

The Assessment of Preschool Children's Development in Motor Skills and Cognitive Skills

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Abstract

The purpose of this study is to assess preschool children's development in motor skills and cognitive skills. 80 preschool children from 12 preschools, their respective parents and teachers were the subjects for this study. Survey questionnaires, an observation checklist and semi-structured interviews were used in the present study. Two assessment questionnaires for motor and cognitive skills development of preschool children were constructed: one for their teachers and the other for their parents. The results revealed that (i) children from the preschools those have full-facilities, reasonable teacher-pupil ratio and proficient preschool teachers can have a chance to get high development in motor skills and cognitive skills, (ii) preschool children who are allowed to play freely presented superior development in motor and cognitive skills. It was also found in this study that the length of schooling was the most significant predictor for children's cognitive and motor skills. Then eight preschool children were observed and their respective teachers and parents were interviewed in order to investigate factors which influence upon the development of children in motor skills and cognitive skills. In addition to school factors, family related factors such as caring style, high quality of parent child relationship, affection of family members are the prominent factors for the development of cognitive and motor skills in children.

Key Words : cognitive skills, motor skills

Introduction

Nowadays, one of the aims of Myanmar parents for sending their children to preschool is just to have foundations for advanced education levels. One can say that this aim is not sufficient for the preschool education. The major goal of preschool education is to train children to have all-round development and also a habit formation needed in their later learning for their survival.

By giving training to preschool children in order to improve their cognitive skills, children can also possess high level of thinking concerning problem solving, initiative, creativity, insight and so on. Similarly by assisting children to raise their motor skill, they will attain self-confidence and healthy ways of living.

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Developing motor skills is sometimes ignored in this knowledge age. But if someone goes to deeper level of developmental stages, he can't deny how much extent it plays an important role in a child's life. Therefore, whether preschool children actually develop their cognitive and motor skills in preschool years or not is becoming a prominent question in education field.

Preschool assessment takes place for many reasons: screening, diagnosis, placement, decisions and remediation of problems. Research has shown that early intervention in a child's life is necessary to minimize lasting effects of a child's difficulties. Thus a comprehensive cognitive and motor assessment in the preschool years can be a key component of a thorough multidisciplinary education.

It is wisely recognized that although many preschool educators are aware of the guidelines for developmentally appropriate practice, putting this practice to work effectively in the classroom is more challenging. Besides, preschool is not the only place which is responsible for the development of motor and cognitive skills as family should be taken into account as an important place in developmental history of the children. Therefore, it is essential to investigate factors which influence on the development of children, especially cognitive and motor skills which are required throughout children's lives.

Purpose of the Study

The major purpose of this study is to assess preschool children's development in motor and cognitive skills. The specific objectives of this research are;

- to examine the effect of preschooling on the development of preschool children in motor and cognitive skills.
- to investigate factors which influence on cognitive and motor skills development of preschool children.

Scope of the Study

Subjects of the study were preschool teachers, children and their respective parents from ten selected preschools under Department of Social Welfare (DSW), Myanmar Maternal and Child Welfare Association (MMCWA), Department of Basic Education (DBE) and two private preschools in Yangon Region.

Definitions of Key Terms

Cognitive skills involve processes such as memory, association, concept formation, language, attention, perception, problem solving and mental imagery (Wikipedia, the free encyclopedia; 2010).

Motor skill is a learned sequence of movements that combine to produce a smooth, efficient action in order to master a particular task. It includes fine motor skills, gross motor skills and ambidexterity (Wikipedia, the free encyclopedia; 2010).

Review of Related Literature

For the past three decades, there has been increasing emphasis on the assessment of preschool children. Many factors have influenced this movement, including the effectiveness of preschool programs, the national agenda of having all children ready for school, and research with young children that has demonstrated the importance of early experiences for later development (R.J. Nagle, 2007). Preschool assessment is a complex and challenging professional task. Effective assessment activities may be bounded by a limited understanding and conceptualization of the growth and development of preschool children.

