

Effect of Training Program on the School Children with Subnormal Intelligence Quotient to Improve Cognitive Skills

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Abstract: The aim of this study was to assess the effect of training Program on School Children with subnormal Intelligence Quotient to improve the cognitive skills. A quasi-experimental study design was selected in carrying out this study and a representative sample of (40 students from Al-Zahraa school, 36 students from El-Nile school, 32 students from Ahmed Orabi School and 44 students from Al-Shaheed Noaman School) were recruited for this study. The tools used for data collection were the Interview questionnaire sheet, Intelligence Quotient test photographer, and Cognitive skills scale. The results of the present study revealed that more than half of students were males. It was found that equal percents 50% of the studied children were living in both rural and urban areas, and the mean IQ score of the studied children was 75.45 ± 5.77 . There was a positive relationship between sex, scholastic year, residence as well as IQ & cognitive skills scale. It was found that there was 9.9% of the studied children had a good score on the total cognitive skill domains before implementing the program, on the other hand, after implementing the training program, the percentage was increased to 100% of the students. It can be concluded that the training program for school children with mild and moderate Intelligence quotient had a positive effect on improving their cognitive skills. The study recommended that: - Development of school programs that will strengthen and enrich the intelligence of students such as seminar, workshop, psychological education or therapy.

Keywords: School children, Intelligence quotient, Cognitive skills.

I. INTRODUCTION

Children during the early years of age undergo rapid growth and development that is greatly influenced by poverty, malnutrition, poor health and un-stimulating home environment. Exclusive breastfeeding, adequate complementary feeding, stimulation, safe environment and care need to be ensured for optimum physical, mental, social and cognitive development and to prevent to adverse impacts on short-term and long-term health and development. Children who have a good start in their life will be healthier adults, resulting in a better social, physical and cognitive development (Pem, 2015). The IQ is a score derived from one of several different standardized tests designed to assess relative intelligence. The IQ of an individual is multi-factorial and is determined by a multitude of factors. However, the various environmental factors modifiable like premature birth, nutrition, pollution, education, drug, and alcohol abuse, mental illnesses, and diseases can have an influence on an Individual's IQ (Kanazawa, 2012).

A study by Travers, Wakeling, Mann, and Hollin (2013) who concluded that the child training programs can be offered in conjunction with the preschool or school age parenting program. The training strengthens children's social, cognitive and emotional skills, such as understanding and communicating feelings, using effective problem-solving strategies, managing anger, practicing friendship and conversational skills, and behaving appropriately in the classroom. It is

essential to understand the unique role and skills that the school nurse brings in terms of prevention, support and (where necessary) treatment. Due to their unique positioning within schools and local community settings, school nurses and their teams can make a positive contribution to the health and well be of all school-aged children and young people. They have a crucial role in providing early help and intervention services where needed. Intervening early and working with children, young people and families to build on strengths and improve self-esteem and cohesion and, where required, referring early for more specialist help is the most effective way of dealing with health, development and other issues within the family (Hassmiller, 2010).

Studying and caring for children is one of the most important criteria for measuring the progress and development of society. Attention to children and their care in all areas are preparing to meet the challenges of civilization imposed by the requirements of the rapid development of the society in which we live. Childhood is one of the most important stages in a person's life. In childhood, the child's abilities are developed, his talents are developed, the child learns speech, reading, and writing, and adapts to the society in which he found himself (Alhawarneh, 2012).

The academic achievement and the mental health promotion, school nurses have the potential to become involved in policy development and policy enforcement. The need for school-based mental health programs is increasingly acknowledged across different sectors for what these programs can do for school-age students and adolescents in terms of cost-effectiveness and mental health care accessibility. School-based mental health services include surveillance, screening, case management, health teaching, counseling, consultation, and collaboration (Puskar, & Bernardo, 2007). In the current study, the researcher was studying the cognitive skills as one of the aspects of the growth and development of the school children, that is the most important factor that helps the children to success in the school and in their lives so that the researcher was developed a training program for school children with mild and moderate IQ to improve their cognitive skills.

II. AIM OF THE STUDY

The aims of the current study were to:

To assess the effect of training program on school children with subnormal Intelligence Quotient to improve the cognitive skills.

Research hypothesis:

The training program for school children with mild and moderate intelligence quotient will have a positive effect on some cognitive skills of those children.

