Relationship between Kindergarten Attendance and Cognitive-Motor Development of Preschool Children in Sabzevar City

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Abstract: Background: Playing is an important part of child's life and it is through playing that children learn how to draw, develop and eventually grow up. Kindergartens can provide a proper and safe place for children to play and grow up. The aim of this study was to compare the cognitive and motor development of children who attend kindergarten with those of other children. **Methods**: This was an analytic-descriptive study of the total population of preschoolers in Sabzevar. The sample comprised 700 participants who were selected randomly using accessible sampling. The data-gathering methods were observation and measurement. Data gathering methods: After completing a demographic questionnaire, the participants were primarily requested to complete the Goodenough Draw-A-Person (DAP test), followed by jigsaw puzzles, the Fekrobekr test, (a local mind game) beads and threads and balance tests 1 and 2. After completing the tests, the results of the two groups were compared. **Results:** Out of 680 participants, 375 were boys and 305 were girls. In total, 59.5% of the participants had attended kindergarten before starting preschool at least for one year. In terms of cognitive development, the Goodenough test score did not show any significant difference between the groups (p=0.466), but there were significant differences between those who attended kindergarten and those who did not on the jigsaw puzzle and Fekrobekr tests (P=000.0 and P=0.002, respectively). The groups did not differ significantly in motor development (P=0.988). **Conclusion**: The results of this study show that children who attended kindergartens did better than other children in cognitive tests but did not differ significantly in motor development.

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Introduction:

Seventy-five percent of a child's brain and 90% of the abilities develop during the first six years of life (1). Playing is an important part of child's life, through which they develop, attain knowledge, learn to draw and eventually grow up (2). Because they do not get bored of repeating actions and also have a flexible body, 3-6 years of age may be the best time for coaching motor skills.(3)

To establish specific individual motor profiles so as to optimize and adapt early intervention programs, it is necessary to evaluate the motor performance of pre-school children. Early identification of possible risk factors that could impair motor development is crucial since poor motor performance may have long-term negative consequences for a child's overall development. (4)

Growth can be observed, evaluated and measured, and is subsequently manifested through physiological signs in the nervous system and finally through behaviour.(5) The effects and the signs presented in various aspects of behaviour are indicators of development and show the mental evolution or cognitive development, problem solving and/or tackling a situation.(2) Researchers use tests, such as jigsaw puzzles and Fekrobekr test, [a local mind game] to evaluate the growth rate of motor - mental development.(6)

The Draw a Picture (DAP) test is a system for the evaluation of a child's mental age. This is a quantitative test that is commonly used for three-year-old children. In this test, the ugliness or prettiness of the picture is not of importance.(5-7-8)

The results of a study by Vale (2011) suggested that structured physical activity (PA) such as a physical education (PE) class increased the daily total physical activity (TPA) and moderate-to-vigorous PA (MVPA) level of preschool children. (9) The results of a study by Matvienko O (2010) showed that a short, intense after-school program can produce significant, sustainable improvements in motor skill and fitness levels of young children.(10)

Also, the results of a study by Bala (2010) and Hong G (2008) showed that all of the educational and

motor activities in kindergartens contribute significantly to school-readiness and children's motor abilities. The highest school readiness was found in the children who had the longest kindergarten attendance. (11-12)

Salami et al. (2000) reported that children in poverty-stricken areas suffer from more deprivation and cannot achieve an optimal growth and proper development of speech, language and cognitive skills. (13) However, Amouzadeh-Khalili (2005) stated that in the terms of measurement criteria, there is no significant difference among children who attended kindergartens in both urban and rural areas. (14)

Methodology

This was a descriptive-analytic cross-referential study. The study population comprised all preschoolers in Sabzevar.

After statistical investigation and a pilot study, 700 participants were selected randomly and through accessible sampling (345 people per group). Because 20 preschoolers did not cooperate and participate in more than one test, they were removed from the sample and their data were not analysed.

The data-gathering tools included a questionnaire, observation and measurement.

The apparatus consisted of a chronometer, balance board, 30-cm thread with rubber loops, A4 paper, plastic nails, meshed planes and jigsaw puzzles.

The sampling procedure was performed as follows. First, the preschool centres were randomly selected. Then, the physical education (PE) teachers and trained colleagues were tested in order to perform accessible sampling on the preschoolers who attended kindergartens.

First, a questionnaire of demographic characteristics was completed using file information and after interviewing the children. Then, after ensuring that children were satisfied with the DAP test, they were given the jigsaw puzzle, Fekrobekr test (a local mind game), thread and beads, and finally, balance test 1 (Time (in seconds) standing on balance board. balancing) and balance test 2 (performing harmonious movements on the balance board). After completion of the tests, the two groups were compared in terms of their ability to respond to the tests. The tools and gathering-data instruments were selected based on standardized criteria.

Results:

In total, 700 children were tested, and 680 participated in all tests. Twenty participants were removed from the whole sample and their results were analysed with regard to the test that they had completed.

The findings show that out of 685participants, 375 were boys (55.1%) and 305 were girls (44.9%). In sum, 403 people (59.5%) had gone to kindergartens before going to preschools for at least one year and the remaining (40.5%) had not gone to the kindergartens.

