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# Adolescent depression as a risk factor for the development of mental disorders. A 15-year prospective follow-up

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***Summary***

***Aim***: *The project attempts to assess the impact of adolescent depression on the development of mental disorders, substance dependency and social pathology in adulthood, as well as the difference in the risk of depression between early and mid adolescence.*

***Method***: *In 1984 the prevalence rate of depression was assessed in a representative sample of an urban adolescent population. The Cracow Depression Survey (KID) was used as a screening tool. In 2000, all participants of the earlier phase of the study were informed by mail about the tasks of the project and were asked to answer the attached questionnaire. Treatment details were collected from district psychiatric hospitals and a local intoxication centre.*

*The study group. A total of 985 letters were sent out (introductory data regarding 50 subjects was incomplete). Fifty letters were returned unopened. There were 256 responses (168 women and 87 men).*

***Results***: *A statistically significant relationship was observed between adolescent depression and the deterioration in general health, as well as cigarette smoking. Mid-adolescence depression in men was related to the lack of a significant partnership; while in women it was related to motherhood and disrupted marriage. Early adolescent depression in women was related to less extended extra-familiar social relations. Conversely, women who suffered from depression in their mid-adolescence declared more relations of this kind.* ***Conclusions***: *Adolescent depression determined by the results of KID seems to have an impact on general health conditions and social relations, particularly in women. The nature of this impact is not clear. Gender plays a more important role in comparison to the stage of adolescence in*

*Key words*: Adolescent depression epidemiology follow-up studies

## Introduction

Over the past decade, a majority of the relevant literature has been devoted to mood disorders in adolescents in terms of DSM-IV diagnostics for affective and anxiety disorders [1, 2, 3, 4, 5, 6]. This research focused on adolescents undergoing psychiatric treatment. These studies aimed to identify a predictive value of the syndrome for major depression events in adulthood [7, 8, 4, 5, 6].

Another strand of research seeks for the relationships between depressive disorders and emotional development processes, including the non-treated population [9, 10, 11, 12, 13, 14] or taking into account those depressive disorders that do not exhaust the DSM IV diagnostic criteria [15, 16, 17]. This approach aims to identify a relationship between depression and the form and conditions of adolescence, described as adolescent turmoil, adolescent crisis or adolescent depression [12, 15, 16, 18]. A critical issue in this approach is the impact of depression experienced during adolescence on the further course of life, especially health in adulthood. A hypothesis was proposed whereby unsolved problems of adolescence might precipitate chronic depression [16]. It was also suggested that this course of events is greater in the case of depression experienced at later stages of adolescence [12, 19, 20].

Regardless of the initial premises, researchers find that adolescent depression increases the risk of suicide attempts [4, 21, 22], the likelihood of treatment under the health care system [23], pharmacological treatment [24, 25], overuse and addiction to nicotine [26] and other psychoactive substances [27], school drop-outs [24], earlier marriages by women [2, 28], unsatisfying marriages [2], as well as minor and serious criminal offences [24].

## Project aim

The aim of this project was to: 1) determine to what extent depressive adolescence may cause mental disorders, addiction and social pathology; and 2) evaluate the difference between the risks posed by early- or mid-adolescent depression to the areas mentioned above. In the authors' opinion, an answer to this question could confirm or falsify the hypothesis that early adolescent depression, as an adequate response to the bio-psycho-social transformations occurring during that particular stage of life, does not constitute a risk factor for further adaptation problems or psychopathological symptoms, as opposed to depression experienced during the middle stage of adolescence.

## Material and methodology

In 1984, a research project was conducted to assess the extent of depression in a representative sample of a general school population of early and mid adolescents. The Cracow Depression Survey Inventory (Krakowski Inwentarz Depresyjny or KID) was the primary instrument employed in this study. In the year 2000, all participants from the original research project were sent letters with information about the new project and its objective, complete with a purpose-designed questionnaire. The questions regarded those areas of activity based on professional literature were likely to have been influenced by depression, depending to an extent on the stage of adolescence which the depression occurred. The survey also included data from the hospital registers maintained by the departments of psychiatry at Jagiellonian University Collegium Medicum, the Babiński Memorial Psychiatric Hospital and the Toxicology Department of Jagiellonian University Collegium Medicum.

