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**MENTAL HEALTH OF SECONDARY SCHOOL
STUDENTS IN HANOI AND TREATMENT RESULTS
USING BEHAVIORAL INTERVENTIONS IN 2015 – 2020**

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INTRODUCTION

School – age illnesses including physical and mental problems have a tendency to increase, affecting 20% of children and adolescents worldwide (WHO-2001). According to a report on “Mental health in children” by American Medical Council, it was estimated that 1/5 of children and adolescents would acquire one mental health problem during school years. In Vietnam, there is approximately 10 – 25% of students have mental problems.

Mental health problems need to be detected early to avoid serious consequences for adolescents, their family and society. High prevalence of those with mental problems refers the necessity in health care and treatment. Among mental disorders in children, attention deficit hyperactivity disorder (ADHD) can have good treatment result if it is early intervened. However, even in developed countries, the access to mental health treatment is still limited. Many studies conducted in UK, US, Australia and Canada showed difficulties in access to medical services and mental health care such as waiting time, referrals or service costs and patients’ perception to services.

Hanoi is the center of economy, culture and society of Vietnam. Beside advantages, there exist many outstanding problems such as robbery, violence, drug addition, suicide, etc., among adolescents. Mental health care for children in Hanoi has not much been concerned, some studies were often conducted on clinical population or inadequate investigation; in fact, there have been just a few behavioral interventions to be carried out.

Some questions should be concerned such as “What are the realities of mental health of school- age children in Hanoi? What are related factors of school-age mental health? What are the preventions and interventions to reduce mental health problems?” Therefore, we conducted the study on “Mental health of secondary school students in Hanoi and treatment results using behavioral interventions in 2015 – 2020” with three main purposes:

1. Describe current situations of mental health of secondary school students in Hanoi in 2015
2. Analyze some related factors of mental health in secondary school students in Hanoi in 2015
3. Evaluate intervention results of ADHD treatment for children at Vietnam National Children’s Hospital from 2016 to 2020

CONTRIBUTIONS OF THE DISSERTATION

In the context that students nowadays are facing more with challenges and stress at school, the study has provided a set of basic data on the current condition of school mental health. The study has identified some related factors to emotional disorders, behavioral disorders, ADHD, peer relationship, self-injury and suicide using multivariate regression analysis. Some related factors to suicidal thought in students include: female gender, sleep disorders, behavioural disorders, difficult influences, drinking alcohol, smoking and bullying. From these results, it is recommended that parents and schools need to coordinate and pay attention to their child in using stimulants, life pressure and school violence. Also, it is necessary to early identify unusual behaviours to prevent mental problems.

The study used uncontrolled clinical trial research methods comparing before and after intervention to evaluate the effectiveness of intervention for ADHD children, in which daily report cards were used. The result showed a significant reduce of 87,7% after 36 months. This is a familiar and easy method for parents, contributing to improving mental health for students, the quality of life for families and society.

STRUCTURE OF THE DISSERTATION

The dissertation consists of 124 pages, including Introduction and Research purposes (2 pages); Literature Review (30 pages); Research Subject and Methodology (23 pages), Research results (37 pages), Discussion (28 pages); Conclusion (2 pages) and Recommendation (1 pages). The dissertation includes 45 tables, 10 graphs, 4 figures, 128 English and Vietnamese references (English: 109 and Vietnamese: 29).

CHAPTER 1 LITERATURE REVIEW

1.1. Reality of mental health in school-age children

1.1. 1. Mental health of students in the world

There are 7-10% of children and adolescents with mental illnesses needed to be treated worldwide. There is a higher percentage of those at dense population with many disadvantaged social factors, especially during puberty. Common mental problems include disruptive and anti-social behaviour (extroverted disorders) with prevalence of 3 – 5%; emotional disorder (introverted disorders) with prevalence of 2 – 5%; psychological obstacles and somatoform disorder with 1-3%; less common disorders include psychological disorder and general developmental disorder (autism) with 0,1% [20].

Mental disorders are often characterized by each developmental stage of children. In adolescents, common problems are depression, anxiety, stress, autism, learning disorders, behavioural disorders, psychosis disorders, mental disorders due to drug use.

Mental disorders are often specific to each stage of a child development, and for adolescents, the most common are emotional problems such as depression, anxiety, stress-related disorders, autism, learning disorders, behavioural disorders, oppositional defiant disorder, mental and behavioural disorders due to substance use.

In Asia, mental illnesses are quite common. On average, there is 20% of children suffering from mental illness. A two-stage study by Mullick và Goodman (2005) on Bangladesh children showed that the percentage of mental illness in children based on ICD- 10 was 15%. Mahbub Hossain et al who collected current evidence on mental disorders in Southern Asia showed different results between residences, urban and rural areas, or gender; Psychological disorder in children accounted for 23,3%, including autism, anxiety, emotional disorders, suicide, and self-injury. In Iran, a survey for parents showed emotional disorder accounted for 8,4% of acquired cases and 6,3% of suspected cases.

1.1.2. Mental illness of school-age children in Vietnam

In the last 25 years, researchers have begun to study mental health in children and adolescents. However, this issue has been more concerned over the last 15 years. In a second national survey on adolescents and youth in Vietnam, there were 2,8% of adolescents with self injury and 3,4% of them have suicidal thoughts. Children are unintentionally pushed into situations where they are forced to be independents and face with too much side effects of market economy while they have not been prepared with necessary knowledge in psychology.

Hanoi is one of the most developed cities in Vietnam. Together with economic and social development, students in big cities are affected by a number of negative social effects and depression from family and school. There have been many studies on psychological health in school-age children in Hanoi. A study on 21.960 students adolescents in Hanoi showed 3,7% of them having behavioural disorder. Another survey conducted by WHO using SDQ scale on 1202 students at primary and secondary schools aged 10-16 years revealed that 19,46% of them had mental problems. This prevalence is the same among genders, schools, and living areas.

Studies by other researchers have shown that mental illnesses and behavioral problems in children and adolescents in Vietnam accounted for a significant prevalence and these issues need to be more completely evaluated.

1.2. Some related factors of mental illnesses in children

1.2.1. Psychological factors

Some studies showed significant association between organizational destruction, fear of alienation, obsessive - compulsive attachment and disruptive behavior disorder (DBD); meanwhile, another study showed no predicted relationship between these problems with severe DBD or diagnostic status. The study conducted by Ruchika Gajwani proved that maltreated children were nearly 10 times more likely to develop mental disorders than other children.

In this stage, children have strong and imbalanced intellectual and moral development with physical changes, knowledge and relationship with adults, friends, learning activities, and so on. The process of forming new things takes time and depends on living conditions and child activities. Therefore, mental development in this period is not the same in all aspects, leading to parallel existence in one child: being both childish and adult. On the other side, children at the same age have different development in different aspects of adulthood.

