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Psychometric properties of health complaints and school setting measures in the Japanese version of the WHO Health Behaviour in School-aged Children Study

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ABSTRACT

This study examined the reliability and validity of health complaints and school setting measures in the Japanese version of the World Health Organization Health Behaviour in School-aged Children Study (HBSC). Self-reporting questionnaires for the HBSC were administered to 240 students of a public senior high school in Okinawa, Japan. Seventy students completed the same questionnaire on two occasions, two weeks apart, for test-retest reliability assessment. Health complaints measures included headache, abdominal pain, backache, feeling low, irritability, nervousness, sleeping difficulties, and dizziness. The school setting measures were: students' satisfaction with school, student involvement, unrealistic expectations, support from teachers, support from students, support from parents, and communication with family. A series of principal component analyses showed that every scale had one dimensionality. Cronbach's alpha coefficients used to assess internal consistency of the scales were reasonable, ranging from 0.50 to 0.84. The test-retest reliability demonstrated adequate stability with scales ranging from 0.60 to 0.77. Satisfaction with school, student involvement, and communication with family were negatively associated with health complaints. In addition, student involvement and support from teachers, students, and parents were positively related to satisfaction with school. These relationships suggested the predictive validity of the school setting scales. In conclusion, this study shows that the health complaints and the school setting scales of the Japanese HBSC questionnaire appear to have acceptable reliability and validity. *Ryukyu Med. J.*, 21(2) 77~81, 2002

Key words: school environment, adolescents, symptoms, psychometric properties, WHO

INTRODUCTION

The Health Behaviour in School-aged Children Study (HBSC) is a cross-national research study conducted in collaboration with the World Health Organization (WHO) Regional Office for Europe¹⁻³⁾. It is an international research project that aims to increase understanding of health, health behaviors, and their context in young people. The study also aims to inform and influence health promotion and health education policy, programs and practice designed for school-aged children at the national and international levels. Researchers from Finland, Norway, and England initiated the HBSC in 1982. Since 1985, the surveys have been carried out every four years in a growing number of countries. The latest survey took place in 1997/1998³⁾.

The HBSC data are collected by using a self-administered questionnaire in school classrooms. The

questionnaire consists of core questions used in all of the early surveys and special focus questions that are unique to each survey. The core questions, in addition to demographic ones, contain perceptions of personal health and well-being, health complaints, and health-related behaviors. The special focus questions in the 1997/1998 survey include health-related aspects of school as a setting and social inequality⁴⁾.

Because children and adolescents spend their time in the school setting almost all day, school plays a critical role as a place to monitor current health status and health behaviors, and as a base for implementing health promotion programs. It is assumed that school climate has a great impact on academic performance, perceptions of school, and health outcomes among students. In fact, Torsheim and Wold⁵⁾ showed that, as a part of the HBSC, frequency of somatic complaints by adolescents may reflect their adaptation to ordinary school demands.

McLellan et al.⁶⁾ reported that students who had positive perceptions of their school environment were significantly more likely to engage in health promoting behaviors. Samdal et al.⁷⁾ also revealed that school setting predictors were associated with the students' academic achievement. In Japan, Takakura et al.^{8,9)} pointed out that school-related stressors considerably influenced depressive symptoms among Japanese junior and senior high school students. Based on these results, the HBSC study can serve as a tool to enhance the development of a health promoting school.

To our knowledge, the questionnaire in the HBSC has not been translated and developed to investigate the health and lifestyle of young Japanese people. In particular, no studies have attempted to examine the relationship between health and school environment by using the questions in the HBSC. In this study, we examined the reliability and validity of health complaints and school setting measures of the Japanese version of the HBSC.

MATERIALS AND METHODS

Subjects and Procedures

A convenience sample consisted of 240 students enrolled in three classes in grades 10 and 11 (ages 15-17) at a public senior high school in an urban area of Okinawa, Japan. This school was chosen based upon willingness of the school principal to participate in this study. Using written instructions provided by researchers, classroom teachers conducted a self-administered anonymous questionnaire survey in classroom settings in February 2001. Students were informed of the nature and intent of the study both in writing and verbally before responding to the questionnaire. Those who did not want to participate in the study could decline to respond and designate that on the front sheet of the questionnaire. The questionnaires were collected from 207 students in the first survey (102 in the 10th grade, 105 in the 11th grade). Seven students declined to participate and 26 students were absent from school when the survey was conducted. Of those who completed the questionnaire in the first survey, 70 students (the 10th and 11th graders were 35 each) completed it at two points in time, two weeks apart, to evaluate test-retest reliability.

Data collection included procedures that allowed researchers to link the test and retest questionnaires without knowing each student's name. During the first survey administration, the students were requested to complete the questionnaire and seal it in a small envelope. Additionally, students who were expected to complete the second survey were asked to seal the envelope in another envelope and write his or her name across the seal. During the second survey administration, each student received the envelope with his or her name across the seal. After they completed the second questionnaire, they took out the first envelope and then put it together with the

second questionnaire in a big anonymous envelope.

