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Infant and Young Child Feeding Practices, Dietary Diversity and their Association with Nutritional Status of Nomadic Children under 5 Years of Age

Muhammad Rizwan Majeed[1], Allah Rakha[2], Sundas Khalid[1], Fahid Nazir[1], Mohammed Nayeem[3], Muhammad Nasir[1]

[1]National Institute of Food Science and Technology, University of Agriculture, Faisalabad, Pakistan
[2] Associate Professor, National Institute of Food Science and Technology University of Agriculture, Faisalabad, Pakistan
[3] National Institute of Food Technology, Entrepreneurship and Management, Haryana, India

Muhammad Rizwan Majeed (First Author)
National Institute of Food Science and Technology, University of Agriculture, Faisalabad
Mohammed Nayeem (Corresponding Author)
National Institute of Food Technology, Entrepreneurship and Management, Haryana, India

Abstract: -

Background:

Poverty, migration and illiteracy among nomads could be leading cause of poor infant and young feeding practices (IYCFP) and poor dietary diversity which may lead to poor nutritional status. The objective of this study was to examine the effect of IYCFP and minimum dietary diversity (MDD) on stunting and wasting among nomadic children under 5 years of age living in district Layyah.

Methodology:

In this cross sectional study, 102 mothers and children participated from 3 tehsils of district. It was a structured questionnaire-based study and the selection of population was made on single stage cluster sampling technique. Anthropometric measurements were applied to all participants. Questionnaire comprised of inquiries about socio-economic status, IYCFP according to WHO and UNICEF guidelines. Assessment of minimum dietary diversity was drawn from food frequency questionnaire-24h. Chi-square test was applied for analyzing associations.

Results and Discussion:

This study found out that 44% of the families were living below poverty line and literacy rate among mothers was merely 8%. Average age of children was 2.3 years. The stunting and wasting rates were 48% and 19% respectively. It was anticipated that early initiation of breastfeeding significantly determined the exclusive breastfeeding (p=0.0) and continuation of breastfeeding for longer period of time (p=0.0). Exclusive breastfeeding and MDD significantly impacted stunting among children (p=0.04) while early initiation of breastfeeding (p=0.0.3) and frequency of snacks consumption (p=0.04) analyzed a significant effect on wasting.

Conclusion:

It was determined that the quality of IYCFP was low, and that even some indicators at high rates relative to national rates had no influence on nutritional status. The customized designed training tailored with sustainable livelihood plans and befitted with nomadic lifestyle can be found a way to improve quality of IYCFP and nutritional status.

Keywords: *Nomads, Dietary Diversity, Nutritional Status, Breast Feeding.*

I. INTRODUCTION

Good infant and young child feeding practices (IYCP) have consequential impact on the growth and nutritional status of the children. Breastmilk is an ideal food for the infants aged between 0-6 months. Starting varied and safe complementary feeding around the age of 6 would prevent the child from undernutrition. It is estimated that 41% of the children worldwide are exclusively breastfed while the number of children breastfed within first hour of birth is also 41% (1). It has been strongly researched that poor IYCFP are linked to childhood malnutrition. About one third of total 9.7 million childhood deaths are linked to malnutrition (2

Dietary diversity (DD) is referred to the nutrient adequacy in term of micro and macro nutrients and to diet variety which are the component of diet quality (3). DD can be the indicator of food security acting as an intermediary variable, on one hand, dependent on socio-economic factors, on the other, predictive of nutritional status (4). The main condition for human survival is to get the food from the environment.

The nomad is a member of a tribe that moves with its animals from place to place. It was reported that about 50-100 million people worldwide are nomads and semi-nomads (5). There is no census on the population of nomads in

Pakistan. Nomadism is the most common in environments that are highly variable and limited in resources. Hence, nomads are unfortunate to be marginalized in every society around the world (6). The most of the problems concerning nomadism are still far from being resolved (7). One major problem among nomadic children is poor IYCFP which have key role in the occurrence of malnutrition. Breastfeeding is though a natural action but it is a behavior which is need to be learned. Nomadic mothers usually do not get active assistance to learn the optimum IYCFP.

Nomadic families are male dominant and women are socially and economically poor. The health culture of nomadic women is very poor and they face lack of health facilities, political and economic problems (8). Women of these families suffer the most as they earn the beard by doing odd jobs like selling bangles, handmade toys from wood, Sarkanda (*Saccharum munja*) and bamboo shoots, picking up trash, begging in streets and bazars for the food and money (9,10). Breastfeeding rates decline due to women's participation in the labor market and a lack of understanding about the advantages of the practice and management of lactation issues (11,12). As the nomadic mothers are illiterate and lack nutrition knowledge, there is more probability of poor IYCFP and higher rates of malnutrition among children (13,14,15,16,17,18,19).