1.2.2. Family-social factors

Adolescents tend to be affected by other people's feeling and relationships between parents, with siblings and others. Parents are the models of father and mother for adolescents, so they tend to react in the same way as their parents do. They learn how to behave in the way that their parents behave. Especially, children at this age are very sensible and critical of dishonesty, so they believe in doing, not by words. As they are sensible, sometimes even an insinuating criticism causes negative effects. It is important for them to be guided with love and dedication.

1.1.3. School factors

School education also affects mental health of students. The imposition of education leads to students to lack of confidence. In addition, the overloaded program and exam pressure make them stressed, worried, leading to physical and mental disorders. Beside school, students are required to attend extra classes run by their teachers, so they have no time for rest, entertainment and doing physical exercises. Moreover, the teacher's attention also influences on their psychological factors with behavioural problems, which has long-term effect on their creativeness and learning abilities.

1.2. Intervention for children with ADHD and accompanied disorders

1.2.3. Medical intervention

Common medication for ADHD includes Atomoxetine, Guanfacine, Clonidine, Bupropion. Overtime, psychostimulant is still a controversy among many communities and a number of studies have shown their ongoing negative effects.

ADHD children have social and learning problems. Therefore, the medical treatment helps to improve social functions.

1.2.4. Behavioral intervention

ADHD children have successful initial years of elementary and begin to pass secondary and high school. They need to be yearly evaluated. This is the best time to complete re-evaluation for their health.

1.2.5. Socio-psychological and educational intervention

Children spend most of their time at school, so psychological evaluation at school plays an important role in effective result. Children with ADHD will experience learning difficulties or failure at least one step until adolescence.

This study has found out the ways to improve these difficulties by changing learning environment, school subjects and individual consultations

CHAPTER 2

RESEARCH SUBJECTS AND METHODOLOGY

2.1. RESEARCH SITE, SUBJECTS AND TIME

2.1.1. Research site

2.1.1.1. Research at community

At the time of the study, there were total 624 secondary schools in Hanoi. The study was conducted at two secondary schools in Hanoi:

- Cat Linh secondary school, Dong Da district, Hanoi was representative for urban area in Hanoi.
- Hong Ky secondary school, Soc Son district, Hanoi was representative for suburb of Hanoi.

2.1.1.2. Interventional study

The interventional study was conducted at outpatient clinic of Vietnam National Children's Hospital (VNCH).

VNCH is the highest referral hospital for children and the leading center for diagnosis and treatment for children with psychological disorders. There were 120 ADHD patients at psychological department participating in the study.

2.1.2. Research subjects

2.1.2.1. Research subjects in community

* **Inclusion criteria:**

- Students from grade 6 to grade 9 with equivalent age from 10 – 15 years.
- Students who do not have physical disabilities such as deafness, blindness, hand and foot impairment.
- Students who do not have damaged nervous system, intellectual disabilities.
- Students whose their parents agree for their child participation in the study.

* **Exclusion criteria:**

- Students who were diagnosed with damaged nervous system or intellectual disabilities.
- Disable students: deafness, blindness, hand and foot impairment.
- Students whose their parents do not agree for their child participation in the study.

2.1.2.2. Research subjects at hospital (interventional research)

* **Inclusion criteria:**

- Patients who was diagnosed with ADHD at Vietnam National Children's Hospital
- Age: from 10-15 years old which was calculated by study year minus year of birth
- Children whose their parents agree for their child participation in the study

*** *Exclusion criteria:***

- Children whose their parents do not agree for their child participation in the study
- Children with deafness, cerebral palsy, intellectual disabilities due to syndromes related to chromosomal abnormalities or other infections or trauma; children with epilepsy who are not controlled with medication and children with other neurological trauma.

2.1.3. Research time: From November 2015 to May 2020

2.2. RESEARCH METHOD

2.2.1. Research design

The study was conducted in two periods:

Period 1: A cross-sectional method combined with descriptive epidemiology was used to evaluate psychological condition of students at secondary schools and find out some related factors to mental health (objective 1 and 2)

Period 2: An uncontrolled clinical trial was used to compare before and after intervention to evaluate the effectiveness of behavioral intervention for ADHD students (objective 3).

