

## SHORT PAPER

# Longitudinal Verification of the Relationship between Psychological, Physiological and Pathological Changes and the Outcome of Classes

Aiko KOHARA <sup>1)2)</sup> Haejin KWON <sup>2)3)</sup> Ayaka GOTO <sup>4)</sup>  
Katsunao NAGAHAMA <sup>5)</sup>

- 1) Tohoku University Graduate School of Medicine
- 2) Research Fellowship of the Japan Society for the Promotion of Science
- 3) Graduate School of Economics, Ritsumeikan University
- 4) University of the Ryukyus
- 5) Kagamigaoka Special Needs Education School in Okinawa

## ABSTRACT

The psychology, physiology and pathology of children with health impairment have not been sufficiently understood in the field of education. However, there is no tool to measure the psychological, physiological and pathological changes of children with health impairment until now and the current state of the classes to consider the psychology, physiology and pathology of children with health impairment has not been investigated. This study aimed to clarify the relationship between the psychological, physiological and pathological changes of children with health impairment and the outcome of the classes by using the PATCHI and SNEAT. The class evaluations were carried out for one 5th-grade student with health impairment by using both PATCHI and SNEAT once a week between January and March in 2015. In results of data collection, the psychological, physiological and pathological changes of children with health impairment and the outcomes of classes at schools were measured and the tasks to be improved in the curriculum of universities for teacher education for special needs education were investigated.

### < Key-words >

The psychology, physiology and pathology of children with health impairment, Assessment, SNEAT, PATCHI

Received  
July 25 ,2015

Accepted  
September 22,2015

Published  
October 30,2015

colora420@gmail.com (Aiko KOHARA)

Asian J Human Services, 2015, 9:107-117. © 2015 Asian Society of Human Services

## I . Introduction

The education of children with health impairment has been actively under discussion in the field of special needs education in Japan. In Japan, the children with health impairment are defined as those who need long-term medical treatment and the special regulations for their living due to their chronic disease such as heart failure, digestive diseases, skin diseases, renal disease, malignancy, etc. Therefore, it is essential to consider the psychological, physiological and pathological aspects of children with health impairment for the special needs education.

Educational needs of children with health impairment have to be dealt with based on the understanding of children with health impairment in the psychological, physiological and pathological aspects. In the curriculum of universities for special needs education, the course about the psychology, physiology and pathology of infants, children or students with physical disabilities has been included as a compulsory course (The Ordinance for the Enforcement of the School Teacher's License Act No.7). In this course, the understanding of children with health impairment is emphasized in the medical perspectives of psychology, physiology (the understanding of diseases and the cares about treatment process) and pathology and in the psychosocial perspectives (psychological and social problems caused by diseases or treatment process).

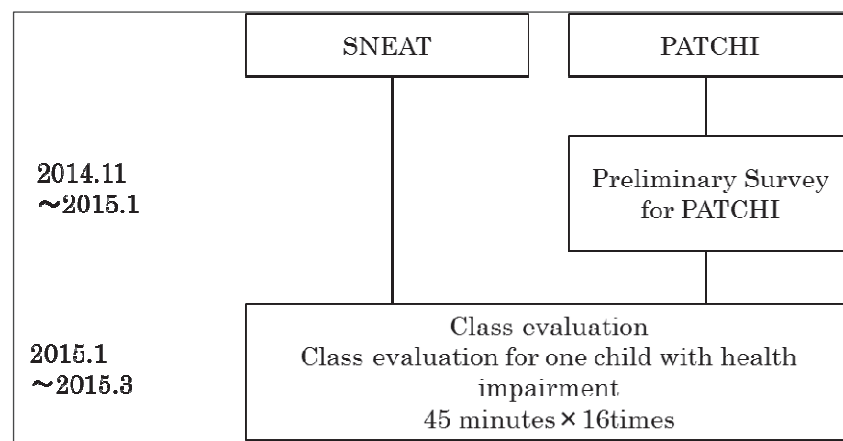
However, the psychology, physiology and pathology of children with health impairment have not been sufficiently understood in the field of education. Since the diseases of children with health impairment have not been sufficiently understood, their opportunities for participating in exercise or other activities have been limited (Kudo & Yokota, 2008). In addition, the excessive consideration of homeroom teachers for those students has also been pointed out as a problem (Tamibuchi, 2011). However, there is no tool to measure the psychological, physiological and pathological changes of children with health impairment until now and the current state of the classes to consider the psychology, physiology and pathology of children with health impairment has not been investigated. Therefore, Kohara et al.(2015) developed the Psychology, Physiology and Pathology Assessment Tool for Children with Health Impairments (PATCHI). The content validity of this tool has been verified and its relevance to Special Needs Education Assessment Tool (SNEAT) has been confirmed. In this study, it is expected that the current state of the field of education in the psychological, physiological and pathological aspects of children with health impairment may be investigated by using PATCHI and SNEAT.

