



## Class average score for teacher support and relief of depression in adolescents: A population study in Japan

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## **ABSTRACT**

**BACKGROUND:** Factors contributing to the relief of depression among adolescents have not been sufficiently revealed. The aim of this study was to assess the effect of teacher support on depression in adolescent students.

**METHODS:** We conducted a self-rating questionnaire survey among 2,780 junior high school students and 93 homeroom teachers in Japan. We employed binary logistic regression models, with teacher support averaged for each class as an explanatory variable and depression as an objective variable. To examine the interaction terms of class average score for teacher support by economic status, by student sex, and by grade satisfaction were estimated.

**RESULTS:** Higher class average scores for teacher support were independently associated with lower levels of depression among adolescents (OR, 0.739; 95% CI, 0.575–0.948). Furthermore, the interaction of class average scores for teacher support with grade satisfaction was significant ( $p = .025$ ). The interaction of class average score for teacher support with economic status and with student sex was not significant.

**CONCLUSIONS:** Our findings suggest that higher class average scores for teacher support were significantly associated with lower depression. These results can help homeroom teachers enhance interventions and promote the health of their homeroom students.

**Keywords:** Child & Adolescent Health; Mental Health; School Health Services; School

Psychology.

The 2012 World Health Organization reports indicated that 20% of all young people have experienced mental health issues, particularly depression and anxiety. The reports further state that suicide is a major cause of death among young people.<sup>1,2</sup> Epidemiological research in the West has found that adolescents account for as high as 2.0–8.0% of the general population of individuals with major depression.<sup>3</sup> According to one study from the United States, 28.5% of high school students have experienced sadness and loss of hope that prevented them from participating in their daily activities for more than 2 weeks, and 7.8% have attempted suicide more than once during the past year.<sup>4</sup> Depression in adolescence is reported to be associated with bullying, substance use, somatic symptoms,<sup>5</sup> risky sexual behavior,<sup>6</sup> self-harm,<sup>7</sup> and suicidal behavior (ideation/attempts).<sup>8</sup> Depression in adolescence doubles the risk of depression in adulthood.<sup>9</sup> Furthermore, depression in adolescence is related to parental socioeconomic status, neighborhood socioeconomic disadvantages,<sup>10</sup> and school factors such as school stress, teacher support, and grade.<sup>11</sup> Based on these findings, intervention research has been carried out with families,<sup>12</sup> teachers,<sup>13</sup> and school environments<sup>14</sup> for the prevention of depression.

Suicide is the second leading cause of death among children aged 10–14 years, and the leading cause of death among people aged 15–39 years in Japan.<sup>15</sup> It has been reported that the current prevalence of depression in Japan among those aged 12–14 years is 4.9% (2.2% in boys and 8.0% in girls), whereas lifetime prevalence is 8.8%

(6.2% in boys and 12.0% in girls).<sup>16</sup> Depressive tendency is observed in 7.8% of elementary school students, and in 22.8% of first- and second-year junior high school students.<sup>17</sup> Although research in the West has been conducted on the effects of teacher support for reduction of depressive symptoms in students,<sup>18-20</sup> these studies had small sample sizes and were not sufficiently adjusted for confounders. Because teachers spend considerable time with students in school, teachers can offer support when students are troubled. However, these effects have yet to be clarified in countries with different educational systems. It is therefore necessary to examine the effects of teacher support to explore preventative strategies for protecting students' mental health. This is the first large-scale study in Japan to focus on teacher support and the mental health of adolescents. The aim of this study was to evaluate the relationship between teacher support and depression among junior high school students by adjusting for potential confounders.

## **METHODS**

### **Participants**

Questionnaire surveys were carried out with students and their homeroom teachers at all 8 of the public junior high schools located within 2 cities in Shizuoka Prefecture, Japan, between December 2012 and January 2013. In total, 2,968 students in all 3 class years, excluding students in special needs classes, were considered for the

study. Because 106 students were absent on the day of the survey, student questionnaire sheets were distributed to 2,862 students and collected in sealed envelopes. Five students refused to submit the questionnaire, yielding a final total of 2,780 students who completed items of the depression screening test and their sex (response rate, 93.7%). Of the 97 homeroom teachers who were included, 4 refused to answer the questionnaire; therefore, 93 homeroom teachers submitted sealed completed questionnaire sheets. Among the teacher questionnaires, 2 teachers failed to indicate their sex.

