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One-year prevalence and incidence of depression among first-year university students in Japan: A preliminary study

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Abstract A structured interview was used to examine the 1-year incidence and prevalence of depression among 116 first-year university students. While 24 of the subjects (20.7%) met the Diagnostic and Statistical Manual of Mental Disorders 4th ed. (DSM-IV) criteria for Major Depressive Episode (MDE), 62 (53.4%) met the Diagnostic and Statistical Manual of Mental Disorders 3rd ed. Revised (DSM-III-R) criteria for MDE, and 27 (23.3%) also met the Research Diagnostic Criteria (RDC) for Major Depressive Disorder (MDD) for the 12 months prior to the interview. Moreover, 23 of the subjects (19.8%) had onset of the DSM-IV criteria for MDE, 54 (46.6%) had onset of the DSM-III-R criteria for MDE, 24 (20.7%) had onset of the RDC for MDD, during the same time period. These high rates of depression may be explained by the students' difficulties in and by their readjustment after entering university.

Key words depression, Diagnostic and Statistical Manual of Mental Disorders 4th ed., incidence, prevalence, Research Diagnostic Criteria.

INTRODUCTION

Adolescent depression is a neglected area of investigation, compared with that among adults: relatively few studies in the literature provide prevalence data exclusively for adolescents. Although some studies on current prevalence, such as those which employ the Beck Depression Inventory[1] can be found[2–12] only a few of them[13,14] employed explicit diagnostic criteria, such as the Diagnostic and Statistical Manual of Mental Disorders, 3rd edition (DSM-III),[15] 3rd edition revised (DSM-III-R),[16] or 4th edition (DSM-IV).[17]

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It may be important to study depression among adolescents, because adolescence is a crucial phase of life in which many major life decisions are made. A more pressing reason, however, is that having a depressive episode early in life greatly increases the risk of further depressive episodes[18,19] and co-occurring non-depressive DSM-III-R disorders.[20]

We are unaware of any studies that have examined the prevalence and incidence of depression among Japanese adolescents at the time of university entrance. In Japanese society, there is a belief that a person's educational background is all-important and that it decides his/her worth and social position. As a result, adolescents are subjected to a highly stressful situation with regard to entrance examinations, especially those for university – known as 'examination hell'. Iga proposed that the intensely stressful preparation for the college entrance examination is one of the major factors of extremely high suicide rates among young Japanese.[21] Thus, there is a possibility that the university entrance

examination has an adverse effect on adolescents' mental health.

The purpose of the present study was to examine the 1-year prevalence and incidence (i.e. rate of onset during the 12 months covered in the study) of depression among first-year university students in Japan. A structured interview was used that could make diagnoses using the Research Diagnostic Criteria (RDC) and DSM-IV. In addition, to compare the incidence and prevalence of Major Depressive Episode (MDE) in our sample with that of previous studies, we also employed the criteria of the DSM-III-R, because most previous studies in this area have used it.

METHODS

Subjects

The subjects in the present study were 116 first-year undergraduate university students (49 male, 67 female) at Tokyo Metropolitan University, who had taken the Introductory Psychology course. They were between the ages of 18 and 23 years (mean = 19.0 years; SD = 1.0). Because the academic year in Japan starts in April, all subjects had experienced entrance examinations in February and March, and had entered university during the 12 months prior to interview.

Procedure

All the criteria required by the DSM-IV, the DSM-III-R, and the RDC for a diagnosis of depression were examined by an ad hoc interview guide, the Time Ordered Stress and Health Interview.[22] This assessed the presence of depressive symptoms during the last 12 months of the subject's life. The structure of this interview guide was as follows: first, the subject's own perception of the existence of depressive mood within the 12 months prior to the interview was elicited ('Have you had feelings of depression/ sadness/dejection/ despondency/emptiness/hopelessness, lasting for more than 14 days, within the past 12 months?'). If the symptom had existed, the dates of onset and conclusion were obtained. The symptom 'loss of interest or pleasure' was also assessed in the same manner ('Have you experienced the feeling that you cannot enjoy or are less interested in those things that you used to enjoy or be interested in, lasting for more than 14 days within these 12 months?'). If a subject reported the presence of either of the symptoms, he/she was assessed as to whether the related symptoms (e.g. early insomnia, hypersomnia, suicidal ideas/acts, loss of confidence, change of appetite or weight, psychomotor retardation/agitation, fatigue or loss of energy) had been present during the same 2-week period or more and represented a change from previous functioning. Finally, he/she was asked whether they had sought or had been referred to someone for help during the depressed period, had taken medication, or had impairment in functioning with family, at home, at school, at work, or in other ways socially.

