Western Europe [2]. According to EU data from 2012, 32.0% of Poles were current smokers in comparison to 28.0% of other EU citizens [1]. The percentage of smoking women in Poland was 24.4% and smoking men 36.9% [3]. According to WHO's report on the current status of the tobacco epidemic in Poland, the average financial cost of premature death is estimated at 621,000 PLN per person, averaging 5,5 billion PLN for over 8,000 premature deaths from second-hand smoke recorded in 2002 [4]. Because Poles are exposed to tobacco smoke for an average of 20 years, this cost might even reach 135 billion PLN in the next 20 years [5]. Attitudes toward smoking are differentiated by sex, place of residence (urban-rural), age, and education [3-7].

The aim of this paper is to evaluate the attitude towards tobacco smoking among PURE study participants, emphasizing the place of residence (urban – rural).

MATERIAL AND METHODS

PURE (Prospective Urban Rural Epidemiology) study covers 21 countries of different status of economic development, and enrolls overall of 150,000 people [8]. All participants were tested in accordance to the PURE project protocol. The paper presents results of PURE Poland study – baseline, covering group of 2,036 people divided into three age groups (< 45, 45-64, > 64 years old), 1,277 women and 758 men inhabitants of both urban and rural areas from Lower Silesia. The study was conducted between 2007-2010. During the study, all partakers after 3, 6, 9, and 12 years of project cycle have been invited for follow-up.

Participants were considered ever smokers if they reported smoking at least one cigarette per day for at least one year. Ever smokers were divided into current smokers (do you currently smoke cigarettes?) and ex-smokers (if they had stopped smoking before the survey). We also recorded the duration of smoking in years and age of smoking initiation.

Data collected was analyzed with use of Statistica 12.0 PL computer programme, with sex, age, place of residence, and education considered. The significance level was established as $p \leq 0.05$.

RESULTS

Among surveyed, 21.0% were current smokers, 31.7% were ex-smokers, and 47.3% have never smoked. Attitude towards tobacco smoking in PURE study population was statistically significantly differentiated by sex, age, place of residence, and education level (Table 1).

TABLE 1. General characteristics of tobacco smoking among participants of PURE Poland study

Characteristics	Ever smokers			Never smokers	*P*-value*	*P*-value**
	Current smokers	Ex-smokers	Total			
Total	425 (21.0)	644 (31.7)	1,069 (52.7)	961 (47.3)		
Sex						
Men	180 (24.0)	310 (41.3)	490 (65.3)	261 (34.7)	0.000	0.000
Women	245 (19.2)	334 (26.1)	579 (45.3)	700 (54.7)		
Age group						
30-44	86 (24.2)	84 (23.7)	170 (47.9)	185 (52.1)	0.000	0.00001
45-64	317 (23.5)	454 (33.7)	771 (57.2)	578 (42.8)		
> 64	22 (6.7)	106 (32.5)	128 (39.2)	198 (60.8)		
Place of residence						
Urban	207 (17.2)	442 (36.7)	649 (53.9)	555 (46.1)	0.000	0.18
Rural	218 (26.4)	202 (24.5)	420 (50.9)	406 (49.1)		
Level of education						
Primary	61 (20.2)	75 (24.8)	136 (45.0)	166 (55.0)	0.002	0.0001
Vocational	98 (30.2)	92 (28.4)	190 (58.6)	134 (41.4)		
Secondary	175 (22.0)	284 (35.7)	459 (57.7)	337 (42.3)		
Higher	91 (15.1)	192 (31.8)	283 (46.9)	320 (53.1)		

**between current smokers, ex-smokers and never smokers; **between ever smokers and never smokers*

TABLE 2. Number of cigarettes smoked daily among ever smoking (1,069) participants of PURE Poland study

Characteristics	Average number	Minimum	Maximum	SD	*P*-value
Total	15.1	1.0	80.0	9.3	
Sex					
Men	16.3	1.0	60.0	8.7	0.000000
Women	13.1	1.0	80.0	9.0	
Age group					
30-44	13.1	1.0	40.0	8.1	0.000063
45-64	15.1	1.0	80.0	9.2	
> 64	17.7	1.0	60.0	10.4	
Place of residence					
Urban	14.2	1.0	60.0	8.6	0.000063
Rural	16.5	1.0	80.0	10.1	
Level of education					
Primary	17.5	1.0	60.0	8.9	0.000004
Vocational	17.1	1.0	80.0	10.6	
Secondary	14.5	1.0	60.0	9.1	
Higher	13.5	1.0	40.0	8.3	

19.2% of women were current smokers, in comparison to 24.0% of men. Gender is risk factor of smoking; men are 1,3-fold more likely to be current smokers than women (OR = 1.3304, CI 1.0700 to 1.6543). With the increase of age, the number of current smokers decreases proportionally: 24.2% of current smokers aged 30-44, 23.5% of current smokers aged 45-64, and 6.8% of current smokers aged over 64 years. 26.4% of rural population were current smokers, while in urban population it was only 17.2%. 15.1% of participants with higher education were current smokers, in comparison to 30.2% with vocational education.