### **Instruments**

*Student questionnaires.* Questionnaire items for students were related to their sex, class year, family structure, economic status, grade satisfaction, teacher support, and depressive symptoms. Family structure was divided into students “living with their biological parents” and “others”. Regarding economic status, students were asked to rate their perception of their family’s finances according to 5 levels, which were divided into a low group, comprising “very tight financially,” and “slightly tight financially”, and a high group, comprising “normal finances,” “slightly well off” and “very well off”. Grade satisfaction is considered an important contributing factor to student mental health. In this study, actual student grades were not examined; however, students rated their levels of grade satisfaction into 4 levels, which were divided into a low group, comprising “not satisfied at all”, and a high group, comprising “not very satisfied,” “a little satisfied,” and “very satisfied”.

Teacher support was assessed using the Scale of Expectancy for Social Support (SESS) for junior high school students,<sup>21</sup> which has been reported to have highly reliable internal consistency (Cronbach's  $\alpha$ , 0.95) (Cronbach's  $\alpha$  for the analytic sample, 0.96). In these study items, based on the significantly measurable positive correlation between SESS and trust in others ( $r = 0.324$ ,  $p < .001$ ), criterion-related validity might be confirmed to some extent. The SESS asks students to rate how much future support they believe they can expect from their teachers using a questionnaire containing 16 items, each answered on a 4-point scale (1, strongly disagree; 2, somewhat disagree; 3, somewhat agree; 4, strongly agree); the total score is therefore between 16 and 64 points. Students were divided into a group with low teacher support ( $< 51$  points, which was the third quartile) and high teacher support ( $\geq 51$  points). Teacher support was assessed by individual students as the "individual student score for teacher support." The "class average score for teacher support" was calculated to indicate the mean level of homeroom teacher support. The class mean for level of teacher support was used to reflect the homeroom teachers' support ability more accurately, prevent possible reverse causation, and mitigate the effect of overestimation or underestimation of teacher support by the students with depression. To analyze the class average score for teacher support, scores  $< 44.6$  (the third quartile) were considered the low group and those  $\geq 44.6$  were the high group.

Depression was assessed using the Japanese version<sup>22</sup> of the Depression

Self-Rating Scale for Children (DSRS-C).<sup>23</sup> This scale has reliable internal consistency (Cronbach  $\alpha$ , 0.77), and is composed of 18 items that relate to the mental condition of children 1 week prior to assessment (Cronbach's  $\alpha$  for the analytic sample, 0.85). DSRS-C correlated closely with self-assessment of perceived health ( $r = 0.462$ ,  $p < .001$ ). Hence there is appropriate criterion-related validity.

The DSRS-C is a screening test for depression, and children are asked to respond on a 3-point scale of always, sometimes, or never. The total score ranges from 0 to 36. Students were classified into the low group if their total score was  $<16$ , which is the cut-off point for the Japanese version of the scale, and the high group if it was  $\geq 16$ . The high group included depression that is a signifier of depressive disorder and an important subject for investigation in school.

*Teacher questionnaires.* Homeroom teachers were asked to state their sex and teaching experience in years. Teachers were divided into 2 groups according to teaching experience: those with  $<10$  years' experience and those with  $\geq 10$  years' experience. Homeroom teachers' data were linked to those of their students for the analysis.

## **Procedure**

Written explanations of the procedure were provided to students, guardians, and homeroom teachers. Participants undertook the survey during lessons with the help of their teachers. Those who did not want participate in the study could decline to respond. Answering the anonymous self-assessment questionnaire was considered to



indicate consent to participate.

### **Data Analysis**

Cross-tabulation and  $\chi^2$  tests were carried out to examine the relationship between depression and covariates. Logistic regression analyses were undertaken using the class average score for teacher support as an explanatory variable and depression as the objective variable. Analyses were conducted after adjusting for individual student scores for teacher support, grade satisfaction, economic status, student sex, class year, family structure, homeroom teachers' sex, and homeroom teachers' teaching experience. The following interactions were examined in turn: class average score for teacher support by grade satisfaction, by economic status, and by student sex. Additionally, analyses were performed by stratifying the data according to students' grade satisfaction, economic status, and sex. Analyses were conducted using SPSS Statistics version 22.0J (IBM Corp., Armonk, NY).

