

EFFECTS OF YOGA PRACTICING ON PHYSICAL AND INTELLECTUAL OF CHILDREN WITH MILD INTELLECTUAL DISABILITY

Nguyen Quoc Thang⁽¹⁾; Thai Thi Diem Thuy⁽¹⁾
Cao Hoang Khuyen⁽²⁾

Abstract:

The study was conducted to evaluate the impact of Yoga practice on the physical health and cognitive capacity of children with mild intellectual disability (CwID) age range 9-11 through the comparison between experimental and control groups. The results showed that yoga practicing has good effects on physical health and intellectual property of CwID.

Keywords: Yoga, children, intellectual disability, physical, intellectual, variables.

INTRODUCTION

According to a Viet Nam national survey, there were 1.3 million people with disabilities are children between the age of 5 and 18¹. Physical disabilities, mental disabilities and hearing impairments are the three most common groups. According to the 2009 Census data, only 66.5 % of Children with disability (CwD) age 6-10 attend primary schools, whereas the national rate is 97.0 %. Intellectual disability children's group is the largest proportion of Vietnam, the highest proportion of children in all obstacles type, 30.8%².

Physical quality, memory and attention of CwID are their weakest points³, so a method which could promote CwID is very necessary in Viet Nam but due to the difficulties of special schools, few researches related to CwID were studied.

Yoga, originated in India more than 5000 years ago⁴⁻⁵, now considered as one of the most common integration or intervention methods for its both physical and mental or psychological good effects⁶⁻¹⁰. However, there is no literature discusses specific yoga asanas program for CwID.

Therefore, the aim of the study is to investigate the effects of yoga practicing on physical health and intellectual of CwID age range 9-11 by comparing yoga group (n=27,

IQ=61.18±5.69, female: 44.44%) with control group (n=30, IQ=61.80±5.66, female:50.00%) after a 16-week yoga program.

RESEARCH METHODS

Participants:

There are 24 districts with 24 public special schools and more than 10 private special education institutions in Ho Chi Minh city (HCMC), Viet Nam (VN), in which there are 10 special schools met the requirement of the experiment conditions about school yard, distance from the city's center and the enthusiastic of the teacher in charge of class. In this study, due to the difficulties of special schools material facility and requirements, and the characteristics of children with disability, a mix method of judgmental sampling and convenience sampling was applied to sample the study samples.

Attendant percentage:

A total initial 60 participants (aged between 6 and 11) participated in this study, of which 30 participants were split to the yoga group and 30 participants were split to the control group. A total of 57 (95.00%) participants completed the experiment (yoga group, n=27; and control group, n=30), the attrition rate of the overall sample was 3 students (5.0%). The attendance rate of those who completed the study was 93.6% for 48 sessions.

(1) PhD, HoChiMinh city University of Physical Education and Sport, Viet Nam

(2) PhD, Thai Nguyen University - Lao Cai Campus

Measures

In this study, because of the inconveniences of existing evaluation tests used in Viet Nam: (1) Psycho-educational Profile – Third Edition (PEP-3); (2) Denver II test, 21 variables are used to evaluation instead. The measurement method is used to collect the data from participants at three points of time: first time at week 1-right before the experiment process starting; the second time is at week 10–the middle of the experiment process; and the third one at week 18-right after the experiment process finished. The procedures, requirements and methods to measure each figure and test are drawn from 101 Performance Evaluation Tests¹¹ and related studies¹¹.

Reliability: In this study, test-retest reliability was used to evaluate the reliability of 21 dependent variables. In each measure, each variable was measured twice, and reliability coefficient on each variable was qualified ($r > 0.85$). The three measures' matrix reliability coefficient for each variable were also very high ($r > 0.90$). These indicated that 21 dependent variables are appropriate for this study.

Variables (especially physique variables) can vary throughout the day, so to ensure reliability variables should be measured at the same time of day. In this study, physical related variables were measured in the morning and intellectual related variables were measured in the afternoon.

Procedures:

The experiment was conducted at two special schools in HCMc, VN from 2016 February 22nd to June 10th every Monday, Wednesday and Friday's morning for 16 weeks long with the total lessons is 48, and 30 minutes per lesson whereas the control group maintained their lifestyle as usual. The researcher requested participants of the control group to maintain their routine activities and not to begin any yoga program during the time of the experiment (16 weeks). Their two 30-minute physical education (P.E) classes take place as usual because the P.E classes are required by the government for training the children fine and gross motor skills in motor skill training room.

