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Disabled Learning Students Before, During, and After the Rehabilitation Tools: A Case Study

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Abstract

Learning disability involves students with reading, writing, and counting disabilities. A clinical work was done amongst six pupils at a primary school in Malaysia. Three of them were learning-disabled pupils and the other three were learning-able pupils. The purpose of the clinical work was to determine whether private lessons, parenting advice, and food supplements as treatments could make significant difference to the assessment results of learning-disabled pupils at school. The basis of test scores in Malay language and Mathematics subjects, the clinical work had shown that learning disabled-students demonstrated significant improvement before, during, and after administering the treatments. Hence, private lessons, parental advice, and food supplements can be used as rehabilitation tools to help learning-disabled pupils learn effectively not unlike their learning-able peers.

Keywords:

Disabled Learning Students, Primary Schools, Clinical Work and Rehabilitation Tools.

1. Introduction

The number of learning-disabled children was increasing every year across developing and developed countries. There were 134,659 learning-disabled children recorded in 2011 and by 2012 it had increased by more than 20,000 to 165,281 [1]. Many factors could have contributed to the problem; the most prominent was traumatic brain injury [2] followed by polluted environment [6]. Healthy brain that supports learning process is important for cognitive activities such as reading, writing, and focusing [4]. Traumatic brain injury would not only disturb the learning process but also weaken the body system of learning-disabled children such as digestion and immune systems [5]. However, there is limited academic research on the use of rehabilitation tools on learning-disabled children in Malaysia. Hence a clinical work was conducted to compare the scores obtained by learning-disabled primary school

pupils (test subjects) who were subjected to private lessons, parental advice, and food supplements (treatments) and learning-able pupils (control subjects) who set for Malay language and Mathematics tests. The clinical work was conducted over a six-month period. Based on the authors' knowledge, the research was the first attempt to determine the effectiveness of rehabilitation tools (treatments) for learning-disabled students where their performance was measured on the basis of Malay Language and Mathematics test scores. Incidentally, the Malaysian Ministry of Higher Education gives priority on the mastery of Malay language and mathematics in its *"3M"* strategy of incorporating reading, writing, and numerical skills in primary school curriculum.

2. Literature Review

According to the National Joint Committee on Learning Disability [6], learning disability is defined as:

"It is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. These disorders are intrinsic to the individual, are presumed to be due to central nervous system dysfunction and may occur across the life span."

Due to their different brain structure and different treatment received by learning-disabled children, they differ from learning-able children (referred to as able children in the rest of the paper) in the way they learn, communicate, and socialise [7]. Other common characteristics include difficulty in reading, writing, speaking, memorising, demonstrating mathematical skills, listening, paying attention, adhering to directions, remaining at the same place, and adapting to new environment [8]; [9]. Children with learning disabilities can be characterised according to the year of schooling. This can be broadly classified into pre-schooling and school-aged years. However, the main concern is on preschoolers (four to six-year olds) who represent those in the critical period of growth. Those in this group with a history of birth complications and genetic or environmental condition have the probability of being learning-disabled. Preschoolers with symptomatic features need to be taken seriously by parents, teachers, and professionals [10]. They must take appropriate preventive and intervention measures upon noticing any signs of deficits on the affected children. Early recognition will help learning-disabled children cope with their condition and different ways of treatment could be tailored for them unlike the standard approach that are applied on able peers. Special interest groups had provided various types of support that positively affect learning-disabled people to cope well with their condition. They were: special education, speech therapy, occupational therapy, neuropsychological rehabilitation, vocational rehabilitation, psychosocial interventions and courses, and peer support [11].

The following hypotheses (H_n) were developed to help achieve the research objective:

H_1: Pre-treatment, on-treatment, and post-treatment scores in Malay language and Mathematics tests are different between learning-disabled pupils who are given private lessons and able students?

H_2: Pre-treatment, during-treatment, and post-treatment scores in Malay language and Mathematics tests are different between learning-disabled pupils who are given parental advice and able students?

H_3: Pre-treatment, during-treatment, and post-treatment scores in Malay language and Mathematics tests are different between learning-disabled pupils who are given food supplements and able students?

3. Methodology

To test the research hypotheses, a clinical work involving six primary school pupils of equal number of learning-disabled pupils and able pupils was conducted in Malaysia. Learning-disabled pupils were identified as those who had an intelligent quotient (IQ) of not more than 80. They were enrolled at a daily primary school rather than a special-need class or special school. Each learning-disabled pupil (test subject) was paired with an able pupil (control subject). Three test subjects were given one type of treatment each, i.e., private lessons, parental advice, and food supplements. The researchers had to bear a large cost in private-lesson fee, honorarium for three consultants who provided parental advice, and expenses on food supplements provided to the learning-disabled pupils. Each subject sat for two specially-designed competency assessments, i.e., Malay Language test and Mathematics test. Overall, the clinical work took six months to complete.

