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Original Research Article

A study on common clinical pattern of presentation of skin and hair changes in nutritional deficiencies associated with dietary fallacies in children 1 to 5 years of age

Pavan Kumar D.*

Department of Pediatrics, DM Wayanad Institute of Medical Sciences, Meppadi, Wayanad, Kerala, India

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***Correspondence:**
Dr. Pavan Kumar D.,
E-mail: pavaniams@gmail.com

ABSTRACT

Background: Dermatological problems constitute atleast 30% of all outpatient visits to the paediatricians and 30% of all visits to dermatologists involving children. Skin diseases in the paediatric age group can be transitory or chronic and recurrent. The chronic dermatoses are associated with significant morbidity and psychological impact. Skin disorders caused by deficiency generally, or less often by an excess of one or more nutrients is called nutritional dermatoses. The objective of the present study was to assess the common clinical pattern of presentation of skin and hair changes in nutritional deficiencies associated with dietary fallacies in children 1 to 5 years of age.
Methods: A hospital based cross sectional study consisting of all children between the age group of 1 to 5 years with Nutritional skin and hair lesions diagnosed with clinical examination in the OPD of the Pediatric Department were included in the study from the month of November 2012 to October 2013. A minimum sample size of 100 children is required for this study. However, author included 150 children.
Results: In the present study, maximum numbers of children were in the age group of 12 – 24 months, 33.33 % (50) of study subjects. The proportion of males 58.00% (87) is higher than females 42.00% (63). Majority of children belonged to Class IV 60.66% (91) socioeconomic status. 76.00% (114) of children fall in the group of under nutrition and this can be attributed to the associated Dietary fallacies of 73.33% (110) children as causative factor. Nutritional anemia associated pallor and sparse hair were the common finding among all other nutritional deficiencies.
Conclusions: Lower socio- economic condition and dietary fallacies were the two most causative factors which had an adverse effect on nutritional status of child causing dermatoses. In the present study, majority of children had nutritional anemia, vitamin A deficiency and vitamin B12 deficiency associated dermatoses with overlapping of the clinical features because of complex interlinking of different dietary factors.

Keywords: Dietary fallacies, Nutritional dermatoses, Skin and hair changes

INTRODUCTION

"Nutrition is defined as the science of food and its relationship to health".[1] Dermatosis is defined as any disorder of the skin especially those without inflammation" (Compare 'Dermatitis' which is characterized by inflammation).[2] Skin disorders caused by deficiency generally, or less often by an excess of one or more nutrients is called nutritional dermatosis.[3]

Skin diseases are the major health problem in the paediatric age group and are associated with significant morbidity. Dermatological problems constitute at least

30% of all outpatient visits to the pediatricians and 30% of all visits to dermatologists involving children.[4] The prevalence of paediatric dermatoses in various parts of India has ranged from 8.7% to 35% in school-based surveys.[5] Skin diseases in the paediatric age group can be transitory or chronic and recurrent. The chronic dermatoses are associated with significant morbidity and psychological impact.

The response of the skin to nutritional deficiency varies with age of the patient and to the different parts of the body6 and also influenced by socio-economic status, climatic exposure, dietary habits and external environment as compared to adults.[6]

It may manifest on the skin, mucous membranes, hair and nails. Frequently, there is a deficiency of more than one dietary factor and overlapping of the clinical features because of complex interlinking of different dietary factors.[3]

Hair changes may present as sparse, dry, lusterless, easily pluckable, hypopigmentation, follicular hyperkeratosis in less severe form of nutritional deficiencies and may varies upto prematurely greying or show a 'Pepper and Salt' appearance, in severe form.[7]

Nutritional disorders in children of age less than 5 years in a developing country where deep root traditions, taboos and false belief have imprisoned the people, the problem of nutritional disorders is more acute, and its impact is more in children.[8]

Hence this study on common clinical pattern of skin and hair Lesions in various nutritional deficiencies associated with dietary fallacies in Children 1 to 5 years of age gives a higher importance.

The objective of the present study was to assess the common clinical pattern of presentation of skin and hair changes in nutritional deficiencies associated with dietary fallacies in children 1 to 5 years of age.

