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Investigating the Growth, Developmental Status, and Some Social Determinants Related to Children Under Five Years Old who were Referred to Comprehensive Urban Health Centers in Zanjan -2021

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Abstract

Background: Considering the role of the growth and developmental status of children on their adulthood health status, and the effect of some related social determinants, the continuous assessment of these indices is very important.

Objectives: The present study was conducted to investigate the growth, and developmental status of children under five years, and some social factors related to in children referred to Zanjan urban comprehensive health centers in 2021.

Methods: This cross-sectional study was conducted on 397 children less than five years old (4 -60 months) using multi-stage random sampling according to the age and gender of children. The tools used in this study included demographic and social determinants questionnaires, Ages & Stages validated Questionnaires, and calibrated meters and scales to monitor growth and developmental status. The data were analyzed using Spss software 26.

***Results*:** Almost 50% of fathers had a private job and 69.8% of mothers were housewives. Nearly 34% of mothers and 39% of fathers had an academic higher education degree. The most normal cases of children's development have belonged to the area of gross movements (94.2%) and the least normal cases belonged to the area of delicate movements (90.7%). There was a significant relationship between the variables of father's occupation, father's corporal punishment experience, child's gender, neighborhood (geographical regions), and parents' age with developmental status. Children's growth was also significantly related to the neighborhood (geographical regions) (height: P=0.001, weight: P=0.008, head circumference: P=0.017), but it was not related to other demographic and social determinants. The results of the logistic regression test showed that for every one-year increase in the age of the father or mother, the chance of the child being abnormal in the field of gross movements decreased by 10%.

Conclusion: The neighborhood and physical environment (geographical regions) was the most important common social determinant in children who had a delay in growth or development. This shows the importance of attention, intervention, and more studies on equality and equity in health for areas that are involved with economic problems and poverty cultural issues, parents' knowledge and awareness of parenting methods, which lead to many problems in the growth and developmental status of children, their health and its complications.

Keywords: growth, development, ages & stages' questionnaires [ASQ], growth chart, under 5-year-old children

Introduction

Today, indicators such as height and weight are used globally to evaluate the physical growth and health of children. Following up on and tracking the growth status of children is accepted in many countries as a tool to assess the growth and promote the health status of children to identify early changes in growth and ensure good status. Children's growth status is an essential part of routine health care, which represents the general well-being in society and the provision of health care delivery [1]. Generally, adulthood

health depends on the growth and developmental status in childhood, and any factor that affects the overall health of a child can also affect his/her growth [2]. Growth means a gradual increase in the number, size, and complexity of cells, which leads to an increase in body height and weight [3], and growth delay means insufficient physical growth or inability to maintain the expected growth rate during a certain period of time [4]. Growth impairment is a global health problem and according to the report of the World Health Organization (2017), the global prevalence of short stature and underweight in childhood was 22.2% and 7.5%, respectively [1] and it was estimated that 45 % of the deaths of children under 5 years old are related to malnutrition [5]. The prevalence of developmental impairment is higher in developing countries than in other parts of the world [6]. In 2020, around 149.2 million children under five years old were stunted worldwide. This number may have increased significantly due to the limitations of access to a rich diet and nutrients during the outbreak of Covid-19, and it will take years to determine its effect on children's height [7]. Children who suffer from short height experience the following issues in early childhood: learning difficulties in school, less income in adulthood, and being unsuccessful in social relationships. These children may never reach normal height growth and their brains may not develop completely [7]. Zablotsky's and et al showed that the prevalence of developmental delay in children increased by 16.2% from 2009-2011 and by 17.8% from 2015-2017 [8], the prevalence of delay in growth in children under five years old in Terengganu was reported 31.7% in Bahtiar's study [9]. In a review study (2020), the overall prevalence of underweight, short stature, and thinness in Iranian children under six years old was reported as 8.4%, 14.5%, and 5.6%, respectively [1]. Mohammadi's and et al study (2017) showed that the overall prevalence of underweight children in Iran was 15.5% which the highest prevalence of underweight belonging to Birjand and Zahedan at 68.6% and the lowest prevalence belonging to Jahrom at 1.8% [1]. The evidence shows that between 1990-1995, %13.8 of those under five years old Iranian children were underweight, which reached 4.1 in 2006-2012; the global ratio for his period of time was 17.5 and 3/9 respectively [10]. This indicates that the prevalence of underweight index in Iran was higher than the whole world. To improve children's health status, not only the assessment of children's growth rate is important, but also awareness of the developmental status of children is necessary. Human evolution is a complex issue and includes the changes that a person acquires lifespan to increase physical, mental, speech, and social improvement. Healthy development in the early years of life provides appropriate conditions for people and leads them to a prosperous life [11] and when a child has a delay to reach developmental abilities accordingly to his age, it will result in developmental delay. From birth to five years old, it is a critical period of time in the development of language, cognitive, emotional, social, behavioral, and physical skills and this forms the basis of new skills and experiences in adulthood. [12]. The prevalence of delayed communication skills, delicate movements, and personal-social skills was reported as 15%, 1.7%, and 16.7%, respectively, in Bahtiar's study in Terengganu [9]. In Iran, the results of Khabazkar's study (2014) on children aged 8-12 months showed that the prevalence of developmental delay in children was 14% [12]. However, the findings of Afraz's research (2012) on children aged between 4 and 24 months indicated that the prevalence of developmental delay in participants was 7%, and the highest percentage of developmental delay was reported in the field of gross movements and the lowest percentage was reported in the personal-social field [13].