This study aimed to clarify the relationship between psychological, physiological and pathological changes of children with health impairment and the outcome of classes by longitudinally measuring them using PATCHI and SNEAT in the field of education.

## II. Method

### 1. Subject and Procedure

This study was conducted through the collaboration with one special needs school in Okinawa Prefecture. The consents of the principal and homeroom teacher whose classes were the subjects of this study were gained in advance. The preliminary test was conducted by using the Psychology, Physiology and Pathology Assessment Tool for Children with Health Impairments (PATCHI) between November, 2014 and January, 2015, and then the class evaluations were carried out for one 5th-grade student with health impairment by using both PATCHI and SNEAT once a week between January and March in 2015 (Figure 1).



<Figure 1> Research Process

### 2. Data Collection

The data were collected and the evaluations were carried out through the observation of 45-minute classes once a week by a third party evaluator. The subjects of classes included Mathematics, Science, Social Studies, Home Economics, Moral Education, and Special Activities (Table 1). The evaluator who is fully aware of the PATCHI and SNEAT filled the questionnaire after observation of the classes. The school events were not included for the evaluation.

&lt;Table 1&gt; Classes for Data Collection

Date	Number	Subject	
1/28	1-1	Mathematics	(MA)
	1-2	Science	(SC)
	1-3	Special Activities	(SP)
2/4	2-1	Special Activities	(SP)
	2-2	Special Activities	(SP)
2/18	3-1	Special Activities	(SP)
	3-2	Mathematics	(MA)
	3-3	Mathematics	(MA)
2/25	4-1	Social Studies	(SO)
	4-2	Moral Education	(MO)
3/4	5-1	Mathematics	(MA)
3/11	6-1	Mathematics	(MA)
	6-2	Special Activities	(SP)
3/18	7-1	Mathematics	(MA)
	7-2	Mathematics	(MA)
	7-3	Home Economics	(HO)

### 3. Questionnaire

#### 1) Psychology, Physiology and Pathology Assessment Tool for Children with Health Impairments (PATCHI)

The content validity of Psychology, Physiology and Pathology Assessment Tool for Children with Health Impairments (PATCHI) was verified (Kohara, Han & Nakakuroshima, et al., 2015) and its relevance to the SNEAT was also confirmed.

The PATCHI consists of 20 items of three domains such as psychological, physiological and pathological domains. This tool uses five-point scale and its perfect score is 100; the score of 45 in the psychological domain, 25 in the physiological domain and 30 in the pathological domain.

#### 2) Special Needs Education Assessment Tool (SNEAT)

The SNEAT is also the tool whose reliability and validity were verified (Han, Kohara & Kohzuki, 2014). The reliability of SNEAT was verified via the internal consistency method and the test-pretest method; both the coefficient of Cronbach's  $\alpha$  and the intra-class correlation coefficient were over 0.7. SNEAT is valid based on its goodness-of-fit values obtained using the latent growth curve model, where the values of comparative fit index (0.983) and root mean square error of approximation (0.062) were within the goodness-of-fit range. The SNEAT questionnaire has a total of 11 items in three domains (Physical Functioning, Mental Health, and Social Functioning) and enables the teachers to evaluate the educational outcome of their students (Han, Kohara & Kohzuki, 2015).