III. SUBJECTS AND METHODS

Research Design:

A Quasi-experimental design was used in this study with pre-test and post-test assessments to assess the effect of training program on school children with subnormal Intelligence Quotient to improve the cognitive skills.

Setting:

The study was conducted at public primary-schools in El-Sharquia Governorate (Diarb-Negm city).

Sample size:

The subjects of this study were composed of 152 students whom their IQ range from 67 to 84, from the four schools were selected randomly, (40 students from Al-Zahraa school, 36 students from El-Nile school, 32 students from Ahmed Orabi school and 44 students from Al-Shaheed Noaman school).

Inclusion criteria:

- 1--Both sexes
- 2-Age from 8-11 years
- 3- Free from physical handicaps.

Sampling technique:- The sample units were selected randomly by using the two-stage cluster sample technique. At first stage, 4 schools out of all available schools were, randomly selected, then at the second stage random sample from each grade at the selected schools was selected by using the proportional allocation technique.

Tools for data collection: Three tools were used to collect the necessary data about the study subjects as the following:-

Tool (1) Interview questionnaire sheet: A specialized designed, structured interview questionnaire sheet was used to collect data about the subjects. It included the student's name, age, sex, the area of residence, mother's education, father's education, school's name, duration of applying the pretest, intelligence quotient and a number of brothers.

Tool (2) Intelligence Quotient test photographer: This test is developed by **Saleh (2008)**. It is used to measure the general ability of the individuals (intelligence). It is consisted of 60 groups of pictures or shapes, each group consisting of 5 photos in each group, there are 4 photos similar in one or more character and only one photo is different from the other photos of the group. Each correct answer is scored 1 point and Zero for wrong one or for unanswered questions. The total score for the test is 62 marks.

Tool (3) Cognitive skills scale: This scale is developed by **El-Morsy (2005)** to measure cognitive skills of the children. It includes seven categories (such as the skill of the counting, skill of perception of the time, skill of handling of the money, the skill of the classification, the skill of the sequence, the skill of teaching the concepts of the spatial relations and finally the skill of the measurement. The total score on the scale was 62 marks.

The Program development (Appendix IV):

The training program was developed to train the school children in some of the cognitive skills.

The aim of the program was to train the children in some of the cognitive skills such as counting skill, time perception skill, sequence skills and dealing with money skill.

General objective of the training program

The training program aimed to improve cognitive skills of school children with subnormal intelligence quotient.

The training program of this study was implemented through 15 sessions in which students were divided into small groups (third class and fourth class in group and fifth class and sixth class in the group in each school) to facilitate the learning process. The length of each session differed according to the content. It ranged from 50 to 60 minutes.

Reliability:

The overall reliability of the cognitive skills scale (Cronbach's Alpha "0.886" acceptable). The cognitive skills scale was developed after a thorough review of the related literature and then reviewed by 5 experts.

Pilot Study

A pilot study was conducted on 10 % school children to evaluate the content of the tools, their clarity as well as to estimate the time needed for filling the sheets with the collected data.

Procedure:

After identifying the school children who fulfilled the criteria of the study, they were requested children themselves and their parents to participate in the study. The purpose of the study was explained briefly to students and their parents who were willing to participate. They were met during the school day from 9 am to 11 am every Sunday from each week for Al-Zahraa school and from 11:30 am to 1:30 pm every Sunday from each week for El-Nile school (Urban school). In Rural schools, they were met during the school day from 9 am to 11 am every Monday from each week for Ahmed Orabi School and from 11:30 am to 1:30 pm every Monday from each week for El-Shaheed Noaman School.

This study was carried out for 7 months during the period from September 2016 to April 2017 (except the period from 25, January to 11, February 2017) due to the mid-year holiday.

Ethical consideration:-

The oral agreement for the participation of subjects was obtained after the explanation the aim of the study. They were given the opportunity to refuse to participate. They were notified that they could withdraw at any stage of the study. Also, they were assured that information would be confidential and used for research purpose only.

Administrative Design

To carry out the study in the selected schools an official permission was obtained from the directors of the four school setting in which research was conducted.

Statistical Design.

The collected data were coded and entered in a database file using the FoxPro for Windows program. After complete entry, data were analyzed using the software Statistical Package for Social Science, (SPSS) version 20 program then processed and tabulated. Frequency distribution with its percentage and descriptive statistics with mean and standard deviation were calculated. Data is qualitative variables presented as number and percent. Regarding scoring system, the items, scores of each domain was summed together, then the sum of scores for each dimension and the total scores were calculated by summing the scores given for its responses. The tests of significance used were the Pearson's Chi-square and t-test. P values of less than 0.05 were considered significant.