Many factors affect the growth and development of children. Prenatal factors include (e.g. genetic factors, infectious diseases in pregnancy, and drugs), factors during childbirth (delivery problems, hypoxia, and trauma), and the postnatal factors (socio-economics issues, health, nutrition, diseases, neighborhood, and education level) all affect the growth and the developmental status of children [14]. Social determinants of health are one of the most important factors which influence public health, Individual child health who are more vulnerable to the harmful effects of thel environmental and social factors [15]. Among the social determinants affecting children's health, the socioeconomic factors attributes to 50% of problems. Parents play an important role in children's health, and various physical

characteristics and environmental factors, beliefs, economic and social conditions of families, etc. are some of the factors affecting children's health. Some believe that parents' education is much more important and more effective than economic and social factors because family income continuously varies from year to year. There is evidence indicating a direct relationship between children's health and family income, which becomes more obvious by the increasing the child ages [16]. The effect of a mother's employment on children's health is also ambiguous and challenging [17] because on the one hand, it increases the family's income and enables the family to access better food and preventive health services, and has a positive effect on children's health [18] and on the other hand if the employed mother has less time to prepare food and take care of children, working may have negative effects on children's health [16]. Salarkiya et al (2010) reported that in addition to family income, the mother's literacy, the parents' culture and beliefs, and the mother's social-emotional support are effective in the nutrition of children under two years old, as one of the important factors affecting children's growth [19]. Ahmadpour's study (2010), showed a significant relationship between height and weight at birth, birth rank, the length and frequency of breastfeeding, father's age, and number of family members, mother's education, age and BMI, socioeconomic factors, and neighborhood (address) with growth status of children [20]. Shahraki et al (2014) reported that increasing the educational level of parents (higher educational level) increases the probability of normal children's health by 2.6% and 3.5%, respectively. The employment of mothers reduces the health status of children by 6.7% and of the health status of twin children by 8.97% compared to other children. Moreover, the increase in parents' educational level reduces the probability of underweight children by 0.9% and 1.5%, respectively, and the employment of mothers leads to an increase in the probability of underweight children by 4% [16].

Maintaining and promoting children's health is one of the health priorities of any society. Although in low- and middle-income countries, infant mortality has decreased, the number of children under five with developmental problems has yet remained unchanged. The first thousand days of life are of vital importance for the development of the brain because during this time the interventions on children will be useful and effective [21]. Therefore, early diagnosis of growth and development problems and timely interventions can provide an opportunity for the children to reach their maximum potential for growth and development, to improve their performance, and to increase their quality of life and social participation [22]. Sufficient awareness of parents and other caregivers about children's mental, emotional, and behavioral growth and influencing factors, helps them to know the diseases affecting developmental status and the methods of preventing them through sufficient knowledge of the stages of normal development of a child [14]. Lack of timely diagnosis and treatment of growth and development disorders will result in numerous complications in children threatening the health and progress of society [23]. Considering the importance of continuous investigation of the growth and developmental status of children and related social and in order to control and prevent children's health risk factors determinants, this study was conducted to determine the state of growth and development and some social determinants related to those children under five years who referred to comprehensive urban health centers in Zanjan in 2021.

