VIA MEDICA

ORIGINAL ARTICLE

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Socio-economic status and duration of TB symptoms in males treated at the Mazovian Treatment Centre of Tuberculosis and Lung Diseases in Otwock

Status społeczno-ekonomiczny i czas trwania objawów u mężczyzn chorych na gruźlicę leczonych w Mazowieckim Centrum Leczenia Chorób Płuc i Gruźlicy w Otwocku

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Abstract

Introduction: The incidence of tuberculosis depends on many factors, not only on health issues but also on socioeconomic factors. The aim of this study was to assess the duration of symptoms and the extent of radiological changes in men with bacteriologically confirmed pulmonary tuberculosis in relation to their socioeconomic status.

Material and methods: This was a retrospective study based on the analysis of 300 hospital records of patients hospitalised in 2004–2006 in the male ward of the Mazovian Treatment Centre of Lung Diseases and Tuberculosis in Otwock. In all patients, the diagnosis of tuberculosis was bacteriologically confirmed. We evaluated the duration of symptoms prior to hospitalisation, the extent of radiological changes and socioeconomic status. We also took into account the place of residence, professional activity, age and marital status.

Results: Among patients with TB hospitalised in the Mazovia Region, 74% were professionally inactive persons and 57% were unemployed. Patients population in cities and villages were similar, but as much as 10% of the patients hospitalised who were actively spreading bacilli in Mazovia Region were homeless. In the study group, 60% of the men were unmarried. In 63% of the patients symptoms of tuberculosis were present for more than two months. Chronic symptoms were reported more often in the unemployed (60%) and in single patients. As much as 81% of the patients at the initiation of treatment, had extensive radiological changes in 3 or more lung fields. Quite often sweeping pulmonary changes were observed in the homeless, unemployed and pensioners. Sputum smear-positive tuberculosis, was demonstrated in 87% of the examined patients.

Conclusions: The incidence of tuberculosis observed in the Mazovia Region was especially observed in the unemployed, disabled and pensioners. Among these patients, many were homeless. The majority of patients in Mazovia Region at the start of treatment already had very extensive radiological changes and the symptoms were present with them for several weeks.

Key words: tuberculosis, socio-demographic risk factors, epidemiology, men

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Introduction

Tuberculosis is a contagious disease that is transmitted through the air. The identification and treatment of infected people is the best prevention of the disease spreading. Tuberculosis may be latent or oligosymptomatic, which delays the diagnosis. Suspicion of the disease is usually made on the basis of a chest X-ray, but the ultimate diagnosis requires bacteriological examination.

The epidemic situation depends on many factors, not only health-related but also socioeconomic ones. The relationship between tuberculosis prevalence and social, financial, and demographic conditions as well as health care system functioning has been known for a long time [1]. A significant influence on the spread of tuberculosis has been confirmed for the following factors: homelessness, overpopulation, hunger, poverty, and poor access to health care [2]. The tuberculosis incidence in Poland and many other regions of the world is twice as high in men as it is in women [3, 4].

Living conditions and the health care system have changed a lot during the last two decades in Poland. The requirement of having health insurance in order to be eligible for medical services may limit access to health care services for people without such insurance. It is a serious problem internationally (also concerning highly developed countries) making control of infectious diseases more difficult. The number of homeless people and people living in extreme poverty in France is estimated at 400,000. The situation is similar in Great Britain (430,000) and even worse in Germany (900,000). There are 5 million of such people in the United States [2]. The tuberculosis incidence rate among homeless people in France is 240/100,000, and it is 25 times higher than for the general population [5]. In Poland tuberculosis treatment is free, but the diagnostic process may be time-consuming. In cases of sputum smear-positive patients the disease may be transmitted to many persons during that period. The aim of this study was to assess the duration of symptoms and the extent of radiological changes in men with bacteriologically confirmed pulmonary tuberculosis in relation to their socioeconomic status.

