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Risk Factors of Growth Faltering among 3-36 Months Old Children in Ahwaz, Iran

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Abstract

Background & Aims: Malnutrition is defined as nutritional disorders or unfavorable health status that can be the result of overconsumption or under consumption of one or more nutrients. The causes of malnutrition are complex, multidimensional, and population specific. United Nations Children's Fund (UNICEF) has adapted a conceptual framework for facilitating researchers in determining the causes of malnutrition in each area. The aim of this study was to determine some risk factors of growth faltering among 3-36 month old children in Ahwaz, Iran.

Methods: This case-control study was conducted on 180 children 3-36 months old in Ahwaz. The subjects were children whose growth curves were horizontal or downward for at least two recent consecutive months. The controls were children with upward growth curves. Data collection was done by face to face interview, family file at the health centers, and direct measurements (mainly for anthropometric measurements). Data analyses were performed by SPSS software. Moreover, chi-square, Mann-Whitney, Kolmogorov-Smirnov, Student's t-test, and logistic regression were statistical tests which were used according to the type and distribution of the variables.

Results: From household variables, the number of family members (P=0.013), number of siblings (P=0.012), and mother's educational level (P=0.019) showed significant association with growth faltering. Among child variables, the child's age (P<0.001), child's birth order (P=0.031), and birth interval with the next child (P=0.004) had significant relationships with growth faltering. Of the child health care variables, the mother's child care status (P=0.017), and the mother's nutritional knowledge (P=0.006) had significant relationships with growth faltering. Finally, the pattern of child nutrition (P<0.001), and the age of starting weaning (P < 0.001) showed significant differences between the two groups.

Conclusion: This study revealed that the child nutritional pattern, number of family members, number of siblings, child's age, child's birth order, birth interval with the next child, mother's educational level, mother's child care status, mother's nutritional knowledge, and the age of starting weaning were related to child malnutrition in Ahwaz. Therefore, appropriate intervention strategies, according to these findings, should be considered by health and other relevant sectors in order to control the problem of childhood malnutrition.

Keywords: Growth faltering, Risk factors, 3-36 month old children, Iran

Introduction:

Malnutrition is any deviation from normal nutritional state or any poor health condition that can be induced by over and under intake of one or more nutrient (1, 2) .The first and great manifestation of malnutrition in children is growth faltering. Growth faltering can be defined as insufficient physical body growth or inability to maintain desirable growth in a certain period; this can be reflected in child growth chart as deviation from normal and standard curves (3-5).

Failure to thrive is one of the most public health problems and more prevalent in first two year of age. There is in all socioeconomically strata, but in poor urban and rural households is more prevalent (3). Malnutrition is stem stone of growth faltering. Reasrchers have devoted more attempts to detecting malnutrition causes, risk factors and finally designing appropriate international strategies. Malnutrition is multifactorial, multidimensional and its determinants are complex and interrelated. Understanding of its causes is essential and critical for problem solving. Because we need to reduce high present prevalence of child malnutrition (3,6). In regard to its high prevalence in Asian countries, attempts to finding causes and determinant algorithm based on UNICEF s conceptual framework in any country or area is essential. Taking appropriate strategies according to earned knowledge is suitable and most effective (6,7). In this study risk factors regarding 3-36 month old Childs growth in AHWAZ from IRAN have studied.

Materials &Methods:

This case-control study conducted on 180 children aged 3-36 month old in east and west health centers of Ahwaz.180 Childs (84cases and 96 controls) were included randomly.childs were included in study that have no genetic inborn ,maternal, hormonal disorders and also lack of cardiovascular,renal,diabetic and etc disease states. Childs were included that they were quietly normal and well been physiologically.

Cases were children whose growth curves were horizontally or downward for at least two recent consecutive months. Controls were Childs with upward growth curves. Two groups were matched based on sex and numbers. Data collection was performed by a questioner that had several items as household child properties ,maternal,primery health care properties, mother care status, food intake pattern and also household socio economical status.

In primary health care facilities section variables such as child weightening status, vaccination status, frequency of mother's visits during pregnancy, primary health care acquiring status was assessed.

In mother's child care pattern: mother's nutritional literacy, mother's attitude for child weightening, child nursing pattern was assessed.

In food intake pattern: exclusive or non exclusive breastfeeding pattern for under 6-months old Childs, supplementary feeding pattern for Childs above 6-months old were assessed.

In household properties variables such as number of family members , sibling numbers , son and daughter numbers , father and mother literacy level , father and mother occupation type, father and mother race , most dominant language for dialog in household, residency status and residency duration for households was analyzed.

in child properties variables such as sex , child's dominant speaking language , age , birth weight , current weight and height , child birth order , birth interval with previews and next child , any history of diarrhea and acute respiratory infections , parents willing status regarding sex and child bearing.