Yoga protocol¹³

Yoga asanas applied in the study were selected by yoga instructors through questionnaire before the experiment took place. There are 29 yoga asanas and one dynamic exercise named Surya Namaskara. The experiment process' syllabus and lesson plan were carefully designed by group of yoga instructors. In addition, chanting Oh, Uh, and Om also were practiced as breathing control technique - a part of each lesson.

Yoga instructors who are in charge of teaching yoga lessons are required: having certificate on yoga training; at least 5 years of experience in yoga teaching and used to teach yoga for children.

Each yoga class takes place under the guiding of one experienced yoga instructor with the presence and help of the teachers who in charge of classes, and aids (yoga pictures and melodious music).

Data analysis

Since the participants were conveniently sampled and assigned into the experimental group and the control group, two statistical analyses were used to justify the appropriateness of using these two groups in this study. The difference in scores was found to be normally distributed for variables by Kolmogorov-Smirnov test.

All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS version 20.0). Differences within each group's scores of the three measures were tested by anova, between groups pre and post-experiment were compared using independent samples t-test to analyze the difference of variables between YG and CG if there was a difference in the pre and post experiment scores between the YG and the CG¹⁴.

RESULTS AND DISCUSSION

The Kolmogorov-Smirnov test results showed the samples are normal distribution ($\text{Sig.} > 0.1$). And the pre-experiment independent samples t-test on 21 dependent variables between YG and GC was not significant (table 3). These suggested that the samples are qualified for the study.

Table 1. Control group Description by Mean, SD and Change rate (n=30)

Variables	$\bar{x} \pm \delta$			W1 (%)	p1	W2 (%)	p2
	Week 1	Week 10	Week 18				
Standing Height	133.03±10.22	133.77±10.15	134.8±10.12	0.55	NS	1.32	NS
Body Mass	33.15±5.61	33.9±5.55	34.58±5.49	2.24	NS	4.22	NS
BMI	18.73±2.37	18.92±2.33	19.03±2.3	1.01	NS	1.59	NS
Heart rate	81.9±1.92	82.23±1.79	81.87±1.87	0.4	NS	-0.04	NS
Breath rate	20.27±1.3	20.23±1.27	19.95±1.14	-0.2	NS	-1.59	NS
Handgrip Strength	8.28±1.01	8.46±0.92	8.58±0.86	2.15	NS	3.56	NS
Standing Long Jump	64.33±6.12	68.57±6.04	72.17±6.39	6.38	*	11.49	*
Sit and reach Flexibility	-7.67±5.79	-6.83±5.28	-5.53±4.62	11.59	NS	32.42	NS
4x10m shuttle run 4x10m	20.65±2.31	20.3±1.93	19.94±1.62	1.71	NS	3.5	NS
One leg balance standing	5.43±1.36	6.1±1.06	6±1.26	11.62	NS	9.97	NS
Direction distinguish	2.53±0.57	2.57±0.5	2.57±0.5	1.57	NS	1.57	NS
1-10 Number counting	2.5±0.51	2.57±0.5	2.57±0.57	2.76	NS	2.76	NS
Color naming test	2.5±0.51	2.57±0.5	2.6±0.5	2.76	NS	3.92	NS
Animals naming test	2.57±0.57	2.6±0.5	2.57±0.5	1.16	NS	0	NS
Shape naming test	2.47±0.57	2.67±0.48	2.63±0.49	7.78	NS	6.27	NS
Fruit naming test	2.53±0.57	2.63±0.49	2.63±0.56	3.88	NS	3.88	NS
Sound-memory test	2.5±0.57	2.6±0.5	2.6±0.5	3.92	NS	3.92	NS
Shape memory test	2.5±0.57	2.6±0.56	2.73±0.64	3.92	NS	8.8	NS
Color memory test	2.63±0.56	2.67±0.55	2.6±0.56	1.51	NS	-1.15	NS
Span of attention test	8.87±2.36	10.5±7.58	11.7±14.74	16.83	NS	27.52	NS
Stableness of attention test	4.13±1.14	4.23±1.04	4.23±0.86	2.39	NS	2.39	NS

Notes: NS-Not Significant; *p<0.05; W1-Week 10 vs Week 1; W2- Week 18 vs Week 1

The results in table 1 indicated that: (versus week 1). There was significant difference on only Standing long jump test (cm) (Sig.=0.014<0.05). The other variables were not significant difference. The significant difference exist both in the first and the second mean comparisons (Sig.=0.010<0.05).

