

Developmental skills of 36-60-month-old children in Isfahan daycare centers in 2013

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ABSTRACT

Background: Assessment of developmental skills is one of the most essential components of children's health evaluation. Since several pubertal disorders are caused by parental negligence in diagnosis, prevention, and treatment of childhood problems, failure to make a timely diagnosis of these problems could have adverse effects on the health of children in future. This study was conducted to determine the developmental skills of 36-60-month-old children in Isfahan.

Materials and Methods: In this cross-sectional study, 196 children, aged 36-60 months, were recruited through random cluster sampling. "Ages and Stages" questionnaire was filled for each subject by their parents (father, mother, or both), and the frequency of developmental delay was determined based on cut-off points. The data were analyzed by descriptive statistics using SPSS 20.0.

Results: About 52.6% of the children were male. Mean age of the children was 50.71 (SD = 8.16) months. The abnormal findings were in the five domains of communication (1.5%), gross motor (3.1%), fine motor (7.7%), problem solving (7.7%) and personal-social (2%).

Conclusions: The results suggest that some of the children had scores below or equal to the cut-off points and needed more evaluation by a professional person. The domains in which the children had problems were fine motor, problem solving, and gross motor. Therefore, health staff should pay more attention to assessment of these domains and parents should be trained to develop their children's skills in these domains.

Key words: 36-60-month-old children, daycare centers of Iran (Isfahan), developmental skills, children -development- daycare centers

INTRODUCTION

One of the most essential components of the evaluation programs on children's health status is investigation of their developmental skills.^[1] Nowadays, social changes, advancements in medical sciences, burdensome economic condition, and disabling changes in the families have resulted in occurrence of behavioral, social, and educational problems in children, which can have a negative effect on their development and lead to challenges in their childhood and adolescence period.^[2] Several studies have shown an increase in prevalence of developmental disorders among children.^[3-7] There is no

accurate estimation about the prevalence of developmental disorders in the general population of Iranian children. But few studies conducted in this context show a relatively high prevalence of these disorders among the children.^[8-10] One of the most appropriate childhood periods to investigate developmental skills is between 36 and 60 months of age.

During this period, the child has a rapid pace of development in physical, motor, cognitive, verbal, and socio-psychological skills. Consequently, the prevalence of developmental disorders is somehow high in this period.^[2] Parents play a key role in helping with children's developmental skills assessment.^[2] Absence of such an important information resource for determination of children developmental status results in a defective assessment. Numerous studies have recently shown that parents can yield accurate information

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about their children's developmental status, regardless of their different socio-economic status, geographical location of residence, or even their level of education.^[11] A study conducted in Boston in 2009 showed that routine use of parents' information in assessment of children's developmental status can facilitate early diagnosis of their developmental disorders, as the afore-mentioned study led to detection of 61.6% of these children with developmental disorders.^[12] Parents' participation in these assessments also yields valuable information about their children's development and, therefore, helps them have relevant and logical expectations from their children. In addition, with regard to the high costs of children's developmental status assessments conducted by the specialists, completion of the developmental skills questionnaire to assess large groups of children in the initial stages of assessment is more cost effective.^[13] The American Academy of Pediatrics recommends assessment of developmental skills in health care centers from the first week of life and at ages of 2 weeks, 2, 4, 6, 9, 12, 15, and 18 months, 2, 2.5, and 3 years, and once a year until the age of 6 years, and every 2 years between 6 years of age and adolescence period for all children.^[11] In Iran, assessment of growth and development is conducted in health care centers by health aids in rural areas and by technicians or bachelors of health in urban areas. In the series of assessments that continue until the age of 8 years, the children are routinely assessed concerning their weight gain and height, but are less assessed with regard to their developmental trend. Therefore, a delayed development in children is diagnosed at higher ages (entrance to primary school) in Iran compared to other countries. The researcher has witnessed inadequate attention paid to children's developmental skills during her attendance in health care houses, health care centers, and daycare centers in Isfahan. Therefore, with regard to irrecoverable complications of delayed assessment of children's developmental skills at different ages, this study aimed to determine the developmental skills of 36-60-month-old children in Isfahan daycare centers.

MATERIALS AND METHODS

This was a descriptive, cross-sectional study conducted through random cluster sampling. Firstly, the list of all daycare centers in 14 districts in Isfahan (based on municipal categorization) was obtained from the Isfahan province welfare office, and a daycare center was selected through convenient random sampling from each district. The name list of children aged 36-60 months was extracted from the selected daycare center, and 14 children were selected from the extracted list as the subjects in each daycare center.