Research by Bailey (1989) suggested that rapid growth across various domains may be discontinuous and unstable. By Romeo (1992) suggested that many children will show highly diverse rates of maturation and spurts in development are common observations during the preschool years. A critical point derived from these developmental issues is understanding the importance of emerging skills as extensions of and complements to acquired skills and learning processes as vital adjuncts to products of learning (Cited in Nagle, 2004).

In the Montessori approach, children are given considerable freedom and spontaneity in choosing activities. The teacher acts as a facilitator rather than a director of learning. The teacher shows the child how to perform intellectual activities, demonstrates interesting ways to explore curriculum materials, and offers help when the child requests it. Some developmentalists favour the Montessori approach, but others believe that it neglects children's social development (Santrock, J. W., 2006).

Grace J. Craig and Don Baucum (2002) stated that children often use their bodies as a means of testing their developing knowledge and

understanding. Motor development is also linked during the early years to general psychological health, to social and emotional adjustment, and to educational achievement (Clark & Phillip, 1985). Underachievement in school, lack of concentration, low self-esteem, poor social competence, and behavioural problems have all been linked to or associated with deficits in motor development in early and later years of childhood. Motor development has been considered an important part of child development and is a universally recognized means for assessing the overall rate and level of development of the child during the early months and years after birth (Gesell, 1973; Illingworth, 1975).

Four factors are necessary for the developmental transitions from one form of reasoning to another. They are the physical environment, maturation, social influences, and the processes referred to as equilibration (Piaget, 1977). Cheung, Y.B. and his colleagues (2000) examined that whether there is a relationship between growth failure in early postnatal period and motor development. The design in this study was longitudinal and the result from this paper is that both fetal and postnatal growths affect motor development in early childhood.

Ellen S. Peisner-Feinberg (2004) conducted one study to examine the impact of child care upon the development of children. The research evidence supports the contention that better quality child care is related to better cognitive and social development for children. Hence, this is equally important to investigate the effect of preschool upon the development of young children in Myanmar and the factors which influence on Myanmar children's development in motor and cognitive skills.

Method and Procedure

As an initial phase of this study, the pilot testing was carried out in December, 2010. For the pilot study, two preschools, one from Basic Education and another one from DSW were selected. Samples were 18 preschool teachers, 10 preschool children and their parents. Based on the results of the pilot study, the researcher improved the weaknesses of wording and changed kinds of questions which were inappropriate and could get incomplete responses. After that, the questionnaires were sent to selected preschools in the third week of December, 2010. The data were analyzed by SPSS version 16 for quantitative data and categorizing qualitative data. Observations were done to investigate the effectiveness of

preschooling upon the development of children in cognitive and motor skills. Eight preschool children were observed in their classroom and playground. Each child was observed for 2 days and the researcher recorded information of each sample, according to the observation checklist. Then the respective teachers and parents of these children were interviewed in order to examine main factors which influence cognitive and motor skill development of preschool children.

Participants

Random sampling method was used. 40 teachers from 12 preschools of Yangon Region were selected as the sample. Out of 12 preschools, two are under Department of Social Welfare (DSW), four from Basic Education Schools and another four established by Myanmar Maternal and Child Welfare Association (MMCWA), and the last two are private preschools.

Each teacher had to answer questionnaire for two children (a boy & a girl) in her class. Furthermore, 80 parents were requested to fill for their child. Again, 8 students and their respective teachers and parents were selected by using purposive sampling method for the qualitative study.

Instruments

In order to get necessary information for the study, two questionnaires were constructed; one for preschool teachers and the other one for respective parents.