#### 4. Data Analysis

The PATCHI evaluates the psychological, physiological and pathological changes of children and the SNEAT does the outcome of special needs education classes; the results of the evaluation by using PATCHI and SNEAT may lead to confirm the relationship between psychological, physiological and pathological changes and the outcome of classes. In this study, the analysis by matching the result of PATCHI to those of SNEAT was conducted. The items about the psychology, physiology and pathology are matched to those of the health of body and mind in the SNEAT. Through the consultation with researchers on special needs education and QOL and in-service teachers, the domains of physiology and pathology have been matched to the physical functioning and the domain of psychology to mental health (Table 2). The scores of corresponding domains were matched to each other and analyzed.

&lt;Table 2&gt; Comparison of PATCHI with SNEAT

SNEAT		Domain		PATCHI	
Q1	Were the activities during the class appropriate for the physical conditions of the student?	Physical Functioning	Physiology	Q10	The student has difficulty in vocalizing and pronouncing.
Q2	Have been the posture, motor ability and motions of student improved?			Q11	The student can arranging stationery
Q3	Has been the ability of student to independently manage daily living improved?			Q12	The student can control urination and bowel movement.
Q4	Has been the degree of student's understanding his/her condition of diseases(disabilities) improved?			Q13	The student has difficulty in handwriting.
			Pathology	Q14	The student feels fatigue.
				Q15	The student has difficulty in breathing (e.g., choking on something or having obstructive phlegm in his/her throat).
				Q16	The student's diseases (disabilities) affect the interactions with friends.
				Q17	The time for learning during the classes has decreased due to the student's diseases (disabilities).
				Q18	The student has pains or numbness.
				Q19	The student has difficulty in participating in class or studying due to diseases (disabilities).
			Q20	The student has difficulty in scratching on the itchy spot.	
Q5	Has the feelings of student changed positively?	Mental health	Psychology	Q1	The student is frustrated or angry.
Q6	Did the student participate in class(learning/activities) in concentration?			Q2	The student shows anxiety.
Q7	Has been the will of student to learn improved?			Q3	The student worries about minor things.
Q8	Could the student respond to the changes of place and situation (the changes of environment) during class?			Q4	The student is motivated to learn.
				Q5	The student responds immediately, when he/she hear or see something.
				Q6	The student has thought that he/she is useful to other(s).
				Q7	The student is pleasant.
				Q8	The student can ask help, when he/she needs it.
				Q9	The student wants his/her difficulties to be understood by others (the psychological difficulty due to his/her disabilities during classes).