IV. RESULT

Table (1) illustrated the characteristics of the studied children. It was found that the mean age of the studied children was 9.61 ± 1.23 years. It was found also that the males were constituted 52% of the studied children, while the females were constituted 48% of the studied children. Regarding to the scholastic year, the studied children were distributed equally on the grades third, fourth, fifth and sixth scholastic year. The table reveals that equal percent, 50% of the studied children were living in both rural and urban areas. The same table also shows that the mean IQ score of the studied children was 75.45 ± 5.77 . It was found also that the mean of duration for applying cognitive skills scale was 54.77 ± 4.36 .

Figure (1) indicates the parent's education of the studied children. It was found that 48% of mothers were illiterate, 63% were elementary education and 41 % were higher education. In relation to the father's education of the studied children, it reveals that 47% of fathers were illiterate, 63% were elementary education and 41 % were higher education.

Figure (2) presented the total score of teaching the concepts of the spatial relations skill throughout the program phases it was found that 74 % of the studied children were answered the teaching the concepts of the spatial relations skill correctly before the implementing the program, while 98 % were answered the teaching the concepts of the spatial relations skill correctly after the implementing the program.

Table (2) demonstrates the effect of training program on the classification skill. It was found that the classification skill of the studied children was improved significantly after implementing the training program $P = 0.000$.

Figure (3) presented the effect of the training program on the total score of the cognitive skills scale. It was found that 9.9 % of the studied children were answered the total cognitive skills scale correctly before the implementing the program, and the percentage increased to 100 % after the implementing the program.

Table 1: The characteristics of the studied children

Characteristics	n=152	%	
School	Alzahraa	40	26.3
	El-Nile	36	23.7
	Ahmed Orabi	32	21.1
	Alshaheed Noaman	44	28.9
Age (mean ± SD)	9.61±1.23		
Sex	Male	79	52.0
	Female	73	48.0
Scholastic year	Third	38	25.0
	Fourth	38	25.0
	Fifth	38	25.0
	Sixth	38	25.0
Residence	Urban	76	50.0
	Rural	76	50.0
IQ (mean ± SD)	75.45±5.77		
Duration (mean ± SD)	54.77±4.36		

Figure 1: The parent's education of the studied children

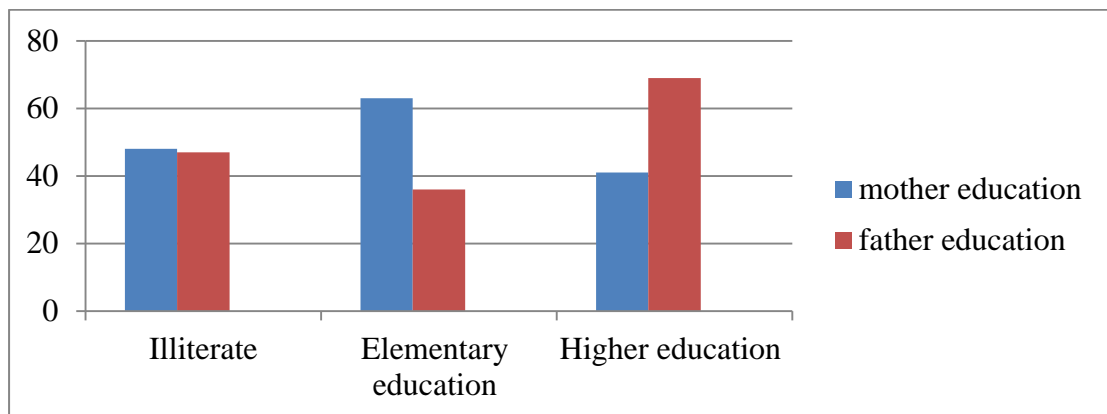


Figure 2: Total score of teaching the concepts of the spatial relations skill before and after implementing program.

