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Depressive symptoms in adolescence and quality of life 17 years later – follow-up study

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Summary

Aim. The answer to the question to what extent depressive symptoms which occur in the middle and late adolescence period affect the quality of life in adulthood.

Material and method. The sample group consisted of 308 adults out of 3,445 who had participated in a 2000 study of prevalence of depressive symptoms among students. 17 years later, letters were sent to all study participants with information about the purpose of the study and an original questionnaire, with quality of life and quality of social network scales (the Collaborative Research on Ageing in Europe Social Network Index – COURAGE-SNI and WHOQOL-AGE) attached.

Results. The presence of depressive symptoms in the untreated population of adolescents is associated, in the case of women, with poorer education and fewer opportunities to work in adulthood compared to their non-depressive peers. In contrast, the men who were not depressive in adolescence take jobs in which they are more likely to earn a high income. An analysis of the quality of life showed statistically significant differences between men and women. In the group of non-depressive men, greater satisfaction with owned financial resources was observed. In the case of adult women, those who had been depressive in adolescence declared a sense of lower overall quality of life and satisfaction with the way of spending free time, satisfaction with achievement of life goals and owned financial means. Non-depressive women presented higher quality of social networks 17 years later.

Conclusions. Long-term observation in our prospective study supports the hypothesis of a developmental character of adolescent depression.

Key words: adolescent depression, prospective studies

Introduction

Developing since the 1970s, for nearly twenty years the concept of quality of life has been the subject of numerous theoretical considerations, focusing primarily on

attempts to define this multidimensional construct and debate on the role of objective and subjective indicators in determining its individual dimensions. Next, research tools were developed to enable a universal evaluation of the quality of life or an evaluation of the quality of life as conditioned by health, depending on specific determining factors caused by past or present diseases or disabilities. In the 1990s, a group established by the WHO defined the dimensions of quality of life and developed a common definition to enable the comparison of research results from different countries. Quality of life was defined as "the individuals' personal perceptions of their position in life in the context of the culture and value system in which they live as well as in relation to their tasks, expectations, standards and interests. Such a broad approach means a comprehensive self-assessment by an individual of their physical health, mental state, level of independence, personal beliefs, social interactions and relations with the environment" [1, p. 1570].

Changes in the classification of mental disorders over the past half-century are accompanied by changes in the approach to adolescent depression. Similarly to the nosology paradigm which underlies ICD-9, the psychodynamic paradigm which underlies DSM II is being replaced by the anosological approach. DSM-5 and ICD-11 have also adopted the principle of sorting classified forms of mental disorders according to the subsequent life phases in which they occur. The authors of DSM-5 pointed out that mood disorders, especially depressive ones, are characteristic of the adolescent period. It was not until the third quarter of the last century that the occurrence of depression in adolescence began to be recognized, but its place in the classifications at that time was not clear. Attempts have been made to resolve these doubts in studies, especially longitudinal ones. A meta-analysis of studies published between 1980 and 2017, which analysed the fate of adolescents with an initial diagnosis of a major depressive episode based on DSM-IV criteria, and which included 31 studies based on 136 tests of 24 cohorts, showed that depression in adolescence increases the risk of academic underachievement and unemployment in adulthood, and is linked to having children [2].

Interesting in this context are the results of Nyberg et al. [3] studies, in which the researchers found that none of the factors such as school satisfaction, peer relations, entertainment, a sense of acquiring knowledge and skills or a bond with the family home were directly related to depression in adulthood. However, taking into account the level of education, professional activity and marital status in early adulthood revealed a strong link between satisfaction from attending school in adolescence and depression in adulthood [3]. The sense of satisfaction and the ability to experience pleasure, as well as efficiency in activities characteristic of the developmental phase are taken into consideration when diagnosing depression in children and adolescents, and also when diagnosing adolescent depression as viewed by Kępiński [4].

Prospective studies of mood disorders among adolescents published at the end of the previous century pointed out the links between adolescent depression and the qual-

ity of life in adulthood [5]. However, studies conducted on the relationship between the occurrence of depressive symptoms in adolescence and distant consequences are not very numerous and mainly address the problems of depression occurring and the assessment of health in adulthood, as well as individual components of social functioning. Therefore, there is a lack of research which would relate to the quality of life measured as a whole, rather than its individual indicators.

It should be emphasized that the paradigm introduced in DSM-5 dismisses the nosological constancy of mental disorders throughout life and introduces the possibility of formulating different diagnoses of mental disorders as they develop in the same person in subsequent phases of life.