Material and methods

This was a retrospective study based on the analysis of medical records of 300 patients hospitalised in years 2004–2006 in the male ward of the Mazovian Treatment Centre of Lung Diseases and Tuberculosis in Otwock. The inclusion criterion was bacteriologically confirmed pulmonary tuberculosis. The studied group consisted of adult men aged 20–87 years; the mean age was 46.4 ± 12 years. We evaluated the duration of symptoms prior to hospitalisation, bacteriological examination, the extent of radiological changes, and socioeconomic status. Place of residence, professional activity, age, and marital status were also taken into account. The extent of radiological changes was assessed according to the number of affected pulmonary fields, with each lung divided into 3 fields (upper, middle, and lower). The criteria used for bacteriological confirmation were: positive sputum smear (A15.0 according to ICD10) or positive sputum culture (A15.1). The place of residence was allocated to one of three categories: town (big towns only), village (including villages and small towns), and homeless. The marital status was classified as either married or single (bachelor, divorced, widower). Informal relationships, e.g. concubinage, were not considered in this classification. According to professional activity the following categories were distinguished: professionally active, retired and disability pensioner, or unemployed.

Results

There was no significant difference in the proportion of town (42.3%) and village (47.4%) inhabitants in the studied group (Fig. 1). A significant percentage (10.3%) of homeless patients was noted. Mean age was similar in the subgroups: 47.1 ± 12.3 years for the urban area group, 45.6 ± 12.2 years for the rural area group, and 47.1 ± 9.4 years in the homeless group.

Unemployed men constituted the biggest subgroup among studied patients (57%), while people professionally active accounted for only 26% and pensioners for 17% (Fig. 2). Mean age for unemployed patients was 44 ± 9.1 years, for professionally active patients 40 ± 9.5 years, and for pensioners 61 ± 11.7 years. The age range in the pensioner group was 28 – 87 years. Among professionally active patients 29.5% were farmers; the remaining patients worked in other industries. The majority of them (60%) were married and lived in villages (62%). Among pensioners: 23 patients lived in towns, 27 in villages, and 1 was homeless. The majority of pensioners (63%) were married. In the whole studied group singles (181) predominated; 40% (119) of the patients were married. Almost all homeless patients were unmarried (30/31). Also unmarried were 58% (85/147) of patients from the village inhabitants and 52% (66/127) from the town inhabitants.

The duration of symptoms varied (Tab. 1). A small number of patients (5%) were asymptomatic before hospitalisation, and the disease was either detected on a routine prophylactic chest radiograph or due to acute symptoms i.e. sudden haemoptysis. In over 15% of patients the disease symptoms started more than 6 months before diagnosis. In professionally active patients the mean duration of symptoms before hospitalisation was 2.4 ± 1.8 months. In 29 of these patients symptoms were present for less than 1 month, in 23 patients for up to 2 months, in 6 patients up to 3 months, and in 20 patients for more than 4 months (Tab. 2). In the unemployed group the mean duration of symptoms before hospitalisation was similar (2.6 ± 2.2 months). Fifty-five of these patients reported symptoms present for less than 1 month, 35 for up to 2 months, 14 for up to 3 months, and 40 for more than 4 months (Tab. 2). In the group of pensioners the mean time of symptom duration was 2.5 ± 1.9 months, and it was not different from the other groups. Nineteen patients from this group had symptoms for less than 1 month, 15 for up to 2 months, 3 for up to 3 months, and 14 for more than 4 months (Tab. 2). The most prolonged time

