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Do depressive symptoms adversely affect the lifestyle? Results of the WOBASZ study

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Abstract

Background: The negative psychosocial risk factors for cardiovascular (CV) disease, such as low social support or depression, may adversely affect the lifestyle.

Aim: To evaluate the lifestyle in terms of anti-health behaviours in patients with depressive symptoms (DS) compared to individuals without DS.

Methods: A total of 6392 men and 7153 women aged 20–74 years were evaluated in the WOBASZ study [a multicentre nationwide study of the Polish population's health]). The presence of DS was assessed with Beck's Depression Inventory (BDI). Depressive symptoms were considered to be present if the patient scored at least 10 points on the BDI scale.

Results: The DS were present in 24% of men and 34% of women. In both groups, the mean age of subjects with DS was significantly higher compared to healthy individuals. Compared to healthy individuals, subjects with DS had a more unfavourable CV risk profile (hypertension, diabetes mellitus, obesity and hyperlipidaemia were significantly more prevalent among the subjects with DS), were characterised by a lower socioeconomic status and inhabited small administrative districts. Subjects with DS were also characterised by more anti-health lifestyles than healthy individuals. Of the 6 elements of anti-healthy lifestyle, 3 or more were observed in 18.8% of men with DS and 14.6% of men without DS ($p < 0.0001$) and in 17.5% of women with DS and 11.3% of women without DS ($p < 0.0001$). Significantly more men and women with DS than men and women without DS were regular smokers (men [M]: 42.3% *vs* 37.4%, $p < 0.0007$; women [W]: 25.6% *vs* 23.3%, $p < 0.0346$), were not physically active (M: 37.4% *vs* 30.2%, $p < 0.0001$; W: 43.4% *vs* 34.9%, $p < 0.0001$), consumed alcohol at least three times a week (M: 3.8% *vs* 1.7%, $p < 0.0097$; W: 0.3% *vs* 0.1%, $p = 0.0349$), were incompliant with their doctor's recommendations (M: 17.9% *vs* 12.3%, $p < 0.0001$; W: 22.2% *vs* 13.9%, $p < 0.0001$) and failed to have their blood pressure measured within the past year (M: 19.4% *vs* 15.0%, $p < 0.0003$; W: 15.1% *vs* 11.4%, $p < 0.0001$). The lack of physical activity and smoking, and — in women — regular consumption of alcohol, were demonstrated to be the lifestyle factors which were significantly and independently related to DS.

Conclusions: A high prevalence of DS, especially among women, has been observed in the Polish population. The DS were found in every fourth man and every third woman. In both groups, subjects with DS were characterised by more anti-health lifestyle compared to healthy individuals. Of all the analysed factors of anti-health lifestyle the following were significantly and independently associated with DS — lack of physical activity and smoking in both sexes and, additionally, regular alcohol consumption in women.

Key words: depressive symptoms, lifestyle, health behaviours, cross-sectional study

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INTRODUCTION

There is an increasing body of scientific reports demonstrating an independent contribution of psychosocial factors to cardiovascular risk [1]. In addition to the increased risk of first episode and poorer prognosis in coronary artery disease (CAD), psychosocial factors may interfere with patient compliance with recommendations regarding the healthy lifestyle both at the population level and among patients at a high risk of CAD [2]. The risk of CAD and the deterioration of its course in patients with preexisting CAD are affected by low socioeconomic status, lack of social support, stress and depression [2]. Psychosocial factors often accumulate in the same individuals or groups of individuals with, for instance, low socioeconomic status. It has been shown that in addition to such "anti-health" behaviours as smoking or unhealthy diet, depressed patients more commonly present with autonomic, inflammatory or endocrine disorders, which increases the risk of cardiovascular disease (CVD).

The aim of the study was to evaluate the lifestyle in the aspect of anti-health behaviours in depressed versus non-depressed individuals.

METHODS

Study group

The evaluation of the prevalence of depressive symptoms (DS) was performed on the basis of a cross-sectional study of a random sample of the Polish population. A total of 6392 men and 7153 women aged 20–74 years were evaluated in the WOBASZ study (*Wieloośrodkowe Ogólnopolskie Badanie Stanu Zdrowia Ludności* [a multicentre nationwide study of the Polish population's health]). The methodology and aims of the cross-sectional study and the sampling method have been reported previously [3, 4]. The study included a questionnaire, a physical examination, anthropometric measurements and laboratory tests.

The socioeconomic status was evaluated by means of a tercile distribution of the product of education (8 levels) and income (6 levels).