Aim of the study

The aim of the study is to try to answer the question to what extent depressive symptoms which occur in the middle and late adolescence period affect the quality of life in adulthood.

Material and methods

The baseline sample consisted of 3,445 individuals who had participated in an epidemiological study in the year 2000 as students of regular schools. At that time, they were examined using the Krakow Depression Inventory (KID) [6, 7]. The study was conducted among adolescents in middle and late adolescence.

In 2017 (17-year observation), to all respondents surveyed in 2000, after the verification of address data, letters were sent with information about the purpose of the study and the authors' questionnaire, with quality of life and quality of social network scales attached. The questions contained in the questionnaire related to those areas of functioning which, based on literature on the subject, may have been affected by depression to varying degrees, depending on the phase of adolescence in which depressive symptoms had occurred. The questions concerned education, professional activity, use of other people's or institutional help, income, marital status, having children, housing conditions, family and social relations, extra-professional activity, general health, hospitalisations, use of psychoactive substances and problems with the law.

The survey returned data regarding 324 people. The analysis used data for 308 people for whom the results of the KID depression test in 2000 were available. Those who responded had a slightly higher KID questionnaire score in 2000 than those who did not respond to this questionnaire (5.8 $SD = 1.96$ vs. 5.5 $SD = 1.83$).

Information on health was inferred from the question "How satisfied are you with your health?". In the analysis of the material, three specific groups of diseases were identified: mental illnesses (depression, neuroses, anxiety, dysthymia, schizophrenia),

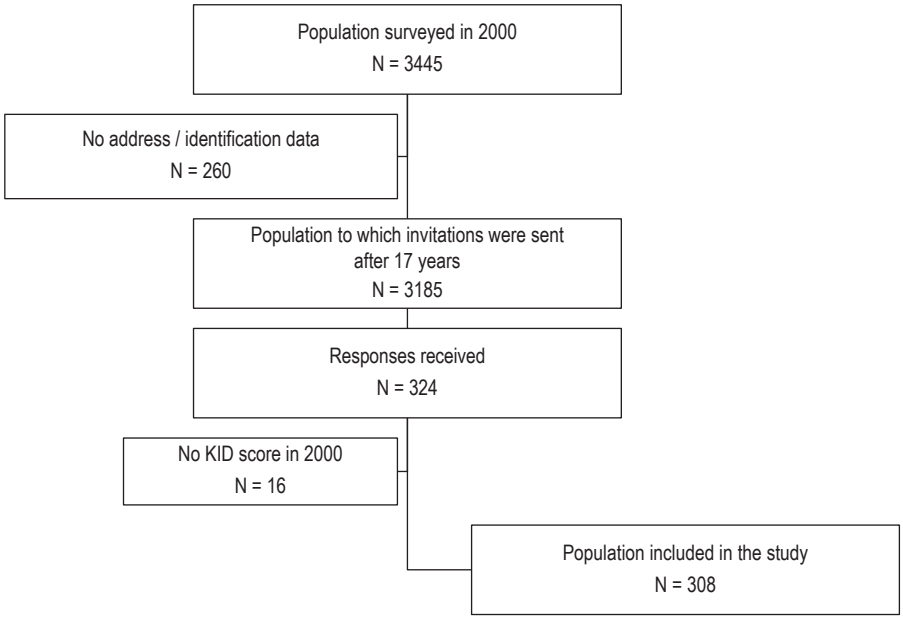

Figure 1. **Size of sample groups in individual studies**

autoimmune diseases (ulcerative colitis, irritable bowel syndrome, bulimia, Crohn's disease, Hashimoto's disease, ulcers, reflux disease) and cancers.

The social network quality analysis was based on the COURAGE-SNI (The Collaborative Research on Ageing in Europe Social Network Index) scale, adjusted to the age of the respondents (with the authors' consent) [8]. This scale assesses the respondents' quality of social contacts in terms of quality of social relations, frequency of direct contacts and a general feeling of support with regard to: spouse/partner, parents, children, other relatives, friends, colleagues and neighbours. The higher the score on the scale, the better the quality of social relations.

Another scale used in the study was the WHOQOL-AGE quality of life scale which consists of 13 questions rated by the respondent on a 5-point scale [9], validated in Polish conditions [10]. The analysis was carried out based on both the entire scale score and its individual item scores.

The description of the material uses frequencies and percentages. Comparison of groups with depressive symptoms during adolescence and without such symptoms was based on the Chi2 test and Fisher's exact test, for small numbers. The analysis was conducted separately for the female group and the male group. The SPSS 25 (PS IMAGO PRO) was used to process the data. All analyses assumed differences with $p < 0.005$ to be statistically significant.

