ORIGINAL ARTICLE

NUTRITIONAL ASSESSMENT FOCUSING ON WOMEN AND CHILDREN IN PALAS VALLEY-KOHISTAN

Romana Irshad, Ayesha Khan*, Adeela Mustafa**, Umer Farooq***

Department of Pathology, *Department of Surgery, **Department of Community Medicine, Khyber Medical College, Peshawar,
***Department of Community Medicine, Ayub Medical College, Abbottabad-Pakistan

Background: Proper nutrition and health are fundamental rights and nutrition is a cornerstone that affects and defines the health of all people, rich and poor. The study was done with the objectives to assess the people of Palas valley with regard to their nutritional status and dietary habits to devise ways and means to overcome primary and associated reasons for these problems. **Methods:** In this descriptive cross-sectional study residents of Palas valley of district Kohistan were included in the study through multistage cluster sampling method. The Palas valley was divided in to two: Kuz Palas (Lower Palas) and Bar Palas (Upper Palas). Two union council each from Kuz and Bar Palas were randomly selected Among the households, one adult male, one woman of childbearing age, one male child and one female child was selected randomly. **Results:** A total of 160 adult and children were interviewed and assessed for the nutritional status. Out of total of 80 children 61 (76.25%) had visible BCG scars. Among children 77.5% were either thinly built or had poor built. Among male adults 95% were of normal built. In adult females, 60% were either of thin built or poor built. Twenty-two percent of male children and 30% of female children were found underweight. Fourteen (35%) males and females have a BMI between 17.1–18.5 while only 6 (15%) of the females have BMI more than 18.5. **Conclusion:** Poverty and illiteracy in the absence of effective social and health services is playing havoc with the population of Palas valley. Poor sanitation and poor personal hygiene expose them to infections and parasitic diseases. Poor availability of food, lack of awareness and tough customs and traditions expose lead to malnutrition.

Keywords: Nutrition; Nutritional assessment; Palas Valley; Kohistan

INTRODUCTION

Proper nutrition and health are fundamental rights[1] and nutrition is a cornerstone that affects and defines the health of all people, rich and poor. It paves the way for us to grow, develop, work, play, resist infection and aspire to realize our fullest potential as individuals, and, as societies[2].

The ultimate goal of every society in development is to build human capabilities and enlarge human choices: to create a safe and secure environment where citizens can live with dignity and equality.[3] To achieve these goals defeating disease and ill health is of paramount importance. Well-fed people are synonymous with overall development. That is the reason that nutritionists have come out of their laboratories to assess the communities' needs and devise ways and means to overcome problems. Their efforts are usually frustrated by the facts that food cannot be procured without money. The forgotten men at the tip of economic pyramids are the obvious sufferers.

This particular study was undertaken in the Palas valley of district Kohistan, NWFP Pakistan. Palas Valley is situated in the Kohistan district of NWFP. It is one of the most isolated and deprived districts in Pakistan and is located in the heart of Himalayas from 34.40–30.35 degrees latitude and from 75.30–50.72 degrees longitude. The total area of district is 7,492 square kilometres. The capital lies at Dassu and the district is further divided into 3 Tehsils namely Palas, Pattan and Dassu for administrative purposes. According to 1981 census, the population of the district is about one million. Clinical, anthropometric and diet survey methods of nutritional assessment were employed for this study. There has been very little available as records in the context of this study as far Palas valley is concerned.

The study was done with the objectives to assess the people of Palas valley with regard to their nutritional status and dietary habits to devise ways and means to overcome primary and associated reasons for these problems in a cost effective and practical way in the long term by adopting the approach of community participation and a respect for the social norms without compromising the ecological balance.

MATERIAL AND METHODS

This was a descriptive cross-sectional study. The residents of Palas valley of district Kohistan KPK,

Pakistan were included in the study through multistage cluster sampling method. The Palas valley was divided in to two: Kuz Palas (Lower Palas) and Bar Palas (Upper Palas). Two union council each from Kuz and Bar Palas were randomly selected. In the next stage one village each from the union councils was randomly selected. On reaching the village investigators randomly selected the first house and then completed the cluster of ten most adjacent houses by interviewing the households. Among the households, one adult male, one woman of childbearing age, one male child and one female child was selected randomly.

