Relationship of Visual-Motor Integration and Handwriting Skills in the Children with Learning Disabilities

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Contents:

- Introduction and back ground
- Methods
- Results
- Conclusion

Introduction and background

- Children with learning disabilities are at risk of having visual–motor integration deficits.
- Visual-motor integration is the degree to which visual perception and finger-hand movements are well coordinated.
- Visual motor integration consists of coordinating visual perceptual skills together with gross-motor movement and fine-motor movement.
- It is the ability to integrate visual input with motor output.

- It is essential in academic performance. Visual–motor integration, visual perception and fine motor control are part of the motor and perceptual components for hand writing performance.

- It is a more important factor than general intelligence, finger dexterity and visual perception in determining handwriting performance.

- Children with poor visual-motor integration skills have a hard time on written assignments.

- Hand writing difficulty is the most common purpose of referral to school-based occupational therapy service.

- Handwriting is an integral part of every child’s school experience.
- Approximately 30–60% of class time in primary school is spent in fine motor and writing activities.
- Handwriting difficulties can have implications for a child’s successful participation in school and play activities, potentially leading to problems in academic performance and lowered self-esteem.

- Visual motor integration and hand writing skills are assessed by occupational therapist.

- School based therapy service is available in the school for children with special education needs in developed countries.

- In Malaysia, there is no school based rehabilitation service in special education classes especially in public schools.

- The children with disabilities who need special education may not be assessed well for their visual-motor integration as well as handwriting skills**.**

- The aims of this study were to examine the visual-motor integration and handwriting skills of children with disabilities and to investigate the relationship between their visual-motor integration and handwriting skills.

Method

Study design

- Exploratory cross sectional study.

Sampling

- Purposive sampling

Operational Definition

- Children with learning disabilities
- Down Syndrome, Autism, Attention Deficit Hyperactive Disorder, Intellectual disability, Specific Learning Disabilities (dyslexia), specific speech and language impairment, speech delay, hearing impairment and visual impairment.

Inclusion criteria:

6 – 12 years old students with disabilities who can follow instruction for the assessment tests in the Integrated Special Education Program of 4 primary schools in Penampang, Kota Kinabalu.

Exclusion criteria:

- Students who can not follow instruction
- Students with no consent

TESTS PERFORMED

- The Beery-Buktenica Developmental Test of Visual-Motor Integration (Beery VMI)
- Test of Handwriting Skills –Revised (THS-R)

The Beery-Buktenica Developmental Test of Visual-Motor Integration (Beery VMI)

- To assess the extent to which individuals can integrate their visual and motor abilities.

- It is a developmental sequence of 30 geometric forms of increasing difficulty that are copied on paper with a pencil by the children.

(Beery, K and Beery, Natasha ., 2006)

The test consist of:

- **Beery-VMI full form test and 2 supplemental tests: (Visual perceptual and motor coordination)**

- (Beery, K and Beery, Natasha ., 2006)

Test of Handwriting Skills –Revised (THS-R)

- **Is to determine if neurosensory integration difficulties are contributing to learning problems students are experiencing.**

- **Writing spontaneously from memory; Writing from dictation; copying selected letters ,words & sentences from a modals; writing words from dictation.**

- (Milone, 2007)