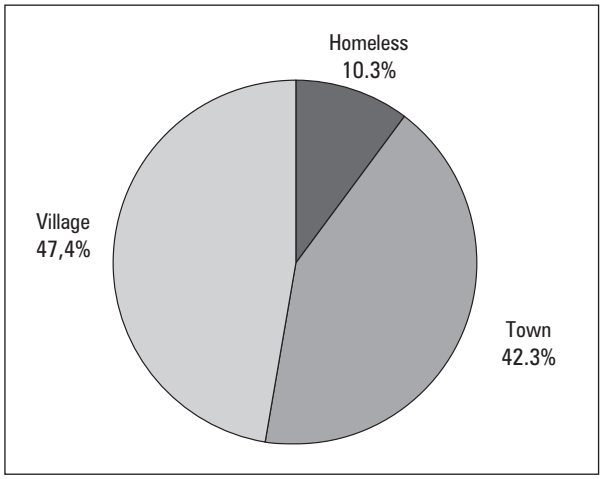

Figure 1. Percentage of patients residing in urban or rural areas or in small townships and the homeless

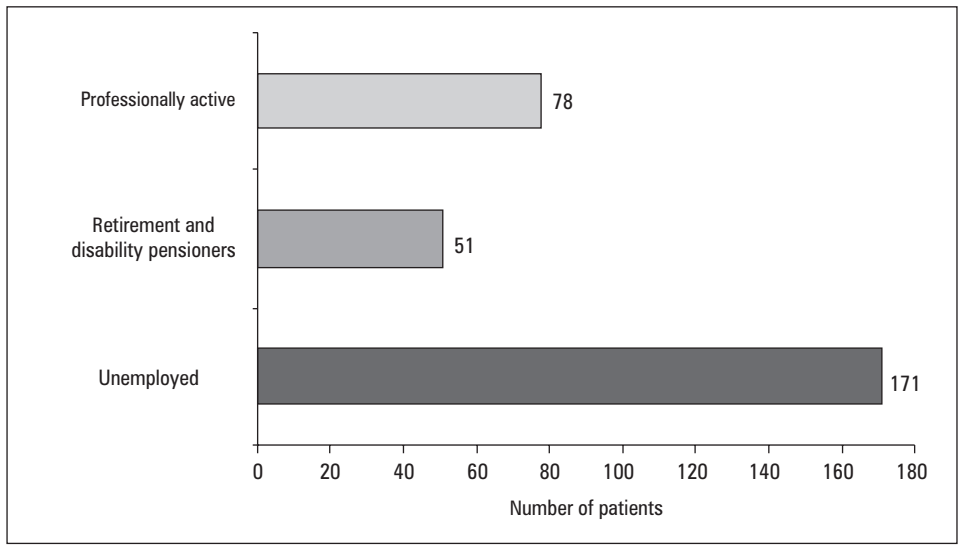

Figure 2. Number of patients unemployed, professionally active and also retirement and disability pensioners

Table 1. Duration of symptoms before the hospitalization

Duration of symptoms before the hospitalization	Number	Percent
0	16	5.3
< 1 month	94	31.3
2 months	85	28.3
3 months	21	7.0
4 months	22	7.4
5 months	16	5.3
> 6 months	46	15.3

Table 2. Percentage of TB-patients by occupational groups and by duration of TB symptoms prior to hospital treatment

	1 month	2 months	3 months	> 4 months
Professionally active	37.1%	30.8%	6.4%	25.7%
Retirement and disability pensioners	37.3%	29.4%	5.8%	27.5%
Unemployed	39.3%	25%	7.1%	28.6%
Homeless	22.6%	32.2%	9.7%	35.5%

from symptoms onset to hospitalisation was in the group of homeless patients at 3.6 ± 2.5 months. The proportion of patients with symptoms present for more than 4 months was higher among farmers in comparison to other professionally active patients (39% vs. 20%). Inhabitants of villages/small towns more frequently reported short (< 1 month) duration of symptoms prior to hospitalisation than patients from big towns (43.7% vs. 32.5%). Only 20% of the homeless had symptoms present for less than 1 month. Also pensioners from villages/small towns more frequently reported symptoms duration shorter than 1 month in comparison to big town inhabitants (44% vs. 30%).