Three questionnaires were developed keeping in view the objectives of the study:

1. Questionnaire for all the members of the sample with regard to Nutritional Assessment
2. Questionnaire for all the members of the sample with regard to dietary habits and diet recall
3. Questionnaire for households only about their knowledge, attitude and practices with regard to nutrition and other related matters

All the three questionnaires were field tested twice, once in Haripur and once in Mansehra, before adopting final versions for printing.

RESULTS

A total of 160 individuals were interviewed and assessed. The table-1 shows the breakup of the sampled population.

Out of total of 80 children 61(76.25%) had visible BCG scars whereas 19 (23.75%) did not have a BCG scar. BCG scar shows vaccination against tuberculosis carried out immediately after birth.

Table-2 gives an account of the frequency and percentages of general appearance by age and sex. Among children 77.5% were either thinly built or had poor built. Among male adults 95% were of normal built. In adult females, 60% were either of thin built or poor built.

Hairs of most of the adults were normal. Whereas in children 16% had thin and sparse hairs, 21% had lack of lustre of hairs and 31% of children had hairs that could be easily plucked. Thin and sparse hairs, hairs with lack of lustre or easily pluckable hairs are indicative of protein energy malnutrition.

Most of the adults, i.e., 79% had normal faces by appearance. In children, 26% had diffuse depigmentation and 26% had naso-labial dyssebacea. Frequency of naso-labial dyssebacea among adults was recorded as 17%. Abnormalities of skin of the face are pointers towards the deficiency of a variety of Vitamins of B complex.

Eighty-nine percent of children had pale conjunctiva. Observation of pale conjunctiva among adult females was 77.5%. Among adult males 30% had pale conjunctiva. The overall observation was 72%. Dryness of conjunctiva or Bitot's spots was not observed.

Fifty-two percent of children were observed with hazy or opaque cornea. Overall dryness of the cornea was 10.6% among all ages and sexes.

Angular stomatitis, an inflammatory condition at the angles of mouth, was observed in 52.5% children and 20% of adult females. Angular stomatitis indicates deficiency of Riboflavin a member of Vitamins of B complex. Twenty-six percent of children had red and raw tongues, whereas 30% of children had fissured tongues. 50% of adult females and 32.5% of adult males had red and raw tongues denoting deficiency of some vitamins of B complex.

Twenty-two percent of children and 25% of adults had mottled enamel of teeth. Mottled enamels indicate excess of Fluorine. Nineteen percent of children and 25% of adults carried dental carries. Dental carries are usually associated with the deficiency of Fluorine. No enlargement of parotid gland was observed. The thyroid enlargement was observed in 8.75% of children and 3.75% of adults. Enlargement of thyroid gland is an indication of Iodine deficiency. Dry and scaly skin was observed in 45% of children and 43.75% of adults. Follicular hyperkeratosis was observed in 33.75% of children and 25% of adults. Dry skin and follicular hyperkeratosis is found in a variety of micronutrient deficiency.

Koilonychia, an indication of advanced stage of Iron deficiency anaemia, was observed in 20% of adult females. Two male children, four female children, one male adult and one female adult were observed with oedema of the dependent parts. There could be many causes of oedema but as far nutritional status is concerned it is found in protein deficiency. No rachitic changes were observed. Rachitic changes mean presence of rickets characterised by the deformity of bones in children suffering from Vitamin D deficiency.

Weights and heights were recorded in the case of all children and the data was compared with WHO reference data. Those children were declared low weight for age (underweight) whose measurements were below 2 Z-scores compared with the median for that particular age group from the reference data. Table 3 shows data as frequencies and percentages for low weight for age in children by sex.