Questionnaire for teachers was comprised with 39 items: personal information such as age, education level, service, name of the school, are in Section A and developmental status of their children concerned with cognitive and motor skills and their suggestions for how to develop children are in Section B. Section B can be divided into two parts; cognitive and motor skills. To be specifically, it included 5 items for memory (e.g., Does the child know his or her name?), 2 items for concept formation and perception (e.g., Does the child understand today, yesterday and tomorrow?), 1 item for association (e.g., Does the child have the idea how to associate objects in his or her environment?), 1 item for reasoning (e.g., Does the child have reason if he or she is asked why he or she behaves like that?), and 3 items for mental imaginary (e.g., Can the child retell about cartoon characters he or she like?) in cognitive part and includes 7 items assessing fine motor skills (e.g., Can the child paint within lines), 8 items for gross motor skills (e.g., Can the child skip some objects while he or she

is running), and 1 item for ambidexterity (e.g., Does the child use only left or right hand while eating, playing and writing?) in motor part.

Questionnaire for parents included 20 items; name of the child, age, name of school, duration of schooling, how much he or she shows development at home and opinion of the parents. Questionnaire for parents was used to get complete pictures of the sample children because abilities that are targeted as weaknesses in a preschool or day care setting may be stronger at home.

Observation checklist was constructed based on Milestones by New York University Child Study Center (NYUCSC). There were 34 items in observation checklist. It began with child's profile and included 14 items for cognitive skills and 16 items concerning motor skills. In this study, two types of semi-structured interview questions were prepared based on these facts such as members of family or extended family, socio-economic status of the family, the condition of the house, parenting style, nutrition and health history and also mother's health while she was pregnant.

Results

Descriptive analyses showed that the mean and standard deviation of survey questionnaire were 85.89 and 8.28 (See Figure 1).

For making interpretation of preschool children's scores of survey questionnaire, both addition and subtraction of mean and standard deviation were calculated. Hence, the values above and below one standard deviation were 94.17 and 77.61. According to these values, scores greater than 94.17 was regarded as above average and less than 77.61 as below average and between 77.61 and 94.17 as average.