Methods

This descriptive-analytical cross-sectional study was conducted on 397 children under five years old (4-60 months) who were referred to comprehensive urban health centers, and their parents after receiving the ethics approval code (IR.ZUMS.REC.1400.001) in Zanjan. The children who lived with their parents and did not have any underlying disability or disease leading to delayed growth and development were recruited in the study, and a written consent form was obtained from parents. First, five health centers were randomly selected as representative of five geographical regions of Zanjan city (north, south, east, and west and center) using the city map (taken from the provincial health center). The number of eligible children based on the sample size calculated for each center according to age and gender (in equal proportion) were randomly included in the study. According to the number of

registered children in each health center, 15% of less than one year, 18% of 1-2 years, 21% of 2-3 years, 22% of 3-4 years, and 24% of 4-5 years old children were recruited in the study with 50% for girls and boys in each age groups. The final sample size of the study was calculated as 425 with a probable attrition rate of 10% (according to the below formula)

$$N=\frac{\left(z_{1-\frac{\alpha}{2}}\right)^2 (p(1-p))}{d^2}=\frac{(1.96)^2(0/5(1-0/5)}{(0/05)^2}=384$$

The developmental questionnaire was completed by the researcher at the relevant center through examination and observation of the child, and the child's growth indices (height and head circumference using a meter (in centimeters) and weight (using a scale in grams) were measured and recorded by the researcher. To calibrate the scale of each center and to determine its reliability, a standard weight was weighed with three scales, and considering that the difference between the scales was less than 100 grams, the reliability of the scale was confirmed. To determine the validity of the meter, an inflexible meter was used with an accuracy of one millimeter, and to determine the reliability of the meter, after every 10 samplings, the size of the meter was compared with another valid inflexible meter, considering that the difference was less than one millimeter, the reliability was confirmed. In order to collect the demographic characteristics of the parents, the demographic questionnaire was completed by both parents. The growth curve and z-score were used to check the growth status of children, so that after measuring the weight, height, and head circumference of each child, if each of the child's growth indicators (height, weight, and head circumference) was between -1 and +1 z-score, the growth status was considered as normal, if it was above +1 z-score, it was considered as higher than normal, and if it was below -1 zscore, the growth status was considered lower than normal status and recorded in the relevant checklist. The age & stages questionnaire (ASQ) was used to evaluate children's development. This questionnaire includes 19 different types of questionnaires, for 19 age groups (4-60 months), and each questionnaire measures 5 developmental dimensions consisting of communication, gross movements, delicate movements, problem-solving, and personal-social which each field has 6 questions. The questions were scored in such a way that 10 points were given for the answer "yes", 5 points were given for the answer "sometimes", and 0 points were given for the answer "not yet". The cut-off points (± z-score) were used to assess children's developmental status (similar to growth assessment that uses a growth curve). The cut-off points of ASQ are determined by "one standard deviation below the mean" and "two standard deviations below the mean" [24]. The standardization of the ASQ questionnaire in Iran was carried out under the supervision of the Ministry of Health, Treatment and Medical Education; UNICEF; Organization for the Education of Exceptional Children, Population and Family Health office, and Research Institute for Exceptional Children. ASQ reliability (according to Cronbach's alpha method) in Iranian children is reported to be 76-86% [25]. The validity of this questionnaire is 84% and the ability of the test to determine developmental disorder is more than 96% [26]. The collected data was analyzed using Spss version 26 and statistical tests of chi-square, logistic regression, and Kruskal Wallis, and the significance level of the tests was considered as $p<0.05$.