Procedure of the tests

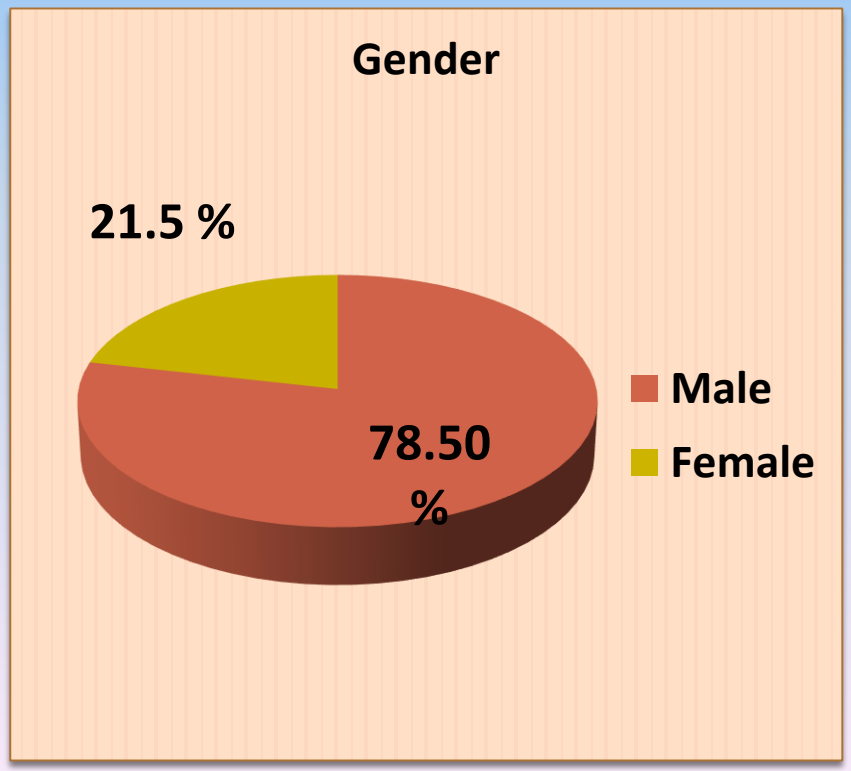
Subjects were tested individually:

- **one test a day for every student**
- **20 to 30 minutes for a test.**
- **The tests were conducted in a quiet room with free of visual distractions.**