Nomadic people are dependent on their environment for getting food which may be called as famine food resources as these people constantly remain at starvation level. Moreover, due to poverty and illiteracy, nomadic diet is mostly consisted of cereals and grains while the food from animal sources, fruits and vegetable consumption is rare (20). This lack of diet diversity is the cause of malnutrition among children as compared to the settled community (18). Stunting (height for age) among children can lead to poor cognitive and motor development, and low school performance while wasting and stunting cumulatively can set about poor immunity to diseases (21,22,23). As the nutritional health of children under five is a major factor in household well-being and child survival (24). This study focused on determination of quality of IYCFP, MDD and their impact on the nutritional status of nomadic children under 5 years of age.

II. MATERIALS AND METHODS

Study design and samples

The study was designed as structured questionnaire-based survey. The selection of population was made on single stage cluster sampling technique to collect the data. The clusters were Tehsils with the defined geographical boundaries.

The study was conducted in three tehsils of district Layyah between 10 March, 2021 to 15 April 2021. The total area of district is 6289 Square kms. According to census 2017, population density is 290 persons per square km while the total population is 1.8 million. This region is situated in the West of Punjab and it is less developed having levels of poverty than the Northern or Central Punjab (25). Mothers having children under 5 years of age were interviewed about the IYCFP and 24-hour FFQ with consent. There were 102 mother-infant pair selected for the study.

A pilot survey was done to identify and address the problems which would affect the actual study. Inappropriate questions and procedures were modified to make possible the smooth collection of data.

Ethical consideration

The study was approved by Directorate of Graduate Studies, University of Agriculture, Faisalabad vide No. DGS/ 8273.76.

Inclusion and exclusion criteria

Inclusion criteria

Inclusion criteria is defined as the key characteristics of the target population which are used to assess the research question. Following are inclusion criteria of this study. In social research, age is a significant factor. It has an impact on a person's actions and behaviors at various phases of life. The children aged between 6 to 60 months old were included in this study. The children below 6 months of age are usually on exclusive breastfeeding or substitutes. As a result, the formula of MDD cannot be applied to these infants. It is well understood that nomadic life necessitates migration. Their livelihood is related to their movement. Some nomads spend more than a season or a year in one location. The study included nomads who migrated during a six-month period.

Exclusion criteria

Exclusion criteria is defined as the characteristics those disqualify prospective subjects from inclusion in the study. Semi-nomads were excluded from the study who live in portable or temporary houses and migrate seasonally, but who also have a base camp where some crops are grown. Pregnant women were also excluded as certain dietary habits, food intake, and weight of women are altered during pregnancy, which may modify responses.

Anthropometric measurement

Weight of the child was measured to the nearest of 0.1kg. Length/Height of the child was measured to nearest of 1 cm. Length was measured by lying down the child on length board while height was measured by standing the child upright. Children under age of 2 years were subjected to length measurement. Generally, length of the child is 0.7cm higher than height (26). Height of the children under 2 years was formulated by following equation.

Height= Length – 0.7 cm

Similarly, height and weight of the mother was also measured to estimate the impact of BMI of mother on IYCFP.

Questionnaire

Questions regarding the socio-economic status such as education level of mother, number of earning hands and livestock asset were asked. The determination of poverty

line was done using Cost of Basic Needs (CBN) method. Pakistan's Planning Commission developed a new poverty threshold based on the Cost of Basic Needs (CBN) approach, which focuses on the spending patterns of reference group households. It initially calculates a food poverty line (FPL) by averaging the food expenditures of the reference group's households. This food expenditure can be translated into a specific calorie intake, which may or may not deviate from the country's minimal caloric threshold. If the two differ, the final FPL is calculated by scaling calories and expenditure to the chosen nutritional criterion. After that, the CBN considers non-food expenditures (such as clothes, shelter, and education) that are important for households. To do so, it focuses on households that can meet the FPL in full at their current level of food spending. To obtain the CBN poverty line, the FPL is then scaled up to reflect the entire expenditure of these households. It was created at 30 USD per adult person's earnings, which was equal to 4700 rupees at the time of study [27].

According to WHO and UNICEF recommendations questions regarding the early initiation of breastfeeding, duration of exclusive breastfeeding, time of commencing complementary feeding and minimum meal frequency (MMF) were asked.