## **RESULTS**

### **Descriptive Statistics**

Table 1 shows the participants' characteristics, prevalence of the high group for depression, and results of  $\chi^2$  tests for each group of participants. The high depression group constituted 25.0% of the participants. Proportions by sex or class year were almost even. The high groups for class average score for teacher support, individual

student score for teacher support, grade satisfaction, and economic status were significantly associated with lower rates of depression. Female students were found to have higher rates of depression than male students. The rate of depression tended to increase with age; however, this result was not statistically significant. No significant relationships were observed between depression and family structure, sex of homeroom teacher, or homeroom teacher's teaching experience. The mean depression score was 11.6 (SD = 6.1, range 0.0–34.0) and the mean of all scores for class average score for teacher support was 42.0 (SD = 3.7, range 29.1–49.4). The mean score for individual student scores for teacher support was 42.0 (SD = 11.8, range 16.0–64.0). Correlations between the class average score for teacher support and individual student scores for teacher support were low ( $r = 0.317$ ).

### **Teacher Support and Depression**

Table 2 shows the results of logistic regression analyses assessing the relationship between depression and the class average score for teacher support. Lower odds ratios of depression were observed for individuals whose homeroom teacher had a high class average score for teacher support, high individual student score for teacher support, high grade satisfaction, and high economic status, compared with those who had low levels in these categories. Female students were found to have higher odds ratios of depression than male students. There were no significant relationships between family structure and depression (Model I). Even after adjusting for confounders, high

class average score for teacher support was significantly related to low rates of depression (Model II).

The interactions in terms of the class average score for teacher support and variables found to be significantly related to depression, namely, grade satisfaction, economic status, and student sex, were added to Model II. The interaction of the class average score for teacher support with grade satisfaction was significant ( $p = .025$ ). However, interactions of the class average score for teacher support with economic status ( $p = .731$ ), and student sex ( $p = .595$ ) were not significant.

Table 3 contains stratified results of analyses according to grade satisfaction. Although there was a significant relationship between depression and the class average score for teacher support among the high group for grade satisfaction, it was not observed among the low group for grade satisfaction. For both high and low grade satisfaction groups, individual student scores for teacher support and economic status were significantly related to lower rates of depression. There was a negative, albeit not significant, relationship between living with parents and depression among the high group for grade satisfaction, whereas a positive relationship was observed among the low group. The odds ratio of depression with homeroom teachers with  $\geq 10$  years of experience tended to lower grade satisfaction among the low group compared with the high group.

Table 4 shows results of stratified analyses according to student sex. Odds

ratios for the class average score for teacher support were lower in female students than male students, with female students having significant odds ratios. For both male and female students, individual student scores for teacher support, grade satisfaction, and economic status were significantly related to low rates of depression. Female students who lived with their parents were found to have lower rates of depression. However, among male students, the opposite results were observed, namely, living with parents led to higher rates of depression. These results were, however, not statistically significant. Odds ratios of female homeroom teachers and depression were slightly higher among male students than female students. Odds ratios of teachers with  $\geq 10$  years of teaching experience and depression were shown to be lower among male students.

Although not described in our tables, according to stratified results based on economic status, odds ratios (95% CI) of the class average score for teacher support and depression were similar between low and high groups for economic status, 0.744 (0.452–1.224) and 0.737 (0.551–0.986), respectively.

## **DISCUSSION**

The results of this study revealed that a high class average score for teacher support is related to low rates of depression. To our knowledge, this is the first study to examine the relationship between class average scores for teacher support and

depression among students. This finding indicates the importance of teacher support in the homeroom with a population approach to mental health. Furthermore, individual student scores for teacher support were shown to be linked to lower rates of depression, independent of the class average score for teacher support. These results support previously published Western studies.<sup>11,24</sup> In this study, the focus of analysis was depression among adolescents. However, overanxious disorders and behavioral disorders in adolescence increase the risk of major depression in adulthood as well.<sup>25</sup> Therefore, it is important for homeroom teachers to pay attention to their students, who spend long hours in school, and recognize issues related to their mental health, including their anxiety and behavior, and deal with them swiftly.