METHODS

A hospital based cross sectional study consisting of all children between the age group of 1 to 5 years with Nutritional skin and hair lesions diagnosed with clinical examination in the OPD of the Pediatric Department were included in the study from the month of November 2012 to October 2013.

Exclusion criteria

Children with congenital anomalies and parents not willing to enroll in the study were excluded.

Different recent published studies from India suggest that the prevalence of Nutritional Dermatoses in children ranges from 4 % to 30%.[5,6] A minimum sample size of 100 children is required for this study. However, we included 150 children.

Informed consent is taken from the parents or the guardians after explaining the aims, objectives and procedures of the study.

A single face-to-face interview using a standardized questionnaire is conducted to collect information regarding the socio-demographic profile, literacy and economical status of parents, dietary adequacy and associated dietary fallacies.

It also includes history about skin lesions, pica, night blindness, worms in the stool, recurrent upper respiratory tract infection or diarrhoeal episode, tingling sensation, numbness, confusion, irritability, drug ingestion (anti-epileptics), bowel and bladder habits, any nutritional supplements taken before. All the parents or guardians were co-operative throughout the study.

Children were examined in the day light for clinical signs of nutritional deficiency. The clinical signs looked for in this age-group were: sparse hair, hyper or hypo pigmented hair, flag sign, increased lanugo hair, perifollicular haemorrhages, alopecia, dyssebacia, pallor, cheilosis, angular stomatitis, glossitis, atrophied papillae, hyper or hypopigmented skin, xerosis, scaly diffuse erythema, loss of subcutaneous fat, intertriginous erosions, rash over upper central chest and neck (casal's necklace), rash over the malar area and perianal crusting. Behavioural and systemic examination was also done.

Statistical analysis

Data was entered in the standardized proforma. and statistical analysis was performed with the help of SPSS Version 17. Percentages and chi-square test were used for the analysis of the data. The P value <0.05 was considered significant.

RESULTS

In the present study, 58.00% (87) children were males and 42.00% (63) were females. Majority 33.33% (50) of them belonged to 12-24 month's age group. 80.66% (121) of children were Hindu. 61.33% (92) of the children belonged to the nuclear family.

In context to birth order, majority 48.00% (72) of the children were of Birth order second. With regards to socio-economic status, majority 60.66% (91) children belonged to Class IV according to modified B.G. Prasad classification.

In majority, 76.00% (114) of children fall in the group of under nutrition, based on the dietary adequacy. Majority of undernourished children 39.47% (45) were in the age group of 12-24 months and distribution was statistically significant (p = 0.001).

Table 1: Socio-demographic profile of the study subjects.

Socio-demographic profile		N= 150	%
Age	12-24	50	33.33
	25-36	42	28.00
	37-48	32	21.33
	49-60	26	17.33
Religion	Hindus	121	80.66
	Muslims	17	11.33
	Christians	12	8.00
Literacy status	Illiterate	22	7.33
	Primary school (1-4)	20	6.66
	Middle school (5-7)	33	11.00
	High school (8-10)	60	20.00
	College (PUC/Diploma)	69	23.00
	Graduate	96	32.00
Family	Nuclear	92	61.33
	Joint	40	26.70
	Extended (3 generation	11	7.33
	Broken	7	4.70
Birth order	First	52	34.70
	Second	72	48.00
	Third	17	11.33
	Fourth	9	6.00
SES	Class I	00	00
	Class II	00	00
	Class III	41	27.33
	Class IV	91	60.66
	Class V	18	12.00

Table 2: Distribution of children based on dietary adequacy.

Age (in months)	Nutrition status					
	Under nutrition		Adequate nutrition		Total	
	F	%	F	%	F	%
12-24	45	39.47	5	13.88	50	33.33
25-36	36	31.57	6	16.66	42	28.00
37-48	23	20.17	9	25.00	32	21.33
49-60	10	8.77	16	44.44	26	17.33
Total	114	76.00	36	24.00	150	100

Table 3: Distribution of children based on dietary fallacies.

Age (in months)	Dietary fallacies				Total	
	yes	%	no	%	F	%
12 - 24	47	42.72	3	7.50	50	33.33
25 - 36	42	38.18	0	0	42	28.00
37 - 48	13	11.81	19	47.50	32	21.33
49 - 60	8	7.27	18	45.00	26	17.33
Total	110	73.33	40	26.66	150	100.0

Table 4: Incidence of various clinical patterns of skin changes seen in nutritional deficiencies associated with dietary fallacies.