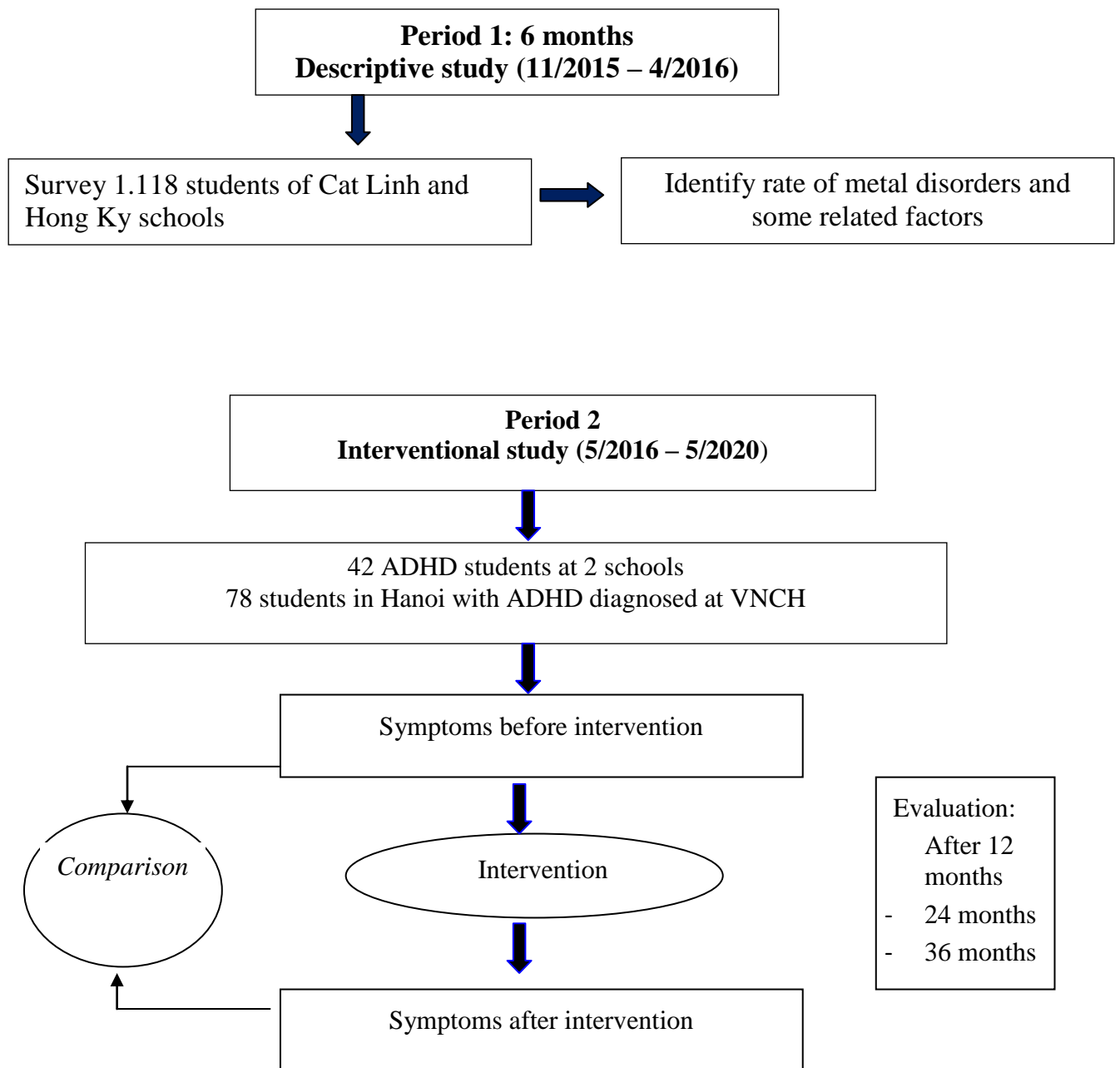


Figure 2.1. Study diagram

2.2.2. Sample selection

2.2.2.1. Sample size

* *Sample size of cross-sectional study:*

Formula:

$$n = Z_{(1-\frac{\alpha}{2})}^2 \frac{p(1-p)}{d^2} DE$$

In which:

n: minimum number of sample

α : significant level $\alpha = 0,05$

Z: confidence coefficient $\alpha = 0,05$, $Z = 1,96$

p: percentage of children with mental disorder in previous study in Hanoi, reference with percentage $p=25\%=0,25$.

DE is the design coefficient $DE=2$

d: expected absolute value, $d = 0,04$

Substituting above values, we get the minimum participants of 900 students. In fact, we collected 1.118 students.

** Sample size for intervention study:*

The formula was applied according to WHO's software SimpleSize as below:

$$n = \frac{\{Z_{(1-\alpha/2)}\sqrt{2p(1-p)} + Z_{(1-\beta)}\sqrt{p_1(1-p_1) + p_2(1-p_2)}\}^2}{(p_1 - p_2)^2}$$

In which:

$p_1 = 100\% = 1$: percentage of ADHD before intervention (selecting ADHD children for intervention).

p_2 : percentage of ADHD children at evaluation after 24 months of intervention (expected percentage of 90% or $p_2 = 0.9$)

$$p = (p_1 - p_2)/2$$

$Z_{(1-\alpha/2)} = 1,96$ is Look-up value with confidence value of 95%, $\alpha = 0,05$

Select sample power = 0,95 with $\beta = 0,05$

n: minimum of children need to be selected for intervention

Based on above formula, the minimum of sample size was 120. In fact, we had 121 participants.

2.2.2.2. Sample selection method

- Sample selection for cross-sectional study:

Way to choose schools:

Purposefully select two schools representing for two areas: inner city area and suburb of Hanoi after discussing with leaders of schools and VNCH (Director of International cooperation project with Denmark – the study used survey data to describe the current condition of the project). Specifically:

- + Cat Linh secondary school, Dong Da district – representative for inner city area.
- + Hong Ky secondary school, Soc Son District – Representative for suburbs of Hanoi.

Way to choose subjects (1.118 students)

Students at two secondary schools were selected for interview.

To select 1.118 students of two schools, we carried out the following steps:

+ Cat Linh school had 1.200 students from grades 6,7,8,9. After listing the number of each grade and the number of each class, we randomly chose 3 classes/grade. So, we have the total students of 12 classes to be chosen.

+ Hong Ky school had total 1250 students from grades 6,7,8,9. Listing the number of classes of each grade and number of students each class. As the number of students per class were less than in Cat Linh, so we randomly chose 4 classes. So the total number of students in 16 classes were chosen.

Therefore, 28 classes from two schools were selected. All the students of 28 classes met the inclusion criteria. In fact, there were 164 students at grade 6, 324 students at grade 7, 337 students at grade 8 and 293 students at grade 9.

- Select samples for interventions study:

+ Select convenient and continuous samples at outpatient clinic at psychological department, VNCH in 24 months.

+ Select all children with ADHD at two schools that have been consulted and diagnosed at VNCH and select more patients from Hanoi that were examined at VNCH and met all inclusion criteria.

+ During intervention, there were 42 patients at 2 schools treated at VNCH and we chose 78 children from Hanoi who came to examine at VNCH and met the required criteria.

2.3. RESEARCH CONTENT

2.3.1. Research content

2.3.1.1. Research content for objective 1 and 2:

- General information of research subjects: age of students and their parents; qualification and current occupations of parents; student's gender; student's health

- Evaluation of mental health of students:

+ Evaluation of mental disorders based on SDQ scale in terms of: emotional disorders, behavioral disorders, ADHD, peer relationship, pre-social behavior, difficult behavior, Total grade of difficulties.

+ Evaluation of self-injury, suicidal thought, suicidal plan in the last 6 months including self-injury; the frequent thought of reality released by dead, frequent making plan of suicide, frequent committing suicide.

- Factors relating to mental disorders include:

+ Factors relating to emotional disorders

+ Factors relating to behavioral disorders

+ Factors relating to ADHD

+ Factors relating to peer relationship

+ Factors relating to be impacted difficulties

+ Factors relating to committing suicide

2.3.1.2. Research content for objective 3

- Evaluation of the effectiveness of ADHD treatment by behavioral intervention:

+ Conditions before intervention include prevalence of ADHD types, combined mental disorders

+ Change in attention deficit score before and after intervention

+ Change in hyperactivity score before and after intervention

+ Change in combined ADHD score before and after intervention

2.3.2.2. Information selection technique

* Questionnaire was used to investigate the reality of mental health and some related factors at two schools.

Step 1. Tool trial:

- After design, the researcher will deliver questionnaires to 100 students at the two schools.

- The trial will evaluate the suitability and unsuitability of the questionnaires.

Step 2. Training for researchers

- Psychologists and specialized doctors of VNCH give training for researcher group on mental health, and explain how to fill in the questionnaires. Researchers are those who have knowledge in pediatric psychology at Psychology department, VNCH.

Step 3. Collecting data

- Making details and informing interview plan to two schools: Cat Linh and Hong Ky secondary school (done by PhD group)

- Preparing personnel, questionnaires, etc. (done by PhD group and researcher group)

- Conducting research as plan: interview (done by PhD group and researcher group)

- Supervising data collection: randomly draw 100 questionnaires and interview to re-identify information. When the error is more than 1% of the information (calculated by school), the questionnaires will be deleted and re-interviewed.

- * Collecting daily report cards (DRC):

- The examination is conducted by psychiatrics at VNCH, with training to unify the way to record clinical data.

- Intervention for 120 ADHD children using behavioral method with daily report cards.