In maternal characteristics variables such as mothers marriage age ,child bearing age of mother, current mother's weight ,mothers weight before pregnancy, mothers height, BMI, well-being status and mother decision-making power in family were assessed.

In socioeconomic status: mean households income (presented by mother), house-possessing status, room numbers and father's attendance times were assessed.

Also for data extracting referred to households health documents. Supplementary feeding pattern were assessed by a 24h-diet recall. In this regard Childs were stratified in 3 categories; **1-** Childs with sufficient and appropriate dietary intake **2-**childs with insufficient dietary intake **3-**child with lack or little intake during past 24 hours. Sufficient or appropriate intake was defined as intakes according to normal or standard desirable values from allowed dietary groups

for child's age. Childs with insufficient intake have intakes above 50% and fewer than 100% of desirable values from allowed dietary groups for child's age. Lack or little intake was intakes under 50% of desirable values from allowed dietary groups for child's age.

Mother and child's weight and height were measured in situ by SECA health scales.BMI and

birth intervals were calculated based on health documentary data. Data analysis was performed by SPSS11.5 software. Kolmogrove-smirnove test was performed for assessing variables normality distribution .T-test was performed for quantities and Man-Whitney test for qualities' variables. Finally all extracted significant variables were analyzed by logistic regression.

Results:

From 180 studied Childs, 87 Childs (48.3%) were from east and 93 Childs (51.7%) were from west area of AHWAZ. 89 Childs (49.6%) were male and 91 Childs (50.6%) were female. Other statistics and results based on characteristic categories are as below:

Household characteristic: from variables that studied in this section, differences in numbers

Of family members, sibling numbers was significant between two groups. (P=0.013) mean numbers for these two variables in cases were higher than controls. In cases group mean mothers literacy was higher than control group and differences were significant.

Table1-differences between two groups based on household properties variables

Variables	Controls	Cases	p-value
Number of family members	3.69±1.10	4.15±1.33	0.013
Sibling numbers	1.63±1.10	2.15±1.38	0.013
Son numbers	0.92±0.82	1.11±1.00	0.166
Daughter numbers	0.83±0.84	1.06±0.94	0.092

Other variables in this section such as son and daughter numbers, mean father literacy, parent

occupation, race, speaking language and residency status were not significant

Table2- differences between two groups based on household properties variables

	Mothers literacy level				
	Illiterate	Primary level	Guidance level	Under graduate	Post graduate
Case	7.14%	36.90%	9.52%	33.33%	13.09%
Control	7.29%	36.45%	26.04%	26.04%	4.16%

Child characteristic: Mean Childs age in case group was higher than control groups. Mean age of growth faltering in case Childs were 12.5±6.7 months.

Significant Childs variables were Childs age (p=0.00), birth order (0.031), birth interval with next child. (p=0.016) Other variables such as

child dominant speaking language, child sex, birth weight, past history of diarrhea and acute respiratory infections, pregnancy and sex willing or non- willing were not significant.

Table3- differences between two groups based on child's quantities variables

Variables	Controls	Cases	p-value
Child age (month)	10.78±7.41	17.13±7.24	0.000
Birth weight(gr)	3119.68±422.78	3124.14±543.78	0.918
Current weight(gr)	8835.52±2281.09	9643.57±1902.13	0.011
Current height(cm)	71.24±9.48	77.88±8.25	0.000

Table4- differences between two groups based on child's qualities variables

Variables	Controls	Cases	p-value
	Category mean	Category mean	
Birth order	83.43	98.53	0.031
Birth interval with next child	96.12	84.08	0.004
Birth interval with previous child	94.00	96.50	0.085

Maternal characteristic: None of variables in this section was significant. Studied variables were mother's marriage age, child bearing age, current weight and height, prepregnancy weight

Studied variables in this part were child weightening and vaccination status, number of mothers visits during pregnancy period, primary health care facility acquiring type.

Mother's care giving status: Differences between two groups based on these variables were significant. (p= 0.01) in this section also differences based on mothers nutritional literacy

and BMI, mother's well-being status, mother decision making power.