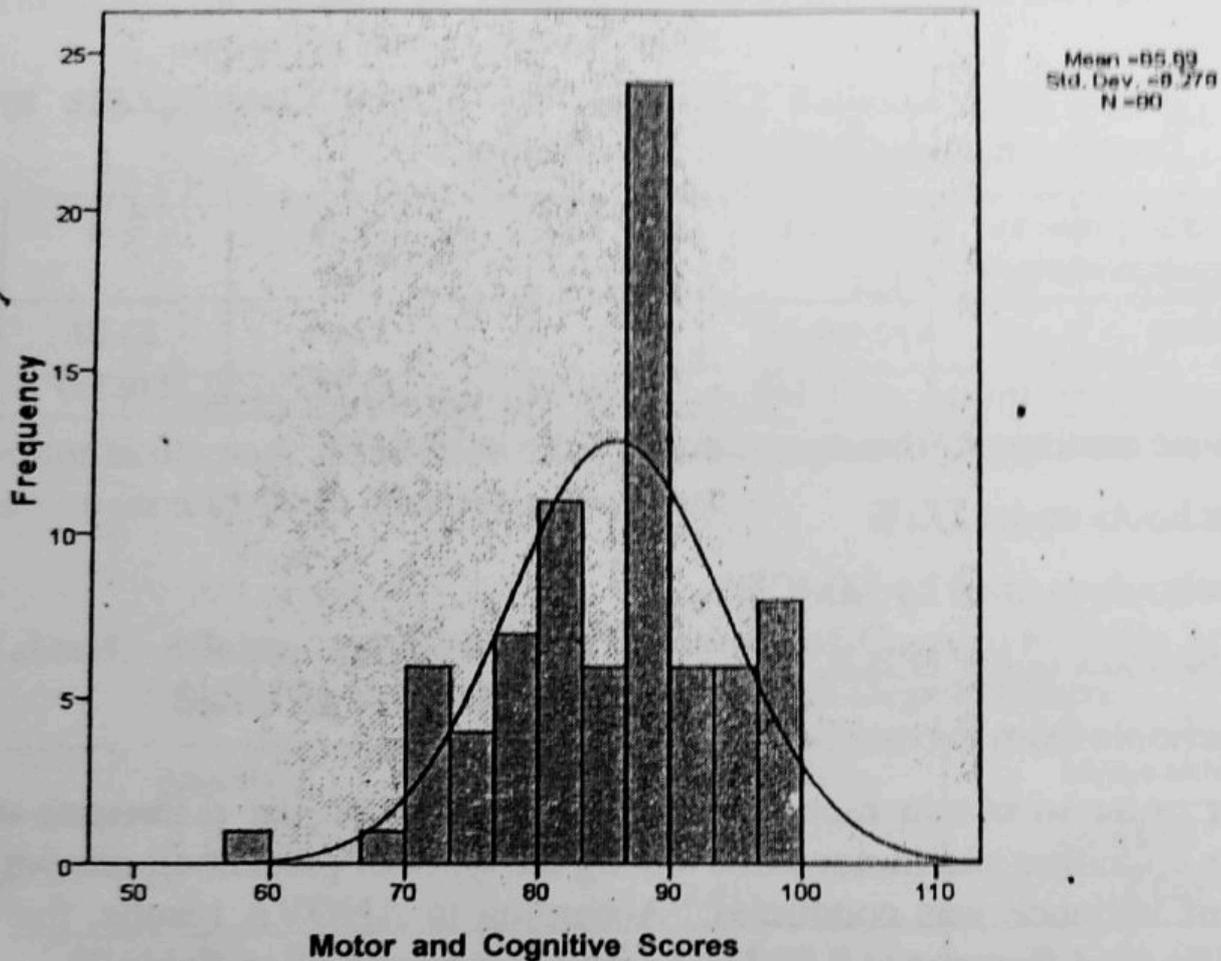


Figure 1 Frequency Distribution of Mean Scores of Preschool Children

Comparison of Motor Skills and Cognitive Skills by Preschools under Different Organizations

In the present research, the samples were selected from preschools under different organizations with different nurturing styles, but also a variety of demographic factors and socioeconomic status. Therefore, the researcher conducted a comparative study of motor and cognitive skills among preschools under 4 different organizations. Descriptive analysis revealed the differences in means and standard deviations of survey-questionnaire among preschools under these organizations respectively.

Table 1. Means and Standard Deviations for Survey Questionnaire by Preschools under Different Organizations

Preschools opened by Different organizations	S-1	S-2	S-3	S-4
	90.85 (8.16)	84.19 (6.20)	82.64 (5.76)	83.07 (10.33)

Note. Numbers in parentheses are standard deviations.

S-1=Preschools under DSW

S-2=Preschools opened by MMCWA,

S-3 = Preschools under D.B.E,

S-4=Preschools from Private Sector.

In order to obtain more detailed information on the difference of children's cognitive and motor skills among the types of preschool, one way analysis of variance was conducted. According to ANOVA results, there was significant difference at 0.05 level within the groups (See Table 2).

Table 2. ANOVA Table of Mean Comparison for Survey Questionnaire by Preschools under Different Organizations

Motor and Cognitive Skills	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	972.422	3	324.141	5.546	.002
Within Groups	4441.566	76	58.442		
Total	5413.987	79			

To get more specific difference, Tukey HSD test was used. It revealed that preschool under DSW differed significantly from preschools of other sectors at 0.05 level (See Table 3).

Table 3. The Results of Tukey HSD Multiple Comparison by Preschools under Different Organizations

I Preschool	J Preschool	(I-J) Mean Difference	Sig
1	2	6.654*	0.01
	3	8.20*	0.09
	4	7.78*	0.015

If survey questionnaire was divided into cognitive skills part and motor skills part, difference in means and standard deviations for each part can be seen through descriptive analyses.

Table 4. Means and Standard Deviations of Cognitive Skills and Motor Skills by Preschools under Different Organizations

Preschool	Cognitive skills	Motor skills
S-1	42.88 (2.41)	48.08 (5.80)
S-2	41.04 (2.62)	43.31 (3.88)
S-3	39.79 (2.12)	42.64 (4.11)
S-4	40.64 (3.52)	43.14 (5.23)

Note. Numbers in parentheses are standard deviations.

