EFFECTS OF MASSAGE AND GYMNASTICS TOWARDS SERUM BDNF AND PSYCHOMOTOR OF CHILDREN UNDER 2 YEARS IN IODINE DEFICIENCY DISORDER (IDD) ENDEMIC AREA

Zulkhah Noor [1], Rahma Yuniar Faradyni [2], Ira Safira[2], Adang Muhammad Gugun [3]

1. Physiology Department of Faculty of Medicine and Health science Universitas Muhammadiyah Yogyakarta, zulkhah.noor@umy.ac.id
2. Student Faculty of Medicine and Health science Universitas Muhammadiyah Yogyakarta
3. Department of Clinical Pathology of Faculty of Medicine and Health science Universitas Muhammadiyah Yogyakarta

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INTRODUCTION

Children living in the mountains are at risk of iodine deficiency disorder (IDD) (Sekhniashvili, 2006). IDD causes hypothyroidism which can lead to impaired neurologic integrity development and axial tonus deficit (Hartono,2002)and some children continue to display neuromuscular, sensory, and cognitive defects in later life (Nandi-Munchi and Taplin, 2015) Stimulus such as massage and gymnastics will increase somatic and autonomic nerve activity that is thought to be very useful for improving psychomotor development(Cook, 2015). Physical exercise increases BDNF which is a molecular mechanism of enhancement of nerve growth (Piepmeier dan Etnier, 2014). The purpose of this study was to assess the effect of massage and exercise on serum BDNF levels and psychomotor development of children under two years of age in IDD endemic area.

Method

This research type was quasi-experimental with non-randomized one group pretest-posttest design. Research subjects were 40 children under two years old from one of IDD endemic areas in Samigaluh Sub-district, Kulon Progo Regency. Massage and gymnastics were performed by mothers who had been trained before by a physiotherapist. Massage and gymnastics were performed every morning or evening in 10-15 minutes, 1-5 times per week for 2 months. SerumTSH and BDNF levels measured by ELISA method (HUMAN TSH, Jerman dan R&D Systems, Inc., Minneapolis, MN 5413, USA) and Psychomotor development measured by Denver DDST II were performed before and after treatment. Data were analyzed by using T test and Kruskal Wallis test.

Result

The lowest TSH level of respondents was 1.10 mIU / L and the highest was 17.24 mIU / L and FT4 levels within normal limits ie between 0.93-2.10 ng / L. This condition indicates that subclinical disorder. Similarly, psychomotor children showed no severe disturbances and delays.

Table 1. Changes in TSH and BDNF Levels Between Pre Test and Post Test in The Study

Parameter	N	(Mean ± SD)		Pair T Test (p)
		Pre test	Pos test	
TSH levels (mIU/L)	25	2,82 ±3,37	2.15 ± 1,49	0,286
BDNF levels (pg/ml)	25	8102,80 ± 14471,52	17153,76 ± 5973,39	0,006

Table 2. Difference in Mean Changes of BDNF Levels Based on Frequency of Massage and Gymnastics

Frequency of Massage and Gymnastics	N	Peningkatan kadar BDNF (rerata ±SD)	Independent T test (p)
1-2 times/week	13	6489,31 ± 19273,72	0,391
3-5 times/week	12	11826 ± 8979,00	

Table 3. Mean of Psychomotor Child Development Scores Before and After Treatment

Psychomotor Aspects	N	Psychomotor Development Scores Mean ± SD		p
		Pre test	Post test	
Adaptive and Fine Motor	40	4,97±0,86	5,42±0,87	0,035
Gross Motor	40	4,72±0,81	5,15±0,94	0,015
Personal Social	40	5,17±0,67	5,37±0,89	0,170
Language	40	4,92±1,07	4,90±0,84	0,939

Conclusion

Massage and gymnastics 1-5 times per week for 2 months in children under 2 years old in IDD endemic areas improves thyroxine function, improves neurological and psychomotor development especially in fine motor and gross motor aspects.

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