The results of multivariate analyses showed that grade satisfaction has a significant negative relationship with depression. Moreover, this study has clarified significant interaction effects between class average score for teacher support and student grade satisfaction, and is the first study to reveal such an interaction. According to analyses stratified according to grade satisfaction level, students who have high levels of grade satisfaction and high class average scores for teacher support have lower rates of depression. In contrast, these results indicate the possibility that among students with low levels of grade satisfaction, homeroom teacher support has not proved effective for their mental health. In addition, teacher support might be low in students with low grade satisfaction. Student academic achievement has been shown to be positively related with

their emotional closeness with parents and teachers.<sup>26</sup> It has been reported elsewhere that students who have support from both family members and teachers attain better grades at school than those who do not.<sup>27</sup> We hope that similar studies will be conducted in other countries where educational systems differ regarding this novel finding.

High economic status was found to have a significant negative relationship with depression in all analyses. Low economic status in childhood is linked not only to the risk of developing major depression in adulthood but also to the risk of low academic achievement. It is therefore evident that social inequality in mental health starts early in life.<sup>28</sup> It is hoped that beneficial environments in which all children develop to their full potential without damaging their health can be guaranteed. No interactions were observed between the class average score for teacher support and student economic status, which suggests that relief effects on depression by the class average score for teacher support were similar in both high and low economic status groups. This finding further indicates the possibility that education in Japan is provided to students equally regardless of economic status. In a study carried out in Canada with students in grades 9 and 10,<sup>29</sup> self-rated health was found to be significantly related to neighborhood social capital such as students' ability to rely on help from others around them, and no interaction effects were observed for neighborhood social capital and family affluence, as were seen in the present study. Further studies are needed to examine interaction effects between economic status and teacher support in other

countries, including developing countries.

The finding that higher rates of depression were observed in female students than male students is consistent with results seen in previous studies on adolescence.<sup>5,30,31</sup> Moreover, this study found no interactions of sex on the relationship between class average scores for teacher support and depression. This is not in line with results of a previous study of African American students aged 10–18 years. That study showed interaction effects of neighborhood social capital and sex and a significant negative relationship between neighborhood social capital and depression.<sup>32</sup> In the present study, no observed interaction effects of sex indicate that teacher support is equally effective for male and female students in Japanese junior high schools.

Among the low grade-satisfaction groups and among male students, odds ratios of 1.3 to 1.4 were associated, albeit not significantly, with higher rates of depression when students lived with their parents. This suggests the possibility that in male students, grades can lead to conflict with parents or that psychosocial factors might worsen conflicts. This finding requires additional consideration. Conversely, a negative, albeit not significant, relationship was observed between teachers with  $\geq 10$  years' experience and depression among students with low grade satisfaction and among male students, suggesting that appropriate support by experienced teachers might exert a favorable influence on students' mental health.

In this study, the rate of high depression was 25.0%. One of the contributing

factors for the observed higher rate in the present study was the incidence of bullying-related suicide among junior high school students at the time this study was conducted. Because of this influence, surveys were carried out in several schools; therefore, students might have been less hesitant to report their depressed symptoms in this study. No significant relationships were observed between family structure and depression. However, previous studies published in the West have clarified relationships between mental health in adulthood and parental divorce in childhood, parental employment status,<sup>28,33</sup> parental criminality and psychopathology,<sup>34</sup> and the presence of family values and confidence.<sup>35</sup> Furthermore, student depression was weakly linked to school size and environment.<sup>36</sup> However, school support was found to compensate for a lack of family function.<sup>37</sup> To promote complementary functions within families, schools, and local areas, it is necessary to clarify the effects of the integration of personal factors and environmental factors as they relate to depression.

### **Limitations**

The limitations of this study are first that the evaluation of depression was based on self-assessment questionnaires rather than clinical diagnoses. There is therefore a possibility that the results contain a large number of false positives. However, to grasp the overall situation related to depression among junior high school students, we had to use a self-assessment questionnaire that was easy to understand and simple to administer. The second limitation is that the classification of economic status



was made by considering students' self-reports, which might be inaccurate. The third limitation is that causes and effects of the variables cannot be addressed because this was a cross-sectional study. Interpretation of the results should therefore be treated with caution. This study has several advantages in that it constitutes the largest research effort in Japan in terms of sample size as well as systematically adjusted for potential confounders and elucidated associations of class average score for teacher support and depression. However, it is necessary to pay attention to statistical significance because the findings might be the product of large sample sizes.