S-1=Preschools under Department of Social Welfare

S-2=Preschools opened by MMCWA

S-3 = Preschools under D.B.E

S-4=Preschools from Private Sector

Again, for further detail analysis, computation by using one way analysis method was done. Here, significant differences were found at 0.01 level for cognitive skills and at 0.001 level for motor skills (See Table 5).

Table 5. ANOVA Table of Mean Comparison for Cognitive Skills and Motor Skills by Preschools under Different Organizations

Skills	Types of School	Sum of Squares	df	Mean Square	F	Sig
Cognitive skills	Between Groups	105.013	3	35.004	4.971	.003
	Within Groups	535.187	76	7.042		
	Total	640.200	79			
Motor skills	Between Groups	440.074	3	146.691	6.227	.001
	Within Groups	1790.313	76	25.557		
	Total	2230.388	79			

Results from one way analyses indicated the necessity to find out the particular types showing the highest and the lowest mean values of motor and cognitive skills. Therefore Tukey HSD comparison procedure was again utilized. By considering results shown in Table 6, it can easily be seen that preschools under Department of Social Welfare were significantly different from the other three types, in motor skills and were significantly different from preschools under D.B.E in cognitive skills.

Table 6. The Results of Tukey HSD Multiple Comparison for Motor and Cognitive Skills by Preschools under Different Organizations

	Preschools (I)	Preschools (J)	Mean Difference (I - J)	Sig.
Motor Skills	1	2	4.769 (*)	.004
		3	5.439 (*)	.006
		4	4.934 (*)	.016
Cognitive Skills	1	2	1.846	.067
		3	3.099 (*)	.004
		4	2.242	.061
Motor Skills	3	1	- 5.434(*)	.006
		2	- .665	.976
		4	- .500	.993
Cognitive Skills	3	1	- 3.099(*)	.004
		2	- 1.253	.448
		4	- .857	.828

* The mean difference is significant at the 0.05 level.

The Relation Between Personal Factors of Preschool Teachers and Development of Children in Early Childhood

In this study, personal factors of preschool teachers include age, educational qualification, service years of teachers and spending time with children per a day. A correlation was computed if there was a statistically significant relationship between teacher's age and development of children in motor skills and cognitive skills. The Pearson Correlation was calculated, $r_{(78)} = -.3$, $p = .001$. The direction of the correlation was negative. It means that children who are in the class of young teachers tend to display high level of development and vice versa (See Table 7).

Table 7. Correlations Between Age of Teachers and Motor and Cognitive Skills of Preschool Children

		Motor and Cognitive Skills	Age of teachers
Motor and Cognitive Skills	Pearson Correlation	1	-.323**
	Sig. (2-tailed)		.004
	N	80	80
Age of teachers	Pearson Correlation	-.323**	1
	Sig. (2-tailed)	.004	
	N	80	80

** . Correlation is significant at the 0.01 level (2-tailed).

Again, a correlation was computed whether there was a statistically significant relationship between teacher's education level and children development in motor skills and cognitive skills. Based on the Pearson Correlation, $r_{(78)} = .28$, $p = .05$, the direction of the correlation was positive which reveals that children who were pupils of teachers who have high educational qualification were likely to express high development in motor and cognitive skills, and vice versa (See Table 8).

Table 8. Correlations Between Level of Education of Teachers and Motor and Cognitive Skills of Preschool Children

		Level of education of teachers	Motor and Cognitive Skills
Level of education of teachers	Pearson Correlation	1	.254*
	Sig. (2-tailed)		.023
	N	80	80
Motor and Cognitive Skills	Pearson Correlation	.254*	1
	Sig. (2-tailed)	.023	
	N	80	80

*. Correlation is significant at the 0.05 level (2-tailed).

Class-type and Development of Children in Motor Skills and Cognitive Skills

ANOVA analysis was again conducted to compare the mean scores for the motor and cognitive skills of children with regard to their age. It was evident that children from the classrooms of same age showed different development in cognitive skills from those who were placed in mixed age. It becomes clearer for 4⁺ children by comparing their development with regard to their class-type. This may be because children can fully participate in learning activities that are appropriate with their level of cognition. Hence, it may be more favorable to consider the age level of children to place them in age-appropriate class (See Table 9).