Inclusion criteria were children with Iranian nationality, born and residing in Isfahan, living with their biological parents,

no chronic diseases in children or parents, and the parents who voluntarily accepted for their children's participation in the study. The number of the subjects was calculated as 196 children by the following formula and with a confidence interval of 1.96, power of 0.84, and $d = 0.25$:

$$n = (Z_1 + Z_2)^2 S^2/d^2$$

Finally, from each municipal district, one daycare center was selected, and from each daycare center, 14 children meeting the inclusion criteria were selected. One of the researchers attended the daycare center, introduced herself to the manager, and then met the parents and gave them enough explanations about the research goals during an orientation session. The researcher ensured the parents about the confidentiality of their children's data, and after the parents signed a written consent form, they were explained how to complete the questionnaires and were asked to return the completed questionnaires to the daycare manager within 2-3 days.^[13] The data collection tools were a demographic information questionnaire and the third version of "ages and stages questionnaire." This (Each) questionnaire has been prepared for developmental skills assessment at a specific age rank, so insufficient knowledge of parents about the normal pattern of child development could not leads to their miss judgment. Therefore, most of the researches who intend to investigate children's developmental skills through their parents' reports use this questionnaire.^[13,14] This test includes 19 questionnaires for 19 different age groups (4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 27, 30, 33, 36, 42, 48, 54, and 60 months) and is completed by the parents. In the present study, the questionnaires specific for the age groups of 36, 42, 48, 54, and 60 months were used. Each questionnaire has tolerance zone of age by 1 month. It can be used for 1 month before or after the target age. For instance, the questionnaire for the age of 36 months can be used for children aged 35-37 months. Each questionnaire contains 30 questions in five domains: communications, gross motor, fine motor, problem solving, and personal-social (each domain contains six questions). There are three responses for each question. "Yes" indicates the child can thoroughly do the activity, "not yet" indicates the child has not done the activity yet, and "sometimes" means the child does the activity sometimes. The response yes is scored 10 points, sometimes is scored 5 points, and the response no is scored zero. The total score is separately calculated for each domain and is compared with the cut-off point related to that domain and in the same age group (scores in each domain range 0-60 points). The cut-off points for each domain are presented in Table 1. If the score of each developmental domain is less than or equal to the related cut-off point, it shows that the child probably has delayed development and needs to refer for more evaluation and follow-up. The questionnaire has been

designed in a way that the people with even primary school education can understand the items well. Its completion needs 10-15 min and its scoring needs 1 min.^[6,9,11,13-15] The questionnaire of “ages and stages” is an internationally valid tool with a sensitivity of 82-89% and specificity of 77-92%.^[14] In Iran, translation, equalization, and standardization of the questionnaire were conducted in 2002 and 2008 under the supervision of Ministry of Health, Treatment and Medical Education, UNISEF, Exceptional Child Education and Training Organization, population and family health office, and Exceptional Child Research Center. Its validity, reliability, and power of test for diagnosis of developmental disorder were reported to be 0.84, 0.94, and over 96%, respectively.^[11,15] In addition, a study was conducted in Tehran in 2006 with the goal of standardization and validation of ages and stages questionnaire and the Cronbach’s alpha was calculated to be 0.79, showing its scientific reliability.^[11] After collection of the completed questionnaires, the related score for each child was calculated by one of the researchers. Data were analyzed by descriptive statistical methods.

Ethical considerations

Scientific and Ethical considerations of this study has been approved by Isfahan University of Medical Sciences.

RESULTS

In this study, 103 male (52.6%) and 93 female (47.4%) children (out of total number of 196 subjects) participated. 29.6% of the children were in the age group 59-61 months, 24.5% in the age group 53-55 months, 18.9% in the age group 47-49 months, 16.3% in the age group 41-43 months, and 10.7% were in the age group 35-37 months. Mean age of entering a daycare center was 38.06 (SD = 11.85) months and mean hours of attendance in the daycare center was 4.4 (SD = 1.3) h/day. 58.6% and 50.5% of the subjects’ fathers and mothers had a university educational degree, respectively. Most of the subjects (91.2%) had normal birth weight (2500-4000 g). The obtained results showed that in making communication, gross motor, fine motor, problem solving, and personal social domains, 1.5%, 3.1%, 7.7%, 7.7%, and 2% of the children scored below or equal to the cut-off point. The highest frequency was for delays in development in the domains of fine motor and problem solving [Table 2]. Mean scores of different developmental domains of the subjects are presented in Table 3.