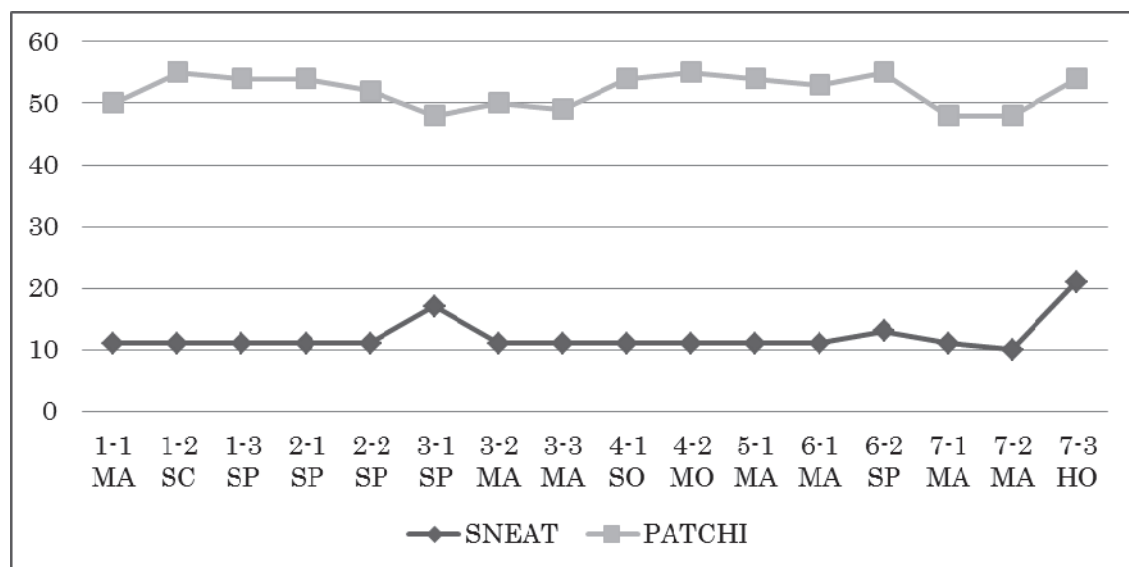
### III. Results

#### 1. Comparison of Physiology and Pathology (PATCHI) with Physical Functioning (SNEAT)

In results of comparing the scores of the PATCHI with those of SNEAT, while the scores of the PATCHI gradually changes, those of SNEAT showed almost no change (Table 3, Figure 2); that is, the physiological and pathological states of children with health impairment showed gradual changes, but there was no change in the outcome of classes.

<Table 3> Scores of Physiology and Pathology (PATCHI) and Physical Functioning

Date	1/28			2/4		2/18			2/25		3/4		3/11		3/18	
Subject	1-1 MA	1-2 SC	1-3 SP	2-1 SP	2-2 SP	3-1 SP	3-2 MA	3-3 MA	4-1 SO	4-2 MO	5-1 MA	6-1 MA	6-2 SP	7-1 MA	7-2 MA	7-3 HO
SNEAT	11	11	11	11	11	17	11	11	11	11	11	11	13	11	10	21
PATCHI	50	55	54	54	52	48	50	49	54	55	54	53	55	48	48	54



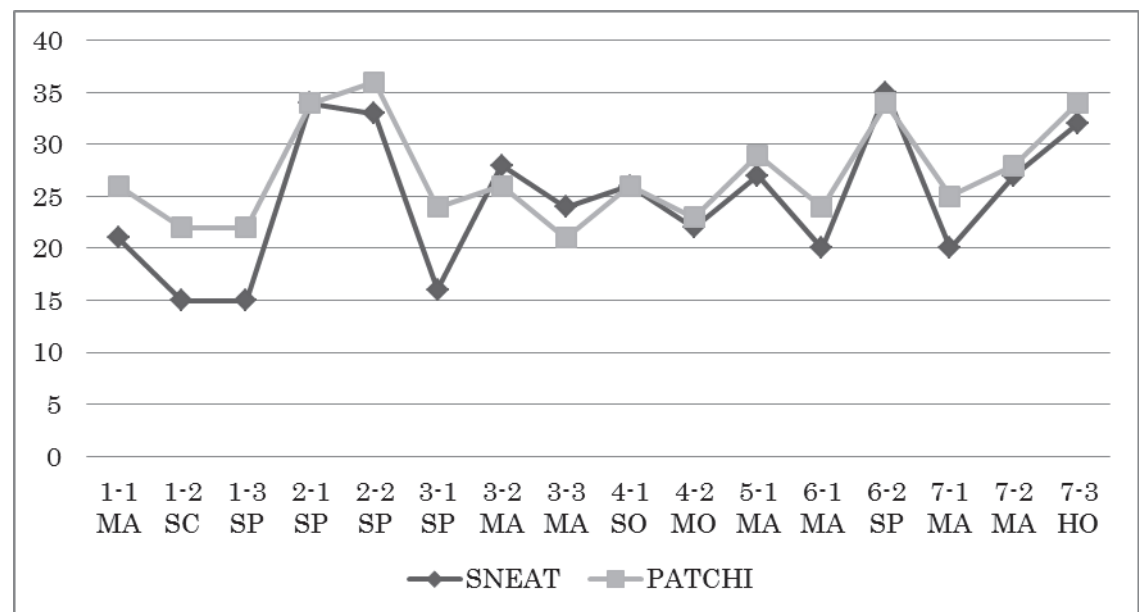
<Figure 2> Changes of the Scores of Physiology and Pathology (PATCHI) and Physical Functioning (SNEAT)

#### 2. Comparison of Psychology (PATCHI) with Mental health (SNEAT)

In results of the comparison of the scores of the PATCHI with that of SNEAT, the changes of PATCHI and SNEAT were similar to each other (Table 4, Figure 3); the psychological changes were similar to the changes of the outcomes of classes.