Evaluation of the prevalence of depressive symptoms

The prevalence of DS was evaluated by means of Beck Depression Inventory (BDI) consisting of 21 individual depressive symptoms, to each of which four different replies were assigned. The subject rated the severity of DS by choosing one of 4 responses to which specific scores were assigned according to the methodology of BDI [5]. The occurrence of DS was confirmed if the subject scored at least 10 points on the BDI scale. The preliminary results and the methodology of the psychological study of the WOBASZ programme have been previously reported by Piwoński et al. [6]. The prevalence of DS has been evaluated in a total of 16 provinces of Poland, in 6164 men and 6915 women.

Lifestyle evaluation

Lifestyle was evaluated with a questionnaire. The following "anti-health" lifestyle elements were analysed: regular smoking (at least 1 cigarette per 24 h), lack of attempts to quit smoking (only for smokers), alcohol consumption at least 3 times a week, lack of regular physical activity (lack of physical exercises lasting at least 30 min), lack of preventive blood pressure (BP) monitoring (at least once a year) and non-compliance with doctors' directions (irregular intake of prescribed medications).

Statistical analysis

The results are presented as means ± standard deviation or as numbers and percentages. The χ^2 test was used to compare the differences in lifestyle between men and women with or without DS. The significance level was established at $p < 0.05$. The relationship between lifestyle factors and DS was evaluated by means of multivariate logistic analysis adjusted for age, sex, size of the inhabited administrative district, socioecononomic status, presence of obesity, diabetes mellitus, CAD, hyperlipidaemia and hypertension. The analyses were performed with the Statistical Analysis System (SAS v 9.2).

RESULTS

Depressive symptoms were identified in 24% of men and 34% of women. The mean BDI score was 14.8 ± 5.2 for men with DS and 15.5 ± 5.8 for women with DS and fell within the 10–18 range (mild to moderate depression according to BDI 1961). At least 19 points (at least moderate depression according to BDI 1961) were scored by 17.9% of men and 21.9% of women.

Compared to healthy individuals, subjects in whom DS were identified, were characterised by a higher mean age, they significantly more commonly inhabited administrative districts of up to 8 thousand people and significantly more commonly belonged to the low socioeconomic status group (Table 1).

The subjects showing DS had an unfavourable CVD risk profile. They were significantly more often affected by CAD, hypertension, diabetes mellitus, obesity or hyperlipidaemia.

They were also characterised by a more risky lifestyle in terms of health than subjects without DS. Of the 6 elements of "anti-health" lifestyle 3 or more were observed in 18.8% of men with DS and 14.6% of men without DS ($p < 0.0001$) and in 17.5% of women with DS and 11.3% of women without DS ($p < 0.0001$). None of the analysed elements of "anti-health" lifestyle were noted in about 25% of subjects with DS in both gender groups. This percentage was higher and exceeded 32% among healthy individuals.

Compared to those without DS, men with DS more regularly smoked and consumed alcohol, were more frequently physically inactive and more of them did not monitor their BP. More men with DS did not comply with their doctors' recommendations. Male smokers with DS did not attempt to

Table 1. Characteristics of the population according to the presence or absence of depressive symptoms (DS)

Analysed factors	Men			Women		
	With DS	Without DS	P	With DS	Without DS	P
Number	1476	4688		2324	4591	
Age (years ± SD)	51.6 ± 14.0	43.5 ± 14.9	< 0.0001	50.3 ± 14.7	42.3 ± 14.5	< 0.0001
Size of the administrative district			0.0017			0.0002
Small (< 8 thousand)	37.5%	32.5%		37.2%	32.4%	
Medium (8–40 thousand)	29.3%	32.5%		30.0%	33.3%	
Large (> 40 thousand)	33.2%	35.0%		32.8%	34.3%	
Socioeconomic status			< 0.0001			< 0.0001
Low	38.4%	26.3%		40.4%	27.5%	
Intermediate	40.0%	39.6%		32.8%	34.2%	
High	21.6%	34.1%		26.8%	38.3%	
Obesity *(body mass index ≥ 30 kg/m²)*	25.2%	19.0%	< 0.0001	30.7%	18.1%	< 0.0001
Smoking *(at least 1 cigarette/24 h)*	42.3%	37.4%	0.0007	25.6%	23.3%	0.0346
Hypertension *(blood pressure ≥ 140/90 mm Hg or treatment)*	50.5%	37.2%	< 0.0001	43.6%	26.3%	< 0.0001
Hyperlipidaemia *(cholesterol ≥ 5.0 mmol/L or LDL-cholesterol ≥ 3.0 mmol/L or treatment)*	64.0%	56.4%	< 0.0001	63.5%	52.5%	< 0.0001
Diabetes mellitus *(glucose ≥ 7.0 mmol/L or a history of diabetes mellitus)*	13.4%	5.6%	< 0.0001	10.4	4.2	< 0.0001
Coronary artery disease (history)	21.0%	7.0%	< 0.0001	18.0%	6.0%	< 0.0001

