Pharmacophore

ISSN-2229-5402

Journal home page: http://www.pharmacophorejournal.com

Pharmacophore
an International Journal
ISSN 2229-5402

COMPARING THE RELATIONSHIP BETWEEN FINE MOTOR SKILLS AND DEMOGRAPHIC INDEXES IN HEALTHY AND HARD OF HEARING ELEMENTARY STUDENTS

Saideh Sadat Mortazavi[1] , Zahra Mortazavi[2*], Seyede Faranak Emami[3]

1. ***School of Rehabilitation Sciences, Hamadan University of Medical Sciences, Hamadan, Iran.***
2. ***MsC , department of speech therapy , university of Social Welfare and Rehabilitation Sciences, Tehran, Iran.***
3. ***Department of Audiology, Faculty of Rehabilitation, Hamadan University of Medical Sciences and Health Services, Hamadan, Iran***

ARTICLE INFO

Received:
03th Jun 2017
Accepted:
29th Nov 2017
Available online:
14th Dec 2017

Keywords: *Skills, elementary school, SPSS 23*

ABSTRACT

Introduction: given the importance of function of our hands in our daily lives, it is crucially important to be aware of accidents that might disturb its function in childhood. Hearing is an essential prerequisite for mental and muscular growth; so much so that numerous studies have reported that there is a relationship between balance disorder in children and their hearing impairment. Therefore, the present study has aimed to examine the relationship between fine motor skills and demographic indexes in healthy and hard of hearing students.
Methods and materials: this study is a descriptive – analytical research and the initial and preliminary reviews and the clinical descriptions in the study were done by using O'Connors' demographic questionnaire. The Purdue Pegboard Test was used for evaluating fine motor skills. The data obtained from the Purdue Pegboard Test and O'Connors' questionnaire was statistically analyzed by using the comparison of means test (independent two-sample t-test) and the statistical software SPSS 23.
Results: results obtained from this research suggest that mean of each of the five tests is indicative of a statistically significant difference between the two groups of students (healthy and hard of hearing students) (p-value<0.001). The results show that gender of the healthy and the hard of hearing students doesn't have a significant impact on obtaining better scores on the skills under study. The analytical results of the comparison made between the skills of left-handed and right-handed students indicate that there is no statistically significant difference between the students in the two groups.
Conclusion: although acquiring motor skills in this study has not been under the influence of gender of the healthy or hard of hearing students or their being left-handed or right-handed, but given the significant and explicit difference between the hard of hearing and healthy students in terms of their motor skills, it is necessary to detect and treat hearing impairments of children as soon as possible, so that it would be easier for their motor skills to improve..

Copyright © 2013 - All Rights Reserved - Pharmacophore

To Cite This Article: Saideh Sadat Mortazavi , Zahra Mortazavi, Seyede Faranak Emami, (2017), "comparing the relationship between fine motor skills and demographic indexes in healthy and hard of hearing elementary students", ***Pharmacophore, 8(6S),*** *e-1173443.*

Introduction

Motor skills play an important role in children's learning and they build a substrate for them to learn other skills such as social and academic skills. Because of inabilities associated with hand skills, the child might have less opportunities to receive sensory information from the environment and to experience the effect of their activities on the world surrounding them (1). Students of first grade of elementary school are busy with doing fine motor activities in 45-55% of their school days (2). Since some of the daily life activities can only be done by the hands, therefore it is crucially important to be aware of accidents that might disturb its function in childhood(3). Hearing is an essential prerequisite for mental and muscular growth; so much so that numerous studies have reported that there is a relationship between balance disorder in children and their hearing impairment. Therefore, the present study has aimed to examine the relationship between fine motor skills and demographic

Corresponding Author: Zahra Mortazavi , Email: Zmortazavi.st@gmail.com

indexes in healthy and hard of hearing students. Hearing impairment is the third prominent disability in Iran with a prevalence of 4-7 newborn per 1000 births (4). Research findings show that healthy children function way better than children using cochlear implants (4).(5) studied the functioning of static and dynamic equilibrium in hard of hearing and healthy children and observed a significant difference between these two groups of children when they were asked to stand on one foot on the ground with their eyes closed and on the balance board. Accordingly, (6) studied the attention that must be paid to the conditions of hard of hearing children and how to control their condition and have reported that it is necessary to diagnose their illness and treat their hearing impairments as quickly as possible so that they could improve their motor skills. Therefore, the present study has aimed to examine the relationship between fine motor skills and demographic indexes in healthy and hard of hearing students.