Determination of MDD

Food Frequency questionnaire was used to examine the dietary history of the nomadic children. The collected data of different food was sub-divided into 7 food groups *i.e.*, grains, roots and tubers; legumes and nuts; dairy products; flesh foods (meat, fish, poultry and organ meats); eggs; vitamin-A rich fruits and vegetables; other fruits and vegetables. Consumption of foods from at least four food groups on the previous day was meant as MDD (28).

Statistical analysis

The collected data was analyzed using IBM SPSS 22.0. Assessment of HAZ and WHZ among children under 5 years of age was completed through WHO Anthro 3.2 which categorized on WHO standard data of growth among children. Chi-square test was used to calculate the significance of categorical variable.

III. RESULTS

There were 105 children participated in the study from all clusters of district Layyah. Out of 105 responses, 3 were found to be missing responses and dropped immediately. Mean age for the children was 2.3 years and nearly half (46%) of the children were having their siblings under the age of 5 years. 53% of the families were comprised of more than 5 members and 56% of the nomadic families were living below the poverty line. The great majority, 92% of the mothers were illiterate and 16, 47,39% mothers were aged between <20, 21-30 and 31-40 years respectively. 73% of the household had 1 earning hand while 27% were having 2 or more than 2 earning hands. 38% of the households had milk giving animals. 29% of the mothers didn`t breastfeed their child. Remaining mothers who breastfed their children, 36% initiated feeding within first hour of birth, 30% started breastfeeding the baby within first day of birth while 4% of the nomadic mothers breastfed their babies within first month of birth.

Table 1: Socioeconomic, IYCFP and nutritional status of nomadic children and their mothers in region Layyah, 2021

Characteristics	N	N%
Poverty Status		
Above Poverty	57	56
Below Poverty	45	44
Age of the mother		
20 or <20 years	16	16
21-30 years	47	46
31-40 years	39	38
Education level of the mothers		
Literate	8	8
Illiterate	94	92
Family size		
<5 members	48	47
5 or >5 members	54	53
Number of earning hands		
1	74	73
2 or >2	28	27
Milk giving animals		
Yes	39	38
No	63	62
Early Initiation of breastfeeding after birth		
Within an hour	37	36
Within first day	31	30
Within first month	4	4
No breastfeeding	30	29
Exclusive Breastfeeding for First 6 months		
Yes	34	33
No	24	24
May be	6	6
Don`t know	8	8
No Breastfeeding	30	29
Continued breastfeeding (months)		
Up to 6	15	15
6-12	28	28
12-24	28	28
>24	1	1
No breastfeeding	30	29
Age of start of complementary feeding (months)		
4-6	59	58
6-8	43	42
Number of snacks consumed by child (last 24 hours)		
1	22	21
2	40	39
3	19	19
No Snacks	21	21
Number of meals consumed by child (last 24 hours)		
1	4	4
2	18	18
3	46	45

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No Major Meal	34	33
Minimum dietary diversity		
<4 major food groups	37	36
4 or >4 major food groups	65	64
Iron-rich foods consumption		
Yes	16	16
No	86	84
Height for age (HAZ)		
< -2 SD	47	46
2 or >2 SD	55	54
Weight for height (WHZ)		
< -2 SD	20	20
2 or >2 SD	82	80
BMI of mother		
<18.5	40	39
18.5-24.99	48	47
25 or >25.0	14	14

It was observed that 15, 28 and 28% of the mothers extended breastfeeding of their children for the period of up to 6m, 6m to 12m and 12mto 24m of the age respectively. Only 2% of the mothers continued to breastfeed for more than 24 months. It was also made out that 58% of the mothers started the complementary feeding at the age between 4-6m while 42% of the mothers did it at the age of 6-8m. It was distinguished that 21% of the infant refrained from any snack in last 24h while 22,39 and 18% of the children ate up 1,2 and 3 snacks in a day respectively. A few numbers of children (6%) weren`t having any major meal. Else ways, 19,47 and 28% of the children were having 1,2 and 3 major meals respectively. The children using iron-rich food on frequent basis was figured out to be 16%. It was determined that 36% of the children did not receive a minimum of 4 of the 7 food groups specified as a cut-off value for MDD.As per WHO definition of stunting, 46% of the children were having HAZ below -2 SD while 54% of them were fallen in normal range for HAZ. It was calculated that 20% of the children found to have WHZ below -2 SD. BMI of the mothers was measured as 39% of the mothers having BMI lower than 18.5, 14% were overweight having BMI more than 25 while 47% of the mothers were having the BMI in the normal range of 18.50-24.99 (Table 1).