Twenty-two percent of male children and 30% of female children were found underweight. Two male children and one female child had wasting. Those children who were 2 Z-scores below the median of the reference population were declared as low weight for height (wasting). Wasting indicates acute malnutrition.

One male child and two female children were found low height for age (Stunted). Children with 2 Z-scores below the median for height of the particular age group of the reference population were declared as low height for age (stunted). Stunting denotes chronic malnutrition.

Mid upper arm circumference (MUAC) were measured in children under-five and above one year of age. It remains the same for children between age one and five years. Below 12.5 centimetres show malnutrition. Table-4 gives an account of data in this regard. 36.7% of male children (1–5 year) and 46.9% of female children had MUAC below 13.5 cm. Weighs and Heights of adults were measured and BMI was calculated, Table-5 shows data of BMI in adult males and females.

The respondents were asked to state their usual dietary habits. They were provided with a list of food components and were asked to state the frequency with which they eat those food components. The food components were milk, eggs, meat, poultry, fish, cereals like maize, wheat and rice, pulses, vegetables and fruits. They were also asked about the consumption of for any additional item not provided in the list. Table-6 gives an account of the frequencies of consumption of food components in predefined categories ranging from occasionally to thrice a day.

This shows that most of the respondents eat wheat once a day in the breakfast, maize twice a day in lunch and dinner. The data implies that the staple diet is maize in almost all the cases. Usual associated dish with maize is either red kidney beans or green vegetables depending upon the season.

Mainly male adults consume fruits outside in bazaars once or twice a week. Children and females eat fruits occasionally.

Male adults consume meat and chicken when they visit the nearby bazaars, usually once a month. Children and women consume meat and poultry occasionally. There is no consumption of fish. Rice is consumed weekly or fortnightly. Some children consume milk and eggs whereas the rest and adults consume such items occasionally.

Dietary recall method was used to assess the food consumption patterns Respondents were asked to what they consumed in the breakfast last day. Table-8 depicts frequencies of dietary items consumed in breakfast by different age groups and sexes. Most of the respondents had two cups of tea with a wheat flour chapatti. Children of lower age were given milk. About diet recall with regard to lunch the data is depicted in table-8.

Most of the respondents had maize with red kidney beans and green vegetable. Some had lassi also. Frequencies about the consumption of food in dinner are given in table-9.

There was no difference between lunch and dinner. The staple diet turns out to be maize and associated dish is invariably red kidney beans.

Table-1: Break-up of the sampled population by age and sex

Less - 1 yr		1–5 yrs		5–14 yrs		15–45 yrs		More - 45 yrs		
M	F	M	F	M	F	M	F	M	F	**Total**
2	3	30	32	8	5	30	27	10	13	160

Table-2: General appearance by age and sex

	Male Child		Female Child		Male Adults		Female Adults		Total	%age
	Total	%age	Total	%age	Total	%age	Total	%age	Total	%age
Normal Built	10	25	8	20	38	95	16	40	72	45
Thin Built	25	62.5	29	72.5	2	5	17	42.5	73	45.6
Poor Built	5	12.5	3	7.5	0	0	7	17.5	15	9.5
Total	40	100	40	100	40	100	40	100	160	100

Table-3: Low weight for age (underweight) in children of both sexes

Male Children		Female Children	
Total	Low W/A	Total	Low W/A
40	9(22.5%)	40	12(30%)

Table-4: Mid upper arm circumference of children 1-5 by sex

MUAC	Male	Female
Above 13.5 cm	19 (63.3%)	17 (53%)
12.5–13.5 cm	8 (26.7%)	10 (31.25%)
Below 12.5cm	3 (10%)	5 (15.75%)
Total	30	32

Table-5: BMI in adults by sex

BMI	Males	Females
Below 16	0 (0%)	9 (22.5%)
16.1–17	2 (5%)	11 (27.5%)
17.1–18.5	14 (35%)	14 (35%)
Above 18.5	24 (60%)	6 (15%)
Total	40	40