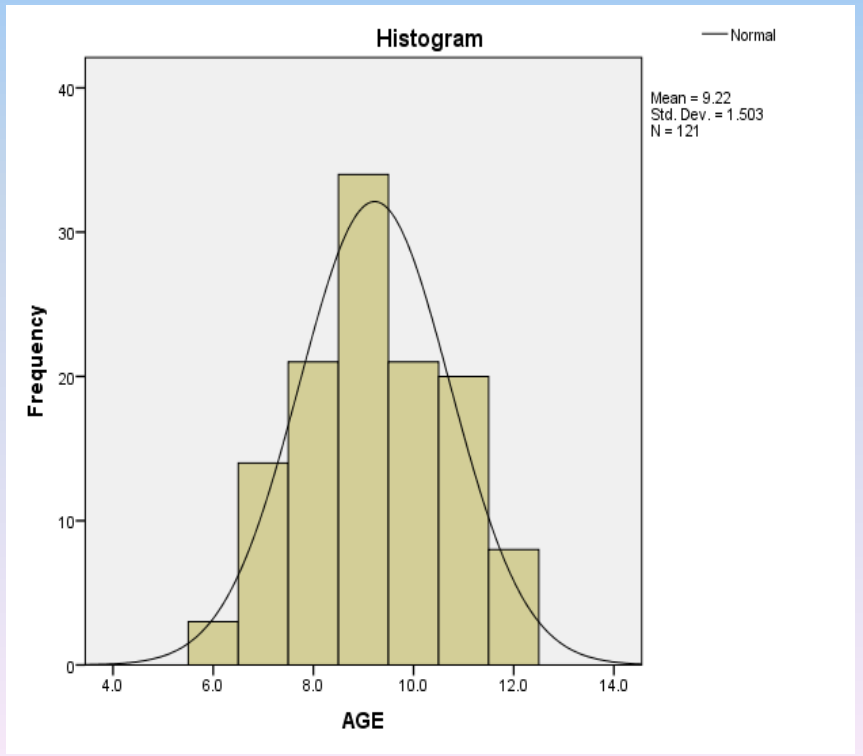
Results

Demographic data

Male = 95 Female = 26



Age distribution



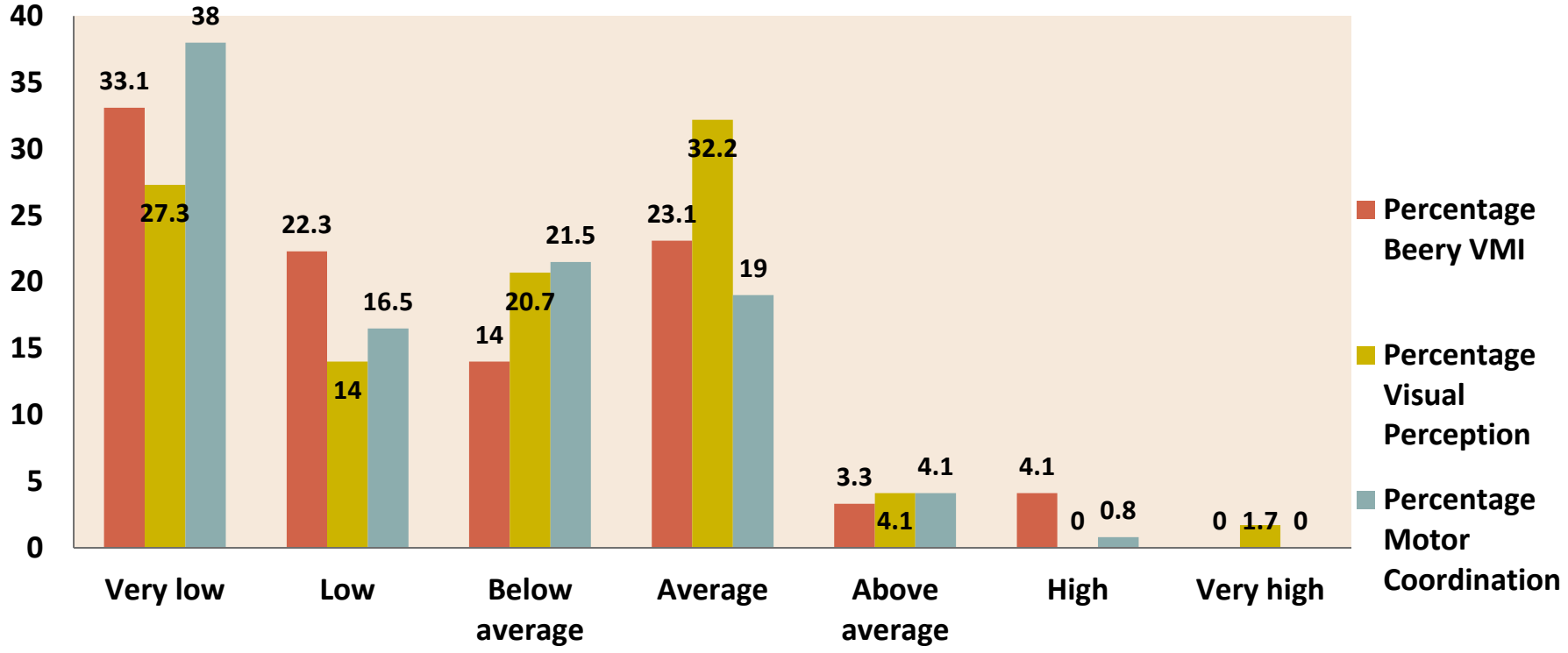
Instrument Reliability Test

The Chronbach's alpha for the tests was found to be highly reliable.