In the study, age, gender, and other demographics were obtained with a brief self-response questionnaire. Each subject was interviewed by one of four interviewers. Before each interview was conducted, consent was obtained from each subject. Each subject received rewards: book coupons worth approximately three US dollars.

The interviewers in the study were a psychologist and three medical students. They received four full days of training, which included lectures and role-playing. They also practised psychiatric diagnosis by 30 case vignettes with keys. The interrater reliability as indexed by kappa coefficient was 0.78 for DSM-III-R MDE and 0.70 for RDC Major Depressive Disorder (MDD). Applying the same training scheme, we demonstrated substantial interrater agreement among Japanese psychologists as well as agreement with experts' diagnosis.[23,24] Statistical analyses were performed using the Statistical Packages for Social Sciences.[25]

RESULTS

Prevalence and incidence of depression

Of the 116 subjects, 24 (20.7%) were found to have had MDE within the 12 months prior to the interview, in accordance with the DSM-IV criteria. Of these, five were males and 19 were females. Thus, the prevalence of MDE was 10.2% among males and 28.4% among females, respectively. The prevalence of MDE was higher among females than among males ($\chi^2 = 4.63$, d.f. = 1, $P = 0.03$). Because one subject with MDE had its onset before the 12 months prior to the interview, the 12-month incidence of MDE was 19.8% (23 out of 116). There were no significant differences in the rate of MDE between the four raters ($\chi^2 = 2.89$, d.f. = 3, $P = 0.41$).

When employing the DSM-III-R, 62 (53.4%) of the subjects were found to have had MDE within the 12 months prior to the interview. Of these, 23 were male and 39 female, with the prevalence 46.9% and 58.2%, respectively. There were no significant differences in the rate of MDE between males and females ($\chi^2 = 1.03$, d.f. = 1, $P = 0.31$). Because eight subjects with MDE had had its onset before the 12 months prior to

the interview, the 12-month incidence of MDE was 46.6% (54 out of 116). There were no significant differences in the rate of MDE between the four raters ($\chi^2 = 2.37$, d.f. = 3, $P = 0.50$). All subjects that were diagnosed as having this condition according to the DSM-IV were also diagnosed as having MDE according to the DSM-III-R.

According to the RDC, 27 (23.3%) students were found to have MDD, eight males and 19 females. Thus, the 12-month prevalence was 16.3 and 28.4%, respectively. No statistically significant difference was recognized between the genders ($\chi^2 = 1.67$, d.f. = 1, $P = 0.20$). In this case, three subjects with MDD had had its onset before the 12 months prior to the interview, so that 20.7% (24 out of 116 subjects) is the 12-month incidence of MDD. No significant differences in the rate of MDD were found between the four raters ($\chi^2 = 3.03$, d.f. = 3, $P = 0.39$). All subjects that were diagnosed as having MDE according to the DSM-IV were also diagnosed as having MDD. Of the 27 subjects who met the criteria for MDD, three failed to be diagnosed as having MDE according to DSM-III-R criteria.

Case descriptions

It may be informative to examine some examples of features of depression that the subjects had experienced.

The mean duration of depressive episodes that were diagnosed by DSM-IV, DSM-III-R and RDC was 107.0 days (SD = 98.8), 96.4 days (SD = 95.2), and 103.1 days (SD = 94.8), respectively. Among the subjects who had had a depressive episode, according to either DSM-IV, DSM-III-R, or RDC (a total of 65 subjects), 19 (29.2%) had had suicidal thoughts, including three (4.6%) who had attempted suicide. Out of the 65 subjects who were diagnosed as having had depression, 26 (40%) reported having significant impairment in their important areas of functioning, which in most cases was studying for entrance examinations. Most of the remainder also had mild impairment in the academic area. Four (6.2%) had exhibited help-seeking behavior, which consisted of consulting a school counselor for a short time.