Table 2. Frequency of the analysed elements of anti-health lifestyle in subjects with and without depressive symptoms (DS)

Analysed lifestyle elements	Men			Women		
	With DS	Without DS	P	With DS	Without DS	P
Lack of regular physical activity *(never exercises for ≥ 30 min)*	37.4%	30.2%	< 0.0001	43.4%	34.9%	< 0.0001
Regular alcohol consumption *(≥ 3 times a week)*	3.8%	1.7%	0.0097	0.3%	0.1%	0.0349
Smoking *(at least 1 cigarette/24 h)*	42.3%	37.4%	0.0007	25.6%	23.3%	0.0346
No previous attempts to quit smoking *(% of subjects who have never attempted to quit smoking)*	7.7%	7.6%	NS	5.1%	6.0%	NS
Non-compliance *(failure to take the prescribed and purchased medications)*	17.9%	12.3%	< 0.0001	22.2%	13.9%	< 0.0001
Failure to self-monitor blood pressure *(failure to measure blood pressure at least once a year)*	19.4%	15.1%	0.0003	15.1%	11.4%	< 0.0001

quit smoking significantly more often than healthy male smokers (Table 2).

Identical tendencies were observed in the group of women. Compared to those without DS, women with DS more regularly smoked and consumed alcohol, were more frequently physically inactive and fewer of them monitored their BP. Women with DS more often failed to comply with their doctors' recommendations. As with the male subjects, female smokers with DS did not attempt to quit smoking significantly more often than healthy female smokers (Table 2).

Table 3. The risk of depression according to lifestyle elements*

Factors	Total		Men		Women	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Regular physical activity						
Yes	1.00		1.00		1.00	
No	1.21 (1.11–1.32)	< 0.0001	1.22 (1.06–1.40)	0.0058	1.21 (1.08–1.36)	0.0013
Regular alcohol consumption						
No	1.00		1.00		1.00	
Yes	1.38 (0.90–2.13)	0.1421	1.23 (0.78–1.95)	0.3771	7.12 (1.29–39.23)	0.0243
Smoking						
No	1.00		1.00		1.00	
Yes	1.39 (1.26–1.53)	< 0.0001	1.38 (1.20–1.59)	< 0.0001	1.39 (1.22–1.59)	< 0.0001
Compliance with the doctor's directions						
Yes	1.00		1.00		1.00	
No	1.12 (0.80–1.58)	0.5116	1.26 (0.80–1.97)	0.3211	0.94 (0.55–1.60)	0.8124
Blood pressure self-monitoring						
Yes	1.00		1.00		1.00	
No	0.84 (0.74–0.96)	0.0077	0.80 (0.66–0.97)	0.0195	0.88 (0.74–1.05)	0.1481

*Values corrected for age, sex, size of the administrative district, socioeconomic status, obesity, diabetes mellitus, coronary artery disease, hyperlipidaemia, hypertension and the "anti-health" lifestyle elements included in the table; OR — odds ratio; CI — confidence interval

The higher prevalence of many disease entities, such as CAD, hypertension and diabetes mellitus among depressed individuals and a more advanced age or lower socioeconomic status in patients showing DS may affect health-promoting activities undertaken by the subjects. Multivariate logistic analysis revealed that the lifestyle factors that were significantly and independently related to DS in the entire group and among men and women separately included — lack of regular physical activity and smoking (Table 3). Both these factors, when corrected for confounders and the remaining elements of the "anti-health" lifestyle, increased the risk of depression to the same degree for all the analysed groups: by 21% in the case of the lack of physical activity and by 39% in the case of smoking. In the entire group and in the group of men, the lack of BP self-monitoring was associated with a lower risk of DS by 16–20%, while only in the group of women regular alcohol consumption increased the risk of DS by over 600%.

DISCUSSION

The WOBASZ study revealed a high percentage of individuals with DS, particularly among women.