Early initiation of breastfeeding estimated a significant impact on the exclusive breastfeeding for 6 months and continuation of breastfeeding for the period of a year or more (p=0.00, p=0.00) (Table 2).

Table 2: Association between early initiation of breastfeeding and other breastfeeding indicators

IYCFP	Socioeconomic Status and BMI of Mother					p-value
Early initiation of breastfeeding	Exclusive Breastfeeding for first 6 months					0.00
	Yes	No	May be	Don`t Know	No Breastfeeding	
Within an hour	19	9	2	6 2	0 0	
Within first day	13	12	4	0	0	
Within first month	1	3	0	0	30	
No breastfeeding	1	0	0			
Early initiation of breastfeeding	Breastfeeding Continued (months)					0.00
	Up to 6	6-12	12-24	> 24	No breastfeeding	
Within an hour	8	12	16	1	0 0	
Within first day	6	15	10	0	0	
Within first month	2	1	1	0	30	
No breastfeeding	0	0	0	0		

It was seen that the age of mother and number of children under 5 years of age has a significant impact on the early initiation of breastfeeding (p=.01), (p=0.01). Household income and presence of milk giving animal in household during the period of start of complementary also feeding had significant effect on the time of start of complementary feeding (p=0.05, p=0.05). Number of earning hands had an effect on number of snacks consumed per day (p=0.01) and BMI of mother also had a significant effect on exclusive breastfeeding (p=0.00) Table (3).

Table 3: Association between BMI of mother and Socio-economic status and IYCFP

IYCFP	Socioeconomic Status and BMI of Mother			p-value
Early initiation of breastfeeding	Age of the mother (years)			0.01
	20 or <20	21-30	31-40	
Within an hour	2	17	18	
Within first day	11	10	10	
Within first month	0	3	1	
No breastfeeding	3	17	10	
Exclusive breastfeeding for first 6 months	Number of children under 5			0.01
	1		2 or > 2	
Yes	27		7	
No				

May be	11	13	
Don`t know	3	3	
No Breastfeeding	2	6	
	12	18	
Age of starting complementary feeding (months)	Household Income		0.05
	Below Poverty Line	Above Poverty Line	
4-6	28	31	
6-8	31	14	
Age of starting complementary feeding (months)	Milk giving animal		0.05
	Yes	No	
4-6	27	32	
6-8	12	31	

Number of snacks consumed in last 24 hours	Number of earning hands				0.05
	0	1	2	3	
1	18	19	26	16	
2	3	2	14	6	
>2	0	1	0	2	

Exclusive breastfeeding for first 6 months	BMI of mother			0.00
	<18.5	18.5-24.99	25 or >25	
Yes	4	22	8	
No	10	13	1	
May be	6	0	0	
Don`t know	7	1	0	
No Breastfeeding	13	12	5	

There was indication of exclusive breastfeeding for 6 months had a significant effect on stunting among children (p=0.04) Table (4).

Table 4: Association between IYCFP and HAZ-score of children under 5 years of age

Infant and young child feeding practices	HAZ-score		p-value
Exclusive breastfeeding for first 6 months	Below -2 SD	Above -2 SD	0.04
No breastfeeding at all	17	13	
Yes	9	25	
No	13	11	
May be	2	4	
Don`t know	6	2	

The results found that early initiation of breastfeeding and number of snacks consumed in last 24 hours had a significant impact on wasting among children (p=0.03), (p=0.03) (Table 5).

Table 5: Association between IYCFP and WHZ-score of children under 5 years of age

Infant and young child feeding practices	WHZ-score		p-value
Early initiation of breastfeeding	Below -2 SD	Above -2 SD	0.03
No Breastfeeding at all	7	23	
Within 1 hour	6	31	
Within 1 day	4	27	
Within 1 month	3	1	
Number of snacks consumed in last 24 hours	Below -2 SD	Above -2 SD	0.03
0	9	14	
1	1	21	
2	7	33	
3	3	14	

Minimum dietary diversity (MDD), the consumption of less than 4 food groups out of 7, had impact on stunting among children (p=0.04). However, the impact of MDD on wasting was found to be non-significant (p> 0.6) (Table 6).