&lt;Table 4&gt; Scores of Psychology (PATCHI) and Mental health (SNEAT)

Date	1/28			2/4		2/18			2/25		3/4		3/11		3/18	
Subject	1-1 MA	1-2 SC	1-3 SP	2-1 SP	2-2 SP	3-1 SP	3-2 MA	3-3 MA	4-1 SO	4-2 MO	5-1 MA	6-1 MA	6-2 SP	7-1 MA	7-2 MA	7-3 HO
SNEAT	21	15	15	34	33	16	28	24	26	22	27	20	35	20	27	32
PATCHI	26	22	22	34	36	24	26	21	26	23	29	24	34	25	28	34



&lt;Figure 3&gt; Changes of the Scores of Psychology (PATCHI) and Mental health (SNEAT)

#### IV. Considerations

This study aimed to clarify the relationship between the psychological, physiological and pathological changes of children with health impairment and the outcome of the classes by using the PATCHI and SNEAT.

In results of data collection, while the scores of the PATCHI gradually changes, those of SNEAT showed almost no change; that is, the physiological and pathological states of children with health impairment showed gradual changes, but there was no change in the outcome of classes. In the meantime, in results of the comparison of the scores of the psychology (PATCHI) with those of mental health(SNEAT), the changes of psychology (PATCHI) and mental health(SNEAT) were similar to each other (Table 4, Figure 3); the psychological changes were similar to the changes of the outcomes of classes. The PATCHI evaluates the psychological, physiological and pathological changes of children and the SNEAT does the outcome of special needs education classes, which means that the psychological changes of PATCHI was shown to be similar to the outcomes of classes that was measured by the SNEAT, because the teacher teaches with looking at the psychological changes of the student(s). In contrast, even though the changes happened



in the domains of physiology and pathology, the outcomes of classes that are measured by the SNEAT have not seemed to be identified, because teachers cannot find the changes of children.

Based on the aforementioned results, the problem caused by the lack of expertise of teachers was derived from the curriculum of universities for special needs education. The curriculum for the teacher education has not been fully established and sometimes even the teachers who obtained the teacher's license do not seem to be fully qualified for the teaching (The Central Education Council, 2014). Due to the differences of curriculum of each university, it is also difficult to guarantee the quality of curriculum (Ministry of Education, Culture, Sports, Science and Technology, 2013). The difference has been pointed out between the abilities that the teacher's license guarantees and those that are practically required to teach at school (The Central Education Council, 2006). The courses of Psychology, Physiology and Pathology of Children with Health Impairments are offered in the curriculum of universities for special needs education. However, the minimum number of full-time instructor who must be hired for the courses of psychology, physiology and pathology of people with physical disabilities, intellectual disabilities and health impairment is one or more (The Standard of Teacher Education 4-5), which means that there may be no expert on physiology and pathology of persons with health impairment depending on the conditions of each university.<sup>1</sup> Moreover, the goals of the mandatory courses for the teacher education have not been fully reflected to the universities' curriculum for teacher education (The Central Education Council, 2006). Since the university's curriculum has been usually given too much emphasis on the expertise in the research areas of university professors, it could not respond to the needs at schools sufficiently (The Central Education Council, 2006). Therefore, due to the lack of the courses of physiology and pathology in the curriculum for teacher education, teachers are poor at finding the physiological and pathological changes of children during classes.