- Guide parents how to fill in the card

- Follow – up after 12 months, 24 months and 36 months

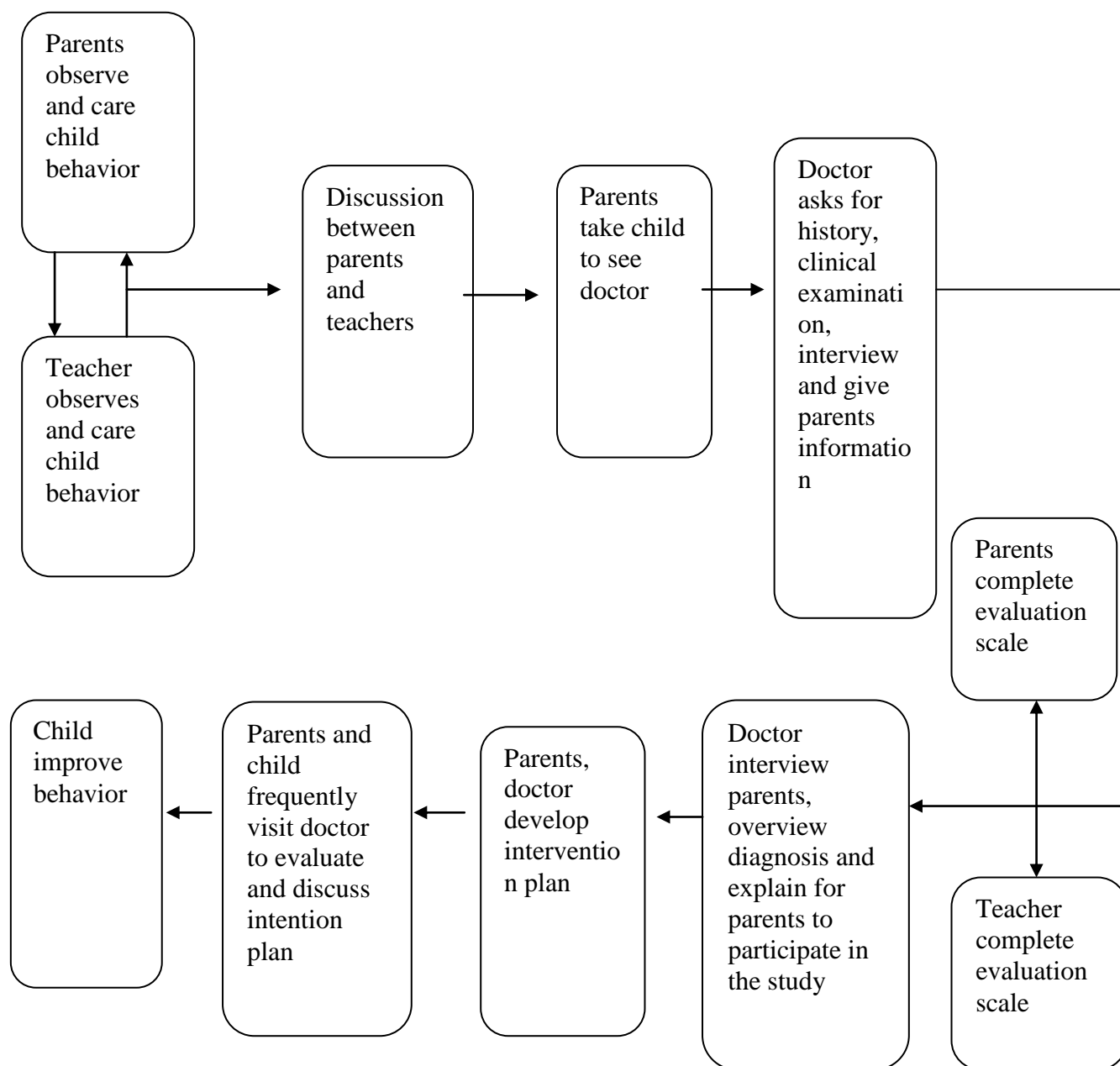


Figure 2.3. Theoretical frame of evaluation and intervention for ADHD children

CHAPTER 3 RESEARCH RESULTS

Table 3.1. Percentage of mental disorders according to SQD scale (n=1118)

Disorders	Mean±SD	95%CI
Emotional disorders	3,9±2,3	3,8-4,1
Behavioural disorders	2,0±1,7	1,9-2,1
ADHD	3,3±1,8	3,2-3,4
Peer relationship problem	2,7±1,7	2,6-2,8
Pre-social behavior	6,6±2,1	6,4-6,7
Affected difficulties	0,7±1,4	0,6-0,8
Total score	12,0±5,4	11,7-12,3

The result showed that emotional disorder score was 3,9±2,3, behavioral disorder score was 2,0±1,7, ADHD score was 3,3±1,8, peer relationship problem score was 2,7±1,7, pre-social behavior score was 6,6±2,1, affected difficulties score was 0,7±1,4. Total score was 12,0±5,4.

Table 3.2. Percentage of mental disorders by SDQ scale (n=1118)

Diagnosis Disorders	Acquired		Suspected		Normal	
	Quantity	%	Quantity	%	Quantity	%
Emotional disorder	153	13,7	106	9,5	859	76,8
Behavioural disorder	100	8,9	112	10,0	906	81,0
ADHD	42	3,8	67	6,0	1009	90,3
Peer relationship problem	85	7,6	243	21,7	790	70,7
Pre-social behavior	178	15,9	145	13,0	795	71,1
Affected difficulties	194	17,4	134	12,0	790	70,7

Students with difficult behaviors accounted for highest percentage with 17,4%, followed by those with pre-social behavioral problem with 15,9% and emotional disorder with 13,7%.

Table 3.3. Percentage of mental disorders by age

Age Disorders	11 years (n=134)		12 years (n=89)		13 years (n=366)		14 years (n=361)		15 years (n=168)		p
	Quantity	(%)	Quantity	(%)	Quantity	(%)	Quantity	(%)	Quantity	(%)	
Emotional disorder	19	14,2	12	13,5	58	15,8	70	19,4	35	20,8	<0,05
Behavioural disorder	6	4,5	2	2,2	38	10,4	37	10,2	17	10,1	<0,05
ADHD	2	1,5	2	2,2	14	3,8	16	4,4	8	4,8	<0,05
Peer relationship problem	12	9,0	3	3,4	28	7,7	25	6,9	17	10,1	<0,05
Pre-social behavior	19	14,2	6	6,7	61	16,7	70	19,4	22	13,1	<0,05
Affected difficulties	19	14,2	12	13,5	58	15,8	70	19,4	35	20,8	<0,05

It can be seen that emotional, behavioral disorder, ADHD, pre-social behavioral problem and affected difficulties increased by age ($p < 0,05$).

Table 3.4. Rate of self- injury (n=1118)

Level		Quantity	Percentage (%)
Never		535	47,8
Yes	Sometimes	551	49,3
	Often	20	1,8
	Very often	12	1,1
	Total	583	52,2

Table 3.4 showed that 52,2% of students have the behavior of self – injury, in which 49,3% of sometimes, often and very often accounted for 1,8% and 1,1%, respectively.