The results in table 2 indicate that: (versus week 1): There was significant difference between week 10 and week 1 on 10/21 variables (Sig.<0.05); and significant difference between week 18 and week 1 on 16/21 variables (Sig.<0.05).

Results in table 3 indicate that: There was no significant difference between YG and GC at pre-experiment (Sig.>0.05). However, at post-experiment, there were significant differences on 16/21 variables (Sig.<0.05), which showed that YG got higher score compared with CG.

The outcomes of this study supported previous studies on yoga integration that showed good effects on both physical and mental or psychological aspects of different subjects [Pathk MP.1983] and [Redfering& Bowman.1981]. On physical aspect, yoga practicing mainly effects on: first physical qualities as muscle trength (handgrip strength and standing long jump test) [Harrison, Manocha& Rubia.2004]; second physiological function (heart rate and breath rate) [Karen Parnes&Dovrat Dagan.2005]. However, the effects of yoga practicing on physique are not clearly.

For the significant change rate of physical qualities, awareness and memory, the effects as a result of repetition of yoga practicing. Like other types of physical activities, yoga practicing contributed to promote muscle

Table 2. Yoga group Description by Mean, SD and Change rate (n=27)

Variables	$\bar{x} \pm \delta$			W1 (%)	p1	W2 (%)	p2
	Week 1	Week 10	Week 18				
Standing Height	132.59±6.885	133.44±6.991	134.48±6.952	0.64	NS	1.42	NS
Body Mass	34.54±6.479	35.19±6.37	35.78±6.276	1.86	NS	3.53	NS
BMI	19.55±2.605	19.62±2.432	19.7±2.27	0.36	NS	0.76	NS
Heart rate	82.41±1.966	81.52±1.847	80.26±1.789	-1.09	NS	-2.64	**
Breath rate	20.91±1.225	20.3±1.203	19.35±1.045	-2.96	NS	-7.75	***
Handgrip Strength	8.11±0.967	8.42±0.862	8.64±0.8	3.75	NS	6.33	**
Standing Long Jump	67.67±9.806	73.85±8.99	79.63±9.191	8.73	**	16.24	***
Sit and reach Flexibility	-5.19±3.773	-2.26±3.706	1±3.627	78.66	NS	295.47	***
4x10m shuttle run	20.85±2.217	19.59±1.519	18.32±1.081	6.23	*	12.92	***
One leg balance standing	5.07±1.357	7.56±1.45	9.59±1.986	39.43	**	61.66	***
Direction distinguish	2.59±0.572	2.74±0.656	3.15±0.362	5.63	**	19.51	***
1-10 Number counting	2.41±0.572	2.67±0.62	3.22±0.506	10.24	**	28.77	***
Color naming test	2.52±0.643	2.7±0.609	3.11±0.424	6.9	**	20.96	***
Animals naming test	2.59±0.636	2.78±0.641	3.11±0.424	7.08	**	18.25	***
Shape naming test	2.63±0.629	2.81±0.557	3.11±0.424	6.62	**	16.72	***
Fruit naming test	2.59±0.636	2.89±0.506	3.19±0.396	10.95	NS	20.76	NS
Sound-memory test	2.63±0.565	2.74±0.594	3.15±0.456	4.1	NS	17.99	NS
Shape memory test	2.44±0.577	2.7±0.542	3.15±0.362	10.12	***	25.4	***
Color memory test	2.52±0.58	2.63±0.565	3.11±0.424	4.27	**	20.96	***
Span of attention test	8.93±2.731	10.11±2.607	11.07±2.674	12.39	NS	21.4	**
Stableness of attention test	4.22±1.188	5.07±1.238	5.44±1.219	18.3	*	25.26	**

Notes: NS-Not Significant; *p<0.05; **p<0.01; ***p<0.001; W1-Week 10 vs Week 1; W2- Week 18 vs Week 1