Table 6: Association between Minimum dietary diversity and WHZ-score, HAZ-score of children under 5 years of age

Minimum dietary diversity	Z-score value		p-value
MDD	HAZ-score		0.04
	Below -2 SD	Above -2 SD	
Yes	25	22	
No	40	15	
MDD	WHZ-score		0.69
	Below -2 SD	Above -2 SD	
Yes	12	8	
No	53	29	

IV. DISCUSSION

Early initiation of breastfeeding and exclusive breastfeeding of children below six months are considered the most decisive indicators for assessing breastfeeding practices (2). Pakistan Health and Demographic Survey (PHDS) indicated the number of children breastfed within first hour and first day of delivery 27 and 66% respectively (29). Delay in initiation of breastfeeding has been considered as a risk factor for neonatal mortality. A study confirmed that 22% of death could be averted by the initiation of early breastfeeding within first hour of birth (30). National Nutrition Survey (NNS) of Pakistan demonstrated that 48% of the infants were exclusively breastfed during the first 6 months of age (33). Similarly, a study performed in India showed that 59% of the infants were exclusively breastfed during first 6 months of age (34). Another study also explained the similar percentage (60%) of exclusively breastfed infants (35). The reason for lower proportion of breastfeeding among nomads can be continuous migration as the respondents were the nomads who migrate at least once in period of six months (36). Other traditional factors such as uvulectomy on the infant and bathing of the mother for 40 days can be the reason for lower percentage of exclusive breastfeeding (37). In present study, 58% of the households started complementary feeding at the age of 4-6 months while 42% of the infants were provided with breastfeeding at the age of 6-8 months. There can be anxiety, stress, conflicting information and lack of knowledge about the introduction of solid food among parents which significantly alter the decisions for the initiation of complementary feeding (39). It was found that only 36% of the nomadic infants were receiving a meal with MDD while NNS of Pakistan indicates the MDD to only 14%. The reason to better MDD might be due to dependency on the environment for acquiring of food. The nomadic mothers are involved in labor work and other odd jobs like begging. Moreover, the presence of milk giving animals, food production at household level for livelihood and fetching the remaining food at some traditional and religious ceremonies. In this study, it was concluded that stunting and wasting among nomadic children was 46 and 20%. According to NNS 2018 of Pakistan, there are 40 and 18% of the children were stunted or wasted respectively. The higher percentage of stunted and wasted children among nomads can be attributed to poverty, illiteracy, women involvement in labor market, constant migrations, poor IYCFP and poor water, sanitation and hygiene (WASH) situations (42,43,44,45,31).

The presence of any milk giving animal at household and household income were founded to be associated with the early start of complementary feeding. Another outcome has also been identified by study that the frequency of snack consumption is associated with wasting among children (38). The more consumption of snacks may provide the extra source of energy for nomadic infants which causes the weight increase ultimately leading to lower prevalence of wasting among the nomadic population.

Analysis of our study showed that the early initiation of breastfeeding after delivery was found significantly associated with WHZ-score. Colostrum is the first milk that is rich in immunoglobin G. A number of studies founded that the infants who do not receive the colostrum are more likely to be wasted, stunted and underweighted (46,47). Furthermore, it has been confirmed by several studies that early initiation of breastfeeding prevents onset of infections, diarrhea and increases the chances of survival of the children (31,32). It was concluded that exclusive breastfeeding has significant impact on the HAZ-score of the infants. A study performed in Indonesia explained through multivariate analysis that stunting among children was significantly associated with non-exclusive breastfeeding (2). Another study conducted in Nepal profound through odd ratio as a mean of association that inappropriate exclusive breastfeeding and exclusive breastfeeding less than 4 months were associated with stunting among children (48). The present study indicated that MDD was associated with stunting among children of nomads. A sufficient number of studies confirmed that MDD was associated with the stunting among children (40,41).

V. CONCLUSION

The stunting and wasting rate among nomadic children observed was 46 and 20% respectively. The higher percentage of stunted and wasted children among nomads can be attributed to poverty, illiteracy, women involvement in labor market, constant migrations, poor IYCFP and poor water, sanitation and hygiene (WASH) situations. It was concluded that exclusive breastfeeding and MDD has significant impact on the stunting of the infants. The early initiation of breastfeeding after delivery and availability of a greater number of snacks was found significantly associated with wasting. In accordance with the results of present study, it is suggested that the special program to circumvent marginalization from the mainstream population and education about IYCFP at a maintainable period of time

should be delivered. A sustainable and skilled livelihood source should be provided through public-private partnerships to avoid economic constraints in achieving better food security, dietary diversity and WASH conditions.

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