### **Conclusions**

This study shows that higher class average scores for teacher support are associated with lower depression. Then, the interaction of class average scores for teacher support with grade satisfaction was significant. Homeroom teachers play an important role in addressing and preventing mental health difficulties and their consequences among their students. Furthermore, homeroom teachers should strengthen the support they provide to students who have low satisfaction regarding their grades.

### **IMPLICATIONS FOR SCHOOL HEALTH**

Support from teachers can influence and promote student mental health. This should be recognized by school personnel as well as teachers themselves, and the role of teachers should expand to encompass support of student mental health as well as student

learning. However, it is difficult for teachers to address the present diverse and complex mental health issues that may arise in students as a result of a more electronically oriented society<sup>38,39</sup> or their increasingly varied family structures.<sup>33</sup> School personnel should be prepared to provide opportunities to improve teachers' mental health literacy and their ability to provide students support through cooperation with health providers. We recommend that teachers provide support on a variety of issues, including on how to improve adolescents' ability to seek support when they may feel it necessary.

The effects of interpersonal psychotherapy delivered in school-based health clinics<sup>40</sup> as well as individual cognitive behavior therapy<sup>41</sup> for depressed adolescents have been established. It is important that health providers such as school nurses, school counselors, or care workers cooperate with homeroom teachers for the early detection of students with depression, and school personnel must then connect students in need of care to clinics that can offer accessible treatment for adolescent depression. Previous studies have reported the effectiveness of interventions for teenage suicide prevention<sup>42</sup> and adolescent depression.<sup>43</sup> Population approaches towards mental health must be introduced to education. Lastly, our results proposed that mental health promotion performed in the classroom should be applied to all students.

### **Human Subjects Approval Statement**

This study was conducted with approval from the Institutional Review Board at

Hamamatsu University School of Medicine (No. 24-147) and was in accordance with the standards of the Declaration of Helsinki.

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## Tables

Table 1. **Participant Characteristics and Prevalence of Depression**

	Characteristics		Prevalence <sup>†</sup>		p
	N	%	N	%	
<b>Depression</b>					
Low	2084	75.0			
High	696	25.0			
<b>Class average score for teacher support</b>					
Low	2085	75.0	556	26.7	.001
High	695	25.0	140	20.1	
<b>Individual student scores for teacher support</b>					
Low	1963	76.5	559	28.5	<.001
High	603	23.5	71	11.8	
<b>Grade satisfaction</b>					
Low	497	18.2	207	41.6	<.001
High	2233	81.8	473	21.2	
<b>Economic status</b>					
Low	567	20.7	235	41.4	<.001
High	2178	79.3	455	20.9	
<b>Student sex</b>					
Male	1397	50.3	262	18.8	<.001
Female	1383	49.7	434	31.4	
<b>Class year</b>					
7th	949	34.1	229	24.1	.614
8th	931	33.5	232	24.9	
9th	900	32.4	235	26.1	
<b>Family structure</b>					
Other	489	17.8	137	28.0	.084
Two biological parents	2254	82.2	546	24.2	
<b>Teacher sex</b>					
Male	1624	62.6	392	24.1	.208
Female	971	37.4	249	25.6	
<b>Teaching experience</b>					
<10 years	1623	60.8	408	25.1	.784
≥10 years	1047	39.2	258	24.6	

Sample size varied due to missing variables.

<sup>†</sup>Percentage with high depression (≥16 score on the Depression Self-Rating Scale for Children) for each characteristic group.