Results

In this study, 397 families (including father, mother, and children under 5 years old) and a total of 1191 people participated, including 397 children aged 4-60 months (199 boys and 198 girls) with the mean age and standard deviation of 35.35±17.41 months. The minimum age of mothers was 15 and the maximum was 48 years with a mean age and standard deviation of 31.54±5.88 years. The minimum age of fathers was 24 and the maximum age was 51 years with a mean age and standard deviation of 36.8±5.47 years. The minimum playing time of mothers with children was zero and the maximum was 240 minutes, while, the minimum playing time of father and child was zero and the maximum was 180 minutes, daily. The most common job of fathers was self-employment (private) with an approximate frequency of 50%, and the most frequent job of mothers was housekeeping (86.9%). The percentage of higher-educated

fathers was higher than mothers (39% vs. 34.3%). Totally 8.1% (N=32) of fathers were addicted, but none of the mothers had addictions. The parents' demographic characteristics are presented in Table 1.

Table 1: Demographic Characteristic of Parents

Variables		Father		Mother	
		Number	**Percent**	**Number**	**Percent**
Job	Housewife	-	-	345	86.9
	Employee	117	29.5	-	-
	Self employed	197	49.6	-	-
	Other jobs	83	20.9	-	-
	Total	397	100	52	13.1
Education	High school	127	32	112	28.2
	Diploma	115	29	149	37.5
	Higher-education	155	39	136	34.3
	Total	397	100	397	100
Addiction	Yes	32	8.1	-	-
	No	365	91.9	-	-
	Total	397	100	-	-
Type of Consumables	Cigarettes	29	7.3	-	-
	Drugs	3	0.8	-	-
	No Consumption	365	91.9	-	-
History of neurological and Mental Disorders	Yes	-	-	7	1.8
	No	-	-	390	98.2
	Total	-	-	397	100
History of Chronic Disease	Yes	2	5	1	0.3
	No	395	95.5	396	99.7

The highest numbers of normal cases were in the domain of gross movements with 94.2% (N=374) and the lowest numbers of normal cases with 90.7% (N=360) were in the domain of delicate movements (Table 2).

Table 2: Distribution of Different Domains of Development of Children Under five Years Old Referring to Comprehensive Urban Health Centers in Zanjan in 2021

Area	Status	Number	Percent
Communicate	Normal	363	91.4
	One standard deviation below normal	27	6.8
	Two standard deviations below normal	7	7
	Total	397	100
Gross Movements	Normal	374	94.2
	One standard deviation below normal	21	5.3
	Two standard deviations below normal	2	0.5
	Total	397	100
Delicate Movements	Normal	360	90.7
	One standard deviation below normal	34	8.6
	Two standard deviations below normal	3	0.8
	Total	397	100
Problem Solving	Normal	363	91.4
	One standard deviation below normal	25	6.3

	Two standard deviations below normal	9	2.3
	Total	397	100
Personal-Social	Normal	372	93.7
	One standard deviation below normal	21	5.3
	Two standard deviations below normal	4	1
	Total	397	100

Using the logistic regression model showed that there was no significant relationship between the domain of communication, delicate movements, problem-solving, and personal-social and gender, while a significant association was found between gender and the domain of gross movements and the chance of being abnormal in boys was 2.4 times of girls (Table 3).

Table 3: The Association Between the Development of Children Under Five Years Old and Gender Using Logistic Regression (Odds Ratio (CI 95%))

Sex	Communicate	Gross Movements	Delicate Movements	Problem Solving	Personal-Social
Boy	0.88 (0.43- 1.78)	2.38 (2.38- 5.93)	0.83 (0.42- 1.63)	0.6 (0.33- 1.37)	1.83 (0.79- 4.26)
Girl	Reference				

To assess the relationship between the development of children under 5 years old and the child's geographical regions using logistic regression showed that there was no significant difference between the probability of children not being normal between the east and west regions. The chance of abnormal "delicate movements" in children in the south region is 5.5 times of children in the west region [5.50 (1.16 - 25.97)], and the chance of children being abnormal in "problem-solving" in the south region is about 5 times of the west region [4.88 (23.35 - 1.02)] with a confidence interval of 95% (CI 95%), while no significant difference was found between the south and west regions in other domains of development of children. No significant difference was found between the center and the west of the city in the areas of communication, gross and delicate movements, but in the area of "problem-solving", and "personal-social" the chance of children living in the center of the city being abnormal was 5.5 times [5.5 (1.18- 26.35)], and 4.5 times [4.53 (1.22 – 16.76)] compared to the West region, respectively. The chance of abnormal "delicate movements" in children of the North region was 5 times of the children in the Western region [4.95 (23.69 - 1.03)]. However, no significant difference was observed between the two regions of the North and the West in other domains of the development of children (Table 4).