DISCUSSION

The present study examined the 1-year prevalence and incidence of depression in a non-clinical university student sample. More than 20% of them had met the DSM-IV criteria for MDE and the RDC criteria of MDD, within the 12 months prior to the study. Furthermore, more than half of them met the DSM-III-R-criteria for MDE. The discrepancy in the prevalence of MDE according to the DSM-IV and DSM-III-R appeared because of a new criterion (criterion C) that requires the presence of impairment of functioning in social, occupational, or other important areas. One may speculate that we adopted criterion C of DSM-IV Major Depressive Episode with a lower threshold. The C criterion states 'the symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning'. We thought that students fulfilled this item only when they reported impairment of function generally expected for students such as 'cannot perform tasks given by lecturers', 'cannot attend lectures', and 'cannot carry out part-time job'. Therefore, we believe that such students were significantly impaired in functioning. It may be because the RDC shares impairment criterion with the DSM-III-R that these two sets of criteria showed virtually the same prevalence of depression.

The prevalence ratio obtained in the present study seems to be quite high, when compared with previous studies of adolescents employing explicit diagnostic criteria.

Angst and Dobler-Mikola conducted epidemiological research in Zurich over a 4-year period, in which they interviewed 220 23-year-old men and 236 24-year-old women, using a structured psychopathological interview and a rating of the Social Consequences of Psychiatric Disturbances for Epidemiology (SPIKE),[13] which can also make a diagnosis of depression on DSM-III-R and RDC. In the present study, the 1-year prevalence of depression was 7.0% (2.3% for men; 11.2% for women) on the DSM-III-R, and 5.1% (1.8% for men; 8.1% for women) on the RDC.

Lewinsohn *et al*. reported that the 1-year incidence of MDE on DSM-III-R criteria was 7.8% (4.8% for men; 10.4% for women) among 1508 high school students who were in the nineth to 12th grades.[14] An epidemiological survey of the 6-month prevalence of depression was conducted in Puerto Rico, which has a higher level of psychiatric symptoms than other parts of North America.[26] Among 295 adolescents between the age of 18 and 24 years, the 6-month prevalence was 2.6%.[26] Among 304 first- and second-year medical students, eight (6%) out of 124 first-year students had met the DSM-III criteria for depression using the Diagnostic Interview Schedule[27] during the previous year.[28]

The 1-year incidence of depression, shown by the current study to be 46.6% for DSM-III-R and 20.7% for RDC, may seem surprisingly high. However, the Clark and Zeldow study indicated a higher incidence

than ours.[29] Out of 55 medical interns (between the ages of 24 and 31 years) 27% developed a depressive syndrome according to RDC during a 6-month internship, based on interviews involving the Schedule for Affective Disorders and Schizophrenia–Lifetime Version (SADS-L).[30] It may be inappropriate to compare the 1-year incidence of the present study (20.7%) with the 6-month one by Clark and Zeldow[29] (27%); however, if one divides a year into two periods equally, and if a depressive disorder extends over both of them, its divided onsets will fall into both of the 6-month incidences. Thus, 1-year incidence may be twice as high as that of a 6-month period. Nevertheless, a very high incidence was revealed among first-year university students in Japan.

The exceedingly high incidence and prevalence in the present study may raise the question of whether the procedures used were not culturally appropriate. However, this seems unlikely because studies in which the interview guide contained the same criteria for a diagnosis of depression reported lifetime prevalence and 12-month incidence of DSM-psychiatric disorders in a Japanese community population that were very similar to those of Western countries.[31] The 12-month incidence of MDE according to DSM-III-R among 220 community residents averaging 55 years of age was 2.7%, while that among 119 community adolescents aged between 18 and 21 years was 10.1%. Although the age-range of the latter sample was quite similar to that of our subjects, the incidence among our sample was much higher. This discrepancy may depend on the characteristics of the subjects; there are comparatively few first-year university students in the Kitamura *et al*. sample,[29] while our sample was composed solely of such students. Therefore, it is possible to regard those students who face university entrance examinations or are entering university as at-risk for the onset of depression. Among the 65 subjects who met any of the three diagnoses of depression that we employed, 23 (35.4%) had the onset between the later period of preparing for examinations and the announcements of the results, nine (13.8%) had the onset soon after entering university, two (3.1%) had the onset throughout both situations. Another strategy to examine whether the results of the present study are unique to first-year university students is to conduct follow-up interviews on the same subjects 1 or 2 years after entering university. This is a matter for future research. The present study suggests at least that the period during the university entrance examination and the new academic environment is stressful to Japanese adolescents.