Depression, probably the most common disease entity in psychiatry, is still being underdiagnosed in clinical practice. Its prevalence in the ageing societies is on the increase and it is 2–3 times more prevalent in patients with other comorbidities, such as diabetes mellitus [7] or CAD [8]. Depression may cause considerable functional and social disability, excluding depressed patients from normal life activities. Depression is also often associated with "anti-health" lifestyle, such as sedentary lifestyle, smoking or drinking. Identification of individuals with depression is therefore very important not only because of the need to treat clinically significant emotional abnormalities, but also to carry out behavioural intervention targeting the risk factors, particularly in patients with the diagnosis of CVD [2].

Many cross-sectional population studies have demonstrated that patients suffering from depression lead an inactive life [9]. We obtained similar findings in our study, where the percentage of physically inactive subjects was significantly higher among the individuals showing DS (men: 37%, women: 43%) compared to subjects without DS (men: 30%, women: 35%). Also the chances of identifying DS among physically inactive subjects were 21% higher than those in individuals undertaking any physical activity and to the same degree for the entire analysed group and gender groups after correction for confounders and the remaining "anti-health" lifestyle factors. Other studies also showed that regular physical activity reduces the risk of depression in adult population [10]. How should the relationship between depression and low physical activity be explained? This relationship may be twofold — depression could lead to reduced physical activity due to the low motivation and lack of energy on the one hand and low physical activity could be a risk factor for depression on the other. Furthermore, compared to healthy individuals, depressed patients are less inclined to undertake any form of activity and deterioration or improvement of DS is associated with changes in physical activity.

Several hypotheses have been put forward to explain the relationship between depression and inactive lifestyle. One of them associates sedentary lifestyle and reluctance to undertake regular physical activity with reduced motivation and vital energy [11]. Studies showed that overactivity of the hypothalamic-pituitary-adrenal (HPA) axis, a well-documented abnormality in patients with major depression, might be the link between inactive lifestyle and depression [12]. Moreover, both depression and sedentary lifestyle are associated with excessive responsiveness of the sympathetic nervous system [11, 13, 14].

The HPA axis dysregulation observed in alcohol dependence is also present in patients suffering from depression and hostility, the two disease entities that are very often associated with alcoholism [15]. Alcoholism has a considerably negative effect on the course of depression, on response to conventional treatment with antidepressants, on the prognosis, suicidal tendencies and social functioning of individuals with DS. Cross-sectional studies have shown that alcohol abuse is the most common problem among depressed patients compared to the general population [16, 17]. In a study by Grant and Harford [16], the percentage of individuals with major depression who regularly consumed alcohol was 21% compared to 7% among non-depressed individuals. In our study, taking into account the differences with the Grant's study, mainly due to a different endpoint ("depressive symptoms" rather than "major depression"), we confirmed the observed tendency, in the case of individuals with DS, towards a more common consumption of alcohol. The percentage of subjects admitting regular alcohol consumption (at least 3 times a week) in the WOBASZ study was twice as high in men with DS (4% of men) compared to men without DS (2%) and in the case of women, among whom regular consumption of alcohol was a marginal problem, the percentage was threefold higher (0.4% *vs* 0.1%). Both studies employed the direct interview methodology, which could have underestimated the percentage of persons abusing alcohol, however in the study by Grant and Harford [16] the research tool (The Alcohol Use Disorder and Associated Disabilities Interview Schedule) seems to select individuals with alcohol problems more precisely. Analysing the issue of regular alcohol consumption corrected for the remaining factors, we found that it was significant and independent of the other factors associated with DS only in women, increasing the chances of identifying depressive symptoms in women regularly consuming alcohol by more than 600% compared to women less frequently consuming alcohol.

Many clinical and epidemiological studies have shown a relationship between smoking and depression and between depression and inability to quit smoking [18–20]. Generally, smoking is the most common habit in patients with depression compared to the general population. The chances of identifying DS in a smoker, taken overall and in gender groups, was 39% higher than in non-smokers. Dopamine is considered the factor that links smoking with psychiatric disorders, as confirmed by clinical studies of bupropion (a dopamine uptake inhibitor), the only agent successfully supporting smoking cessation [21]. In our study, the percentage of smokers who had never attempted to quit smoking was similar among the subjects with depression and in healthy individuals. Subjects with depression are most likely afraid of deteriorating after they quit smoking. A study by Glassman et al. [22] showed that patients with a history of depression who had quitted smoking were at a 7-fold higher risk of recurrent depression than individuals who carried on smoking. Doctors should therefore be very careful when recommending that patients with mental disorders should quit smoking and patients who decided to quit smoking should be under particular supervision by the clinics.