Average number of cigarettes smoked daily was 15.1 cigarette a day, SD ±9.3 (Table 2). Men were smoking relatively more: 17.5 cigarette a day, SD ±9.1 than women: 13.1 cigarette a day SD ±9.0. Rural area's population was smoking relatively more: 16.5 cigarette a day, SD ±10.1 than of urban area: 14.2 cigarette a day, SD ±8.6. With the increase of educational level, the average number of cigarettes smoked daily decreases (17.5 cigarette a day, SD ±8.9 in primary education group vs. 13.5 cigarette a day, SD ±8.3 in higher education group).

Average age of initiation of smoking in studied population was 19.8, SD ±4.5 (Table 3). Men have taken on smoking significantly earlier (19.2, SD ±4.6) than women (20.4, SD ±4.4). With decreasing age of the participants observed, the average age of initiation of smoking decreases (21.1 ±6.7 in group > 64 years, 19.7 ±4.1 in group 45-64 years, and 19.4 ±3.9 in group 30-44 years). Urban participants have taken on smoking earlier (19.7, SD ±4.2) than rural (20.1, SD ±4.9). There were no statistically significant differences between the average age of initiation of smoking and level of education.

Place of residence in the rural area increases the risk of being a current smoker nearly 1.7-fold (OR = 1.7269, CI 1.3924 to 2.1418); on the other hand, living in urban area, increases the chance of quit smoking over 2.3-fold (OR = 2.3044, CI 1.7897 to 2.9671). The detailed analysis of attitude towards tobacco smoking adjusted for sex, age, and place of residence has demonstrated that either men or women in every age group living in the urban area are characterised by lower percentage of current smokers and higher percentage of ex-smokers (Table 4). In men, statistically significant differences in percentage of current smokers was observed in group aged 30-44 years (15.0% of current smokers in urban vs. 39.7% in rural area). In women, statistically significant differences were observed in group aged 30-44 years (14.9% of current smokers in urban vs. 33.7% in rural area), and in group aged 45-64 years (18.9% of current smokers in urban vs. 26.0% in the rural area).

DISCUSSION

In our study, one-fifth of the population aged 30 years or more are current smokers. This result is consistent with the data obtained within Polish-Norwegian (PONS) Study conducted in years 2010-2011 among

TABLE 3. Age of initiation of smoking among ever smoking (1,069) participants of PURE Poland study

Characteristics	Average age	Minimum	Maximum	SD	*P*-value
Total	19.8	6.0	50.0	4,5	
Sex					
Men, total	19.2	6.0	50.0	4.6	0.000005
Women, total	20.4	10.0	42.0	4.4	
Age groups*					
30-44	19.4	10.0	41.0	3.9	0.096993
45-64	19.7	6.0	42.0	4.1	
> 64	21.1	12.0	50.0	6.7	
Place of residence					
Urban	19.7	6.0	42.0	4.2	0.096993
Rural	20.1	10.0	50.0	4.9	
Level of education					
Primary	19.7	10.0	50.0	5.7	0.15
Vocational	19.8	13.0	42.0	4.1	
Secondary	19.9	8.0	47.0	4.2	
Higher	19.9	6.0	48.0	4.7	

TABLE 4. Characteristics of tobacco smoking among participants of PURE Poland study considering sex and place of residence (urban-rural)

Characteristics	Current smoker			Ex-smoker			Never smoker		
	Urban	Rural	*p*-values	Urban	Rural	*p*-values	Urban	Rural	*p*-values
Men									
Age group									
30-44	14 (15.0)	25 (39.7)	0.0005	25 (26.9)	15 (23.8)	0.0181	54 (58.1)	23 (36.5)	0.0082
45-64	65 (22.6)	62 (34.3)	0.060	147 (51.2)	63 (30.9)	0.00009	75 (26.1)	63 (34.8)	0.0451
> 64	6 (7.9)	8 (15.7)	0.9007	39 (51.3)	28 (54.9)	0.29310	31 (40.8)	15 (29.4)	0.191
Total	85 (18.5)	95 (32.2)	0.000	211 (46.0)	99 (33.6)	0.00001	160 (34.9)	101 (34.2)	0.811
Women									
Age group									
30-44	16 (14.9)	31 (33.7)	0.0019	20 (18.7)	24 (26.1)	0.2659	71 (66.4)	37 (40.2)	0.0001
45-64	103 (18.9)	87 (26.0)	0.0128	184 (33.7)	67 (20.0)	0.00003	259 (47.4)	181 (54.0)	0.05740
> 64	3 (3.2)	5 (4.8)	0.5540	27 (28.4)	12 (11.5)	0.08886	65 (68.4)	87 (83.7)	0.01150
Total	122 (16.3)	123 (23.2)	0.002	231 (30.9)	103 (19.4)	0.000	395 (52.8)	305 (57.4)	0.10108

dwellers of Świętokrzyskie voivodeship in Poland, aged 45-64 years – there were 20% of current smokers reported in that population [9]. The percentage of current smokers has decreased over the years (data obtained within HEM study in 2002 [10]), when 46% of men and 30.9% of women were current smokers. Polish arm of Global Tobacco Survey (GATS) from 2009-2010 has reported 36.9% of current smoking men and 24.4% of women [11]. Comparing our findings with data from major studies (Table 5), we can conclude that over the last decade, the percentage of current smokers had steadily decreased.