In the group of 84 patients with symptoms lasting for longer than 4 months the mean number of affected pulmonary fields was 4.7 ± 1.5. The majority of them were unemployed (60%) and unmarried (61%). Of these patients 44% lived in villages, 43% in towns, and 13% were homeless. In the group of 110 patients that were admitted to the hospital during the first month of presence of symptoms, more than half (54%) lived in villages and 35% lived in towns. In this group as much as 63% of patients were unemployed and 21% were professionally active men. Extensive radiologic changes (3 or more fields affected) were present in more than 70% of these patients, and 86% were sputum smear-positive. In 43% of patients all lung fields were affected at the time of the admission to the hospital, and in 22% — 5 lung fields were affected (Fig. 3). Changes limited to only 1 field were found in 4% of patients, and limited to 2 fields in 15%. Summarising, as many as 81% had extensive radiologic changes affecting 3 or more pulmonary fields. In the group of homeless patients such extensive radiologic changes were found in 93% of cases (Tab. 3). The mean number of affected lung fields was 3.6 ± 1.6 for professionally active patients, 4.0 ± 1.6 for pensioners, and 5.8 ± 1.4 for the unemployed. The proportion of patients with extensive radiologic changes (3 or more fields) was higher in farmers than in the remaining professionally active patients (74% vs. 60%). The percentage of patients with radiologic changes limited to

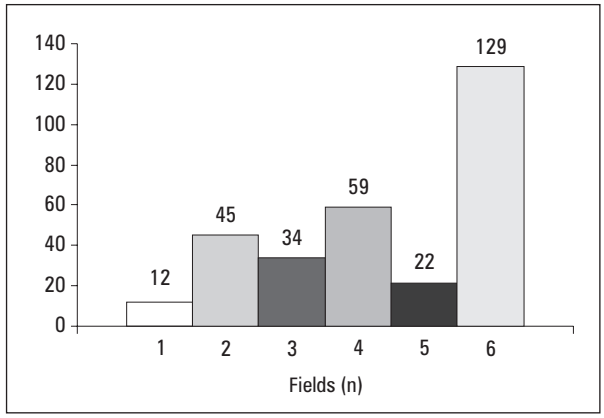

Figure 3. Distribution of the radiological pulmonary changes

1–2 pulmonary fields was greater in the group of professionally active patients (40%) than in pensioners (21.5%) and than in the unemployed (10%).

Of all patients 86.6% were both sputum smear and culture-positive (A.15.0), and 12.6% were only sputum culture-positive (A15.1). Only in 2 cases (0.7%) was the diagnosis of tuberculosis confirmed by genetic tests i.e. PCR (A15.3). In none of our patients tuberculosis coexisted with HIV infection.

Discussion

We believe that many of our results may be surprising for physicians specialising in tuberculosis, as they differ from those obtained in past years. That includes a significant proportion of homeless patients, unemployed patients, and patients with extensive radiologic changes in the lungs. As the epidemiologic situation in Poland has improved, limited radiologic changes in the course of tuberculosis would be expected. Our studied group consisted of sputum smear or culture positive patients, in the majority expelling huge amounts of tubercle bacilli. That may explain the high proportion of patients with extensive (affecting more than 3 pulmonary fields) radiologic changes. Some doubts regarding the real time of symptoms duration appear; could such advanced radiologic

Table 3. Correlation between extent of radiological changes in the lungs and occupational activity

	1 Field (%)	2 Fields (%)	3 Fields (%)	4 Fields (%)	5 Fields (%)	6 Fields (%)
Professionally active	7.7	28.2	10.2	26.9	5.1	21.8
Retirement and disability pensioners	7.8	13.7	17.6	17.6	15.7	27.3
Unemployed	0.7	9.3	7.8	15.7	6.4	60
Homeless	0	9.7	19.4	19.4	3.2	49.3

changes develop in the period of time as short as that reported by our patients? While bacteriological and radiologic status could be verified objectively, the assessment of duration of symptoms was entirely dependent on the patients' evaluation. It cannot be excluded that the patients did not pay proper attention to their symptoms or tried to minimalise symptoms in order to justify a delay in contacting a doctor.