Primary health care characteristic: None of variables in this section was significant.

level was significant. (p= 0.006) other differences based on mothers weighed attitude (p=0.16), child nursing pattern (p=0.76) between two groups were not significant. Child age in starting supplementary nutrition between two groups showed significance.(p=0.00)

Table5- differences between two groups based on mother's care giving status

Variables	Controls	Cases	p-value
Mother care giving score	2.2±0.60	2.40±0.67	0.033
Mothers nutritional literacy score	3.80±4.84	1.75±4.98	0.006
Child nursing score	6.33±3.69	6.15±4.26	0.764

Child food intake: 17.8% of studied Childs were under 6-months old that were distributed between two groups. From this 32 Childs 19 Childs have exclusive breastfeeding until study time and 13 Childs have non exclusive breastfeeding. For remaining Childs in two groups data was as below:

In cases 8% have adequate and enough intake, 62.7% have inadequate intake, 27.7% have lack or little intake. In control groups 44.6% have adequate intake, 46.2% with inadequate intake, and 9.2% with lack or little intake. Data analysis between two groups based on above differences showed significance. (p=0.00)

Table6 - differences between two groups based on supplementary feeding starting age

	Childs age at starting time of supplementary feeding					
Groups	Non started	<4	4-6	6-12	12<	Total
Case	0	5	32	45	2	84
Control	22	3	25	45	1	96
Total	22	8	57	90	3	180

Table7- differences between two groups based on supplementary food intake

	Child supplementary food intake			
Groups	Adequate	Inadequate	Lack or little intake	Total
Case	8	52	23	83
Control	29	30	6	65
Total	37	82	29	148

Socio-economic status: None of variables studied in this section were significant. Studied variables were mean household income (based **Discussion:**

on mother's statement), house-possessing status, room numbers and father's attendance times.

Study was conducted for detecting child growth faltering determinants and causes. Results showed that from household characteristic variables: number of family members, sibling numbers, mothers literacy levels were correlated with child growth faltering. From child properties variables: child's age, birth order, birth interval with next child was correlated with child growth faltering. From mother's care giving status variables, mothers nutritional literacy level, mothers nursing pattern were correlated with child's malnutrition and growth faltering. From child food intake pattern variables: starting age of supplementary feeding, child food intake pattern was correlated with child growth faltering.

AHWAZ is multi race city with Arab, Lor and Fars and some other minority races. There was not any significant difference between two groups based on race. In other former studies from Iran also no significant differences have been reported. Number of family members and sibling numbers obviously can affect income sharing between each individual inside family and so any increment in family size and members can induce a potentiate risk on household (8).

Differences between two groups based on numbers of family members and sibling numbers was significant. These results were same with results from other previous studies from Iran, for example, in studies from rural areas of Kerman (9), Khoramabad (10) and in under 2 years old Childs from Sari (11). But in two studies in Kermanshah (12) and Arak (13) on 3 years old child have not been seen significant correlation between groups based on above mentioned variables.

Mother's literacy is a context for mothers learning and understanding ability. Low literacy level affects learning power and can limit individualization of educated subjects, so this can reduce mother's nutritional literacy (5). In this study comparing two groups based on both mothers general and nutritional literacy showed significant differences between groups. In previous studies from Birjand (14), Sari (11), Bandar Abas (15), Kerman (16) in Iran significant differences have been reported based

on mothers literacy levels, but in other studies from Kermanshah(12) and Arak (13). such differences have not been seen. In studies from Uganda (17,18), Bangladesh (19), Ghana (20) and Nigeria (21) effects of mother's literacy level on child growth faltering pattern have been showed. Based on mother's nutritional literacy variables in studies from Iran in Gilan (22), Amol (5) and Zahedan significant differences between studied groups were showed.

From Childs variables, differences based on child's age, birth order, birth interval with next child in this study was significant. These results were same with other studies from Iran and other countries. Many studies from Iran and other countries have showed increasing rate of child malnutrition and growth faltering after starting age of supplementary feeding at 7-months old. In this study child's with growth faltering were predominantly 6-24 months old. Studies from Khoram Abad (10) rural areas, Nahavand (23) in Iran and studies from rural and urban areas from India (24), west Kenya (25) has showed same results. But in studies from Kermanshah (12) in Iran and Brazil (26) conflicting data have been reported.

High birth order indicates high child-bearing frequencies in family and this can yield in high sibling numbers, which can affect mother's child care-giving pattern. In these states care and physiologic power divides between Childs and reduction in care can take place. Frequent child bearing occurs after lacking of appropriate child intervals. Studies also have showed affects of child's birth order on growth faltering pattern. For example studies from Kerman (9), Kermanshah (12) in Iran and Indian rural and urban areas (24) has showed same significances. Birth interval between present and previous child have been studied in other studies and its correlation with growth faltering have been reported.

In studies from Iran (Lorestan and Zahedan), Saudi Arabia's rural areas (27), Nigeria (21) negative effect of inappropriate birth interval have been presented. Correspond with this study results from other studies such as Amol rural areas study in Iran, Kenya (28) study have showed mother care giving affects on 3-36

moths old child's malnutrition and growth faltering. Results from this study are in parallel with studies from Gilan (22), Kerman (9), Zahedan, and Arak (13) rural areas, Nahavand (23) from Iran, also with studies from other countries such as Kenya (west Kenya study(25)) based on affects of mother care giving pattern and starting age of supplementary feeding (8).