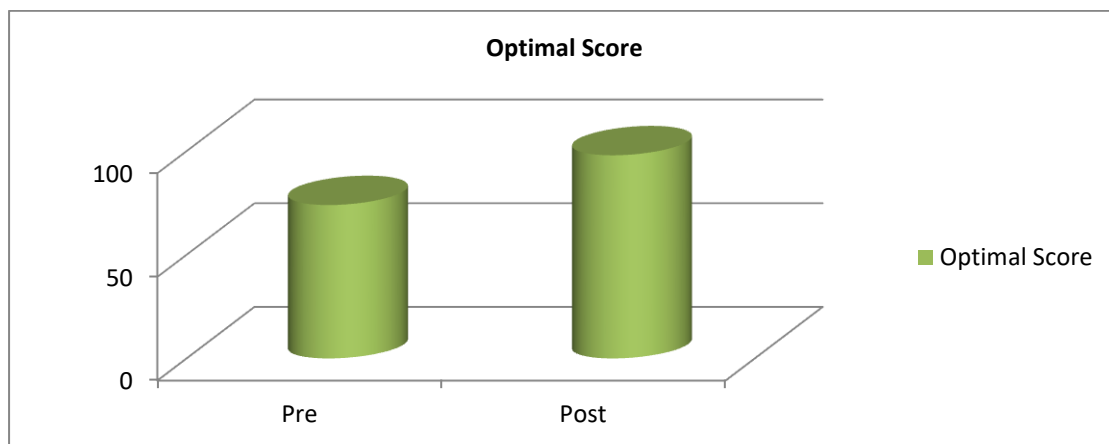
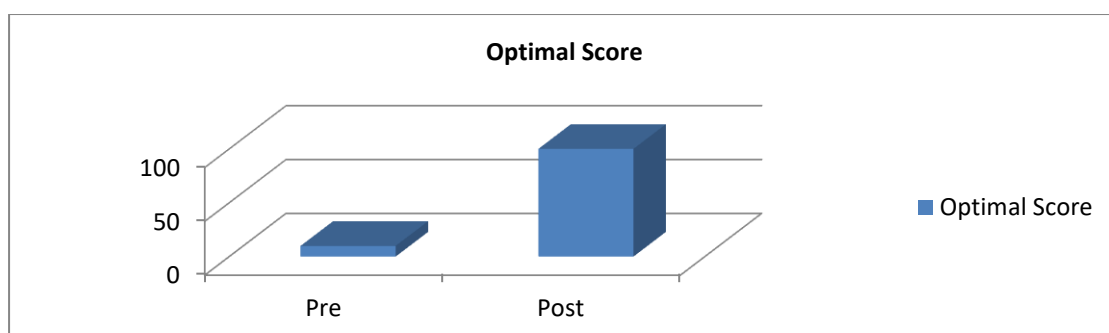


Table 2: Effect of the training program on classification skill

Classification		Pre optimal n=152 (%)	Post optimal n=152 (%)	P value
Questions	1-Classify the things according to color?	56 (36.8)	127 (83.6)	<0.001*
	2-classify things according to their geometric shape?	61 (40.1)	122 (80.3)	
	3-Classify things according to their size?	57 (37.5)	110 (72.4)	
Total of the domain		52 (34.2)	127 (83.6)	

*P is significant at < 0.05

Figure 3: Total score of the cognitive skills scale throughout the program phases



V. DISCUSSION

The results of the current study showed that more than the half of the studied children were males; this finding was in line with a study done by **Ghazi, Zaleha, Aljunid, Shah, and Abdalqader (2013)** who conducted in Baghdad concluded that more than the half of the studied children was males. This finding may be due to that in both rural and urban areas, the parents of the children concerned with males' education, especially in rural areas and they didn't complete the study of females and marry them younger. This finding was in contrast with a study done by **Ghabanchi, and Rastegar (2014)** who appointed that students in Iran to explore the relationship between emotional intelligence, IQ, and reading-comprehension proficiency that was presented that more than of the half of students were female.

This result disagreed with **Matthew and Grigorenko (2010)** found in their study conducted on students in Africa to assess ethnic and linguistic group differences in cognitive test performance in the West African country of the Gambia and to investigate the sources of these differences. , it was found that children in urban environments perform better in cognitive tests than children from rural areas in Africa. This finding was in line with the results of the present study as it was found that there was a significant relationship between the residence and cognitive skills scores (children from the urban area were done better than children from rural area). The possible cause may be that, in the urban, the parents concerned with their pupils study and follow them in the school tests continuously, and cooperative with the school in improving their pupil's achievements .