DISCUSSION

The obtained results showed that some of the subjects had obtained scores lower than or equal to the cut-off points in all developmental domains and needed a follow-up. This was more frequent in fine motor and problem-solving domains, compared to others. In the study of Kerstjens *et al.* on 544

Table 1: Cut-off points for each developmental domain based on age groups

| Age (months) | 36 | 42 | 48 | 54 | 60 |
|----------------------|------|------|------|------|------|
| Developmental domain | | | | | |
| Communication | 38.7 | 35.0 | 39.1 | 35.0 | 31.7 |
| Gross motor | 35.7 | 25.0 | 32.9 | 25.0 | 32.7 |
| Fine motor | 30.7 | 25.0 | 30.0 | 25.0 | 30.5 |
| Problem solving | 38.6 | 25.0 | 35.0 | 25.0 | 30.1 |
| Personal-social | 38.7 | 25.0 | 23.4 | 25.0 | 39.5 |

Table 2: Distribution of subjects’ scores based on cut-off points in different developmental domains

| Score | Above the cut-off point | | Below or equal to the cut-off point | |
|-----------------------|-------------------------|---------|-------------------------------------|---------|
| | Frequency | Percent | Frequency | Percent |
| Developmental domains | | | | |
| Communication | 193 | 98.5 | 3 | 1.5 |
| Gross motor | 190 | 96.9 | 6 | 3.1 |
| Fine motor | 181 | 92.3 | 15 | 7.7 |
| Problem solving | 181 | 92.3 | 15 | 7.7 |
| Personal-social | 192 | 98 | 4 | 2 |

Table 3: Mean and statistical indices of subjects’ different developmental domains’ scores

| Developmental domains | Minimum score | Maximum score | Mean | Standard deviation |
|-----------------------|---------------|---------------|-------|--------------------|
| Communication | 20 | 60 | 56.02 | 6.4 |
| Gross motor | 15 | 60 | 53.2 | 9.2 |
| Fine motor | 0 | 60 | 48.8 | 11.6 |
| Problem solving | 25 | 60 | 47.4 | 9.4 |
| Personal-social | 25 | 60 | 52.8 | 7.6 |

Dutch children aged 46 months, the subjects needed a follow-up in all domains, especially in gross motor.^[16] In the study of Nelson *et al.* on 1171 children aged 36-60 months among the general population and in the study of Troude *et al.* on 179 children aged 36 months among the general population, some of the subjects obtained scores less than or equal to the cut-off point and needed a follow-up, especially in fine motor domain.^[17,17] The frequency distribution of children with developmental delay in the present study was different from the above-mentioned studies in gross motor, fine motor, and personal-social domains (either higher or lesser). Cultural differences including methods of child breeding, parental style, families’ socio-economic status, etc., may be the reasons for this difference.^[2] Meanwhile, in the domain of making communication, the number of the studied children in Isfahan who needed follow-up was less than that in all the afore-mentioned countries, and in the domain of problem solving, it was more. Different sample sizes and subjects’ characteristics in the above-mentioned

studies and in the present study may have played a role in the observed difference. Dorre *et al.*, in a study on 114 children aged 4-60 months with a history of hospitalization in neonatal intensive care unit (NICU) in Arak, Iran, used ages and stages questionnaire and showed that making communication was the most frequent developmental disorder among subjects. A lower percentage of children needed follow-up in all developmental domains in the present study compared to Dorre *et al.*'s study.^[9] Ali Akbari *et al.*, in an investigation on the correlation between high-risk pregnancy with developmental retardation in 356 children of age 4-60 months in Isfahan, showed that the subjects had major problems in fine motor and gross motor domains.^[8] But in the present study, the subjects needed a follow-up in fine motor and gross motor domains. Comparison of the present study with the other studies conducted in Iran also showed a different prevalence in developmental retardation among the children. This could be due to the differences in inclusion criteria and the population studied. Comparison of the mean developmental scores of the subjects in the present study with those of Kerstjens *et al.*'s study shows that the mean scores in the domains of communication, gross motor, and fine motor were higher in the present study compared to their study, although they were lower in problem-solving domain and equal in personal-social domain. A reason for this difference can be the different characteristics of the subjects, as in Kerstjens *et al.*'s study, 72.9% of the subjects (1510 out of 2072) had a history of being pre-term,^[19] but in the present study, mothers were unaware of their children's history of being pre-term and 6% ($n = 13$) of the subjects had birth weight lower than 2500 g. As the history of prematurity and low birth weight can negatively affect the trend of development,^[2] it can be the reason for lower score of children's development obtained in Kerstjens *et al.*'s study, compared to the present study. On the other hand, in the present study, 58.6% of the mothers had university education, whereas 28.5% of the mothers had university education in Kerstjens *et al.*'s study.^[19] As the mothers' level of education can affect their understanding of the questionnaire items or their accountability in giving responses to the questions, it can be a reason for the different results obtained in these two studies, although cultural differences and their effects should not be ignored.^[2]

CONCLUSION

The obtained results showed that the children needed developmental follow-up mostly in fine motor, problem-solving, and gross motor domains. Therefore, the health care centers' staff should pay a close attention to this issue and teach families the related developmental skills, especially in these domains. The developmental status of the children in different age groups should be regularly

monitored, as timely diagnosis of developmental problems and initiation of proper treatment can prevent many of the disabilities occurring to these children in future.

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