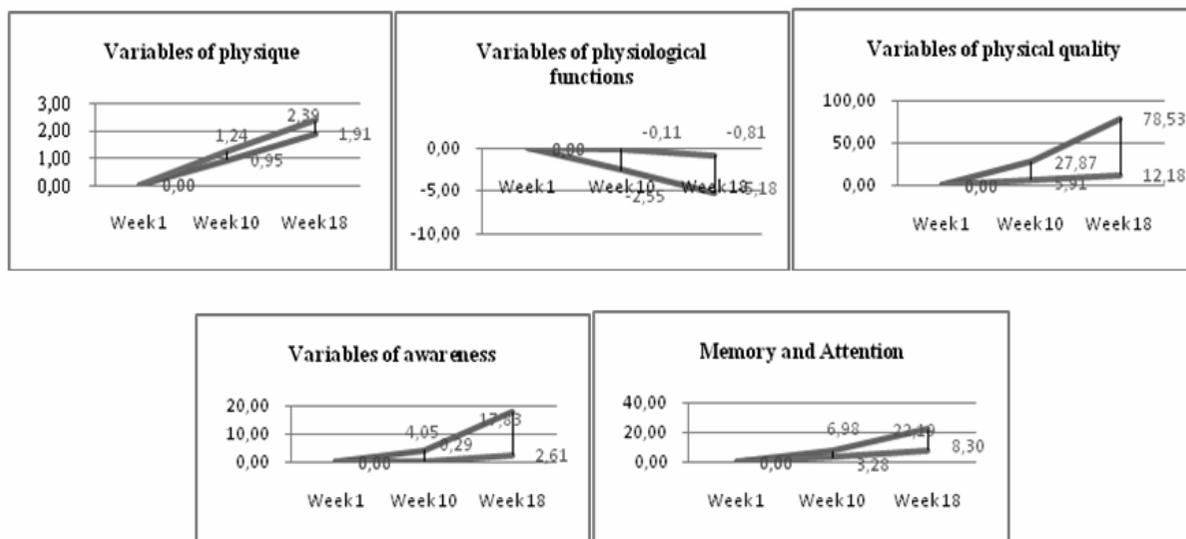


Table 3. Pre and post-experiment independent samples t-test

Variables	Pre-experiment				Post-experiment			
	Y (n=27)	C (n=30)	t -values		Y (n=27)	C (n=30)	t - values	
	$\bar{x} \pm \delta$	$\bar{x} \pm \delta$			$\bar{x} \pm \delta$	$\bar{x} \pm \delta$		
Standing Height	132.59±6.885	133.03±10.22	0.0189	NS	134.48±6.952	134.8±10.12	0.184	NS
Body Mass	34.54±6.479	33.15±5.61	0.866	NS	35.78±6.276	34.58±5.49	0.776	NS
BMI	19.55±2.605	18.73±2.37	1.243	NS	19.7±2.27	19.03±2.3	1.106	NS
Heart rate	82.41±1.966	81.9±1.92	0.985	NS	80.26±1.789	81.87±1.87	3.307	**
Breath rate	20.91±1.225	20.27±1.3	1.911	NS	19.35±1.045	19.95±1.14	2.953	**
Handgrip Strength	8.11±0.967	8.28±1.01	0.617	NS	8.64±0.8	8.58±0.86	0.278	NS
Standing Long Jump	67.67±9.806	64.33±6.12	1.556	NS	79.63±9.191	72.17±6.39	3.588	***
Sit and reach Flexibility	-5.19±3.773	-7.67±5.79	1.895	NS	1±3.627	-5.53±4.62	5.891	***
4x10m shuttle run	20.85±2.217	20.65±2.31	0.323	NS	18.32±1.081	19.94±1.62	4.378	**
One leg balance standing	5.07±1.357	5.43±1.36	0.998	NS	9.59±1.986	6±1.26	8.241	***
Direction distinguish	2.59±0.572	2.53±0.57	0.391	NS	3.15±0.362	2.57±0.5	4.953	***
1-10 Number counting	2.41±0.572	2.5±0.51	0.647	NS	3.22±0.506	2.57±0.57	4.577	***
Color naming test	2.52±0.643	2.5±0.51	0.121	NS	3.11±0.424	2.6±0.5	4.148	***
Animals naming test	2.59±0.636	2.57±0.57	0.163	NS	3.11±0.424	2.57±0.5	4.388	***
Shape naming test	2.63±0.629	2.47±0.57	1.025	NS	3.11±0.424	2.63±0.49	3.916	***
Fruit naming test	2.59±0.636	2.53±0.57	0.371	NS	3.19±0.396	2.63±0.56	4.272	***
Sound memory test	2.63±0.565	2.5±0.57	0.859	NS	3.15±0.456	2.6±0.5	4.316	NS
Shape memory test	2.44±0.577	2.5±0.57	0.364	NS	3.15±0.362	2.73±0.64	2.967	**
Color memory test	2.52±0.58	2.63±0.56	0.763	NS	3.11±0.424	2.6±0.56	3.837	***
Span of attention test	8.93±2.731	8.87±2.36	0.088	NS	11.07±2.674	11.7±14.74	0.217	NS
Stableness of attention test	4.22±1.188	4.13±1.14	0.289	NS	5.44±1.219	4.23±0.86	4.370	***