Table 3.5. Rate of suicidal thought by gender (n = 1118)

Level		Male (n = 550)		Female (n = 568)		Total (n = 1118)	
		Quantity	(%)	Quantity	(%)	Quantity	(%)
Never		473	86,0	457	80,4	930	83,2
Have suicidal thought	Sometimes	56	10,2	95	16,7	151	13,5
	Often	11	2,00	14	2,5	25	2,2
	Very often	10	1,8	2	0,4	12	1,1
	Total	77	14,0	111	19,6	188	16,8
p < 0,05							

Table 3.5 shows that 16,8% of students have suicidal thought; female have more rate of suicidal thought than male (19,6% vs 14,0%). The difference is significant with $p < 0,05$.

Table 3.6. Rate of suicidal thought by age (n=1118)

Level	Never		Sometimes		Often		Very often	
	Quantity	(%)	Quantity	(%)	Quantity	(%)	Quantity	(%)
11 years (n=134)	121	90,3	12	9,0	1	0,7	0	0,0
12 years (n=89)	75	84,3	12	13,5	1	1,1	1	1,1
13 years (n=366)	309	84,4	45	12,3	9	2,5	3	0,8
14 years (n=361)	278	77,0	67	18,6	9	2,5	7	1,9
15 years (n=168)	147	87,5	15	8,9	5	3,0	1	0,6
Total	930	83,2	151	13,5	25	2,2	12	1,1

Among 16,8% of students with suicidal thought, those at age of 14 years has highest rate with 23% and lowest age is 11 years with 9,7%.

3.2. Some related factors of mental health

Table 3.7. Relationship between demographic features and emotional disorders

Emotional disorders Demographic features		Acquired (n = 153)		None (n = 965)		OR (95%CI)
		Quantity	(%)	Quantity	(%)	
Gender	Female	95	16,7	473	83,3	1,70
	Male	58	10,6	492	89,4	(1,20 - 2,42)
Living with	Other*	24	25,3	71	74,7	2,34
	Both parents	129	12,6	894	87,4	(1,42 - 3,86)
Siblings	Yes	11	25,0	33	75,0	2,19
	No	142	13,2	932	86,8	(1,08 - 4,43)

Table 3.7 show the correlation between emotional disorders and gender; living with both parents and having siblings.

Table 3.8. Correlation between emotional disorder and self - injury

Self-injury Psychological disorder		Yes (n = 583)		None (n = 535)		OR (95%CI)
		Quantity	(%)	Quantity	(%)	
Emotional disorders	Yes	105	68,6	48	31,4	2,23
	No	478	49,5	487	50,5	(1,55-3,21)
Behavioural disorders	Yes	73	73,0	27	27,0	2,69
	No	510	50,1	508	49,9	(1,70-4,26)
ADHD	Yes	32	76,2	10	23,8	3,05
	No	551	51,2	525	48,8	(1,48-6,26)
Peer relationship problems	Yes	96	44,2	121	55,8	0,67
	No	487	54,1	414	45,9	(0,50-0,91)
Affected by difficulties	Yes	137	70,6	57	29,4	2,58
	No	446	48,3	478	51,7	(1,84-3,60)

The table shows the correlation between self-injury and emotional disorder, behavioural disorder, ADHD, peer relationship and affected by difficulties. Self-injury in children with ADHD is 3,05 times higher than that in children without ADHD ($1,48 <$

OR < 6,26); behavioural disorder is 2,69 times higher ($1,70 < \text{OR} < 4,26$); and affected by difficulties is 2,58 times higher ($1,84 < \text{OR} < 3,60$).

Table 3.9. Correlation between some behaviors and suicidal thought in students

Behavior \ Suicidal thought		Yes (n = 188)		No (n = 930)		OR (95%CI)
		Quantity	(%)	Quantity	(%)	
Alcohol intake	≥1 time/month	59	28,64	147	71,36	2,44 (1,71-3,47)
	Rarely	129	14,14	783	85,86	
Drunkenness	≥1 time/month	17	38,64	27	61,36	3,32 (1,77-6,23)
	Rarely	171	15,92	903	84,08	
Smoking	Yes	18	37,50	30	62,50	3,18 (1,73-5,83)
	No	170	15,89	900	84,11	
Being bullied inside school	Yes	78	27,96	201	72,04	2,57 (1,85-3,58)
	No	110	13,11	729	86,89	
Being bullied outside school	Yes	37	26,06	105	73,94	1,93 (1,27-2,91)
	No	151	15,47	825	84,53	
Bullying inside school	Yes	56	22,40	194	77,60	1,61 (1,13-2,28)
	No	132	15,21	736	84,79	
Bullying outside school	Yes	41	25,63	119	74,38	1,90 (1,28-2,82)
	No	147	15,34	811	84,66	

Behaviors include drinking alcohol ≥ 1 time/month, drunkenness ≥ 1 time/month, smoking, being bullied inside and outside school, bullying inside and outside school have relationship with suicidal thought.

Behavioral intervention results of ADHD treatment and other mental problems from 2016 to 2020

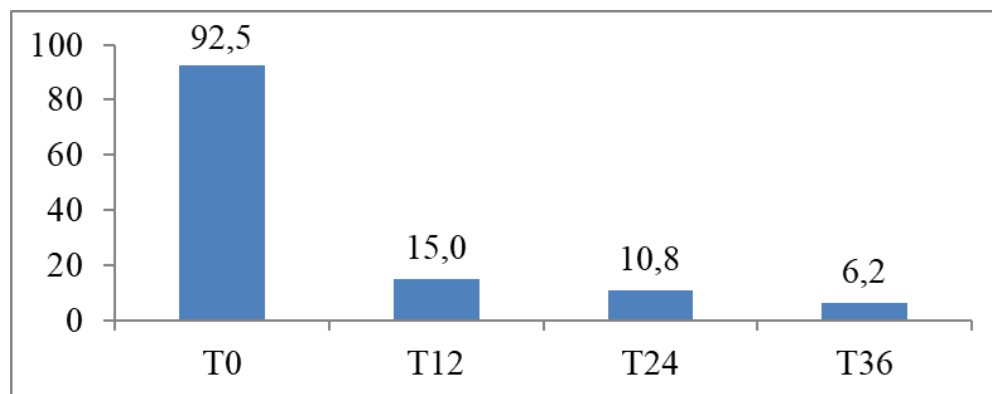


Figure 3.1. Percentage % of ADHD after intervention

Figure 3.1 shows that ADHD before intervention was 92,5%, this rate reduced by 6,2% after 36 months, the change rate is 93,3%, the difference is significant ($p < 0,05$).