## Basic variable and modes of data analysis

The depression variable (D) was constructed using the input KID score**.** A value higher than 6 (D+) was adopted in this project as the basic variable. In view of the nature of this research project, a Y/N response variable was also introduced as well (ODP). The sample was divided using the birth date as a cut-off (before 1968) yielding the same groups as in the previous project and surveyed as an early- and mid-adolescence stage. Initially, these groups had been established using the school grade (primary school grade 7 and secondary school grade 2). Fifteen years later, it was decided that the age criterion was more significant than the stage of education and the results of the two KID versions (KID IO "B1" and IO "C1"), which are comparable.

The data from the questionnaire and supplementary sources analyzed in relation to the basic variables (D and ODP) of a qualitative nature were qualitative and quantitative. Appropriate statistical tests were selected matching the nature of such data (i.e. for qualitative data – a c2 test for multiple division tables, and for quantitative data – a t test for the significance of differences between arithmetic mean for independent groups).

## Research sample

The 1984 project involved 1,035 subjects. Of those selected, personal data was incomplete or current addresses could not be established for 50 subjects, who were excluded from the project. Letters were sent to 985 persons, 50 letters were returned unopened and there were 256 responses from 168 women and 88 men. Table 1 contains summary data for the KID result from the 1984 research of the entire group and the group that answered the questions in 2000.

Table 1

**Summarized comparison of samples from 1984 and 2000 (standard deviation SD figures in brackets)**

| Variable | Sub group | Year | |
|---|---|---|---|
| | | 1984 | 2000 |
| Mean KID score | Whole group | 5.58 (1.85) | 5.80 (1.96) |
| | Women | 5.92 (1.83) | 6.12 (1.95) |
| | Men | 5.19 (1.81) | 5.17 (1.85) |
| | Older | 5.64 (1.83) | 5.92 (2.00) |
| | Younger | 5.51 (1.91) | 5.67 (1.94) |
| % of whole group | All depressives | 30.2 | 37.1 |
| | Depressive women | 37.3 | 45.8 |
| | Depressive men | 21.9 | 20.7 |
| | Older depressives | 27.7 | 36.3 |
| | Younger depressives | 33.6 | 38.0 |

The response/no-response analysis excluded the unopened returns regarded as not received. Throughout the group, the female gender and depression were linked more often than the bell curve of the responses could explain.

Table 2

**Response to follow-up questionnaire vs. depression history**

| Group | | Number of responses | Number of non-responses |
|---|---|---|---|
| Non-depressive in 1984 | Actual number | 161 | 527 |
| | Expected number | 178.8 | 509.2 |
| Depressive in 1984 | Actual number | 95 | 202 |
| | Expected number | 77.2 | 219.8 |

$\chi^2(1)=7.94935$; pi= .00481

Table 3

**Response to follow-up questionnaire vs. gender**

| Group | | Number of responses | Number of non-responses |
|---|---|---|---|
| Women | Actual number | 168 | 362 |
| | Expected number | 137.4 | 392.6 |
| Men | Actual number | 88 | 367 |
| | Expected number | 118.6 | 336.4 |

$\chi^2(1)=19.99024$; pi= .00001

## Follow-up survey analysis

The D variable analysis was performed for the entire group of subjects who had answered the survey questions and were divided in the gender and age sub-groups.

Adults who had a record of depression during their adolescence had terminated their relationships more often by estrangement or divorce as opposed to a "break-up" (Tab. 4) and were more likely to have children than what the statistical distribution would suggest (Tab. 5). A statistically significant (greater) number of women with depression in adolescence reported serious illnesses during the previous 15 years (Tab. 6) as well as tobacco use (Tab. 7). Men with a depression record during adolescence were more likely not to have a partner in their life (Tab. 8).