Notes: NS-Not Significant; *p<0.05; **p<0.01; ***p<0.001

ARTICLES

strength and the ability to do activities. More over, yoga practicing with many stretched asanas (like: seated bend forward pose, seated wide legged straddle pose, stretch like a dog pose) helps children promote their flexibility, and (like: rised arm pose, warrior 1 and 2 pose, and half lotus pose) help children improve their balance. Such kinds of physical effects support for previous studies [Deborah L. Berger.2009]

These results showed that: yoga practicing has good effects mainly on most of physiological function figures, physical qualities figures, awareness, memory and attention's figures but not on physique figures compare with non-yoga practicing.

CONCLUSION

The study suggests that yoga practicing has good effects on physical (except physique) and intellectual of CWID. The findings of this study need more support from related studies with larger sample size and more assessment variables, which will be conducted in the future.

REFERENCES

1. UNFPA: People with Disabilities in Viet Nam [EB], Key Findings from the 2009 Viet Nam Population and Housing Census. Ha Noi, December 2011, http://vietnam.unfpa.org/webdav/site/vietnam/shared/Disability_ENG.pdf, (accessed on 16 Jan. 2013).
2. Sources: National Coordinating Council on Disabilities (NCCD) [EB], 2010.
3. Nguyen Quoc Thang (2012), *Effectiveness of aerobics exercises on children with intellectual disability in Ho Chi Minh city* [D], Ho Chi Minh city university of Physical education and Sports, 2012.2.
4. B.K.S. IYENGAR (2014), *Yoga – the path to holistic health* [J], Dorling Kindersley Limited, p.46-56.
5. B.K.S. IYEGAR (1991), *Light on Yoga* [M], Harper Collins Publishers, London, p.19-20.
6. Uma K and colleagues, *The integrated approach of yoga; a therapeutic tool for mentally retarded children; a one year controlled study* [J], J Mental Def Res 1939; 33:415-521.

7. Jensen, P S.& Kenny, D. T (2014), *The effects of yoga on the attention and behavior of boys with ADHD* [J], Journal of Attention Disorders. 7. 206-216.

8. Naomi J. Steiner and colleagues (2013), *Yoga in an Urban School for Children with Emotional and Behavioral Disorders: A Feasibility Study* [EB], J Child Fam Stud 22:815–826 doi. 10.1007/s10826-012-9636-7

9. Krusche (1999); Kuttner et al. (2006), *Sirven (2003). Krusche, F. (1999). Yoga respiratory therapy helps children with asthma* [C], Fortschritte der Medizin, 117, 44.

10. Heidi L. Beattie (2014), *The Effect of Yoga Lessons on Young Children's Executive Functioning* [D], University of Nebraska, August 2014.

11. Brian Mackenzie (2005), *101 Performance Evaluation Tests* [M], Electic Word plc, London.

12. Deborah L. Berger, Ellen Johnson Silver, Ruth E.K. Stein (2009), *Effects of yoga on inner-city children's well-being: a pilot study* [J], Alternative Therapies. Sep/Oct 2009, vol. 15. No. 5. p. 36-41.

13. Ministry of AYUSH (2016), *Common Yoga Protocol – Yoga for Harmony & Peace* [M], AYUSH Bhawan, B-Block, GPO Complex, INA, New Delhi – 110023, 3. 2016, p.3-4.

14. Hoang Trong, Chu Nguyen Mong Ngoc (2008), *SPSS for research data analysis - Volume 1,2* [M], Hong Duc publishers, HCMc.

(Received 5/11/2019, Reviewed 7/11/2019

Accepted 25/11/2019

Main responsible: Nguyen Quoc Thang

Emai:thangqn@upes.ed.vn)