

*Distribution of developmental delay
according to anthropometric measures
among children under two years of
age attending primary health care
centers in Tikrit city*

دراسة التأخر التنموي وفقاً لقياسات النمو البشرية
لدى الأطفال تحت سن السنتين المراجعين لمراكز الرعاية الصحية
الأولية في مدينة تكريت



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Introduction:

-Definition of developmental delay:

Developmental delay (DD) is a descriptive term utilized when a child's development is deferred in at least one territory contrasted

with other children. While global DD is the delay that occur in more than one domain. These diverse regions of development may include:

- Gross motor development: how children move, crawl, sit, stand or walk.
- Fine motor development: how children manipulate objects and use their hands for accurate fine movements and plays.
- Communication: how children convey, comprehend and utilize language.
- Problem solving: how children comprehend, think and learn.
- Social and emotional development: how children interact with others and create expanding autonomy.(1)

Caretakers end up mindful of defer when the child does not accomplish a few or the majority of the points of reference (milestones) at the normal age.(1)

Literatures vary in recognizing the correct prevalence rate of DD yet around every one of the writers share a similar supposition of the high number of influenced children with the expression that this issue is more common than any other classification of medical issues in pediatrics aside from the acute infections and trauma.(2)

In an investigation directed in USA in 2006-2008 by the CDC it was discovered that 17.1% of US kids have some sort of DD. This finding was relatively like the WHO appraisals of 15% of children globally anticipated that would have a developmental problem in 2008.(3)

Statistical data from developing countries are not sufficient to estimate the size of the problem, however, the institute of

child health in the university college of London published a series of three articles in 2007 about the developmental skills of children in the developing nations where it was shown that more than 200 million children under 5 years are not satisfying their developmental potential. The greater part of these children live in south Asia and sub-Saharan Africa. These hindered children are probably going to do ineffectively in school and in this manner have low earnings, high fertility, and give poor care to their own children, accordingly adding to the intergenerational transmission of poverty.(4)

Aim:

This study aims to identify the distribution of developmental delay according to anthropometric measures among children under two years of age attending primary health care centers in Tikrit city

Subjects and method:

It is a cross sectional study conducted on children under 24 months of age who were chosen by systematic random sampling from the children attending Ibn Rushd, Ibn Sina and Al-Razy primary health care centers in Tikrit city in Iraq during the period from February 2017 to January 2018. Their caretakers were interviewed and the children were tested for developmental delay problems by the Ages and Stages questionnaires third edition.

Results:

-Distribution of study sample according to different parameters and frequency of developmental delay:

The total children included in the results analysis were 311; this sample was categorized into two categories according to each of the studied parameters, which were children's head or occipito-frontal circumference (OFC), length,

weight, and others. Numbers and percentages are shown in table (1).

Total children with any kind of DD was found to be 130 (41.8%), while children with global DD, i.e. with a delay in two or more of the developmental domains were 39 (12.54%).

On the other hand, the most common DD type was in the gross motor domain with 55 (17.68%) children affected, followed by fine motor and social/emotional domain with 40 (12.86%) children affected for each, then the problem solving domain with 29 (9.32%) children and finally the communication delay with the least number of children affected 16 (5.14%).Table (2).

Table (1): Distribution of study sample according to the studied parameters.

Factor	Details	Number	Percentage
Head circumference	Low OFC	58	18.64%
	Normal OFC	253	81.35%
Length	Short	60	19.29%
	Normal	251	80.7%
Weight	Underweight	62	19.93%
	Normal	249	80.06%

Table (2): Percentages of developmental delay.

Developmental delay domain	Number	Percentage
Total children with developmental delay	130	41.8%
Total children with communication delay	16	5.14%
Total children with gross motor delay	55	17.68%
Total children with fine motor delay	40	12.86%
Total children with problem solving delay	29	9.32%
Total children with social/emotional delay	40	12.86%
Children with global developmental delay	39	12.54%

-Distribution of developmental delay according to children's anthropometric measures:

- Regarding the children's head circumference, it was found that children with low OFC are more commonly affected by DD than those with normal OFC measures, that is 33 (56.89%) of the low OFC children having DD problems compared to 97 (38.33%) of the normal OFC children. This finding was highly significant statistically ($P=0.009$). The statistically significant differences were found in the gross motor and problem solving domains. Table (3).

Table (3): Distribution of developmental delay according to child head circumference.