Table 4: The Association Between the Development of Children Under Five Years old and the Place of Residence Using Logistic Regression Using (Odds Ratio (CI 95%))

Geographical Regions	Communicate	Gross Movements	Delicate Movements	Problem Solving	Personal-Social
East	3.21 (0.8- 12.33)	1.33 (0.28- 6.16)	4.27 (0.87- 20.81)	4.27 (0.87- 20.81)	0.65 (0.10- 3.99)
South	1.68 (0.39- 7.32)	1.68 (0.39- 7.32)	5.50 (1.16- 25.97)	4.88 (1.02- 23.35)	1.33 (0.28- 6.16)
Center	3.67 (0.97- 13.89)	1.71 (0.39- 7.42)	4.33 (0.89- 21.11)	5.58 (1.18- 26.35)	4.53 (1.22- 16.76)
North	2.46 (0.61- 9.89)	2.08 (0.50- 8.63)	4.95 (1.03- 23.69)	2.60 (0.48- 13.82)	1.35 (0.29- 6.24)
West	Reference				

children whose fathers were self-employed, had more number of normal development than children whose fathers were employees or had other jobs. Specifically in the field of communication, the number of normal cases was at the highest value of 94.9% (187 people). Most of the mothers participating in the study were housewives, but the percentage of normal cases among the children whose mothers were housewives was almost equal to the children whose mothers were working, and there was little difference.

Regarding the relationship between different domains of development and parents' occupation, the results showed that the chance of being abnormal in the domain of "communication" in children whose fathers were self-employed (private job), was 60% lower than in children whose fathers had other jobs [0.39 (0.15 - 0.97) (Table 5). Data analysis using logistic regression showed no significant relationship between the parents' education and children's development.

Table 5: The Association Between the Development of Children Under the Age of Five and the Occupation of Parents Using Logistic Regression (Odds Ratio (CI 95%))

Relationship	Job	Communicate	Gross Movements	Delicate Movements	Problem Solving	Personal-Social
Father	Employee	0.99 (0.41- 2.35)	1.19 (0.27- 5.12)	0.60 (0.23- 1.57)	1.14 (0.36- 3.63)	0.399 (0.30- 3.24)
	Self-Employed	0.39 (0.15- 0.97)	2.19 (0.61- 7.80)	0.73 (0.32- 3.63)	1.86 (0.68- 5.11)	1.10 (0.38- 3.19)
	Other Jobs	Reference				
Mother	Housewife	1.14 (0.38-3.38)	3.47 (0.45- 26.33)	0.96 (0.35- 2.58)	1.61 (0.47- 5.47)	0.57 (0.20- 1.61)
	Employed	Reference				

The results of investigating the relationship between children's development and the punishment experience of the child's parents are presented in Table 5. Using the logistic regression model showed that there was no significant relationship between the experience of the father's punishment and children's development in the domains of "communication", "gross movements", "delicate" and "personal-social movements", but in the area of "problem-solving", the chance of being abnormal in children whose fathers did not experience physical punishment was 60% lower from other children [0.40 (0.16-0.99)]. Meanwhile, no significant relationship was observed between the experience of the mother's physical punishment and the children's development (Table 6).

Table 6: Investigating the Relationship Between the Development of Children Under Five years old and the Experience of Punishing the Child's Parents Using Logistic Regression

	Punishment	Communicating	Gross movements	Delicate movements	Problem Solving	Personal-social
Father	yes	1 (0.42-4.41)	0.69 (0.21-2.20)	0.80 (0.30-2.13)	0.50 (0.19-1.28)	0.69 (0.21-2.20)
	no	1.32 (0.43-4.07)	0.55 (0.18-1.68)	0.40 (0.67-1.70)	0.40 (0.16-0.99)	0.67 (0.22-1.98)
	I do not know					
Mother	yes	5.36 (0.64-44.40)	0.77 (0.12-4.89)	0.86 (0.19-3.86)	1.05 (1.05-3.81)	2.26 (0.45-11.36)
	no	2.65 (0.34-20.32)	0.94 (0.20-4.26)	1.01 (0.29-3.55)	0.54 (0.17-1.69)	0.77 (0.17-3.56)
	I do not know					

The results showed that there was a significant relationship between the age of the parents and the domain of gross movements [father: 0.91 (0.84-0.99), mother: 0.91 (0.85-0.98)] indicating that the chance of the child being abnormal in the field of gross movements decreases by 10% for every one year increase in the age of the father or mother.