Table 4

**Adolescent depression record vs. termination of last partner relationship**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Break-up | Actual number | 22 | 40 |
| | Expected number | 25.9 | 36.1 |
| Divorce or estrangement | Actual number | 11 | 6 |
| | Expected number | 7.1 | 9.9 |

$\chi^2(1)= 4.68399$ pi= . 03045

Table 5

**Adolescent depression record vs. having children in adulthood**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Have children | Actual number | 71 | 100 |
| | Expected number | 62.9 | 108.1 |
| Have no children | Actual number | 22 | 60 |
| | Expected number | 30.1 | 51.9 |

$\chi^2(1)= 5.14567$ pi= .02330

Table 6

**Women's adolescent depression history vs. major illnesses over 15 years**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Illnesses reported | Actual number | 23 | 15 |
| | Expected number | 17.1 | 20.9 |
| No illnesses reported | Actual number | 51 | 75 |
| | Expected number | 56.9 | 69.1 |

$\chi^2(1)= 4.73978$ pi= .02947

Table 7

**Women's adolescent depression history vs. cigarette smokers**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Smokers | Actual number | 28 | 15 |
| | Expected number | 17.5 | 20.5 |
| Non-smokers | Actual number | 53 | 74 |
| | Expected number | 58.5 | 68.5 |

$\chi^2(1)= 4.15822$ pi= .04143

Table 8

**Men's adolescent depression history vs. being in a partner relationship**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Partner relationship | Actual number | 13 | 61 |
| | Expected number | 15.5 | 58.5 |
| No partner relationship | Actual number | 5 | 7 |
| | Expected number | 2.5 | 9.5 |

$\chi^2(1)= 3.62353$ pi= .05697

As compared to the non-depression cases, adults with a depression record later in their adolescence were more likely to have children (Tab. 9). They also had extensive social relationships outside of their immediate families more often (Tab. 10). Those with an early adolescent depression had a less extensive social life (Tab. 11).

Table 9

**Mid-adolescent depression history vs. having children**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Children | Actual number | 38 | 55 |
| | Expected number | 33.3 | 59.7 |
| No children | Actual number | 6 | 24 |
| | Expected number | 10.7 | 19.3 |

$\chi^2(1)= 4.29603$ pi= . 03820

Table 10

**Mid-adolescent depression history vs. extra-familial socializing**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Once a week or more | Actual number | 22 | 29 |
| | Expected number | 18.2 | 32.8 |
| Once a month or more | Actual number | 12 | 42 |
| | Expected number | 19.3 | 34.7 |
| Less than once a month | Actual number | 10 | 6 |
| | Expected number | 6.4 | 11.6 |

$\chi^2(2)= 8.58549$ pi= . 01367

Table 11

**Early adolescent depression history vs. extra-familial socializing**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Once a week or more | Actual number | 21 | 46 |
| | Expected number | 25.9 | 41.1 |
| Once a month or more | Actual number | 21 | 16 |
| | Expected number | 14.3 | 22.7 |
| Less than once a month | Actual number | 7 | 16 |
| | Expected number | 8.9 | 14.1 |

$\chi^2(2)= 7.28350$ pi= .02621

A comparison was also carried out taking into account both gender and age. In women, there was a relationship between a late-adolescent depression and having children (Tab. 12), and between early adolescent depression and more frequent serious ailments (Ta. 13).

Table 12

**Women's mid-adolescence depression record vs. having children**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Yes | Actual number | 32 | 32 |
| | Expected number | 28.7 | 35.3 |
| No | Actual number | 3 | 11 |
| | Expected number | 6.3 | 7.7 |

$\chi^2(1)= 7.28350$ pi= .02621

Table 13

**Women's early-adolescence depression record vs. major illnesses over 15 years**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Illnesses reported | Actual number | 12 | 5 |
| | Expected number | 7.6 | 9.4 |
| No illnesses reported | Actual number | 26 | 40 |
| | Expected number | 30.4 | 36.6 |

$\chi^2(1)= 5.29938$; pi= . 02133

Men who experienced depression during mid-adolescence were comparably more likely to have experienced an unsuccessful relationship (Tab. 14). No differences were found between the non-depression group and the early adolescent depression group.