The study was conducted following approval from the Jagiellonian University Medical College Bioethics Committee (1072.6120.52.2017).

Results

In the group of women who had been depressive during adolescence, a lower percentage of people with higher education (76.7% vs. 90.6%, $p = 0.01$) and professional careers (84.7% vs. 94.4%, $p = 0.029$) was observed compared to their peers who had not shown depressive symptoms. In the male group, a similar (although statistically insignificant) difference was observed with respect to the level of education: men who had declared depressive symptoms in adolescence were less likely to complete higher education (66.7% vs. 80.2%, $p = 0.221$). On the other hand, the men who had declared depressive symptoms stated that they currently all had jobs compared to 92.2% of men without depressive symptoms ($p = 0.604$). However, it was in the group of non-depressive men that most of the respondents declared an income of more than PLN 3,500 per month (58.6% vs. 33.3%, $p = 0.048$).

No differences were observed in the housing conditions of the examined women presenting depressive and non-depressive symptoms. On the other hand, in the male group, it was observed that those who had been depressive in adolescence most often had three rooms (76.9%), while in the group of people without depression, the most frequent response declared by those surveyed was that they were living in one – or two-room dwellings (55.7%). Moreover, in this latter group, 11.4% of the respondents declared owning a home with four or more rooms ($p = 0.009$). Neither in the female nor the male group was there an impact observed of past adolescent depression on having a spouse/partner seventeen years later or on the respondents' declarations concerning the sense of closeness in their relationships. In the male group, however, it was observed that men declaring depressive symptoms were more likely to have children (64.7%) compared to non-depressive men (43.1%), but the difference did not reach statistical significance ($p = 0.099$).

No differences were observed in the frequency of participation in sports activities or having friends depending on whether or not depression had occurred in adolescence.

Table 1. **Demographic and social characteristics of subjects examined twice – in 2000 and 2017**

Variable	Female		p	Male		p
	No depression N=128	Depression N=60		No depression N=102	Depression N=18	
Higher education	116 (90.6)	46 (76.7)	0.010	81 (80.2)	12 (66.7)	0.221*
Employment	119 (94.4)	50 (84.7)	0.029	94 (92.2)	18 (100.0)	0.604

table continued on the next page

Income > PLN 3,500	41 (32.5)	19 (32.8)	0.977	58 (58.6)	6 (33.3)	0.048
Living alone	12 (9.4)	6 (10.0)	0.892	14 (13.7)	0 (0.0)	0.125*
Number of rooms 1-2 3 rooms 4 and more	 43 (43.0) 39 (39.0) 18 (18.0)	 26 (51.0) 18 (35.3) 7 (13.7)	 0.617	 49 (55.7) 29 (33.0) 10 (11.4)	 3 (23.1) 9 (76.9) -	 0.009
Having spouse / partner	112 (87.5)	51 (85.0)	0.638	75 (73.5)	14 (82.4)	0.556*
Close relationship with partner	110 (97.3)	50 (98.0)	1.000*	73 (97.3)	13 (92.9)	0.405*
Having children	72 (56.3)	34 (56.7)	0.957	44 (43.1)	11 (64.7)	0.099
Number of children 0 1 2 3 4	 56 (44.1) 44 (34.6) 22 (17.3) 5 (3.9) -	 26 (43.3) 17 (28.3) 15 (25.0) - 2 (3.3)	 0.081	 58 (56.9) 27 (26.5) 15 (14.7) 2 (2.0) -	 6 (35.3) 6 (35.3) 5 (29.4) - -	 0.246*
Having friends	121 (94.5)	52 (88.1)	0.109*	90 (88.2)	16 (88.9)	1.000*
Sports activity	67 (52.8)	30 (50.0)	0.725	62 (60.8)	10 (55.6)	0.676

* based on Fisher's exact test

When analysing the health of the women and men surveyed, no significant differences were observed between those who had been depressive and those who had not in adolescence. There were no statistically significant differences in the incidence of any serious disease after the seventeen-year period between the first study and the second questionnaire, nor were there differences depending on the types of diseases selected: i.e. mental disorders, autoimmune diseases or cancer. Moreover, the symptoms of adolescent depression were not linked to more frequent use of stimulants such as smoking, drinking alcohol or using drugs. However, different trends in the female and the male group should be noted. In the women's group, 13.3% of those who had presented depressive symptoms in adolescence used drugs compared to 5.5% of those who had not declared depressive symptoms, while in the men's group, the men without depressive symptoms used drugs more often (26.5% vs. 5.6%).