Skin findings	N	%
Pallor only	16	10.7
Xerosis with keratotic hyperpigmented plaques	13	8.7
Pallor, keratotic hyper pigmented plaques with xerosis	13	8.7
Pallor, xerosis, hypopigmented skin lesion	12	8
Pallor with diffuse hyperpigmentation of palmar creases, flexures and knuckles	12	8
Pallor with fissures of palms and doles (goose skin)	10	6.7
Xerosis with diffuse scaly hyperkeratotic lesion	10	6.7
Pallor, xerosis, superficial desquamation, hypopigmented skin lesion	09	6
Pallor, dermatomalacia with hyperpigmented keratotic plaques	05	3.3
Dermatomalacia with keratotic plaques and hyperpigmentation of knuckles	05	3.3
Pallor, scaly diffuse erythema	04	2.7
Pallor, superficial desquamation, skin ulceration	04	2.7
Dermatomalacia with keratotic hyper pigmented plaques with fissuring of palms	04	2.7
Dermatomalacia (fissuring of skin)	04	2.7
Pallor, xerosis, superficial desquamation with dermatomalacia	04	2.7
Pallor, seborrheic dermatoses, fissuring of palms and soles and hyperkeratosis	04	2.7
Pallor, dermatomalacia	03	2
Xerosis, diffuse hyperpigmented keratotic scaly lesion	03	2
Pallor with nasolabial dyssabacea	02	1.3
Pallor with seborrheic dermatoses	02	1.3
Dermatomalacia with keratotic hyperpigmented plaques	02	1.3
Pallor with diffuse hypopigmented scaly lesion	02	1.3
Dermatomalacia with nasolabial dyssabacea	02	1.3
Flaky paint dermatoses	02	1.3
Keratotic hyper pigmented plaques with seborrheic dermatoses	01	0.7
Pallor, lichenified inner part of scrotum with diffuse hyperpigmentation of palmar creases and knuckles	01	0.7
Pallor with periorofacial eczematous dermatitis	01	0.7

In this study, 73.33% (110) children is having the causative factor for dietary fallacies, majority of them 42.72% (47) falls in the age group of 12-24 months and is mainly due to delayed weaning and faulty weaning

practices and in the following age groups are mainly due to faulty cooking practices and eating habits.

Table 5: Incidence of various clinical patterns of hair changes seen in nutritional deficiencies associated with dietary fallacies.

Hair findings	F	%
Sparse hair only	18	13.1
Lusterless with heterochromia	16	11.7
Hyperkeratosis of hair follicle with keratin plugs	14	10.2
Hyperkeratosis with plugged follicles with localized hypopigmentation	14	10.2
Brittle hair with diffuse hypopigmentation	11	8.1
Brittle, lusture less, diffuse hypopigmentation with sparsity and hyperkeratosis of hair follicle	09	6.6
Short brittle hair with diffuse alopecia	09	6.6
Alternate dark & light bands with sparsity &pluck ability	08	5.8
Sparsity, lustureless with easy pluckability	07	5.1
Curled plugged follicles (corkscrew appearance)	05	3.6
Pluckability with diffuse patchy alopecia	04	2.9
Lustureless with localized hypopigmentation	04	2.9
Sparsity with localized hypopigmentation	04	2.9
Sparsity, hyperkeratosis with diffuse alopecia	03	2.2
Perifollicular purpura with diffuse hypopigmentation	03	2.2
Hyperkeratosis of hair follicle with alternate dark and light bands	03	2.2
Hyperkeratosis with plugged follicles	03	2.2
Short sparse hair with diffuse hypopigmentation	02	1.5

DISCUSSION

The present study was conducted with the objective of assessing the common clinical pattern of presentation of skin and hair changes in nutritional deficiencies associated with dietary fallacies among one to five years of children.

The age of the study subjects ranged from 12 to 60 months, maximum numbers of children were in the age group of 12-24 months which constituted about 33.33 % (50) of study subjects. The proportion of males 58.00% (87) is higher than females 42.00% (63).