Materials and methods:

This study is a descriptive – analytical research with a cross-sectional research method. The statistical population of the present study is composed of 46 elementary students of 7 to 11 years in the academic year of 2015-2016 in Hamedan city. Out of these 46 hard of hearing students, 14 were eliminated from the study due to various reasons such as students' or parents' lack of cooperation, mental retardation and orthopedic impairment and ultimately, 32 hard of hearing students and 32 healthy students were selected as the research sample. The demographic information about the students were collected using a questionnaire. The demographic information included being diagnosed with hearing impairment (before the time of language learning or after it) and the cause of their hearing impairment, record of using hearing aids and the duration of it, communicative styles of the child and type of rehabilitation interventions including work therapy, physiotherapy, speech therapy, auditory training and the age at which the therapeutic interventions of each patient has begun. After obtaining the confirmation of the Ethics Committee in Hamedan University of Medical Sciences and Exceptional Education and the consent of students' parents, the initial and preliminary reviews and the clinical descriptions in the study were done by using O'Connors' demographic questionnaire. The students under study had to have the following criteria in order to participate in the study: obtainment of consent from students' parents, lack of neurological and orthopedic hand disorders, lack of anxiety disorders, lack of concentration disorders, being of the ages of 7 to 11 years, having had hearing assessment up to one year ago, an audiometry of 70+ dBHL, severe-deep or deep hearing loss. One of the advantages of using the O'Connors' questionnaire was that it also evaluated symptoms of hyperactivity disorder and attention deficit in children. This questionnaire contained 26 questions which must have been answered by the parents of the selected samples. The four-option Likert scale was used for giving scores to these 26 questions. The Purdue Pegboard Test was used for evaluating fine motor skills. The test sheet had two rows of holes in the middle and four holes above these two rows. From right to left, there are 25 pins, 20 kelars, 40 gaskets and 25 pins. After the student is seated comfortably in a chair, the Purdue Pegboard test is put in front of him/her. It is very important for the examiner to be familiar with the activities. It is assumed that the students can perform better by using their right hand, unless they are left-handed. In this case, they would be asked to use their left hand and the score obtained by them would be recorded in the table. Before the beginning of the test, various sections of the test would be explained to the student and first the student takes the test three times for practice and it is the score obtained in the fourth time that counts. Each time, after the testees pick up a pin with their right hand from the container on their right, they put each pin in the holes on the right of the sheet in 30 seconds and they start with the holes on the upper section. If a pin falls off the hand of the testee, the test would be interrupted and again continued. When the examiner says stop, the test ends after 30 seconds. The recorded score is based on the number of pins that have been placed correctly. This is done for both hands. In order to evaluate the coordination between the two hands, the testee is asked to simultaneously pick up pins with his/her right and left hands and is given 30 seconds to put the pins in the two rows of the Pegboard holes. Each couple of pins that are placed in the holes correctly indicate the score one. At the end of the test, the testee is given 60 seconds to place the pins, kelars and gaskets inside the holes (montage stage). The data obtained from the Purdue Pegboard Test and O'Connors' questionnaire was statistically analyzed by using the comparison of means test (independent two-sample t-test) and the statistical software SPSS 23.

Results:

31 of the students suffered from congenital hearing impairment and one of the students had acquired hearing impairment because of a high level of bilirubin. Except of one students who didn't use the hearing aids prescribed by their doctor because of their inefficiency (table 1) other students used hearing aids. The mean hearing loss of the right ear was 85 – 90 dBnHL and of the left ear was 90 – 95 dBnHL in the 32 students under study. The students with the high level of bilirubin suffered from a different range of hearing loss and according to the audiometry, the hearing loss was MODERATE before the assessment but SEVERE at the time of assessment.

The information presented in table 2 show that mean of this test is indicative of a statistically significant difference between the two groups of students (healthy and hard of hearing students) (p-value<0.001). The results also indicate that healthy students had a better performance in terms of hand skills than the hard of hearing students. The results of comparing the mean of scores obtained from the skill tests show that male and female healthy students do not have a statistically significant different with one another ($p=0.59$). In other words, in healthy students, gender does not have a significant impact on the obtainment of a better score on the skills under study (table 3). The results of comparing the mean of scores obtained from the skill tests show that male and female hard of hearing students do not have a statistically significant different with one another ($p=0.42$). to put it differently, in hard of hearing students, gender does not play a significant role in the obtainment of a better score on the skills under study (table 4). The analytical results of the comparison made between the skills of left-handed and right-handed students indicate that there is no statistically significant difference between the students in the two groups ($p=0.71$, table 5). In addition, no significant difference was seen between the right-handed and left-handed hard of hearing students in the comparisons made between the mean of the skill tests ($p=0.83$, table 6).