In only 65% of tuberculosis patients in Poland (in 61% in the Masovian region) is the diagnosis confirmed bacteriologically [3]. It is possible that a less advanced radiologic picture and shorter period of symptoms prior to diagnosis are more frequent among patients with negative bacteriological examination. From an epidemiological point of view, patients like ours, expelling large numbers of tubercle bacilli, are more important because they constitute a source of infection. Knowledge of risk groups allows for action aimed at early detection and treatment of the disease. Our results indicate that the effort should be directed towards men who are unemployed, homeless, and unmarried. Older people should not be forgotten, as the disease may have an oligosymptomatic course in them. Routine chest X-rays are reasonable in cases with persistent non-specific general symptoms or symptoms of the respiratory system.

We compared our results with those obtained in a study from the years 1991-2000, performed in the town of Kalisz. That study encompassed 376 tuberculosis patients (sputum smear positive and negative) [6]. Similarly to our study the percentage of professionally active patients was small — 21.5% [6]. The group of different types of pensioners was bigger (39.6%) while the unemployed group was smaller (37%) [6]. In our study, from the Masovian region, the unemployed accounted for 57% and pensioners for 26%. The proportion of professionally active people among tuberculosis patients was similar in Kalisz and in the Masovian region in the studied period of time, while the percentage of pensioners decreased and the percentage of unemployed increased. In the 1970s and 1980s the majority of tuberculosis patients were professionally active [7,8]. In 1992 Miller et al. recorded that only 8.5% of all Polish tuberculosis patients were unemployed [9]. In 2002 this rate increased to 23% [10]. In our study the rate reached 57%. This depicts how huge changes have taken place in the structure of professional activity in tuberculosis patients. In 1992 the proportion of various types of pensioners and dependants among tuberculosis patients was already quite high — 55%, while professionally active patients accounted for only 31% [9]. This significant increase of tuberculosis incidence among the unemployed was also seen in Russia [11]. Other tuberculosis risk factors included: living in crowded facilities, imprisonment, low financial status, etc. [11]. The proportion of homeless patients was very high in our group (as much as 10%). In the 1990s that proportion was two times lower [6]. In 1992 the homeless accounted for only 1% of tuberculosis patients [9], and in 2002 that percentage increased up to 2.8% [10]. In the United States the tuberculosis incidence rate is 50-fold higher among the homeless in comparison to the general population (270 vs. 5/100,000) [12]. In Poland the rate for the homeless is as high as 4290/100,000 [13]. Very high tuberculosis incidence has also been shown for people living in poverty — 730/100,000 [13], while for the general population it is 24/100,000 [3]. Screening chest X-rays conducted in recent years in shelters for homeless people in the region of Wielkopolska allowed for detection of active tuberculosis in 2% of cases, and post-tuberculosis features in 6.5% [14]. Most of those patients were sputum smear-positive. A chest X-ray should always be performed in a homeless person with symptoms, especially cough, because it has been shown that in up to 12.5% of such people tuberculosis may be detected [14]. Of course, asymptomatic cases also may occur. A chest X-ray allows for detection of other disease as well, e.g. lung cancer or circulatory system disorders (heart

failure) [14]. Homelessness is such a significant risk factor for tuberculosis that screening tests, abandoned in the general population for economic reasons, may be justified in this group. Among men suffering from tuberculosis the homelessness rate is 3 times as high as in women in the Masovia region.

Married men constituted 40% of the studied group; the majority of patients were divorced, widowers, or bachelors. Unmarried people are more prone to tuberculosis than married [15]. Of course the distinction between unmarried and single is crucial. The increase in number of informal relationships has been observed recently, so not all of our unmarried patients were single, and some of them could have partners or live together with their families (parents, siblings). In a random sample of tuberculosis patients in Poland real singles accounted for nearly 19% [10]. In a comprehensive Polish publication from 2007 it was stated that being single is a risk factor for tuberculosis, for more extensive radiologic changes, and for treatment default leading to treatment failure [10]. These observations were confirmed by data from Estonia, where being unmarried appeared to be one of the risk factors for tuberculosis [16]. In the study from Kalisz half of the patients were married [6]. Single men predominated among tuberculosis patients in Russia [17]. On the other hand, publications from Asia show the opposite phenomenon, with tuberculosis being more frequent in extended families sharing a small living space [18].