Table-6: Dietary habits by age and sex

Food Component	1 a day		2 a day		3 a day		1 a week		2 a week		1 a month		Occasionally	
	C	A	C	A	C	A	C	A	C	A	C	A	C	A
Milk	0	0	11	0	0	0	40	40	0	0	0	0	0	0
Pulse	10	0	70	80	0	0	0	0	0	0	0	0	0	0
Vegetables	11	0	69	80	0	0	0	0	0	0	0	0	0	0
Fruits	0	0	0	0	0	0	0	25	0	15	80	0	0	40
Meat	0	0	0	0	0	0	0	0	0	0	0	12	80	68
Chicken	0	0	0	0	0	0	0	0	0	0	0	16	80	64
Fish	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rice	0	0	0	0	0	0	61	51	19	29	0	0	0	0
Wheat	69	80	0	0	0	0	0	0	0	0	0	0	0	0
Maize	0	0	69	80	0	0	0	0	0	0	0	0	0	0
Eggs	11	0	0	0	0	0	49	0	0	0	0	0	20	80

*C=Children   A=Adult

Table-7: Diet recall – Breakfast by age and sex

Food Items	Children		Adults	
-	Male	Female	Male	Female
Tea – Cup	30	28	40	40
Wheat – Chapatti	30	28	40	40
.Milk	10	12	0	0

Table-8: Diet recall – Lunch by age and sex

Food Items	Children		Adults	
-	Male	Female	Male	Female
Maize	35	34	40	40
Red Kidney Beans	33	30	38	37
Lassi (Buttermilk)	08	12	12	15
Saag (Greens)	02	04	02	03
Milk	05	06	0	0

Table-9: Diet recall – Dinner by age and sex

Food Items	Children		Adults	
-	Male	Female	Male	Female
Maize	35	34	40	40
Red Kidney Beans	33	30	38	37
Lassi (Buttermilk)	08	12	12	15
Saag (Greens)	02	04	02	03
Milk	05	06	0	0

DISCUSSION

The available literature and according to the observations of the investigators of this study, it may be safely concluded that Palas Valley is one of the most backward areas of this country. Communications are very poor with few link roads in a very tough terrain. There are linkages by traditional paths that can be covered by foot only or animals for transportation (donkeys) involving uphill climbing most of the time. Therefore, transportation of food items from outside remains a problem. The infrastructure for health, social and education sectors, is almost non-existent. Poverty is widely prevalent with little opportunities of employment. Most of the populace is faced with abject poverty. The life pattern is somewhat nomadic with biannual migration between highlands and lowlands. They heavily depend upon their livestock and subsistence farming. Livestock is usually the source of hard cash rather than food. Among a few crops are maize, beans and green leafy vegetables. There are walnut trees with good production but it is also a source of cash. There are a variety of plants in the forests having nutritional and medicinal value but lack of awareness hampers the full exploitation of these resources. Womenfolk work overtime to assist in farming, taking care of the cattle, household activities and collection of wood for fuel. Literacy is very low and almost zero percent among the females.[4]

The results of this particular study are based on a small sample of 40 houses of four villages due to time and resource constraint coupled with the inaccessible nature of the area. But this study, though on a small scale, is still consistent with what have been documented by previous observers. Moreover, the results in most cases are consistent with what should be expected from a backward area. The results are not alarming but this may just be the tip of the iceberg.

The nutritional assessment is based on clinical observations, anthropometry and diet surveys. Tests like, Haemoglobin, urinary thiamine, urinary riboflavin, urinary Iodine, stool for worms and occult blood, and serum retinol levels, would have been more conclusive but due to constraints in the form of resources was a major obstacle. Being a cross sectional study, caution must be exercised to interpret these results but nonetheless they may prove a great pointer towards the prevalent situation in the Palas Valley as far their nutritional status is concerned.