In terms of cognitive development, the results of the analysis of variance with two factors, sex and group, indicated that the effect of sex was significant but that of group (whether or not the child attended kindergarten) was not significant.

As can be seen in Table 1, the females' score of 23.87±8.68 on the Goodenough (DAP) test is significantly higher than the males' DAP test score of 20.23±8.53

($P<0.001$). The DAP test scores of the children who did not attend kindergartens is 21.61±8.95 and not significantly different ($P=0.65$) from the scores of the children who did attend kindergartens 22.02±8.66.

Table 1 shows the comparison of DAP test scores in terms of the group and sex.

The means and standard deviations (SD) of the two groups' scores on the jigsaw puzzle are presented in Table 2. The results show that the two groups were significantly different on this test. The mean score of the kindergarten group (67.4±1.88) is significantly higher than that of children who had not attended kindergartens (16.4±1.172).

Table 2 shows the mean and SD of the jigsaw puzzle test in the group.

The mean and SD of scores for both groups on the Fekrobekr test score are presented in Table 3. The Fekrobekr mean score was significantly higher in the kindergarten children ($p=0.002$).

Table 3 shows mean and SD of Fekrobekr test score in both groups.

In relation to motor development, balance test 1 compared the two groups on the period of time that they maintained their balance. There was no significant difference ($p=0.988$). However, there was a significant sex-based difference on balance test 1. Females maintained their balance significantly longer than males ($P<0.001$).

The results of balance test 2 (which is a qualitative test) were examined using the chi-square test. The groups did not differ significantly ($P=0.074$). There was also no significant group difference ($P=0.183$) in the thread and bead tests ('fine and gross movements).

Associations between the thread and beads tests, jigsaw puzzle, Fekrobekr test and the length of time balancing (balance 1) were analysed by Pearson correlation coefficient. There were positive correlations among all tests. Therefore, the tests are interdependent. There was a positive correlation ($P<0.05$) between the annual increase in the number of children in the kindergartens and successful administration of the thread and beads test and jigsaw puzzle. However, there was no significant correlation

with success in other tests (table 4) administered during the kindergarten education years.

Table 4: mean and SD of balance test score (1) between both sexes.

Table 1: The comparison of DAP test scores in terms of the group and sex.

Group	Sex	Mean	SD	P value
Unattended	Male	20.49	8.426	P= 0.65
	Female	23.10	9.441	Nonsig
	Sum	21.61	8.951	
Attended	Male	20.06	8.618	
	Female	24.37	8.134	
	Sum	22.02	8.663	
Total	Male	20.23	8.529	
	Female	23.87	8.679	Sig 000.0
	Sum	21.85	8.777	

Table 2: The mean and SD of the jigsaw puzzle test in the group.

Group	Mean	SD	P value
Unattended	16.4	1.172	Sig 0.000
Attended	67.4	1.882	
Total	46.4	1.835	Among groups 0.000

Table 3: Mean and SD of Fekrobekr test score in both groups.

Group	Mean	SD	P value
Unattended	69.4	2.312	Sig 0.002
Attended	68.5	4.787	
Total	29.5	4.011	

Table 4: mean and SD of balance test score (1) between both sexes.

Sex	Mean	SD	Pvalue
Male	2227.6332	1635.920	P=0.000 sig
Female	2491.5974	1869.963	
Total	1749.10633	2346.830	

Discussion:

The statistical analyses indicate that there was a significant difference between the jigsaw puzzle scores of the two groups (P<0.001). In addition, the Fekrobekr test scores for children who had attended kindergartens were higher than those of the other children (P=0.002). The results of these two tests, which are considered as typical cognitive development tests, demonstrate that kindergarten education results in better cognitive development. These results are supported by the findings reported by other researchers. A report by Deboard and Aman (2002) suggests that a considerable part of learning in children depends on their surroundings (15-16).The experience that children obtain from their environment plays an effective role in their future success (17-18-19-20-21).

In terms of motor development, there was no significant difference between groups in either maintenance of balance on the balance board (test 1), balance test 2, which involved performing harmonious movements on the balance board (test 2), or the thread and beads test ('fine and gross movements). With regard to the increasingly limited space of kindergartens, there is no proper playground for children to play freely. Most kindergartens are established in an apartment house, which prevents children from performing any motor coordination and group games. The results obtained by Amouzadeh-Khlaili (2005) are consistent with this finding. In the study by Amouzadeh-Khalili, rural children were more successful than urban children in the balance board test and it was suggested that, considering the physical structure of villages, the development of motor skills in villages is better than that in cities. (14)

The findings of a study by Adea et al. entitled 'The effect of education before schooling on the IQ and the growth and development of children (18) and also the results of the study by Bala (2010) showed that all of the educational and motor activities in kindergarten contribute significantly to school-readiness and children's motor abilities. (11) However, in the present study, kindergarten

attendance affected only cognitive development and not motor development.

Conclusion:

The results of this study show that children who had attended kindergartens performed more successfully than other children in the cognitive tests; however, there was no statistically significant difference between the groups in respect of motor development.

With regard to the results obtained in this study, it is emphasized that it is necessary to pay attention to the plans and physical structure of kindergartens in order for children to perform motor activities in an appropriate manner.

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