Test scores were recorded in three stages: pre-treatment, during-treatment, and post-treatment. Comparisons were made between test-subject and control-subject test scores. Table I gives the sampling rubric of the research.

Table 1: Clinical work groups

Number of pupils	Condition	Are they given:		
		private lessons?	parental advice?	food supplements?
1	Learning-disabled	Yes	Yes	Yes
2		Yes	Yes	Yes
3		Yes	Yes	Yes
4	Able	No	No	No
5		No	No	No
6		No	No	No

IV RESULTS

A. Private-Lesson Treatment

Table II shows the result of the experiment. The Malay Language test scores at pre-treatment stage for the test-subject was 76.7 and 62.9 for the control-subject. As the private lessons extended for four weeks, the test score had increased for both subjects, i.e. 85.9 for the test-subject and 87.1 for the control-subject. Their scores continued to rise at the end of the private lessons, i.e., 94.6 and 100, respectively.

Table 2: Malay language test scores (private-lesson treatment)

Phase	Score	
	Test	Control
Pre-treatment	76.7	62.9
On-treatment	85.9	87.1
Post-treatment	94.6	100

The pattern was the same with Mathematics test scores although they were much lower. The pre-treatment scores were 41.8 and 62.8 for test and control subjects. The interim scores were 55.2 and 70 and final scores were 76.2 and 80, respectively (Table III).

Table 3: Mathematics test scores (private-lesson treatment)

Phase	Score	
	Test	Control
Pre-treatment	41.4	64.8
During treatment	55.2	70.0
Post- treatment	76.2	80.0

B. Parental-Advice Treatment

Parental advice that catered for the basic needs, nutritional needs, and psychological wellbeing of the test subject

was another type of treatment used in the experiment. The pre-treatment score in Malay language test was 56.6 (Table IV). The score had increased to 71.9 then 89.9 in the next two phases, respectively.

Table 4: Malay language test scores (parental-advice treatment)

Phase	Score	
	Test	Control
Pre-treatment	56.6	76.4
On-treatment	71.8	70.0
Post- treatment	89.8	100

The scores for able students were higher an increasing as well in all the three phases.

The scores for Mathematics followed the same pattern and were much lower (Table V). For example, the pre-treatment score of 25.3 was about half of the corresponding Malay language score.

Table 5: Mathematics test scores (private-advice treatment)

Phase	Score	
	Test	Control
Pre-treatment	25.3	63.1
On-teatment	71.8	70.0
Post- treatment	89.8	100

C. Food-Supplement Treatment

Three types of food supplements were administrated to the test subject, namely, vitamin C, vitamin D3, and omega-3 fatty acids [2]. The Malay language and Mathematics test scores increased from pre-treatment to post-treatment phases, i.e., 60.1, 68.1, 89.6 and 28.1, 50, and 74.2, respectively for the test subject (Table VI and Table VII). Similarly, test scores were also increasing with the control subject albeit higher values, i.e., 69.4, 88.1, 97.3 and 51.2, 59.0, and 74.4, respectively.

Table 6: Malay Language test scores (food-supplement treatment)

Phase	Score	
	Test	Control
Pre-treatment	60.1	69.4
During treatment	68.1	88.1
Post- treatment	89.6	97.3

Table 7: Mathematics test scores (food-supplement treatment)

Phase	Score	
	Test	Control
Pre-treatment	28.1	51.1
During treatment	50.0	59.0
Post- treatment	74.0	74.4

4. Conclusion

The findings from the experiment demonstrate that private lessons, parenting advice, and food supplements can help learning-disabled pupils to fair well at school. The improvement was substantial where the performance of those who were given private lessons and food supplements was not far off from the performance of able students. In fact, there was hardly any difference in Mathematics test scores between those who were given food supplements and those who were not. The longitudinal clinical work illustrated that the performance of learning-disabled pupils had improved at pre-treatment, during treatment, and post-treatment phases. The research had involved six primary school pupils rather than a large sample. Nevertheless, it had provided valuable information on the effect of private lessons, parental advice, and food supplements on learning-disabled pupils' cognitive skill. The treatments could be administered as rehabilitation tools at school. It was possible to conduct the longitudinal experimental research to test the extent to which a treatment (an independent variable) significantly affect test score (the dependent variable) of learning-disabled pupils. The relationships had been examined over different phases of the treatment. The research could be performed on a large sample using advanced statistical techniques such as structural equation modelling that promises improved reliability and robustness of results [12]; [13]; [14]. An added advantage is the convenience of generalising conclusions when a probabilistic sample is used.

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