One may also question whether the present findings did not represent a real illness, but rather reflected an acute response to the situational demands of preparing for examinations. It should be noted that we used DSM-IV, DSM-III-R and RDC diagnostic rules without any modification. Thus, the present incidence figures suggest that the affected students' response to the situational demand reached the level of diagnosable depressive illness. It follows from what has been said that Japanese first-year university students, and students preparing for university entrance examinations, may be in poor surroundings, which can lead to many students suffering from a psychiatric disorder such as depression. One reason why 'examination hell' is so much of a problem may be that the level of education a person has received is taken very seriously in Japanese society. Even if that level is the same, a person who graduated from a more prestigious school tends to be respected more in various kinds of situation in his/her life. Thus, excessive competition is conducted from an early stage of life, and students are forced to study very hard, often at the expense of their social lives. However, once they have entered a 'good university', they have relatively little to do after they have entered. Given this situation, it is not surprising that many of the first-year university students suffer from depression upon entering university, through their entrance examinations.

There are a number of drawbacks that limit generalization of the findings from the present study. The first one is sampling bias, as the subjects in the study were first-year university students who were attending a psychology class. The second point is whether the sample in the study was representative of Japanese university students in general. Because Tokyo Metropolitan University is one of the municipal universities in a suburb of the city, there is a great deal of competition to enter. In spite of the fact that the majority of students entered the university as a result of extreme competition, more than half of them had originally wanted to enter other universities, such as state-funded ones.[30] They are therefore likely to experience a sense of unwillingness and discontent, which may well be representative of Japanese university students in general, because most of them are primarily concerned to have a good educational background.

Another limitation of the present study is that the genetic and environmental variables, such as family history of depression and social support, were not examined. Several previous studies have found that adolescent subjects with a family history of depression were more likely to develop depression themselves.[28,29] A further study may be required to examine the factors associated with the onset of

depression in first-year university students, especially during the entrance examination period.

In summary, a high 1-year incidence and prevalence of depression was found among first-year university students at a Japanese university. The question remains, however, as to what steps the health services should undertake to look after these students effectively, as well as to carefully address those factors that are linked to depression among this population. In fact, of the students who had had depression, only four had consulted school counselors. If a student who is suffering from depression knows the existence and location of counseling facilities, and if there were fewer stigmas about consulting counselors and psychiatrists, it may be the first step to managing depression among a non-facilitated population. Ideally, both the Japanese educational and social systems should be changed to reduce the stress on adolescents.