Table 2. **Characteristics of health condition and use of psychoactive substances according to gender and occurrence of depressive symptoms in adolescence**

Variable	Female		p	Male		p
	No depression N=128	Depression N=60		No depression N=102	Depression N=18	
Last PHC (primary health care) visit Last month 2-6 months ago >6 months ago Does not use PHC	 36 (28.3) 47 (37.0) 29 (22.8) 15 (11.8)	 20 (35.1) 15 (26.3) 14 (24.6) 8 (14.0)	0.546	 12 (11.8) 36 (35.3) 30 (29.4) 24 (23.5)	 1 (5.6) 6 (33.3) 8 (44.4) 3 (16.7)	0.674*
Frequency of use of PHC In last 2-3 years 1/year Several times/year 1/month More often	 32 (26.0) 37 (30.1) 50 (40.7) 4 (3.3) -	 14 (24.6) 15 (26.3) 25 (43.9) 3 (5.3) -	0.867	 35 (36.8) 29 (30.5) 29 (30.5) - 2 (2.1)	 6 (35.3) 7 (41.2) 4 (23.5) - -	0.826*
ER/A&E (last year)	24 (18.9)	15 (25.0)	0.338	10 (9.8)	2 (11.1)	1.000*
Serious illness	31 (24.2)	16 (27.1)	0.671	21 (20.6)	3 (16.7)	1.000*
Mental disorders	6 (4.7)	3 (5.0)	1.000*	9 (8.8)	2 (11.1)	0.670*
Autoimmune diseases	7 (5.5)	4 (6.7)	0.746*	1 (1.0)	-	1.000*
Cancers	3 (2.3)	4 (6.7)	0.212*	3 (3.0)	-	1.000*
Specialist treatment	116 (90.6)	54 (90.0)	0.892	84 (82.4)	13 (72.7)	0.335*
Smoking cigarettes	13 (10.2)	10 (6.7)	0.211	27 (26.7)	5 (29.4)	0.776*
Drinking alcohol No <1/week Up to 5/week More	 32 (25.2) 77 (60.6) 17 (13.4) 1 (0.8)	 10 (16.7) 36 (60.0) 11 (18.3) 3 (5.0)	0.162	 11 (11.5) 42 (43.8) 32 (33.3) 11 (11.5)	 4 (23.5) 10 (58.8) 2 (11.8) 1 (5.9)	0.147*
Using drugs	7 (5.5)	8 (13.3)	0.083*	27 (26.5)	1 (5.6)	0.069*
Violation of legal norms	1 (0.8)	2 (3.3)	0.239*	6 (5.9)	-	0.590*

* based on Fisher's exact test

An analysis of the quality of life of the respondents and the quality of social networks developed by 30-year-olds in the male group showed no significant impact of depression in adolescence on the respondents' quality of social contacts or their overall

quality of life. The statistically significant differences between depressive and non-depressive men were observed in relation to satisfaction with their financial resources – namely, non-depressive men were more satisfied with their resources (3.75 vs. 3.22, $p = 0.045$), and satisfaction with use of time – non-depressive men were less satisfied (3.32 vs. 3.83, $p = 0.04$). In the female group, on the other hand, depression in adolescence was associated with a sense of lower overall quality of life (40.4 vs. 43.2 in the non-depressive group, $p = 0.008$). These differences were visible in deriving less satisfaction from spending free time (3.30 vs. 3.65, $p = 0.035$), less satisfaction with the achievement of life goals (3.26 vs. 3.65, $p = 0.017$) and less satisfaction with financial resources owned (3.29 vs. 3.83, $p < 0.001$).

Table 3. **Comparison of quality of life indicators according to gender and depressive symptoms occurring in adolescence**