- **Beery-VMI (3 items, $\alpha = .875$)**
- **THS (10 items, $\alpha = .926$)**

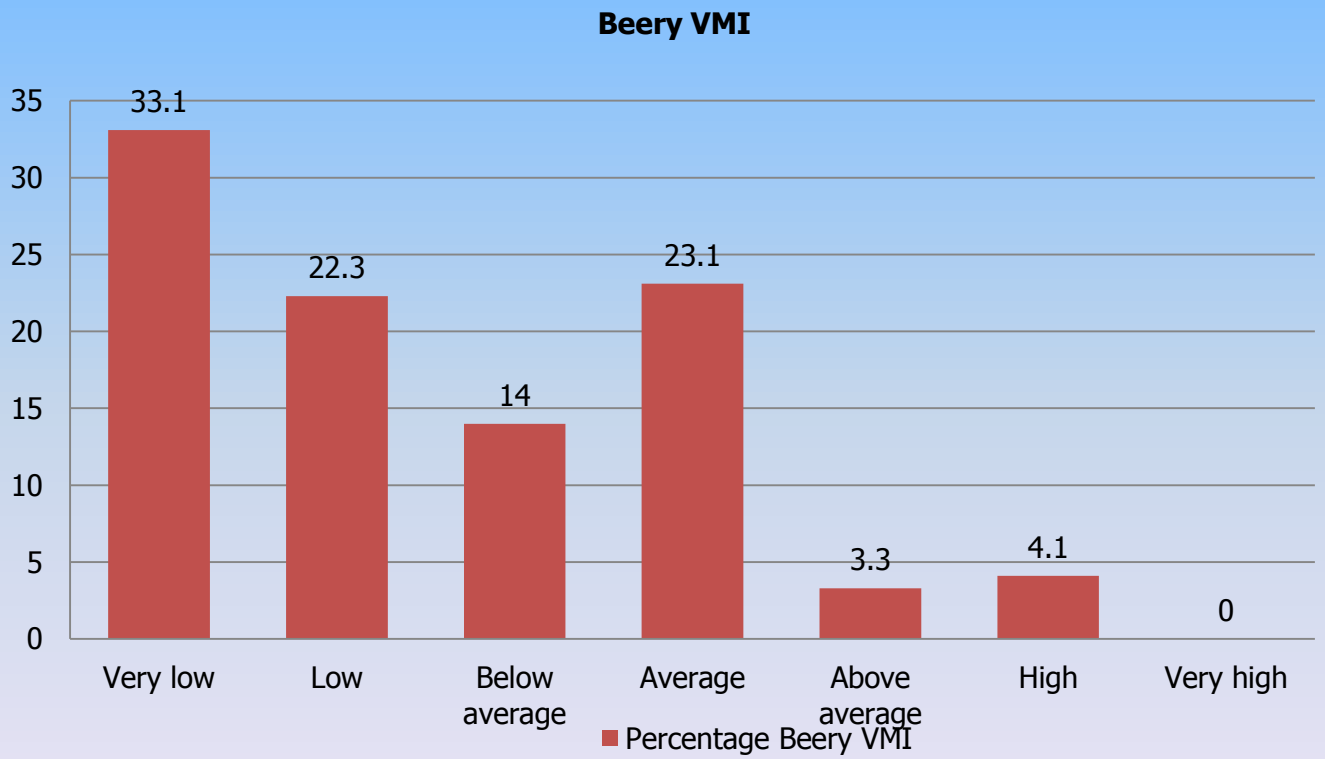
Beery VMI

Mean VMI =78.8, SD = 20.5
Mean Visual perceptual =81.2, SD = 21.1
Mean Motor coordination =75.5, SD = 19.2