The survey population included children and adults of both sexes individually and as households. It was noted that most of the adult women were wearing dark clothes. Such practices in dress expose them to the deficiency of vitamin D, due to less exposure of body to sunlight, which may manifest itself in the form of osteomalacia or soft bones[5]. Such a disease in women of childbearing age may complicate the course of pregnancy and delivery.[6] Though this study could not detect osteomalacia in women for social reasons, but observations of Dr. Amir Hamza states its prevalence among women to the tune of 50%. If his observations are taken on face value it could be concluded that Vitamin D deficiency is widely prevalent and may be due to the dress practices.

Women and children were either of thin or poor built, which may be the good work of widespread malnutrition and paucity of health and social services.
As far the observations of the hairs, face, lips and tongue is concerned, the results show that deficiency of different members of vitamin B complex is present due to overall low consumption of diet.

The observation of conjunctiva reveals that most of the population especially women and children are anaemic. Some women also had koilonychias, a manifestation of advanced stage of iron deficiency anaemia.[7] The anaemia may be attributed to the nutritional status mainly due to the deficiency of dietary iron. Moreover, keeping in view the status of poor sanitation and poor personal hygiene, worms infestation[8] cannot be ruled out.

The dryness of cornea of eyes was also observed, which may be due to the deficiency of vitamin A.[9] Vitamin A deficiency may be present but in the absence of appropriate tests it could not be established on the results of this study.

Though no abnormality of gums was observed but it should not exclude vitamin C deficiency and other gum disorders because of the small size of the sample.

Rachitic changes were also not observed in the children of relevant ages but due to the reasons stated as above it should not exclude altogether the deficiency of vitamin D in children.

There were cases of dermatosis and hyperkeratosis, which may be due to the deficiency of a variety of macro and micro nutrients. The classical dermatitis, diarrhoea and dementia of pellagra were not observed. But keeping in view that the staple diet of Palas valley people is largely maize, deficient in Niacin, with little support of other nutrient intake, there may be cases of Niacin deficiency though not of the magnitude to manifest itself as pellagra, a fully developed Niacin deficiency disorder.

There were cases of mottled enamel and dental caries both in children and adults. This may be attributed to poor dental hygiene rather than the play of fluorine deficiency or excess.

Enlargement of thyroid gland was found in a small number of children and adults. Being a hilly area exposed to glaciers and floods, there may definitely be iodine deficiency, which could have been evaluated by more extensive and exclusive study of goitres along with urinary Iodine levels. Nonetheless, it implies that iodine deficiency disorders may be prevalent.

Some cases of oedema in the dependent parts were also observed in children, which may be attributed to protein deficiency and maize diet.[10] Protein deficiency may be present in milder form not manifesting itself as Kwashiorkor.

The anthropometric studies of children reveal that 22% of male children and 30% of female children were underweight as compared to overall situation in Pakistan in which 31% of children are underweight. This is an unusual finding when we look at the overall results of our study. Wasting and stunting were not observed in many children. Mid upper arm circumference (MUAC) measurement shows that 47% of children 1–5 years of age had MUAC below 13.5 cm pointing towards total energy malnutrition. Cases of stunted children and those with wasting were not many. Lack of observation in stunting and low but not very low figures of underweight may be due to ignorance of the populace with regard to the recall of correct age of children. The figures anyway imply that protein energy malnutrition is prevalent in the children.

The Body Mass Index of adults show that 85% of women had a BMI below 18.5 and 50% had it below 17.5. Among them 22.5% had a BMI below 16, which is an indicator of severe malnutrition when we compare it to the overall situation in Pakistan it is much worse as according to the nutritional survey of Pakistan 2011, 18% of Women aged 15–49 years are under weight.[11]

This implies that the womenfolk are grossly malnourished depicting the overall social status of woman

The dietary habits of Palasi people are almost universally the same. Data reveals that in the breakfast they drink two or more cups of tea with a wheat bread. Breastfed children or a bit older one contends with milk. At lunch and dinner, they eat maize breads either with boiled beans or if available green leafy vegetables as curry. Some also consume lassi (buttermilk). Rice is consumed once a week or fortnightly. The consumption of staple diet on the face seems to be sufficient.