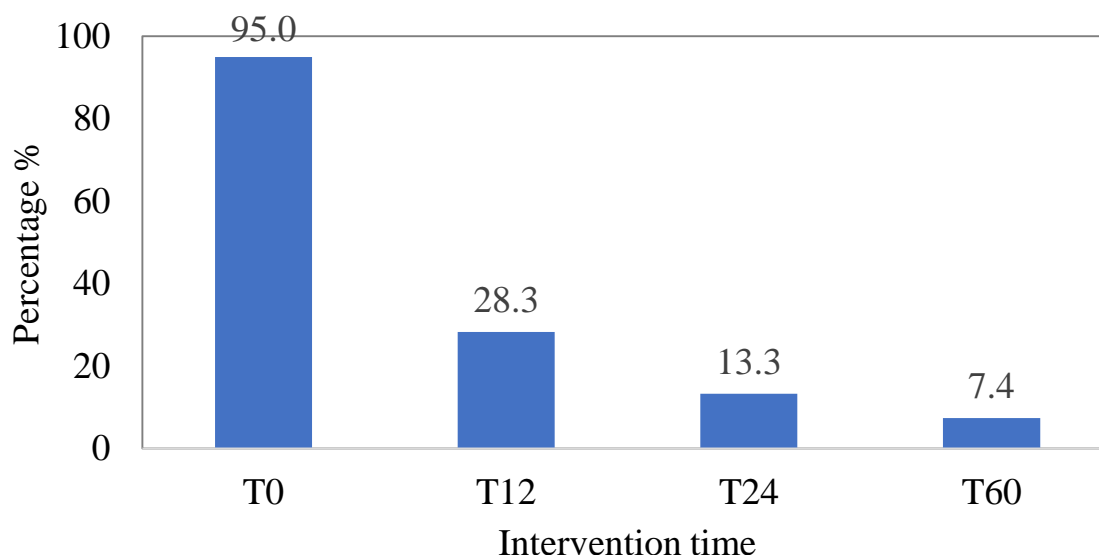


Figure 3.2. Percentage of ADHD after intervention

Figure 3.2 shows the percentage of ADHD before intervention is 95%, which decreases gradually after 36 months, this percentage is 7,4%; the reduction percentage is 92,2%, the difference is significant ($p < 0,05$).

Table 3.10. Effectiveness of reducing ADHD after intervention

ADHD Period	Attention deficit		Hyperactivity		Combined		Acquired ADHD	
	Quantity	(%)	Quantity	%	Quantity	%	Quantity	(%)
T0 (n = 120)	9	7,5	6	5,0	105	87,5	120	100,0
T12 (n = 120)	21	17,5	5	4,2	13	10,8	39	32,5
T24 (n = 120)	8	6,7	5	4,2	8	6,7	21	17,5
T36 (n = 81)	5	6,2	4	4,9	1	1,3	10	12,3
p(T0-T36)	> 0,05		> 0,05		< 0,05		< 0,05	
MĐTĐ	17,3%		2,0%		98,5%		87,7%	

Table 3.8 shows that ADHD decreases gradually, in which 100% children with ADHD, after 36 months, the rate reduces by 12,3%, the change rate is 87,7% ($p < 0,05$); in which combined ADHD reduces most with the change rate is 98,5% ($p < 0,05$).

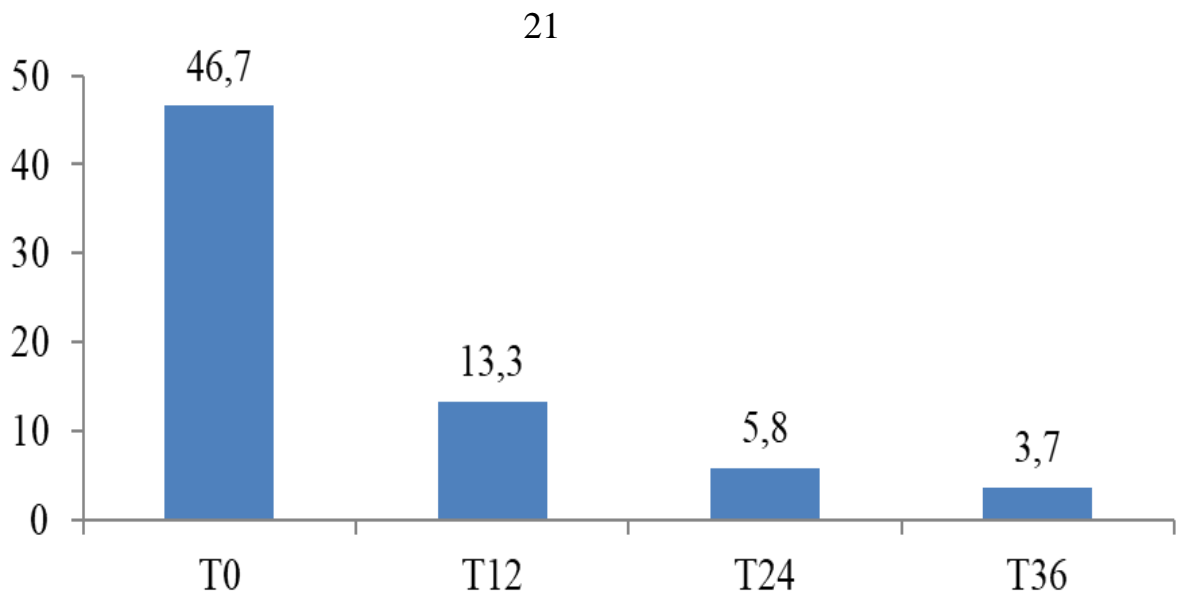


Figure 3.3. Percentage of anxiety after intervention

The rate of anxiety, stress before intervention is 46,7%, this rate reduces over time and after 36 months, the rate is 3,7%, reduction rate is 92,1%, the difference is significant ($p < 0,05$).

CHAPTER 4 DISCUSSION

4.1. Reality of mental health of Hanoi secondary school students

3.1.1. Percentage of mental disorders in secondary school students

Total score of mental disorders: The total score of mental disorders was calculated by the scores of emotional disorders, behavioral disorders, ADHD and peer relationship problems, excluding the score of pre-social behavior. Our results showed that the total score was $12,02 \pm 5,35$.

Percentage of emotional disorders: Acquired rate was 13,7% and the suspected rate was 9,5%. Our result was higher than that of Glazebrook et al (2003), in which the acquired rate of emotional disorder by SQD in male and female was 10,7% and 12,1%, respectively, the suspected rate in male and female was 7,0% and 8,6%, respectively. Our result was lower than that of Cury and Golfeto (2003) who conducted research on students. In the SQD version for parents, the rate of emotional disorder was 30,8%; meanwhile, in the SQD version for teachers, the rate was 1,83%. The combination of two scales show the rate of emotional disorder was 7,14%.