Discussion:
The role of the hearing system as an essential prerequisite for individual growth and the development of motor skills has been confirmed (7). (8) observed that having a hearing impairment leads to visual or motor impairments. In the present study, the Purdue Pegboard tool was used for assessing the sensory and motor hand skills of children under study. (9) argued that given the fact that the reliability of this test was proved in previous researches, this test is a far better choice than other for assessing the motor hand skills of male and female students. In the assessments which were done using the Purdue Pegboard test, the results obtained from comparing the means of the skill tests taken by the samples in the healthy and hard of hearing groups showed that there was a significant difference between the two groups of students (p-value<0.001); in such a way that the scores obtained by healthy students in association to fine motor movements were lower than that of hard of hearing students. According to the aforementioned results, (7) reported that in writing, performance of children with cochlear implants is lower than desirable. In addition, they also reported that because of their hearing impairment, children with growth disorders use unconventional and uncommon patterns of holding pencils and scissors (10). The absence of the significant difference between male and female students in the healthy and hard of hearing groups of students in terms the scored obtained by them in the skill test complies with the results of the study conducted by (5). In other words, gender does not have a significant impact on the obtainment of a better score on the skills under study by the samples in the healthy group or hard of hearing group. Moreover, in a report similar to the result obtained from the present study, (11) reported that gender does not have an impact on the obtainment of scores in the skill tests by healthy and hard of hearing students. In contrast, (12) observed a significant difference between the means of scores associated with the coordination between vision and hand in the two groups of healthy boys and girls in the elementary school and girls performed better. Furthermore, in contrast with the result reported in the present study, (13) studied motor skills and performance variables in male and female students of 6 to 11 years living in the south of Tehran and observed a significant difference between the male and female students and girls had a better performance. The analytical results of the comparison made between the skills of left-handed and right-handed students indicate that there is no statistically significant difference between the students in the two groups. In the present study, the majority of participants were left-handed and given that most of the daily activities are done with a more emphasis on one hand, therefore neither being left-handed nor being right-handed is considered to be a superiority. Thus, a difference between the individuals in terms of their fine motor skills is not expected.

Conclusion:
Although in this study, motor skills of the students in the healthy group and the students in the hard of hearing group was not affected by their gender or by their being left-handed or right-handed, but given the significant and explicit difference between the hard of hearing and healthy students in terms of their motor skills, it is necessary to detect and treat hearing impairments of children as soon as possible, so that it would be easier for their motor skills to improve.

Sources:

Attachments:
Table 1 – descriptive table of the scores obtained by the hard of hearing students under study from the O'Connors' questionnaire

Number of Hard of Hearing Students	Mean of Scores	Maximum	Minimum
32	28.28	33	26

Table 2 - results of the two-sample independent t-test for comparing the speed of movement of the dominant hand, the speed of movement of the nondominant hand. Coordination between the two hands, hand skill and montage in healthy and hard of hearing students

Variables	Mean (Hard of Hearing)	standard deviation ±	Mean (Normal)	standard deviation ±	t-value	*P-value*
Speed of movement of the dominant hand	6.67	1.20	10.25	1.137	-10.99	0.001
Speed of movement of the nondominant hand	4.81	1.42	8.85	1.22	-12.19	0.001

Coordination between the two hands	2.96	1.34	7.28	1.42	-12.26	0.001
Hand skill	14.48	3.64	26.31	3.78	12.29	0.001
Montage	8.26	5.31	17.4	4.18	7.29	0.001

Table 3 - results of the two-sample independent t-test for comparing the speed of movement of the dominant hand and the nondominant hand. Coordination between the two hands, hand skill and montage in healthy male and female students

Variables	**Female (n=20)**		**Male (n=12)**		**t-value**	***P-value***
	Mean	standard deviation ±	Mean	standard deviation ±		
Speed of movement of the dominant hand	10.35	1.47	10.90	1.25	0.58	0.60
Speed of movement of the nondominant hand	8.96	1.36	8.67	0.99	0.63	0.54
Coordination between the two hands	7.36	1.73	7.17	0.72	0.43	0.42
Hand skill	26.60	4.29	26.9	2.83	0.55	0.59
Montage	17.41	3.65	16.42	5.06	0.64	0.53

Table 4 - results of the two-sample independent t-test for comparing the speed of movement of the dominant hand and the nondominant hand. Coordination between the two hands, hand skill and montage in hard of hearing male and female students

Variables	**Female (n=18)**		**Male (n=14)**		**t-value**	**P-value**
	Mean	standard deviation ±	Mean	standard deviation ±		
Speed of movement of the dominant hand	6.62	1.38	6.86	0.95	0.59	0.55
Speed of movement of the nondominant hand	4.84	1.50	4.86	1.89	0.05	0.96
Coordination between the two hands	2.89	1.45	3.21	1.18	0.68	0.50