TABLE 5. Comparison of tobacco smoking between Polish epidemiological studies

	PURE			GATS [10]			Sozańska *et al.* [7]			PONS [9]			HEM [11]		
	Current smoker	Ex-smoker	Ever-smoker	Current smoker	Ex-smoker	Ever smoker	Never smoker	Current smoker	Ex-smoker	Ever smoker	Never smoker	Current smoker	Ex-smoker	Ever smoker	Never smoker	Current smoker	Ex-smoker	Never smoker
Male	24	41.3	65.3	34.7	36.9	21.8	58.7	36.6	31.5			19.7	42.79	62.49	37.44	46	17.3	36.7
Female	19.2	26.1	45.3	54.7	24.4	11.3	35.7	58.5	24.9			15.28	30.25	45.53	54.47	30.9	11.7	57.4
Urban	17.2	36.7	53.9	46.1	30.3	17.1	47.4	51	23	25.4	48.4	19.46	43.18	62.64	37.36			
Rural	26.4	24.5	50.9	49.1	25.4	15.1	40.5	57.1	33.7	20.2	53.9	20.45	41.92	62.37	37.63			
Age group																		
30-44	24.2	23.7	47.9	52.1														
45-64	23.5	33.7	57.2	42.8								16.78	34.44	51.22	48.78			
> 64	6.7	32.5	39.2	60.8		26.9 (> 60 years)												

The strongly differentiating factor in the attitude towards tobacco smoking in our population was rural place of residence. Percentage of current smokers was much higher among rural than urban dwellers. Rural place of residence increases the risk of being a current smoker 1.7-fold. Those results are different from those obtained within GATS study that have reported higher percentage of current smokers among urban than rural dwellers (30.3% vs. 25.4%, respectively), and the fact that the percentage of current smokers increased with urbanization of place of residence [11] (Table 5). Our results, in conjunction with data obtained by Sozańska *et al.* [7], who reported that the prevalence of current smokers was higher in rural population than in the population of a nearby small town, indicate that the trend observed in GATS study has been reversed. Lower percentage of current smokers reported in our study in both places of residence (17.2% – Wroclaw agglomeration and 26.4% – rural surroundings of Wroclaw) in comparison to study by Sozańska *et al.* obtained in 2012 (23.0% – small town Sobótka and 33.7% – rural surroundings of Sobótka) [7], can be an argument in favor of this conclusion. Likewise, in PONS study, the percentage of current smokers was higher among rural than urban dwellers, though the difference was not as significant as in our or Sozańska *et al.* study (Table 5). In addition, the chance of cessation of smoking is 2.3-fold higher among urban than rural dwellers (OR = 2.30, CI 1.80 to 2.97 in PURE study and OR = 2.37, CI 1.32 to 4.25 in Sozańska *et al.* study). In our study, the percentage of smoking either men or women in every age group was higher among rural dwellers. What is alarming, the highest percentage of current smoking men and women was reported in the youngest age group of 30-44 years (39.7% of men and 33.7% of women, respectively). Among dwellers of rural surroundings of Sobótka, the highest percentage of current smokers was reported in the age group 51-60 years old – 44.9%, and in the group 31-40 years old – 37.4% [7]. On the other hand, among urban dwellers of Wrocław, the highest percentage of current smokers was reported in the age group of 44-64 (22.6% of men and 18.9% of women, respectively). Among urban dwellers of Sobótka, the age group of 51-60 years old was characterised by highest percentage of current smokers; in the age group 31-40 years old, this percentage was 26.3% [7].

The average age of initiation of smoking among population of PURE study was 19.8 years old and it is statistically significantly higher among women than men (20.4 vs. 19.2). Those findings are consistent with the data obtained within GATS study, conducted in the population over 15-years-old, which reported that in most cases, men and women started smoking at the age of 11-17 years old and 18-24 years old but women started smoking later than men [4]. In our population, we can observe a tendency of early initiation of smoking along with decrease of average age of smokers, but the

age of initiation is higher among rural dwellers. Average number of smoked cigarettes in our study was lower than the amount reported in GATS study (15.1 cigarette a day vs. 17.2 cigarette a day, respectively). Rural dwellers smoke statistically significantly more than urban dwellers (urban: 14.2 cigarette a day in PURE; 17.0 cigarette a day in GATS and rural: 16.5 cigarette a day in PURE; 17.4 cigarette a day in GATS).

Clear confirmation of thesis underlying this article requires further research. An individual approach is essential while designing programmes of tobacco control, with special consideration to rural place of residence.

DISCLOSURE

Authors report no conflict of interest.

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AUTHORS' CONTRIBUTIONS

KPZ, KZ and AS prepared research concept of the publication. MW collected data. KPZ and AB analysed data. KPZ wrote the article. KZ and WAZ critically reviewed the publication. AS and WAZ finally approved it.