Measures

The research team, which included a bilingual speaker, translated the questionnaire in the 1997/1998 HBSC study⁴⁾ from English into Japanese. In this study, the health complaints and school setting measures in the HBSC were analyzed.

Health complaints include the items headache, abdominal pain, backache, feeling low, irritability, nervousness, sleeping difficulties, and dizziness (Table 1). The students reported on a five-point scale if each symptom was experienced most days, more than once a week, about once every week, about once every month, or seldom or never.

The school setting measures include the following: students' satisfaction with school, student involvement, unrealistic expectations, support from teachers, support from students, support from parents, and communication with family. The students' responses were measured by means of 21 items on a five-point scale. Each item was shown in Table 2.

Data analysis

The dimensionality of each scale was tested by an exploratory factor analysis using principal component analysis. Cronbach's alpha coefficient was computed for each scale to assess the internal consistency of their component items. A test-retest reliability of each scale was examined using Spearman's correlation coefficients. The predictive validity of the school setting scales was evaluated by Spearman's correlations with health complaints and satisfaction with school. We applied a criterion of $p < 0.05$ for significance.

Table 1 Result of principal component analysis for health complaints

Items	Factor loadings
1 Headache	0.68
2 Abdominal pain	0.54
3 Backache	0.49
4 Feeling low	0.83
5 Irritability or bad temper	0.70
6 Nervousness	0.65
7 Difficulties in getting to sleep	0.57
8 Dizziness	0.69
Eigenvalue	3.4
% of variance	42.3

RESULTS

Results of principal component analyses for health complaints and school setting scales are shown in Table 1 and Table 2, respectively. The tables demonstrate the factor loadings on the first factor, the eigenvalues, and the percentage of the total variance explained by the first factor. A series of principal component analyses extracted one single factor for each scale with eigenvalue greater than one, suggesting that each scale reflects a single dimension. All first factors accounted for 42% to 86% of total variance in each scale. The factor loadings for the items were high, exceeding 0.40.

Table 3 shows Cronbach's alpha and the test-retest reliability of each scale. The alpha coefficient of health complaints was 0.80 and those of each school setting scale ranged from 0.50 to 0.84. The test-retest reliability was 0.77 for health complaints and 0.60 to 0.75 for school setting scales. Spearman's correlation coefficients between health complaints and school setting scales are presented in Table 4. Satisfaction with school, student

involvement, and communication with family were significantly correlated to health complaints. In addition, student involvement and support from teacher, students, and parents were significantly associated with satisfaction with school.

DISCUSSION

The health complaint scale included eight common symptoms among adolescents. These complaints were included in previous HBSC studies¹⁻³⁾ and in symptom checklists used in other studies¹⁰⁾. The health complaints studied are thought to be well defined and measure experienced complaints, without significant problems of face validity¹¹⁾.

In this study, the health complaint scale was found to have one dimensionality and 0.80 for the alpha coefficient of the total list of items. In addition, the respondents were found to be sufficiently stable, with test-retest reliability of 0.77 for the scale. The alpha coefficients in a cross-national comparison carried out by Haugland et

Table 2 Results of principal component analyses for school setting scales

Items	Factor loadings
Satisfaction with school (eigenvalue 1.9; % variance 62.3)	
1 Our school is a nice place to be	0.87
2 I feel I belong at this school	0.83
3 I think that going to school is boring	-0.65
Student involvement (eigenvalue 1.8; % variance 46.0)	
1 The students are treated too severely/strictly in this school	-0.41
2 The rules in this school are fair	0.64
3 I am encouraged to express my own views in my class (es)	0.76
4 Our teachers treat us fairly	0.82
Unrealistic expectations (eigenvalue 1.3; % variance 67.0)	
1 My parents expect too much of me at school	0.82
2 My teachers expect too much of me at school	0.82
Support from teachers (eigenvalue 1.7; % variance 86.4)	
1 When I need extra help form my teachers, I can get it	0.93
2 My teachers are interested in me as a person	0.93
Support from students (eigenvalue 2.1; % variance 69.1)	
1 The students in my class (es) enjoy being together	0.83
2 Most of the students in my class (es) are kind and helpful	0.84
3 Other students accept me as I am	0.82
Support from parents (eigenvalue 2.1; % variance 70.5)	
1 If I have problems at school, my parents are ready to help	0.88
2 My parents are willing to come to school to talk to teachers	0.84
3 My parents encourage me to do well at school	0.80
Communication with family (eigenvalue 1.8; % variance 45.1)	
1 Father	0.77
2 Mother	0.70
3 Elder brother (s)	0.60
4 Elder sister (s)	0.60

Table 3 Descriptive statistics, Cronbach's alpha, and test-retest reliability for each scale