Table 14

**Men's mid-adolescence depression record vs. termination of a serious relationship**

| Group | | Depression record in 1984 | No depression record in 1984 |
|---|---|---|---|
| Terminated serious relationship | Actual number | 6 | 8 |
| | Expected number | 2.6 | 10.4 |
| No such experience | Actual number | 4 | 26 |
| | Expected number | 5 | 25.6 |

$\chi^2(1)= 3.89423$; pi= . 04845

### Supplementary source analysis

During the previous 15 years, ten members of the studied group were hospitalized, including three people on three occasions, at the Babiński Memorial Hospital. During the previous five years, seven people were treated at the Department of Toxicology of the Medical College, Jagiellonian University, following suicidal attempts. The numbers are therefore too small to clearly identify the impact of depression in adolescence on psychiatric hospitalization and suicidal attempts.

## Discussion

In the research conducted 15 years ago, there was a statistically significant relationship between depression and gender (more depression cases in women) and age (more depression cases in those born after 1968). When both gender and age were taken into consideration, the male group did not display any statistically significant age differences. In conclusion to that project, the occurrence of depression decreased with the age of the female group, but remained higher in both groups than in the male groups.

It seems that there is an overrepresentation however, of depressive women and overall women in the follow-up study. It must therefore be accepted that this fact could have an influence on the interactions between variables. Data analysis in this respect would suggest that all results not taking into account the gender criterion should be regarded as related principally to women.

Based on the results it may be assumed that a history of early- or mid-adolescent depression impacts the life of those affected. Two mechanisms of such influence were identified in the studied sample. The first was related to the interaction between the depression and overall health, but not with any particular group of disorders or psychiatric hospitalisation. A theoretical explanation of the relationship between early depression and serious health disorders could be sought along the lines of the theory of psychosomatic disorders or the concept of the somatic manifestation of chronic depression. However, answers to questions posed using those theories would require separate research, and the significance of any tobacco use should also be considered.

The other influence of depression was observed in a number of data on interpersonal relationships, with the gender variable playing a key role. It seems that the depression observed during mid adolescence in men may cause problems in building and maintaining lasting emotional relationships. In the case of women, the relationship between depression (especially during mid-adolescence) and having children, and the manner of terminating the last relationship would indicate that they are quicker to get involved in serious relationships than their non-depressive peers. During their adulthood, women who experience depression in early adolescence have fewer contacts beyond the family than their non-depressive counterparts, but depression in mid-adolescence reverses this proportion.

The relationships found during the study largely confirm the data cited in literature on the similarly designed research of the development age [2, 23, 24, 25, 26, 28]. The results obtained do not allow the confirmation of the hypothesis about a normative

nature of depression during early adolescence. What is particularly telling in this context is the relationship between the age during the first research project and the declared serious health conditions between the first project and the follow-up questionnaire. The diagnosis of the adolescence crisis or depression is typically made by clinicians hoping that it would describe a normative, passing status that would not have an impact on the rest of the young person's life. The results obtained in this study would suggest a careful revision of this viewpoint. While the results do not allow for the rejection of the concept of a normative adolescent crisis or a normative adolescent depression, they do point to the context of growing up and health risks in a situation that makes solving developmental problems more difficult.

## Conclusions:

1. Both gender and the depression level criteria had an influence on the responses to the questionnaire limiting the final representative nature of the selected sample in relation to the original group.
2. Depressive disorders measured with the KID survey form and observed during early and mid adolescence may have an impact on the life of patients.
3. The occurrence of depression seems to have an impact on overall health and the nature of personal relationships. The research, however, does not clearly define this nature.
4. Gender seems to be more defining for this impact than the stage at which the depression was observed.
5. In the light of the study it is difficult to either confirm or clearly reject the opinion on the normative nature of depression during early adolescence.
6. The results obtained justify the need for further research on the problem structured so as to gradually follow the development of the adolescents who, due to their depression, constitute a risk group.

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