CONCLUSIONS

A large percentage of individuals with DS was observed in the Polish population. The DS ware identified in every fourth man and every third woman. In both gender groups, subjects with DS were characterised by a more "anti-health" lifestyle compared to healthy individuals. Of all the analysed factors of "anti-health" lifestyle the following were significantly and independently associated with DS — lack of physical activity and smoking in both sexes and, additionally, regular alcohol consumption in women.

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Czy objawy depresji wpływają niekorzystnie na styl życia? Wyniki badania WOBASZ

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Streszczenie

Wstęp: Negatywne psychospołeczne czynniki ryzyka chorób układu sercowo-naczyniowego, takie jak niski poziom wsparcia społecznego czy depresja, mogą niekorzystnie wpływać na styl życia.

Cel: Celem pracy była ocena stylu życia w aspekcie zachowań antyzdrowotnych pacjentów z objawami depresji w porównaniu z osobami niewykazującymi takich objawów.

Metody: W ramach Wieloośrodkowego Ogólnopolskiego Badania Stanu Zdrowia Ludności (WOBASZ) w latach 2003–2005 zbadano 6392 mężczyzn i 7153 kobiety w wieku 20–74 lat. Występowanie objawów depresji oceniono wg kwestionariusza skali depresji Becka (BDI). Jeżeli badany uzyskał przynajmniej 10 pkt wg skali BDI, potwierdzano obecność objawów depresji.

Wyniki: Objawy depresji występowały u 24% mężczyzn i 34% kobiet. W obu grupach płci średnia wieku osób z objawami depresji w porównaniu z osobami zdrowymi była istotnie statystycznie wyższa. Osoby z objawami depresji miały bardziej niekorzystny profil czynników ryzyka chorób układu sercowo-naczyniowego niż osoby zdrowe (istotnie częściej stwierdzano u nich nadciśnienie tętnicze, cukrzycę, otyłość czy hiperlipidemię), częściej charakteryzowali się niskim statusem socjoekonomicznym i mieszkali w małych gminach. Ponadto osoby te cechowały się bardziej antyzdrowotnym stylem życia niż osoby bez objawów depresji. Spośród 6 elementów antyzdrowotnego stylu życia 3 lub więcej zaobserwowano u 18,8% mężczyzn z objawami depresji i u 14,6% mężczyzn bez takich objawów ($p < 0,0001$) (u kobiet odpowiednio 17,5% i 11,3%; $p < 0,0001$). Zarówno mężczyźni, jak i kobiety z objawami depresji częściej niż osoby bez takich objawów regularnie palili tytoń (M: 42,3% *v.* 37,4%; $p = 0.0007$; K: 25,6% *v.* 23,3%; $p < 0,0346$), częściej byli nieaktywni fizycznie (M: 37,4% *v.* 30,2%; $p < 0,0001$; K: 43,4% *v.* 34,9%; $p < 0.0001$), częściej spożywali alkohol (≥ 3/tydzień) (M: 3,8% *v.* 1,7%; $p = 0,0097$; K: 0,3% *v.* 0,1%; $p = 0,0349$), częściej nie stosowali się do zaleceń lekarskich (M: 17,9% *v.* 12,3%; $p < 0.0001$; K: 22,2% *v.* 13,9%; $p < 0,0001$) oraz większy odsetek nie mierzył ciśnienia tętniczego przynajmniej raz w roku (19,4% M z objawami depresji nie mierzyło ciśnienia w ciągu ostatniego roku *v.* 15,0% M bez objawów depresji; $p < 0,0003$; K: 15,1% *v.* 11,4%; $p < 0,0001$). Czynnikami stylu życia istotnie i niezależnie związanymi z objawami depresji okazały się brak regularnej aktywności fizycznej, palenie tytoniu i regularne spożywanie alkoholu u kobiet.

Wnioski: W populacji polskiej zaobserwowano wysoką częstość występowania objawów depresji, szczególnie wśród kobiet. Objawy depresji występują u co czwartego mężczyzny i u co trzeciej kobiety. W obu grupach płci osoby z objawami depresji charakteryzują się bardziej antyzdrowotnym stylem życia niż osoby zdrowe. Spośród analizowanych czynników antyzdrowotnego stylu życia istotnie i niezależnie związane z objawami depresji były: brak aktywności fizycznej i palenie tytoniu u obu płci oraz regularne spożywanie alkoholu u kobiet.

Słowa kluczowe: objawy depresji, styl życia, zachowania zdrowotne, badanie przekrojowe

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