Hand skill	14.00	3.38	15.7	3.33	0.83	0.42
Montage	7.78	5.64	9.07	4.94	0.67	0.50

Table 5 - results of the two-sample independent t-test for comparing the speed of movement of the dominant hand and the nondominant hand. Coordination between the two hands, hand skill and montage in healthy students based on their superiority in terms of being left-handed or right-handed

Variables	**Dominant hand (right) (n=28)**		**dominant hand (left) (n=4)**		**t-value**	***P-value***
	Mean	Standard deviation±	Mean	Standard deviation±		
Speed of movement of the dominant hand	10.25	1.26	10.25	2.22	0.000	1.000
Speed of movement of the nondominant hand	8.86	1.21	8.75	1.50	0.162	0.873
Coordination between the two hands	7.36	1.47	6.75	0.958	0.795	0.433
Hand skill	26.50	3.78	25.00	3.91	0.363	0.719
Montage	16.93	4.04	17.5	5.68	0.739	0.466

Table 6 - results of the two-sample independent t-test for comparing the speed of movement of the dominant hand and the nondominant hand. Coordination between the two hands, hand skill and montage in hard of hearing students based on their superiority in terms of being left-handed or right-handed

	Dominant hand (right) (n=27)		dominant hand (left) (n=5)		t-value	*P-value*
	Mean	Standard deviation±	Mean	Standard deviation±		
Speed of movement of the dominant hand	6.67	1.21	7.00	1.22	0.565	0.576
Speed of movement of the nondominant hand	4.81	1.47	5.00	1.22	0.264	0.793
Coordination between the two hands	2.96	1.31	3.4	1.52	0.668	0.506
Hand skill	14.48	3.76	14.40	3.21	0.206	0.838
Montage	8.26	5.04	8.80	7.22	0.045	0.964

References

1. Case-Smith J, O'Brien JC. Occupational therapy for children: Elsevier Health Sciences 2013.
2. McHale K, Cermak SA. Fine motor activities in elementary school: Preliminary findings and provisional implications for children with fine motor problems. American Journal of Occupational Therapy. 1992;46(10): 898-903.
3. Akbarfahimi M, Karimi H, Rahimzadeh Rahbar S, Ashaeri H, Faghehzadeh S. The relationship between motor function of hemiplegic upper limb and independency in activities of daily of living in stroke patients in Tehran. Koomesh. 2011;12(3):236-43..
4. Hendar O, O'Neill R. Monitoring the Achievement of Deaf Pupils in Sweden and Scotland: Approaches and Outcomes. Deafness & Education International. 2016;18(1):47-56.
5. Jafari Z, Karimi H, Sazmand A, Malayeri S. Comparing the Prevalence of Handedness between Normal and Congenitally Deaf Students in Age Intervals of 12 to 18 Years in Tehran. Quarterly Journal of Rehabilitation. 2007;8(1):25-34.
6. Derlich M., Krêcisz K., Kuczyñski M. (2011). Attention demand and postural control in children with hearing deficit. Res. Dev. Disabil. 32, 1808–1813. 10.1016/j.ridd.2011.03.009.
7. Mayer C, Watson L, Archbold S, Ng ZY, Mulla I. Reading and Writing Skills of Deaf Pupils with Cochlear Implants. Deafness & Education International. 2016.
8. Conway CM, Pisoni DB, Kronenberger WG. The importance of sound for cognitive sequencing abilities the auditory scaffolding hypothesis. Current Directions in Psychological Science. 2009;18(5):275-9..
9. Smith YA, Hong E. Normative and validation studies of the Nine-hole Peg Test with children. Perceptual and Motor Skills. 2000;90(3):823-43.
10. Rodger S, Ziviani J, Watter P, Ozanne A, Woodyatt G, Springfield E. Motor and functional skills of children with developmental coordination disorder: A pilot investigation of measurement issues. Human movement science. 2003;22(4):461-78.
11. Jain M, Bharadwaj SP, Kaira LS, Bharadwaj SP, Chopra D, Prabu D, et al. Oral health status and treatment need among institutionalised hearing-impaired and blind children and young adults in Udaipur, India. A comparative study. Oral Health Dent Manag.12(1):41-9.. 2013.
12. Nazi S, Rahimzadeh-Rahbar S, Karimi H. Comparison of Motor Skills in Boys and Girls First Grade Student in Tehran. Journal of Rehabilitation. 2006;7(2):37-40.
13. SHEYKH M, BAGHERZADEH F, ABD AM, SAFARI M. A COMPARISON BETWEEN MOTOR PERFORMANCE & MOTOR SKILLS IN 11-16 YEAR-OLD STUDENTS IN SOUTH OF TEHRAN. 2008.