Table 2. Relationship between Class Average Score for Teacher Support and Depression

	Model I <sup>†</sup>		Model II <sup>‡</sup>	
	OR	CI	OR	CI
<b>Class average score for teacher support</b>				
Low	1		1	
High	0.694**	(0.563–0.855)	0.739*	(0.575–0.948)
<b>Individual student scores for teacher support</b>				
Low	1		1	
High	0.335***	(0.257–0.437)	0.358***	(0.267–0.480)
<b>Grade satisfaction</b>				
Low	1		1	
High	0.377***	(0.307–0.462)	0.406***	(0.320–0.516)
<b>Economic status</b>				
Low	1		1	
High	0.373***	(0.307–0.454)	0.431***	(0.343–0.542)
<b>Student sex</b>				
Male	1		1	
Female	1.981***	(1.662–2.362)	1.953***	(1.594–2.393)
<b>Class year</b>				
7th	1		1	
8th	1.044	(0.846–1.288)	1.084	(0.848–1.386)
9th	1.111	(0.900–1.371)	1.264	(0.976–1.635)
<b>Family structure</b>				
Other	1		1	
Two biological parents	0.821	(0.659–1.023)	1.035	(0.796–1.344)
<b>Teacher sex</b>				
Male	1		1	
Female	1.084	(0.902–1.302)	1.082	(0.877–1.334)
<b>Teaching experience</b>				
<10 years	1		1	
≥10 years	0.974	(0.814–1.166)	0.945	(0.765–1.167)

\*p < .05, \*\*p < .01, \*\*\*p < .001.

OR = odds ratio; CI = 95% confidence interval.

<sup>†</sup>Result of univariate logistic regression.

<sup>‡</sup>Result of multiple logistic regression adjusted for all setting variables.

**Table 3. Association between Class Average Score for Teacher Support and Depression Based on Student Grade Satisfaction**

	<b>Low</b>		<b>High</b>	
	OR	CI	OR	CI
<b>Class average score for teacher support</b>				
Low	1		1	
High	1.147	(0.688–1.911)	0.637**	(0.475–0.855)
<b>Individual student scores for teacher support</b>				
Low	1		1	
High	0.428**	(0.240–0.762)	0.340***	(0.241–0.480)
<b>Economic status</b>				
Low	1		1	
High	0.462**	(0.295–0.726)	0.425***	(0.326–0.554)
<b>Student sex</b>				
Male	1		1	
Female	1.906**	(1.253–2.899)	1.961***	(1.552–2.477)
<b>Class year</b>				
7th	1		1	
8th	1.176	(0.717–1.929)	1.075	(0.810–1.427)
9th	1.221	(0.686–2.174)	1.248	(0.934–1.669)
<b>Family structure</b>				
Other	1		1	
Two biological parents	1.331	(0.806–2.199)	0.929	(0.684–1.260)
<b>Teacher sex</b>				
Male	1		1	
Female	0.985	(0.636–1.525)	1.123	(0.884–1.428)
<b>Teaching experience</b>				
<10 years	1		1	
≥10 years	0.851	(0.537–1.347)	0.978	(0.771–1.241)

\*p < .05, \*\*p < .01, \*\*\*p < .001.

OR = odds ratio from multiple logistic regression adjusted for all setting variables; CI = 95% confidence interval.

Table 4. Association between Class Average Score for Teacher Support and Depression Based on Student Sex

	Male Students		Female Students	
	OR	CI	OR	CI
<b>Class average score for teacher support</b>				
Low	1		1	
High	0.805	(0.543–1.194)	0.702*	(0.508–0.971)
<b>Individual student scores for teacher support</b>				
Low	1		1	
High	0.285***	(0.174–0.467)	0.403***	(0.279–0.583)
<b>Grade satisfaction</b>				
Low	1		1	
High	0.399***	(0.278–0.572)	0.408***	(0.296–0.562)
<b>Economic status</b>				
Low	1		1	
High	0.429***	(0.301–0.611)	0.431***	(0.319–0.582)
<b>Class year</b>				
7th	1		1	
8th	0.926	(0.629–1.362)	1.212	(0.881–1.667)
9th	1.119	(0.751–1.668)	1.396	(0.994–1.960)
<b>Family structure</b>				
Other	1		1	
Two biological parents	1.399	(0.909–2.155)	0.842	(0.602–1.177)
<b>Teacher sex</b>				
Male	1		1	
Female	1.100	(0.792–1.529)	1.056	(0.803–1.388)
<b>Teaching experience</b>				
<10 years	1		1	
≥10 years	0.810	(0.581–1.129)	1.067	(0.810–1.406)

\*p < .05, \*\*p < .01, \*\*\*p < .001.

OR = odds ratio from multiple logistic regression adjusted for all setting variables; CI = 95% confidence interval