Variable	Female			Male		
	No depression	Depression	p	No depression	Depression	p
Quality of life self-assessment	4.30 (0.73)	4.08 (0.85)	0.072	3.94 (0.85)	4.11 (0.76)	0.431
Quality of life scale						
Satisfaction with health	3.96 (0.72)	3.80 (0.92)	0.235	3.80 (0.87)	3.89 (0.83)	0.696
Self-satisfaction	3.81 (0.75)	3.53 (0.97)	0.052	3.75 (0.89)	3.72 (0.67)	0.891
Satisfaction with personal relationships	3.99 (0.93)	3.82 (0.93)	0.229	3.65 (1.04)	4.06 (0.87)	0.126
Satisfaction with housing conditions	4.24 (0.82)	3.98 (1.13)	0.113	4.07 (0.92)	4.22 (0.73)	0.501
Satisfaction with use of time	3.65 (0.89)	3.30 (1.12)	0.035	3.32 (1.00)	3.83 (0.79)	0.040
Everyday vitality	3.69 (0.94)	3.42 (1.05)	0.082	3.82 (0.97)	3.83 (0.99)	0.957
Being in control of desired activity	3.67 (0.94)	3.51 (0.82)	0.258	3.74 (0.82)	3.83 (0.92)	0.665
Being able to attain goals	3.65 (0.99)	3.26 (1.10)	0.017	3.65 (0.87)	3.67 (0.97)	0.953
Having enough money to meet own needs	3.83 (0.85)	3.29 (0.98)	<0.001	3.75 (0.99)	3.22 (1.17)	0.045
Sense of satisfaction with close friendship	4.43 (0.76)	4.21 (0.89)	0.078	4.09 (1.03)	4.22 (0.73)	0.608
Overall quality of life score	43.2 (6.34)	40.4 (7.60)	0.008	41.7 (6.72)	42.6 (6.80)	0.608

Higher quality of the social network of women who had not been depressive during adolescence was also observed (65.9 vs. 59.3, $p = 0.046$).

Discussion

An analysis of the results of the seventeen-year prospective study on the relationship between depression in adolescence in the untreated population of adolescents and their health and functioning in adulthood indicates that the occurrence of depressive symptoms in that phase of development is, in the case of women, linked to getting a poorer education and having less opportunity of working professionally in adulthood than is the case with non-depressive peers. In the male group, on the other hand, it was observed that the depressive individuals were less likely to obtain a higher education than their non-depressive peers, although the difference did not reach statistical significance. In contrast, the men who were not depressive in adolescence take better-paid jobs in which they are more likely to earn a high income. It was also observed that the men who had presented depressive symptoms were more likely to have children and live in slightly better housing conditions; however, as was the case with the level of education, the correlation did not achieve statistical significance. Earlier studies of adolescents in Krakow revealed links between depression in adolescence and earlier pregnancy or establishing transitory relationships [5, 11, 12].

In the case of mid-adolescence depression in men, a lack of significant partner relationships was observed; in the case of women, earlier motherhood and early divorces were observed. Depressive symptoms in early adolescence turned out to be linked with lower intensity of social interactions outside the family circle. In contrast, women with depressive symptoms in middle adolescence turned out to have a more intense social life [5].

An analysis of the quality of life of the respondents showed statistically significant differences between the men and the women who had shown depressive symptoms in adolescence. Namely, in the group of non-depressive men, greater satisfaction with financial resources owned was observed. In the case of women, those who had been depressive in adolescence declared a sense of lower overall quality of life in adulthood, especially with regard to spending free time, satisfaction with achievement of life goals and financial means owned. By contrast, non-depressive women presented a higher quality of social networks seventeen years later.

Quality of life, as an assessment of the past, the future and the present dimension, can be linked to the respondents' sense of psychosocial potential. This shows their belief that they are able to control their current life situation, but also that they are making plans for the future, which may indirectly indicate mental well-being and satisfaction with life. [10]. The results obtained indicate that, contrary to predictions, the occurrence of depressive symptoms in this phase of development cannot be treated as a predictor of mental disorders in later periods of life. This was already indicated by the results of earlier prospective studies conducted among adolescents in Krakow. They did not find any links between adolescent depression and affective disorder in adulthood [5, 11, 12].

What should be mentioned in the first place among the limitations of the presented study is that the data was collected based on mailbox surveys, which involves the risk of errors typical of this type of tools – primarily related to respondents having to retrace certain facts from the past but also the risk of unconscious or conscious distortion of information. In addition, the use of the mailbox survey form in a way involves a relatively low percentage of obtained survey returns – this being a problem typical of many such studies. The resulting feedback in the order of about 10% of the initial sample seems quite low; however, it should be taken into account that it is a study repeated 17 years after the first study. What is noticeable in comparison to previous questionnaire studies is that there was less willingness to cooperate and send feedback, although the authors did cover the costs. Such a small sample size does not make it possible to obtain the appropriate statistical power of inference; however, it can be a basis for observing certain trends evident in the studied group.

Conclusions

Long-term observation in our prospective study supports the hypothesis of a developmental character of adolescent depression.

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