Access to primary health care facilities as one of public health indicators was studied. In counterpart with other previous studies from Iran in Bandar Abbas (15), studies from Nigeria (21), West Kenya (25) didn't showed significant difference. In these mentioned studies child weightening and vaccination status were been reported in correlation with child's malnutrition and growth faltering.

This study revealed that child's food intake pattern is strongly correlated with child's growth status. Results from this study were corresponding with those from Amol (5) in Iran, rural areas from Malawi (29) and Ghana (20).

In this study didn't see correlation between household's socio economic state and growth faltering. Non significant studied variables in this section were mean households income, house possessing state, residential room numbers and father's attendance times. Although in other studies in Iran from Lorestan (10), Birjand (14), Kermanshah (12), Takestan (30), Kerman (16) households income were been seen correlated with child's growth status. In studies from Bangladesh (19), South India (24) significant correlations between household's incomes with child's growth status have been reported.

Finally all of observed significant variables from this study can be put in UNICEF's conceptual frame work for child malnutrition and growth faltering as below:
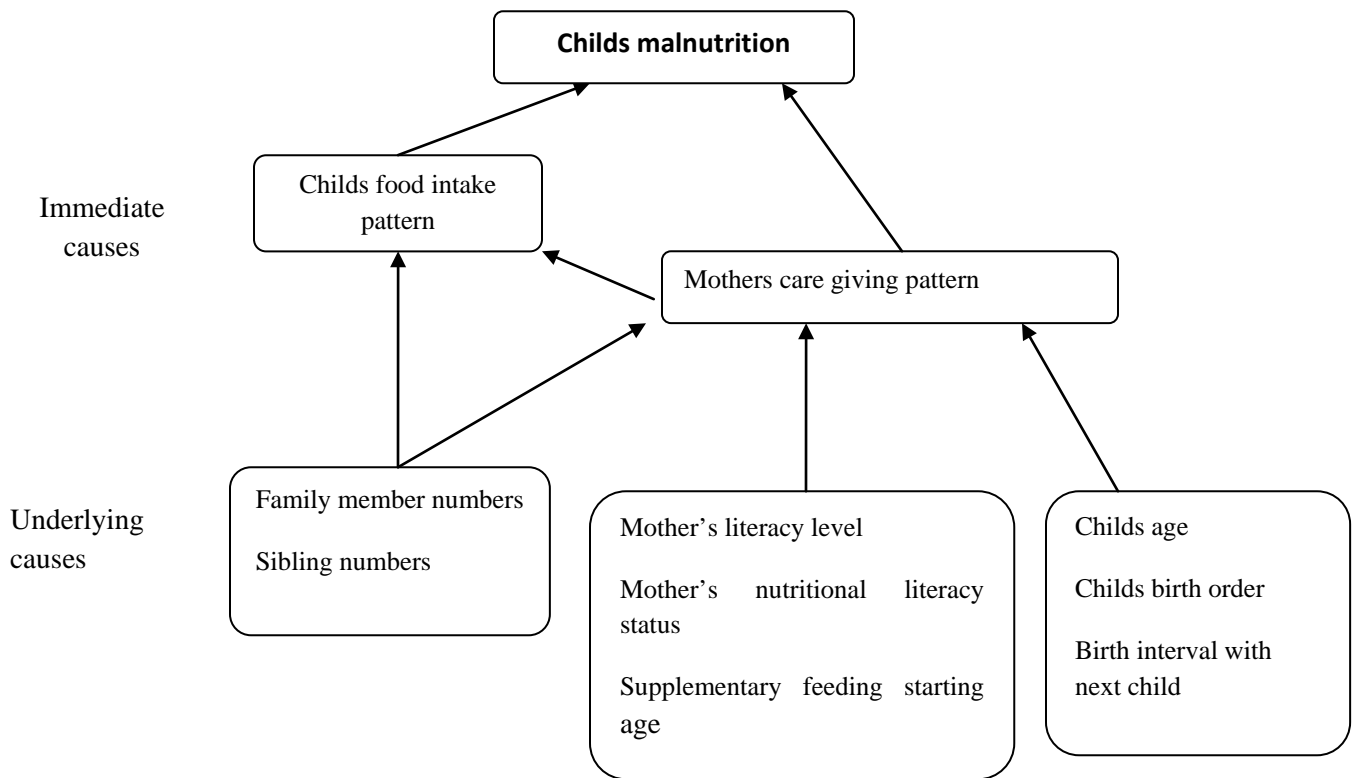
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