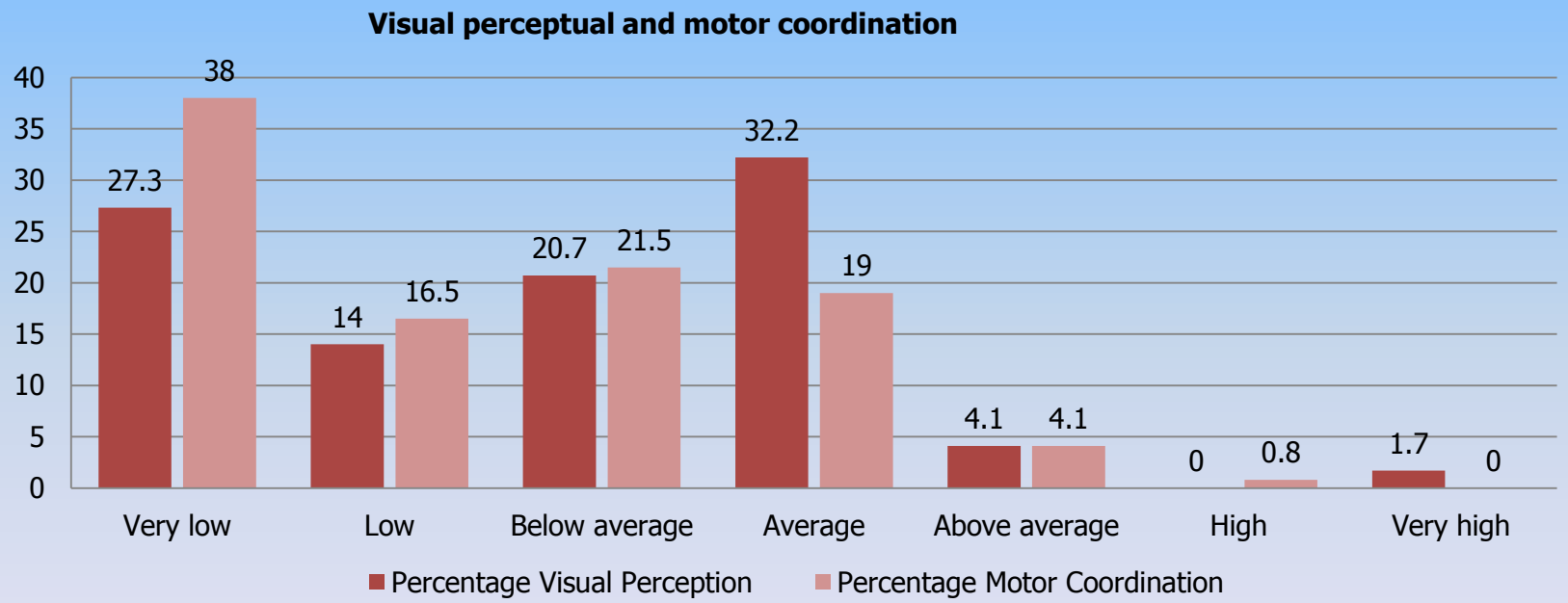
	Beery VMI	Visual perceptual	Motor coordination
very low -below average	69.4% (n=84)	62.0% (n=75)	76.0% (n=92
average – very high	30.5% (n=37	38.0% (n=46	23.9% (n=29).