We did not analyse the influence of alcohol abuse, mainly because there were no reliable data on that subject. The information regarding alcohol consumption obtained from patients needs to be treated with a huge dose of caution. However, the significance of this factor is frequently emphasised in the literature [10, 19]. It seems to be an especially crucial problem in Russia, where 25% of tuberculosis patients are believed to abuse alcohol, and the risk for treatment default in these patients is 7 times higher than in the general population [17, 19].

In the studied patients, extensive changes in lungs were observed. Involvement of 6 pulmonary fields was especially frequent in homeless and unemployed patients. Korzeniewska-Koseła showed that extension of radiologic changes is related to being unemployed, single, and abusing alcohol [10]. Miller et al. [9] described a higher frequency of fibrous-cavernous pulmonary tuberculosis in people with lower educational status and in pensioners, but the employment structure in 1992 was different than seen presently in the Masovian region. It is probable that pensioners had better access to health care services than the unemployed and the homeless. The outcome of comparison of the radiologic changes extent seen now in Masovian region and reported for Lublin region for year 1957 is surprising [20]. In the cited study, changes limited to 1 pulmonary field were present in 21.4% of patients, limited to 2 fields in 24.1%, limited to 3 fields in 13.8%, limited to 4 fields in 12.3%, limited to 5 fields in 7.9%, and affecting all 6 fields in 19.5% [20]. This data, based on the analysis of 2000 patients, shows that the presently seen radiologic changes were more extensive than in the past. Sputum smear-positive (61%) and negative (39%) patients were included in the 1957 study [20]. That difference in the extent of radiologic changes may, to some degree, depend on the delay in tuberculosis detection due to worse access to health care services for unemployed and homeless people as well as due to declining vigilance of health care professionals, nowadays. It may also be a result of abandoned radiologic screening that allowed for tuberculosis detection in a less advanced stage in asymptomatic patients, and for detection of inactive post-tuberculosis changes. Issues like patients' low awareness of health-related problems, not paying attention to their health condition, and their reluctance to contact health care professionals should also be considered as causative factors.

It took 10 months in rural areas and 3 months in urban areas from symptom onset to tuberculosis diagnosis 50 years ago [20]. Nowadays, time from symptoms onset to diagnosis is shorter in inhabitants of rural areas than those of urban areas. It is probably associated with improvement in access to health care services in villages and small towns in recent decades in Poland. However, there are countries where poor access to health care services in rural areas still increases the risk of tuberculosis-related death [21].

There has been a gradual shift in the age of tuberculosis patients. In 1957 the majority of them were younger than 40 years old [22], while presently the majority are over 40 years old. The aging of this population is typical for well-developed countries [23]. Recent studies in Poland also showed that 64% of tuberculosis patients are older than 45 years [10]. The results confirm the significance of sociodemographic factors in tuberculosis [24, 25]. Even in the richest countries like the United States the importance of unemployment, poverty, and low social or educational status for tuberculosis epidemiology is emphasized [26]. The contribution of various sociodemographic factors is different and depends on the country. Monitoring of locally dominating factors promoting the spread of tuberculosis helps in the creation of successful programmes of disease control.

Conclusions

A total of 74% of sputum smear-positive tuberculosis patients in the Masovian region were professionally inactive people, including 57% unemployed. As many as 10% of sputum smear-positive patients hospitalised in the Masovian region were homeless. In 63% of sputum smear-positive patients symptoms were present for more than 2 months before the diagnosis was established. The majority of patients (81%) had very extensive radiologic changes, affecting 3 and more pulmonary fields, at the time of treatment commencement.

Conflict of interest

The delares no conflict of interest.

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