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REFERENCES

1. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch. Gen. Psychiatry* 1961; **4**: 561–571.
2. Clark DC, Salazar-Grueso E, Grabler P, Fawcett J. Predictors of depression during the first 6 months of internship. *Am. J. Psychiatry* 1984; **141**: 1095–1098.
3. Gibbs JT. Psychosocial factors associated with depression in urban adolescent females: implications for assessment. *J. Youth Adolesc.* 1985; **14**: 47–60.
4. Kaplan SL, Hong GK, Weinhold C. Epidemiology of depressive symptomatology in adolescents. *J. Am. Acad. Child. Adolesc. Psychiatry* 1984; **23**: 91–98.
5. Leon GR, Kendall PC, Garber J. Depression in children: Parents, teacher and child perspectives. *J. Abnorm. Child Psychol.* 1980; **12**: 221–235.
6. Oliver JM, Burkham R. Depression in University students: Duration, relation to calendar time, prevalence, and demographic correlates. *J. Abnorm. Psychol.* 1979; **88**: 667–670.
7. Schoenbach VJ, Kaplan BH, Grimson RC, Wagner EH. Use of a symptom scale to study the prevalence of a depressive syndrome in young adolescents. *Am. J. Epidemiol.* 1982; **116**: 791–800.
8. Siegel LJ, Griffin NJ. Correlates of depressive symptoms in adolescents. *J. Youth Adolesc.* 1984; **13**: 475–487.
9. Sullivan WO, Engin AW. Adolescent depression: Its prevalence in high school students. *J. Sch. Psychol.* 1986; **24**: 103–109.
10. Teri L. The use of the Beck Depression Inventory with adolescents. *J. Abnorm. Child Psychol.* 1982; **10**: 277–284.
11. Velez CN, Johnson J, Cohen P. A longitudinal analysis of selected risk factors for childhood psychopathology: The children in the community study. *J. Am. Acad. Child Adolesc. Psychiatry* 1989; **28**: 861–864.
12. Weinberg WA, Emslie GJ. Adolescents and school problems: Depression, suicide and learning disorders. *Adv. Adolesc. Ment. Health* 1988; **3**: 181–205.
13. Angst J, Dobler-Mikola A. The Zurich study. III. Diagnosis Depression. *Eur. Arch. Psychiatry. Neurol. Sci.* 1984; **234**: 30–37.
14. Lewinsohn PM, Hops H, Roberts RE, Seeley JR, Andrews JA. Adolescent psychopathology: I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *J. Abnorm. Psychol.* 1993; **102**: 133–144.
15. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edn. American Psychiatric Association, Washington DC, 1980.
16. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edn, revised. American Psychiatric Association, Washington DC, 1987.
17. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders,* 4th edn. American Psychiatric Association, Washington DC, 1994.
18. Harrington R, Fudge H, Rutter M, Pickles A, Hill J. Adult outcomes of childhood adolescent depression. *Arch. Gen. Psychiatry* 1990; **47**: 465–473.
19. Kovacs M, Feinber TL, Crouse-Novak MA, Paulauskas SL, Finkelstein R. Depressive disorders in childhood: I. A longitudinal prospective study of characteristics and recovery. *Arch. Gen. Psychiatry* 1984; **41**: 229–237.
20. Kashani JH, Carlson GA, Beck NC *et al*. Depression, depressive symptoms, and depressed mood among a community sample of adolescents. *Am. J. Psychiatry* 1987; **144**: 931–934.
21. Iga M. Suicide of Japanese Youth. *Suicide Life Threat. Behav.* 1981; **11**: 17–30.
22. Kitamura T. *Time Ordered Stress and Health Interview.* National Institute of Mental Health, Ichikawa, Chiba, 1991 (in Japanese).
23. Hasui C, Sugiura T, Tanaka E *et al*. Reliability of childhood mental disorder: Diagnoses by Japanese psychologists. *Psychiatry Clin. Neurosciences* 1999; **53**: 57–61.
24. Sugiura T, Hasui C, Aoki Y *et al*. Japanese psychology students as psychiatric diagnosticians: Application of criteria of mood and anxiety disorders to written case vignettes using the RDC and DSM-IV. *Psychol. Report* 1998; **82**: 771–781.
25. SPSS Inc. *SPSS User's Guide,* 2nd edn. SPSS Inc., Chicago, 1986.
26. Canino GJ, Bird HR, Shrout PE *et al*. The prevalence of specific psychiatric disorders in Puerto Rico. *Arch. Gen. Psychiatry* 1987; **44**: 727–735.
27. Robins LN, Helzer JE, Croughan J, Ratcliff KS. National Institute of Mental Health Diagnostic Inter-

view Schedule. *Arch. Gen. Psychiatry* 1981; **38**: 381–389.
28. Zoccolillo M, Murphy GE, Wetzel RD. Depression among medical students. *J. Affective Disord.* 1986; **1**: 91–96.
29. Clark DC, Zeldow PB. Vicissitudes of depressed mood during four years of medical school. *JAMA* 1988; **260**: 2521–2528.
30. Endicott J, Spitzer R. A diagnostic interview: The Schedule for Affective Disorders and Schizophrenia. *Arch. Gen. Psychiatry* 1978; **35**: 837–844.
31. Kitamura T, Fujihara S, Iwata N, Tomoda A, Kawakami N. Epidemiology of psychiatric disorders in Japan. **In**: Nakane Y, Radford M (eds). *Images in Psychiatry: Japan.* World Psychiatric Association, Paris, 1999; 37–46.