Behavioural disorders: The acquired rate was 8,9%, suspected rate was 10,0%. Our study was much lower than that in Le Minh Hoang et al (2022) who used SDQ scale to conduct study on high school students at Nghe An and showed that 92,4% had social communication problems. Our result was lower than that of Glazebrook et al (2003) who showed the percentage of behavioural disorder in male was 15,1% and suspected rate was 11,5% according to SDQ scale. The rate was 10,3% in female and suspected rate was

10,4%, which was lower than that in Arman et al (2012), Children aged 6 – 18 years has the disorder rate was 34,7%, which was lower than that in Cury's study.

Rate of mental disorder by age: between 11 and 15 years old, students in our study showed emotional disorder, behavioural disorder, ADHD, pre-behavioural problem and affected difficulty increased by age ($p < 0,05$). The rate of emotional disorder in children aged 11 years was only 14,2%; however, by the age of 15, the rate was 20,8%; behavioural disorder in children aged 11 years was 4,5%, the age of 15 was 10,1%; ADHD in children aged 11 was 1,5%, children aged 15 was 4,8%; peer relationship in children aged 11 was 9%, 15 years was 10,1%, pre-behavioral problem in children aged 11 was 14,2% 15 years was 13,1%; difficulty affect was 14,2% in children aged 11 years and 20,8% in aged 15. Our result was similar to that of Giannakopoulos et al (2009) in which they showed that SDQ points in terms of emotional disorder, behavioural disorder, ADHD, pre-behavioural problem and affected difficulty increased by age. This can be explained that when children get older, they are in puberty and develop psychologically and physiologically. On the other hand, when studying in higher grades, they face with more difficulties and greater pressure.

4.1.2. Self-injury and suicidal thought in students

Self-injury in students

Our result showed that 52,2% of students had self-injury over the last 6 months in which 49,3% of students sometimes have self-injury, 1,8% often have self-injury and 1,1% at very often level. Our result is higher than that in Hawton et al (2012) who conducted research in community and showed 10,0% of adolescents have self-injury.

Suicidal thought

In the past 6 months, the prevalence of students with suicidal thought at sometimes level was 13,5%, often level was 2,2% and very often level was 1,1%. This rate was high in ages 12,13 and 14, which is consistent with the psychological and physical changes in students. The study also reveals female students have higher rate of suicidal thought at 19,5%, higher than male students at 14,0%. At all levels, female students have a higher rate of suicidal thought than male students, the difference is significant $p < 0,05$.

4.2. Some related factors of mental health in students at secondary schools in Hanoi

Our research result shows that demographic factors including gender, living with parents, living with siblings are related to emotional disorders ($p < 0,05$). In fact, female tend to express more emotions than male, so our result was suitable. Our result was similar to that of Arman et al (2012) in which the rate of emotional disorder in male children aged 6 – 10, 11 – 13 and 14 – 18 was 19,8%; 24,4% and 21,2%, respectively; meanwhile, this rate in female children was 24,1%; 26,3% and 31,3% [110]. Our study was also the same as the study by Gao et al (2013) on 22,108 subjects, using SDQ scale showed that female gender was a factor of emotional disorder.

The result also shows that there was a significant correlation between gender and behavioural disorder in students ($p < 0,05$). Male had a 11,1% risk of behavioral disorder, this rate was 1,69 times higher than that in female (6,9%) (95%CI 1,11-2,58).

There was correlation between alcohol intake, smoking and behavioural disorders, in which students with at least 1 time per month of alcohol intake had 3 to 4 times higher of behavioural disorder (95%CI: 2,22 - 5,28); this rate in children with drunkenness at least 1 time per month was 9,3 times higher than other groups (95%CI: 4,92 - 17,64). The rate in smoking students was 8 times higher than those without smoking (95%CI: 4,30 - 14,89). Our result was equivalent to the study by Theo DuPaul et al (2021) who conducted a research in 10 years in which he proved that behavioural disorder resulted from alcohol intake and smoking.

In our study, there was a significant correlation between violence and self-injury in students, in which students who were bullied at school was at 1,49 times higher risk of self-injury than those without bullying (95%CI 1,13-1,96); Students who were bullied outside of school was at 2,73 times higher risk of self-injury than those without being bullied (95%CI 1,85-4,03); Students who bullied others at school were 1,38 times more likely to be injured than those without bullying (95%CI 1,04-1,84). Students who bullied others outside of school were 1,45 times more likely to be injured than those without bullying (95%CI 1,03-2,04).

Female students had 1,49 times higher rate of suicidal thought than male students (95%CI: 1,09 - 2,05); children above 14 years old had 1,47 times higher than those below 14 years (95%CI: 1,07 - 2,02). The higher prevalence in female was similar to the study by Scott et al (2012), on subjects at 12 - 30 years old in which the thought of unmeaningful life in female was 53,0%, the thought of death or suicide accounted for 65,0% in female [115]. Our result was the same as the result in the study by Peng et al (2019) in which female had more thought of suicide OR = 1,7 (95%CI: 1,4 - 2,2); those living in urban areas had more suicidal thought than other areas OR = 1,5 (95%CI: 1,1 - 2,1). However, there was no difference in ages group in term of suicidal thought.

Our study revealed that mental disorders affected suicidal thought in students. This result was equivalent to other studies. According to Resch et al (2008) who used SDQ scale showed average point was 4,88 (95%CI: 4,21 - 5,55); average point in group without suicidal thought was 2,25 (95%CI: 2,15 - 2,35), the difference was significant $p < 0,001$; average point of behavioural thought in this group was 2,86 (95%CI: 2,43 - 3,30) compared with group without suicidal thought, the average point was 1,87 (95%CI: 1,80 - 1,94), the difference was significant with $p < 0,001$.

4.3. Results of behavioural intervention in ADHD treatment and accompanying mental disorders from 2016 - 2020

Evaluation of symptoms of attention deficit showed that all symptoms reduced significantly after intervention of 12 months, 24 months and 36 months ($p < 0,05$). It can be seen that reducing symptoms of attention deficit is important in increasing learning

ability, family and society relationship. The rate of hyperactivity before intervention was 92,5%, after 12 months, 24 months and 36 months of intervention, this rate decreased by 15%, 10,8% and 6,2%, respectively. The reduction change was 93,3%; the difference was significant ($p < 0,05$). Therefore, it can be seen that using DRC is highly effective in reducing signs of hyperactivity in children.

General evaluation on ADHD revealed that 100% of children acquired ADHD before intervention, after 12 months, 24 months and 60 months, the prevalence reduced by 32,5%, 17,5% and 12,3%, respectively. Therefore, the percentage of children with ADHD reduced by 87,7% after 60 months of intervention. With types of ADHD, the most common is combined attention deficit/hyperactivity; before intervention, there was 87,5% of children had ADHD. The percentage reduced after 12 months, 24 months and 60 months with the percentage of 10,8%, 6,7% and 1,3%, respectively. Therefore, the percentage of ADHD children reduced by 98,5% after 60 months of intervention. The result also shows that symptoms of anxiety, depression decreased after 12 months, 24 months and 60 months of intervention.