In Total %68.6 (N=273) of children had a normal height, %71.5 (N=284) had a normal weight, and %84.8 (N=83) of them had normal head circumstances. There was no significant association between family income and children's height growth status (p=0.155), but a significant relationship was found between the geographical regions/ neighborhood and height growth status, indicating the percentage of height growth was lower or higher than normal in the southern region (P<0.001) (Table 7).

Table 7: Distribution of Height of Children Under Five Years Old Based on Residency and Family Income Status

Variable	Social class	Lower than normal, number (percentage)	Normal, number (percentage)	Higher than normal, number (percentage)	P-value*
Family Income	Enough	9 (8.6)	70 (66.7)	26 (24.8)	0.155
	Relatively enough	16 (8.1)	146 (74.1)	35 (17.8)	
	Insufficient	12 (12.6)	57 (60)	26 (27.4)	
Geographical regions	East	5 (6.3)	51 (63.7)	24 (30)	<0.001
	South	14 (17.5)	36 (45)	30 (37.5)	
	Center	5 (6.3)	63 (79.7)	11 (13.9)	
	North	7 (8.9)	58 (73.4)	14 (17.7)	
	West	6 (7.6)	65 (72.3)	8 (10.1)	

***Chi-square test/Fisher's exact test**

No significant association was found between parents' education, job, and the experience of punishment. Also, the results showed that there was no significant association between the height growth of children and birth rank (p=0.975), gender (p=0.509), and child's age (p=0.673).In total, 71.6% (N= 111) of 155 children whose fathers had higher education and 74.3% (N= 101) of 136 children whose mothers had higher education had normal weight. The most frequent underweight children belonged to those whose fathers and mothers' education was less than a diploma certificate respectively 18.9% (N= 24) and 19.6% (N= 22). There was no significant relationship between the father's education (P=0.516) and employment (p=0.700), and the mother's education (p=0.651) and job (p=0.411) with children's weight status. The highest

percentage of normal weight cases belonged to children whose fathers were self-employed or official staff (self-employed fathers 73.1% and self-employed mothers 72.6%) and children whose employed mothers (75% versus housewife mothers 71%). Comparing the findings of children whose parents experienced corporal punishment in childhood with those whose parents did not experience corporal punishment, showed that the normal weight cases were slightly higher in parents with punishment experience. However, no significant relationship was observed between parental punishment experience and children's weight status. As can be seen in Table number 7, family income had no significant relationship (p=0.111) with children's weight status, although a significant relationship was found between the neighborhood and children's weight status (p=0.008), indicating in the southern region, the number of normal weight cases was lower than other centers. The highest number of children with normal weight were in the north, center, and west regions (Table 8).

Table 8: Distribution of Weight Status of Children Less than Five Years Old Based on Geographical Regions and Family Income Status

Variable	Social class	Lower than normal, number (percentage)	Normal, number (percentage)	Higher than normal, number (percentage)	P-value
Family income	enough	16 (15.2)	72 (16.6)	17 (16.2)	0.111
	Relatively enough	29 (14.7)	151 (76.6)	17 (8.6)	
	Insufficient	17 (17.9)	61 (64.2)	17 (17.9)	
Geographical regions	East	14 (17.5)	52 (56)	14 (17.5)	0.008
	South	19 (23.8)	46 (57.5)	15 (18.8)	
	Center	6 (7.6)	62 (78.5)	11 (13.9)	
	North	9 (11.4)	63 (79.6)	7 (8.9)	
	West	14 (17.7)	61 (77.2)	4 (5.1)	

No significant association was found between birth rank (p=0.490), gender (p=0.863), and children's age with weight status (p=0.226). There was no significant association between children's weight status and parents' age, the total number of children, the number of males, and the number of female children less than 5 years old. There was no significant relationship between the father's education (P=0.788), mother's education (p=0.356), fathers' occupation (p=0.903), mothers' occupation (p=0.255), punishment experience of fathers (p=0.382) and punishment experience of mothers (p=0.214) with children's head circumference status.