Domain	Low OFC		Normal OFC		Chi square	P-value
	Delay	Normal	Delay	Normal		
Communication	1 (1.72%)	57 (98.27%)	15 (5.92%)	238 (94.07%)	1.709	0.191
Gross motor	17 (29.31%)	41 (70.68%)	38 (15.01%)	215 (84.98%)	6.619	0.01
Fine motor	9 (15.51%)	49 (84.48%)	31 (12.25%)	222 (87.74%)	0.448	0.503
Problem solving	10 (17.24%)	48 (82.75%)	19 (7.5%)	234 (92.49%)	5.284	0.021
Social	7 (12.06%)	51 (87.93%)	33 (13.04%)	220 (86.95%)	0.039	0.841
Overall DD	33 (56.89%)	25 (43.1%)	97 (38.33%)	156 (61.66%)	6.678	0.009

- Regarding the children's length, it was found that children with short stature are more commonly affected by DD than those with normal lengths, that is 28 (46.66%) of the short children having DD problems compared to 102 (40.63%) of the normal length children. This was insignificant statistically. The statistically significant differences were found in the communication, gross motor and problem solving developmental domains. Table (4).
- Regarding the children's weight, it was found that underweight children are more commonly affected by

DD than those with normal weight, that is 28 (45.16%) of the underweight children having DD problems compared to 102 (40.96%) of the normal weight children. This finding was insignificant statistically. The statistically significant differences were found in the gross motor and problem solving developmental domains. Table (5).

Table (4): Distribution of domain-specific developmental delay according to child length.

Domain	Short stature		Normal stature		Chi square	P-value
	Delay	Normal	Delay	Normal		
Communication	9 (15%)	51 (85%)	7 (2.78%)	244 (97.21%)	14.796	<0.001
Gross motor	25 (41.66%)	35 (58.33%)	30 (11.95%)	221 (88.04%)	29.371	<0.001
Fine motor	4 (6.66%)	56 (93.33%)	36 (14.34%)	215 (85.65%)	2.545	0.110
Problem solving	12 (20%)	48 (80%)	17 (6.77%)	234 (93.22%)	10.02	0.001
Social	7 (11.66%)	53 (88.33%)	33 (13.14%)	218 (86.85%)	0.094	0.758
Overall DD	28 (46.66%)	32 (53.33%)	102 (40.63%)	149 (59.36%)	0.723	0.395

Table (5): Distribution of domain-specific developmental delay according to child weight.

Domain	Underweight		Normal weight		Chi square	P-value
	Delay	Normal	Delay	Normal		
Communication	3 (4.83%)	59 (95.16%)	13 (5.22%)	236 (94.77%)	0.014	0.903
Gross motor	19 (30.64%)	43 (69.35%)	36 (14.45%)	213 (85.54%)	8.935	0.002
Fine motor	7 (11.29%)	55 (88.7%)	33 (13.25%)	216 (86.74%)	0.171	0.679
Problem solving	10 (16.12%)	52 (83.87%)	19 (7.63%)	230 (92.36%)	4.240	0.039
Social	4 (6.45%)	58 (93.54%)	36 (14.45%)	213 (85.54%)	2.839	0.092
Overall DD	28 (45.16%)	34 (54.83%)	102 (40.96%)	147 (59.03%)	0.359	0.548

Discussion:

-Frequency of developmental delay:

This study showed a high percentage of DD of 41.8%. This finding was much higher than what is known globally from different studies of percentages ranging from 1.5-20.3%. (5-10) However, some of the studies among children in developing countries revealed much higher percentages like a study conducted in Ghana in 2013 which resulted in a DD

percentage of 44.6%(11), and a study conducted in India with a total DD percentage of 46.8%.(12)

This high percentage in this study is attributed to the following:

- The internal displacement crisis in Iraq and especially in these areas like Tikrit city where this study took place.
- The ages of the study sample (below 24 months) during which the DD problems are more common than older children age ranges with which most of the studies deal, like school aged children studies.(13)
- The differences in sociodemographic characteristics of children in this study with others from different studies so that poverty, low socioeconomic status and bigger families are all contributing to the higher frequency of the problem.

-Distribution of developmental delay according to children's anthropometric measures:

A statistically significant difference in the frequency of DD was found among those children with low OFC (56.89%) compared to those of normal OFC measures (38.33%). This agrees with findings from other studies were the most common developmental disability among low OFC children was in the intellectual and language domains.(14,15)

This relation is now attributed to the close relation between head circumference and the brain growth in the first 24 months of life which is evident in the microcephalic small for gestational age babies who have intellectual disabilities more frequent than children from the same ages with normal head circumferences.(16)

Another growth indicator studied is the length or height of children, where it was found that short stature is significantly related to communication, gross motor and problem solving developmental domains. This result agrees with findings from other studies which stated that stunting is an important factor in estimating the risk of DD.(17,18)

This effect of short stature could be attributed to the fact that it is one of the indicators of chronic undernutrition for children.

The last anthropometric measure used in this study is the children's weight. In general, there was no statistically significant relation between low body weight and DD except for the gross motor and problem solving domains. Although this finding is supported by a similar result from the previously mentioned Kenyan study(17), it may be explained by the fact that the low score of weight for age is an indicator of an acute illness which may be a direct cause of lower developmental achievements.

Conclusions:

1. The percentage of developmentally delayed children in Tikrit city was (41.8%).

2. There are heterogeneous contributing factors that are related in one way or another to the developmental outcome.
3. DD was more common among stunted (46.66%), microcephalic (56.89%) children.
4. Underweight children were more commonly affected by DD problems in the gross motor and problem solving domains.

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