It is important to reduce signs of hyperactivity as it helps students perform better at school and at home. The use of DRC brings good results in reducing signs of hyperactivity in children.

Our study was similar to that of Iznardo et al (2020) who used DRC for children with ADHD and showed significant symptoms with average difference 0,36 (95%CI: 0,12 - 0,60, $p < 0,005$) [99]. Similarly, Rogers et al (2022) also revealed high effectiveness after 2 weeks by using DRC. Our result was equivalent to the study by Pyle et al (2017) in reducing ADHD symptoms after intervention with DRC.

Our study was also like the study by Iznardo et al (2017) on 272 children aged 7,9 years with three studies to compare controlled groups, one study to compare 3 treatment groups, two studies comparing before and after treatment and direct observation of learning and social behaviours [99]. A study by Nichole Jurbergs (2010) also proved the effectiveness of using daily report cards.

Our results also showed that oppositional defiance symptoms decreased steadily over the intervention after 12,24,36 months ($P < 0,05$). Research by Fabiano and colleagues (2010) shows that intervention with DRC had clearly improvement in classroom violence and the rate of teacher's assessment of behaviour in class, learning outcomes as well as purposeful behavioural improvement.

Intervention result showed that signs of behavioural disorder decreased significantly over the time of intervention. Regarding intervention for disruptive behaviour disorders, according to a meta-analysis study by Gaastra et al (2016), oppositional defiant disorder decreased by 52,0% after teacher's management. Our result was the same as the study by Iznardo et al (2017) who also used daily report cards, in which there was difference from externalizing disorders in ADHD children, the rate was 0,34 (95%CI: 0,66 - 1,44, $z = 5,25$).

Our result was also similar to that of Merrill et al (2017) on ADHD children which showed that the use of DRC combined with behavioral education helped to improve learning performances.

The study showed that signs of anxiety, stress all reduced after 12, 24, 36 months of intervention. Therefore, it can be included that behavioral intervention plays an important role in treatment for children with ADHD, Oppositional defiant disorder (ODD), defiance and behavioural disorder. It can be seen that this method is highly effective and low cost, in which parents are trained, then follow, encourage and arrange schedules for children.

CONCLUSION

1. Reality of mental health of school-age children

- Based on SDQ scale, score of emotional disorder is $3,9 \pm 2,3$, behavioral problem is $2,00 \pm 1,7$, ADHD score is $3,3 \pm 1,8$, peer relationship problem is $2,7 \pm 1,7$, pre-social behavior is $6,6 \pm 2,1$, affected difficulties is $0,7 \pm 1,4$. Total score is $12,0 \pm 5,4$.

- Percentage of acquiring mental problems based on SDQ: emotional disorder 13,7%, behavioral disorder 8,9%, ADHD 3,8%, peer relationship problem 7,6%, pre-social behavior 15,9%, difficult behavior 17,4%.

- Percentage of self-injury accounts for 52,2%, Frequency: sometimes 49,3%, often, very often: 2,9%.

- Students with suicidal thought accounted for 16,8%, the age of 14 accounted for 23,0%; Frequency: sometimes: 13,5%, often/very often: 3,3%.

2. Some related factors of mental health of school-age children

- Some related factors of emotional disorder: female gender, family without full biological mother and father, siblings, history of epilepsy, headache ≥ 1 time/month, abdominal pain, sleep disorder, smoking, bullying and being bullied inside and outside of school.

- Some related factors of behavioral disorders: abdominal pain ≥ 1 time/month, sleep disorder, drunkenness ≥ 1 time/month, bullying and being bullied inside and outside of school.

- Some related factors of ADHD: allergy

- Some related factors of peer relationship problems: being bullied inside school.

- Some related factors of difficult behavior: male gender, atopic eczema, headache, being bullied outside of school.

- Some related factors of self-injury: male gender, age below 14, father's age < 33 at birth, allergy, behavioral disorder, difficult behavior, alcohol being bullied outside of school.

- Some related factors of suicidal thought: female gender, sleep disorder, behavioral disorder, difficult affected behavior, drinking and being bullied inside of school.

3. Results of behavioural intervention in treatment of ADHD

- The use of DRC in behavioral intervention brings effectiveness in treatment of ADHD, in which before intervention, there was 100% of children had ADHD, after 60

months of intervention, the rate was 12,3%. The total rate reduced by 87,7% ($p<0,05$). Types of disorders are listed according to different scales:

+ Attention deficit: before intervention, the rate was 95%, after intervention the rate was 7,4%, total rate reduced by 93,3% ($p<0,05$).

+ Hyperactivity: before intervention 92,5%, after intervention 6,2%, the rate decreased by 92,8% ($p<0,05$).

- The use of DRC helps to reduce accompanied mental disorders, including:

+ ODD: before intervention 73,3%, after intervention 2,5%, the rate reduced by 93,2% ($p<0,05$).

+ Behavioral disorder: 14,2% before intervention, 1,2% after intervention, the rate reduced by 91,5 ($p<0,05$).

+ Anxiety, depression: before intervention 46,7%, after intervention 3,7%, the rate reduced by 92,1 ($p<0,05$).

RECOMMENDATION

1. Promote health care programs at schools with screening and prompt treatment of mental disorders. Besides, students' disease history, physical problems such as headache, recurrent abdominal pain, sleep disorder, acquired diseases need to be concerned.
2. There should be cooperation between schools and parents in the use of substances such as beer, alcohol, smoking, violence such as bullying and being bullied inside and outside of school in order to prevent and protect mental health for students.
3. Intervention should concern features of students such as age, gender, family condition such as parents' divorce, death of father or mother and parents' attention level to their child.
4. DRC is effective in ADHD intervention, so it should be implemented in community and at schools.

LIST OF PUBLICATIONS RELATED TO THE DISSERTATION

1. Vũ Thị Loan, Lương Xuân Hiến, Lê Thanh Hải, Thành Ngọc Minh, Đỗ Mạnh Hùng (2018), An investigation into some related factors of emotional disorders in high school students in Hanoi in 2015. *Journal of Clinical Medicine and Pharmacy 108*, ISSN: 1859 – 2872, Vol 13 - No 5/2018, pp. 157-162.
2. Vũ Thị Loan, Lương Xuân Hiến, Lê Thanh Hải, Thành Ngọc Minh, Đỗ Mạnh Hùng (2018), Reality of mental health of secondary school students in Hanoi, 2015 based on SQD scale, *Journal of Clinical Medicine and Pharmacy 108*, ISSN: 1859 – 2872, Vol ... - No .../2018, pp. 111-118.
3. Vũ Thị Loan, Đỗ Mạnh Hùng, Lương Xuân Hiến (2022), Some related factors of self-injury in secondary school students in Hanoi, *Journal of Community Health*, ISSN: 2354 - 0613, Vol 63 - No 5/2022, pp.41-47