As can be seen in Table No. 9, there was no significant relationship between children's head circumference and family income (p=0.140). A significant association was found between head circumference and geographical regions (p=0.017). Not a single abnormal head circumference was found in the northern region of the city while in the southern region of the city, 34.6% of children had abnormal head circumference. The highest number of normal head circumference cases and higher than normal (30.8 %) belonged to the central region of the city. There was no significant relationship between children's head circumference status (p=0.840), child's gender (p=0.596), and child's age (p=0.326) (Table 9).

Table 9: Distribution of Head Circumference Status of Children Under two Years Old Based on Geographical Regions and Family Income

Variable	Class	Lower than normal number (percentage)	Normal number (percentage)	Higher than normal number (percentage)	P-value*
Income	Enough	1 (2.9)	28 (80)	6 (17.1)	0.140
	Relatively Enough	12 (20.3)	34 (57.6)	13 (22)	
	Insufficient	5 (14.7)	21 (61.8)	8 (23.5)	
Geographical Regions	East	4 (15.4)	19 (73.1)	3 (11.5)	*0.017
	South	9 (34.6)	11 (42.3)	6 (23.1)	
	Center	1 (4)	19 (76)	5 (20)	
	North	0 (0)	18 (69.2)	8 (30.8)	
	West	4 (16)	16 (64)	5 920)	

*Chi-2 test/Fisher's exact

Discussion

This study was conducted to determine growth and development status and its related social factors in children under 5 years old. The findings of the present study showed that with regards to the developmental status of children, the most numbers of normal cases were in the domain of gross movements, and the chance of male children being abnormal in this area was 2.4 times of female children. In a study conducted by Afraz et al. (2012) to examine the developmental status of 4-24 months old children, the most developmental problems were observed in the field of gross movements, which was inconsistent with the results of the present study [13]. In Soleimani's study on 12 months old children, the highest prevalence of developmental problems belonged to the area of communication and the lowest prevalence belonged to the area of problem-solving [27]. In the study of Amir Ali Akbari 2009 in Isfahan, the highest amount of developmental delay was observed in the field of delicate movements and the lowest number in the personal-social field in a study in Isfahan (2009) [23], which is contrary to the present study. The cultural differences between families living in different regions could be one of the possible causes of these differences. Talking and playing with children could influence their developmental status in different dimensions, resulting in learning a particular skill better or sooner than other children in different geographical regions and cultures.

Zareipour et al conducted a study on children aged 6-12 months and reported the prevalence of developmental delay in participants as 18.8%, indicating the most and the least frequency related to communication and gross movements, respectively, which was inconsistence with the results of the present study [26]. This difference in the results can be due to the age difference of the participants. In the mentioned study, it was found that boys have more developmental delay than girls, which was in line with the results of the present study [26].

According to the findings of the present research, in the south region of Zanjan city, the chance of children being abnormal in the area of delicate movements was 5.5 times, and in the area of problem-solving was 5 times of children in the west area of Zanjan. In addition, in the area of problem-solving, the chance of abnormality of children in the central region was 4.5 times, and in the area of personal-social area, it was 5 times of the western region. The chance of abnormality of the children of the northern region in the area of delicate movements was 5 times of the children in the western region. Therefore, the children in the Western region of Zanjan had a better developmental status in problem-solving and personal-social areas compared to the central region, and in delicate movements' area compared to the Northern region of Zanjan. The prevalence of developmental disorders in children referred to health centers was reported as 12.4% by Nouh Jah in Dezful (2012). There was a significant relationship between developmental disorders and

gestational age, and the prevalence of developmental disorders in male children was higher than in female children (12.8% vs. 11.7%) [14] which was in line with the results of the current study. The findings of the present study showed that the distribution of height growth of children was different according to geographical region, and the southern region (with a lower level of socio-economic status) had the most abnormalities in height growth. Sarbisheghi Moghadam, in a study on 3-72 months old children, found that there is a significant association between the economic status and housing status of the family with children's developmental disorder [28], which was in line with the current research regarding the housing status, although regarding the economic status, it was uneven. This difference in the results could be due to the different tools and criteria used for measuring the economic status of the family, for example, in the present study, the adequacy of the family's income and geographical regions (which shows the economic status of the residents of that area) was used as the criteria for economic status, while in the reviewed study, the ownership status of the house was considered as a criterion, however, all of which can be indicative of the economic status of the family from different perspectives.