	Score range	Mean	SD	Alpha	Test-retest reliability [†]	p
Health complaints	11–40	33.8	6.1	0.80	0.77	<0.001
Satisfaction with school	3–15	7.5	2.5	0.68	0.72	<0.001
Student involvement	4–20	11.6	2.8	0.60	0.60	<0.001
Unrealistic expectations	2–10	6.5	1.7	0.50	0.71	<0.001
Support from teachers	2–10	6.1	2.0	0.84	0.62	<0.001
Support from students	3–15	6.2	2.7	0.77	0.75	<0.001
Support from parents	3–15	6.7	3.4	0.79	0.75	<0.001
Communication with family	5–20	13.7	3.1	0.57	0.71	<0.001

[†]: Spearman's correlation coefficients

Table 4 Spearman's correlations between health complaints and school setting scales

	Health complaints		Satisfaction with school	
	r	p	r	p
Satisfaction with school	–0.304	<0.001	–	–
Student involvement	–0.199	0.005	0.448	<0.001
Unrealistic expectations	0.086	0.237	–0.045	0.528
Support from teachers	–0.117	0.104	0.407	<0.001
Support from students	–0.037	0.608	0.442	<0.001
Support from parents	–0.010	0.894	0.363	<0.001
Communication with family	–0.246	0.006	0.089	0.326

al.¹¹) ranged from 0.75 to 0.79 for the Western students. Similarly, the test-retest survey conducted with a one-week interval demonstrated that intra-class correlations were 0.63 to 0.74. Wisniewski et al.¹⁰) also found that test-retest reliability was generally significant and exceeded 0.60 at both one and five-week intervals. These findings of previous studies were almost comparable to the findings of this study. Thus, health complaint scale in the Japanese HBSC showed an adequate internal consistency reliability and stability.

Some factor analytic studies suggest that health complaints in adolescents may reflect two or more underlying dimensions^{10,11}). On the other hand, a one single factor model could also be proposed in empirical and theoretical studies^{11,12}). Haugland et al.¹¹), who examined the same eight items used in this study, demonstrated that a model with one single factor had an adequate goodness-of-fit. This study also revealed one dimensionality of health complaints. Comparison and interpretation of previous studies is complicated by methodological differences. Differences between these findings may be due to differences in the expression of symptoms, as well as culturally related differences in the willingness to report illness¹¹).

As for the school setting scales, all scales were found to have one dimensionality and demonstrate reasonable internal consistency of their component items, with Cronbach's alpha ranging from 0.50 to 0.84. The test-retest

reliability proved to be satisfactory. Each scale had good Spearman's correlations to measure the test-retest reliability with lower for student involvement ($r=0.50$) and higher for student support and parental support ($r=0.75$). Thus, these data suggest that each school setting scale may reflect a single structure and be reproducible.

In the 1997/1998 HBSC survey, the rationale for school setting items is that there are the relationships between the students' perception of school and their reported health and quality of life⁴). That is, the relationship between risk and resource factors in the school setting seems to be the key to understanding how the students' experiences in school affect their lifestyle, health and quality of life. Many previous studies have demonstrated the rationale of school setting items¹³⁻¹⁷). A conceptual framework in the 1997/1998 HBSC study is that the students' school climate perceptions, such as student involvement, unrealistic expectations, and support, influence their satisfaction with school, their academic performance, and any perceptions of role overload, and consequently this relates to the students' perceived health and health behaviors⁴). In this study, satisfaction with school, student involvement, and communication with family were significantly associated with health complaints. Additionally, student involvement and support from teachers, students, and parents were positively related to satisfaction with school. Therefore, these findings partially support the conceptual framework in the

HBSC study and suggest the predictive validity of the school setting scales. It seems reasonable to suppose that the school setting scales in this study can be either a risk or a resource for the students' perceived health, and those can be intermediate variables important in health perspective. In addition, some of the school setting scales may be risk factors for accumulation of health-risk behaviors since it is suggested that covariation of health-risk behaviors among Japanese high school students may have a lot to do with underlying problems related to "maladjustment to school life"¹⁸⁾.

One limitation of this study is our sample selection process. This study was carried out exclusively on students in only one public senior high school in Okinawa Prefecture whose principal consented to participate in the study. Moreover, these data apply only to students who attended high school. Therefore, the present findings must be interpreted cautiously and limited from generalizing about adolescents in Japan as a whole. We did not have information on psychometric properties of the scales among the students who are not in the same age group. Another limitation is that a back-translation method was not used in the translation process of the scales. It is not clear whether each scale precisely translates from the original one. Therefore, we cannot determine if an observed difference in the scale should be attributed to an inadequate translation or a real cultural difference when conducting international comparisons.

In conclusion, the health complaints and the school setting scales of the Japanese HBSC questionnaire appear to have acceptable reliability and validity. These instruments need to be tested in other areas and cultures to ensure that the findings are not specific to Okinawan students. Further refinement of the measures should be considered.

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