Beery VMI ordinal results



	Beery VMI
very low -below average	69.4% (n=84)
average – very high	30.5% (n=37

Visual perceptual and motor coordination ordinal results



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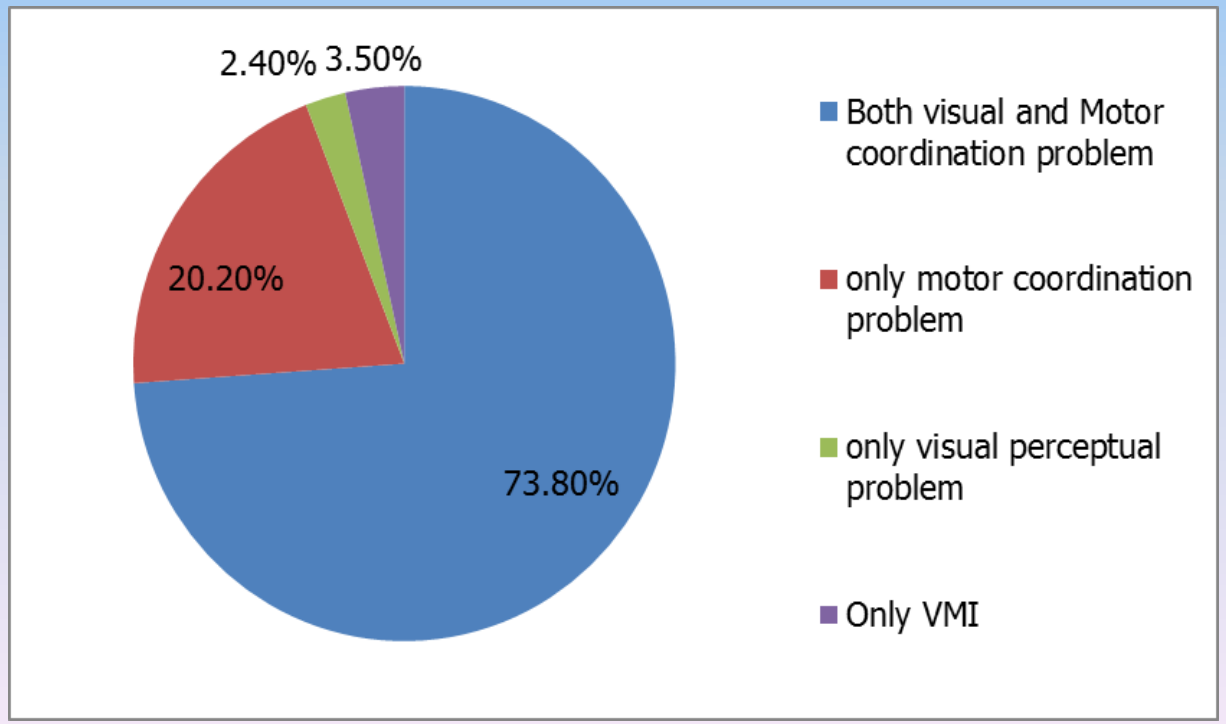
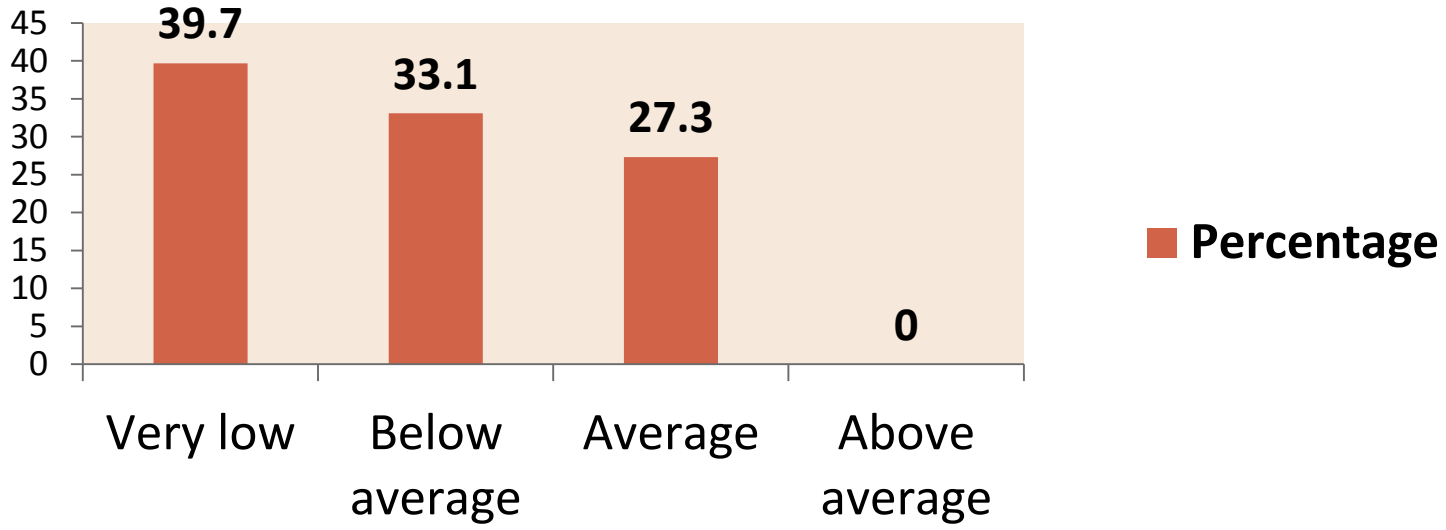
Visual perceptual and motor coordination problems in subtests among 69.4% of the students who had Beery VMI below average score



THS-R

Positive skewed (0.54)
Median score =74.0, IQR = 27



	THS
very low -below average	72.8% (n=88).
average – above average	27.3% (n=33).

- The ancillary scores showed that 85% (n=103) have problem in speed, 50% (n=61) in reversal, 26% (32) in touching, and 82% (99) in case errors.

- At the abbreviated administration the result revealed that 49% (n=59) had copying problem.

Correlation between VMI and THS

Items	r value	Munro BH (2000)
VMI - THS	***r* = 0.760, p < 0.01**	**high**

Correlation between VMI and THS was significant at high level, indicating that higher VMI scores are associated with higher THS scores ($r = .760$, $p < 0.01$).

Conclusion

- More than two third of the study population had impairment in visual motor integration and hand writing skill deficits.
- A significant relationship was found between visual motor integration and hand writing skills.
- The higher VMI scores are associated with higher THS scores.

- Early childhood developmental programmes which contain sensory stimulation should be carried out in children with learning disabilities to obtain motor and visual skills that are essential for the development of visual motor integration at a pre-school level.

- Visual motor integration skills should be considered when the children with learning disabilities have hand writing difficulties.

- These study findings showed that occupational therapy and other rehabilitation services are necessary in Malaysia special education school system as school-based therapy.

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- **THANK YOU**