The results of the present study showed that the children in the south of Zanjan were more delayed in terms of growth than other regions, and underweight, short stature, and small head circumference were significantly more in the children of this region than in other regions of the city. Evidence of a study conducted in Bam and Barawat (2013) showed that children's developmental disorder has a significant relationship with the geographical regions, age and sex of the children [29], which was in line with the current study regarding the association between geographical regions and growth (in both studies the growth retardation was more in deprived regions), although it was inconsistent with results of the current study regarding the sex, age and birth rank. This variance in results could be probably due to the difference in the data collection method of the two studies. In Dartaj's study, the information was extracted through the existing data in the health centers, while in the present study, data was gathered through the examination of the participants and questionnaire prospectively by the researcher. Moreover, the research community in the Dortaj [29] research was a small city that had many destructive effects in the earthquake of 2012, so the socio-economic conditions of the residents of that area are still unfavorable and weak. In the current research, the residents of Zanjan city are investigated as a center of an industrial province, in terms of livelihood and ease of access to health centers and health care services, the conditions are much better and easier. In the current study, there was no significant relationship between birth rank, mother's age, mother's education, and mother's employment with children's growth status, which was in line with the results of Hasani and et al study [2]. The results of the study of Fesharaki (2013) showed that the child's gender and age, parents' education, birth rank, and mother's employment had no significant relationship with children's growth, which was in line with the results of the present study [30]. In Wahhabi's study, there was no significant relationship between gender and birth rank with child growth, which was consistent with the present study. But in the case of the mother's education and its association with a child's growth, it was inconsistent [6], which can be due to the difference in the research community and the age of participants. In addition, the most important difference between the Wahhabi study and the present study is the type of sampling; In Wahhabi's study, the existing data available in the health centers records was used which has own weaknesses, while in the present study, data were collected using the examination of the participants and filling questionnaire by researcher. No significant. Relationship between parents' occupation and the number of children in the family with children's height growth was reported by Davoudi in Hamedan (2013), which was in line with the present study. However, in the same study, the relationship between parents' education and children's height growth was significant which was not in line with the results of the current research [31]. This difference probably could be due to the variation in geographical region and the age of the children under study; Davoudi's study was conducted on primary school children, and information was collected through health centers records in schools, and children

were evaluated based on the National Center Health Statistics (NCHS) anthropometric criteria, which was different from the present study. In addition, in order to check the level of education of parents, the level of literacy of parents was categorized into illiterate, primary, secondary and higher education, which in the present study was categorized into their higher health literacy, diploma, and higher education.

Conclusion

The results showed that the majority of children (94%) had normal development in the area of gross movements, while about 91% of children had normal development in the area of delicate movements. The abnormal cases of development in the area of gross movements in baby boys were 2.4 times of baby girls. Developmental delay in personal-social area was more in central region of the city. The chance of abnormal development of children whose fathers were self-employed was 60% lower than other children in the field of communication, which can be due to the high communication skills of the father and the transfer of this skill to the children. Therefore, having knowledge and skills in parenting can help parents in all areas to raise healthier and more capable children. The most abnormal growth status was in the southern region. In the southern region, parents, especially mothers, had a lower level of education, which affects children's health. As mothers are the main caregivers of children under five years old, heir higher health literacy can provide healthy and nutritious food for the child and establish proper communication with the child, and by knowing the natural stages of development, delays in growth and development can be prevented. Holding training classes for parents can help them increase their ability to have healthy children which could result in a healthier child and a healthier society in the future.

The cross- sectional study design limitations, the weak likelihood of generalizability of the results to other communities, lack of cooperation of families and children to participate in the study to measure the growth and development of children simultaneously are some of the limitations of this study. Also due to the pandemic of Coronavirus, the participants did not attend comprehensive healthcare centers properly which resulted in delays in sampling and data collection. Insufficient resources and lack of accessibility to relevant studies and literature reviews were some other important challenges of this study which limited the comparability of the result of this study with wider literature

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Conflict of interest

Authors declare no conflict of interest.

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