In the meantime, there are social workers and care workers as the careers to work for persons with disabilities. The curriculum for the education of social workers and care workers mandatorily includes the courses of the 'structure and functions of human body and the diseases' or 'psychology and psychological supports' (The Regulation on the Designation of Schools for Social Workers and Care Workers, the Article 3 and 4). In results of browsing the curriculum on online syllabus in the field of social welfare, the

---

<sup>1</sup> In Japan, the special needs education is comprised of five fields such as hearing impairment, visual impairment, intellectual disabilities, physical disabilities and health impairment and the five types of teacher's license are also issued according to the fields that the teachers choose among the said five fields. Therefore, the universities for special needs education should have five experts for five fields, but the Law stipulates that the minimum number of full-time instructor who must be hired for the courses of psychology, physiology and pathology of persons with disabilities is one or more. Since this Law may be interpreted that one full-time instructor who is an expert on one field may teach all the courses of psychology, physiology and pathology for five fields, there may be no expert on the psychology, physiology and pathology of persons with health impairment.

anatomy and physiology (Tohoku Fukushi University syllabus, 2015; Syukutoku University syllabus, 2015; Kyusyu University of Nursing and Social Welfare syllabus, 2015) and general medicine (Tohoku Fukushi University syllabus, 2015; Junior College of Aizu syllabus, 2015; Kobe University of Welfare syllabus, 2015; Kyusyu University of Nursing and Social Welfare syllabus, 2015) have been offered. It has been found that the curriculum for the education of social workers and care workers has included the courses of physiology and pathology more sufficiently than the curriculum of universities for special needs education. Conclusively, the courses of physiology and pathology need to be sufficiently included in the curriculum of universities for teacher education for special needs education. In this study, the psychological, physiological and pathological changes of children with health impairment and the outcomes of classes at schools were measured and the tasks to be improved in the curriculum of universities for teacher education for special needs education were investigated. There were also the limitations in this study that the subject for observation was only one student and the curriculum from various departments that are related with disabilities could not be analyzed. However, this study is the first attempt to evaluate the classes on the spot by using both PATCHI and SNEAT. This longitudinal study that was carried out at school through the observation of the third party, which is not common, is expected to contribute to the psychological, physiological and pathological researches for students with health impairment. In the future researches, the number of subjects should be increased and the current state of the classes that are taught based on the consideration of psychology, physiology and pathology by using PATCHI should be also explored. In addition, the curriculum analysis for students with other types of disabilities will need to be carried out.

**Reference**

- 1) Aiko Kohara, Takafumi Nakakuroshima, Katsunao Nagahama, Kaoru Kinjo & Changwan Han(2015) The measurement of Educational Assessment for children with Duchenne muscular dystrophy. *Bulletin of Faculty of Education*, 87, 139-146.
- 2) Changwan Han, Aiko Kohara & Masahiro Kohzuki(2014) Development of Scale to Special Needs Education Assessment Tool(SNEAT). *Asian Journal of Human Services*, 7, 125-134.
- 3) Ayano Kudo & Masashi Yokota(2008) Study on the Role of School nurse for the health impaired -In Search of Desirable Cares at Elementary and Junior High School-.
- 4) Akiko Taniguchi(2011) The Trend and Prospect of the Studies on the Educational Psychology for Special Needs Education - Centering on the Studies on the Education for Persons with Health Impairment. *The Annual Report of Educational Psychology in Japan*, 50, 145-154.
- 5) The Central Education Council(2006) The Future Direction of the System of the Cultivation of Teachers and Teacher's License (Reports).
- 6) The Central Education Council(2014) The Improvement of the System of the Cultivation, Recruitment and Training of Teachers, a summary of issues.
- 7) Ministry of Education, Culture, Sports, Science and Technology(2013) The Reform of the Cultivation of Teachers in the Level of Graduate Schools (Reports).
- 8) Tohoku Fukushi University syllabus(2015)  
<http://www.tfu.ac.jp/education/few/dsw/curriculum.html>
- 9) Syukutoku University syllabus(2015)  
<http://www.shukutoku.ac.jp/sougou/intro/syllabus.html>
- 10) Kyusyu University of Nursing and Social Welfare syllabus(2015)  
<http://www.kyushu-ns.ac.jp/departments/socialwelfare/cur.html>
- 11) Junior College of Aizu syllabus(2015)  
<http://www.jc.u-aizu.ac.jp/02/59.html>
- 12) Kobe University of Welfare syllabus(2015)  
<http://www.kinwu.ac.jp/syllabus/index.html>