The results of the present study were revealed that , half of the studied children were lived in rural areas and the other half of them lived in urban areas, and the majority of the studied children, their IQ was 75 with mean IQ 75.45 ± 5.77 , this finding was contradicted with the results of the study done by **Eswar, Nagesh and Devaraj (2011)** who conducted their study on school children in India to explore the relationship between intelligence quotients of 12–14 year old school children in a high and a low fluoride village in India ,it was concluded that ,the mean IQ score of children was (86.3 ± 12.8) . This may be due to the age of the studied children in the current study was less than the children in the other study, as well as when the age increase, the cognitive skills develop and the IQ increases.

This finding was supported the result of a study done by **Finn, Kraft, West, Leonard, Bish, and Martin (2014)** conducted their study on students in public schools to investigate the impact of schools on both academic performance and cognitive skills; it was found that there was a positive and a statistically significant relationship between both 4th and 8th-grade test scores and cognitive skills scores. This finding was agreed with the present study results as it was found that there was a significant relationship between scholastic year and cognitive skills scores (students in grade five and six were done better than students in grade three and four), the possible cause may be due to that with increasing the age of students, they become more open-minded and their brain become more matured and with increasing levels of grade, their cognitive abilities become more developed.

The finding of the present study was also in line with the results of a study done by **Egalite, Mills, and Greene (2014)** who conducted their study on students in public boarding school in Arkansas to assess the non-cognitive skills of 174 students 11th and 12thgrade students attending a residential public high school in Arkansas, it was found that differences in cognitive skills scores by student grade, the result was statistically significant comparing 12thgrade students and 11th grade students, the 12th grade students had higher average cognitive skills scores than their younger counterparts in the 11th grade.

These findings were supported by the study of **Villagonzalo (2016)** who revealed that school-age students to explore the relationship between intelligence quotient, emotional quotient, spiritual quotient, and adversity quotient and the academic performance of students,it was found that, there was 25% of respondents participated in the study from each year level with a total of 100%, this finding was supported the result of the present study that , the studied children were distributed equally on the four grades third, fourth, fifth and sixth year. The purpose of 25% per year level was to have an equal size of populations from different year level and the sample to be representative.

The results of a study done by **Oommen (2014)** stated that genetics and acquisition are the origin of intelligence, for example, a child and his genes are derived from his parents ,this may be explained the result of the present study as it was found a significant relationship between residence and IQ score (children from urban area were more intelligent than children from rural area), which is in agreement with other studies done elsewhere **Makharia, Nagarajan, Mishra,**

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Peddisetty, Chahal, and Singh (2016) who found in their study conducted on school children from India to assess effect of environmental factors on intelligence quotient of children, it was found that place of residence influence the IQ of children to a great extent. This may be due to that the city is characterized by the provision of education to all members of the city, the spread of educational institutions, schools & universities as well as the high proportion of learners. On the other hand, in the village the proportion of learners is much lower than the city, as well as there is not universities or institutions of higher education in the village.

These findings of the current study go with the results obtained by **Kashif and El-Morsy (2010)** conducted their study about effectiveness of training program for students with learning disabilities for development of some cognitive skills in Zagazig, it was found that the students before the program had a difficulty in identifying the geometric shapes and after the program they had developed the classification skill and this by improving their abilities on different colours and knowing the different geometric shapes (triangle- circle-square-and rectangle) and the differences in size (large and small), this finding was supported the result of the present study, it was found that there was a significant improvement after implementing the training program in the classification skill, the second domain of cognitive skills.

The results of the present study found that training program for cognitive skills for the children in the current study effects positively and improved their cognitive skills significantly, this finding was agreed with the result of the study done by **Carpenter, Ledbetter and Moore (2016)** who conducted their study to investigate learning cognitive training program effects in Children Ages 8–14, the researchers have demonstrated support for the efficacy of cognitive training programs in improving individual cognitive skills .

VI. CONCLUSIONS

According to the findings of the present study, it can be concluded that:

The training program for school children with mild and moderate Intelligence Quotient had a positive effect on improving their cognitive skills as there was a statistical difference throughout the phases of the study.

VII. RECOMMENDATIONS

On the basis of the study findings, the following recommendations are suggested:

- 1- Create the appropriate psychological atmosphere within the family should be done so that the child feels safe and secure, as well as the parents listen to their children's talk with love and affection
- 2- Cooperation with the school through visits of parents to school to follow up the level of their children's achievement in the various studying subjects.
- 3- Further research is recommended in order to develop a training program for parents and teachers of the students with subnormal intelligence quotient should be held to improve the cognitive skills of their children

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