Adult males when visit the nearby bazaars eat fruits, meat and chicken occasionally. Children and women only have the opportunity to eat meat when some animal is sick and is slaughtered or there is an occasion like Eid festival.

Eggs are occasionally given to children and rarely to women. Fish, which is in abundance in the river and streams of the valley, fail to attract Palasis as food. This implies the low intake of animal proteins in all ages and sexes.

The food habits show that there is very little variety of food consumed. Though sufficient amounts of maize are consumed but no consumption of meat, poultry, eggs, fish, fruits and vegetables, other cereals and other pulses expose them to a variety of deficiency disorders. These deficiency disorders could be of proteins, fatty acids, Vitamin A, Vitamin D, Niacin, Thiamine, Riboflavin, Vitamin B_{12}, Vitamin C, Iron, Calcium and Iodine. Though this study has not revealed a lot many deficiency states, which may be attributed to the small sample size and lack of biochemical assessment methods rather than the lack of these disorders.

CONCLUSION

In the light of above discussion, it may be concluded that poverty and illiteracy in the absence of effective social and health services is playing havoc with the population of Palas valley. Poor sanitation and poor personal hygiene expose them to infections and parasitic diseases. Poor availability of food, lack of awareness and tough customs and traditions expose lead to malnutrition states of a variety of nutrients both macro and micro nutrients. Lack of knowledge and a will to exploit their own available resources is another factor contributing to the overall gloomy scenario.

AUTHORS' CONTRIBUTION

RI: Conceived study, collected data and did literature review and data analysis. AK: Helped in literature review, data analysis and writeup. AM: literature review and Writeup. UF: Conceived the study, supervised data collection and writeup

REFERENCES

1. UN. Universal Declaration of Human Rights article. 25(1). UN Doc. A/810. General Assembly Resolution 217A. 1948.
2. Pol JLV, Schuftan C. No right to food and nutrition in the SDGs: mistake or success? BMJ Glob Health 2016;1(1)e000040.
3. Singh AR, Singh SA. Diseases of Poverty and Lifestyle, Well-Being and Human Development. Mens Sana Monogr 2008;6(1):187–225.
4. Palas Conservation and Development Project, Baseline Data Report, from data collected during Himalayan Jungle Project, 1999-2000. [Internet]. [cited 2018 Jan 15]. Available from: http://www.palasvalley.org
5. Mithal A, Wahl DA, Bonjour JP, Burchardt P, Dawson-Hughes B, Eisman JA, et al. Global vitamin D status and determinants of hypovitaminosis D. Osteoporos Int 2009;20(11):18017–20.
6. Mithal A, Kalra S. Vitamin D supplementation in pregnancy. Indian J Endocrinol Metab 2014;18(5):593–6.
7. Fawcett RS, Linford S, Stulberg DL. Nail abnormalities: clues to systemic disease. Am Fam Physician 2004;69(6):1417–24.
8. Kumar G, Vaidyanathan L, Stead LG. Images in emergency medicine. Koilonychia, or spoon-shaped nails nails, is generally associated with iron-deficiency anemia. Ann Emerg Med 2007;49(2):243,250.
9. Sommer A. Vitamin a deficiency and clinical disease: An historical overview. J Nutr 2008;138(10):1835–9.
10. Williams CD. A nutritional disease of childhood associated with a maize diet. Arch Dis Child 1933;8(48):423–33.
11. Usaid. Key findings of the national nutrition survey of 2011. Research and development solutions. Policy Briefs Series No. 41, December 2013. [Internet]. [cited 2018 Jan 15]. Available from: http://www.resdev.org/files/policy_brief/41/Policy%20Brief%20 41%20-%20Nutritional%20Status.pdf

Address for Correspondence:
Dr. Romana Irshad, Asstt. Professor, Department of Pathology, Ayub Medical College, Abbottabad-Pakistan
Email: romanairshad@outlook.com