Table 9. The Results of Tukey HSD Multiple Comparison for Cognitive Skills by Age of Children in the Class

	I	J	I-J (Mean Difference)	Sig
Cognitive skills	2	1	2.34 (*)	.000
		3	1.71 (*)	.000

* The mean difference is significant at .005 level.

1= class of 3⁺ ages, 2= class of 4⁺ ages, 3= class of both 3⁺ and 4⁺ ages

The Relation Between Children's Motor Skills and Cognitive Skills and Personal Factors of Children

The results of t test on the Cognitive and Motor Skills by gender revealed that there was no gender difference for the Cognitive and Motor Skills in this study. This finding may be related to the Value of Children (VOC) and gender preference in the Myanmar families. In Myanmar, children have been valued as treasure since ancient times regardless of their gender. This caring style makes the girls think of themselves not weaker than the boys and another point different from other cultures is that Myanmar girls are never reluctant to compete with boys in all aspects.

Simultaneous multiple regression was conducted to investigate the best predictors of children's motor and cognitive skills (MCS). The combination of variables to predict these skills included age of children (AC) and duration of schooling (DS).

The result was $F(2, 77) = 16.58, p < .000$. The adjusted R squared value was .28. This indicates that 28% of the variance in cognitive and motor skills can be explained by the model. According to Cohen (1988), this is a large effect.

Then, the model can be defined as in the following equation:

$$MCS = 1.93 AC + 8.37 DS$$

The results revealed that duration of schooling was the most significantly related variable to children's cognitive and motor skills.

The Relation Between the Development of Cognitive Skills and Motor Skills

Simple regression was conducted to investigate how well motor skills (MS) predict cognitive skills (CS). The results were statistically significant. $F(1, 79) = 200.72, p < .000$. The identified equation to understand this relation was $CS = 21.02 + .455 (MS)$.

The adjusted R squared value was .72. This indicated that 72% of the variance in cognitive skills was explained by the motor skills. According to Cohen (1988) this was a large effect. This finding can be interpreted that the motor skills of children will develop if parents and teachers support them to improve their cognitive skills. It also indicated that the developmental areas of children were related with each other and thus the caregivers of the children should facilitate them as far as they could.

Results of Observation and Interviews

To analyze the qualitative data, the researcher reviewed the purpose of the study and findings of the quantitative data. The results of observation and interview were combined to interpret in order to get understanding of factors which have impact on development of children. Findings described that several factors concerning family and school environment have impact upon the development of motor and cognitive skills. Besides, as shown in quantitative study, children who showed high motor skills expressed satisfactory cognitive skills and children who have low motor skills were also slow in development of cognitive skills. Thus caregivers of young children should not focus only on one aspect of development but on all areas of development. Finally it can be concluded that above factors should be taken into consideration since the very beginning of early childhood in order to become all-round developed children.

Conclusion

As the primary purpose of the study was to assess the preschool children's development in motor skills and cognitive skills, the researcher conducted an assessment by using both quantitative and qualitative method. Then, the study explored that there was a statistically significant correlation between personal factors of preschool teachers and development of preschoolers in early childhood, it may be concluded that children who were in the class of young teachers tended to display high level of

development and vice versa. In addition, the fact that children who were pupils of teachers who have high educational level were likely to express high development in motor and cognitive skills and vice versa can be interpreted. As the cognitive mean difference between 4⁺ children from the classes in which they were divided according to their age and from the mixed classes acquired from Tukey HSD test was significant at .005 level, it may be generalized that it would be more favorable to divide children at preschools according to their age. This may be because children can participate in activities appropriate with their level of cognition. From these analyses, family related factors were found to be strongly related with the development of cognitive and motor skills in children. Moreover, all young children in Myanmar will be physically and mentally strong if the family shares the responsibility which is to equip children with motor skills and cognitive skills with early childhood educators.

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