Similar age and sex distribution was found in a study conducted by Mathur et al in which majority of children 60.33% (128) were in the age group of 12 -24 months and males 61.30% were higher than females.[8]

As majority of children belonged to Class IV 60.66% (91), it made them vulnerable to malnutrition due to low dietary intake, improper hygiene and infection. In a similar study done in the rural area, 86.10% were of social classes IV and V and none were in social class I and II.[8]

Rao et al study showed that highest proportion of under nutrition 52.17% (214) was in the age group of 12-24 months and quotes that 12-24 months is the "Critical period" for undernutrition. Similar type of results was also seen in this study too and this can be attributed to the associated Dietary fallacies like early cessation of breast feeding, delayed weaning, faulty weaning technique, bottle feeding with improper dilution and contaminated mixtures are main causes of early nutritional deficiencies and transitional growth failure.[9]

Study conducted by Behera et al found that 51.40% of 1 to 5-year children had pallor and another study done by Ashwathi et al revealed that 70.00% of preschool children had pallor as a common skin finding in nutritional anemia.[10,11]

Study done by Sachithananthan et al, in Chennai city revealed that sparse hair in 28.40% of children is common hair lesion in anemia.[12] According to Mathuret al study, pallor was present in 18.30% (37) of children and sparse hair in 1.98% (37).[10]

Rola et al study revealed that vitamin A deficiency is one of the most common etiology for the keratotic hyperpigmented skin lesions.[13] Study done by Ragunatha et al showed that 3.20% of children had keratotic hyperpigmented skin lesions with follicular hyperkeratosis.[14] Chester et al study showed that 6.60 % of children had follicular hyperkeratosis with plugged follicles as a common hair lesion in vitamin A deficiency.[15]

Barker et al study proved that pallor and hyperpigmentation of knuckles is the most common presentation of vitamin B12 deficiency.[16] Study done in uttarakhand by Amileena et al revealed that 40.00% (18) of children with vitamin B12 deficiency had hyperpigmentation of knuckles and palmar creases with pallor.[17] Another study done by Aaron et al reported that 19.00% (12) of the patients with Vitamin B12 deficiency had skin hyperpigmentation and 9.00% (5) had diffuse hypopigmentation of hair as a predominant skin and hair changes respectively.[18]

Srihari et al study showed that 3.4% - 6.2% of school going children with vitamin B2 deficiency had nasolabial dyssabacea, angular stomatitis as a most common skin finding.[19] Roe et al study showed that severe vitamin B2 deficiency can have lichenification of genitals and perianal region as a cutaneous finding.[20]

Oliver et al study showed that follicular hyperkeratosis with pigmented icthyosis and corkscrew hair follicle is the most common cutaneous manifestation in scurvy.[21] According to Nguyen et al perifollicular purpura with hyperkeratosis, ecchymoses and coiled corkscrew hairs are the specific and diagnostic cutaneous manifestations of scurvy.[22]

Study done by Yaovares X et al showed that follicular keratotic papules at the elbows and knees are the most common cutaneous presentation in phrynoderma. Ragunatha et al study showed that in 125 patients of phrynoderma, the lesions were discrete, keratotic, follicular, pigmented or skin colored, acuminate papules.[14,23]

According to Mathur et al study, 2.00% (4) of children had protein energy malnutrition in which all the 2.00% (4) of children exhibit sparse hair with pluckability as a common hair lesion.[8] Brewester et al study showed that 29.90% of PEM children had erythematous, hyperpigmented skin lesion and 72.20% of children had sparsity and pluckability as a predominant hair lesion.[24] Another study proved that sparsity with alternate dark and light bands with easily pluckability are the most common hair changes seen in PEM.[25]

CONCLUSION

In the present study, majority of children had nutritional anemia, vitamin A deficiency and vitamin B12 deficiency associated dermatoses. Small percentage of study subjects had deficiency of vitamin B2, vitamin C, trace elements like zinc, essential fatty acids and PEM associated dermatoses. Clinical features of majority of nutritional deficiencies were overlapped because of complex interlinking of different dietary factors.

Lower socio-economic condition and dietary fallacies were the two most causative factors which had an adverse effect on nutritional status of child causing dermatoses.

Hence ICDS needs to be strengthened to function more efficiently with proper intersectoral co-ordination between health and social welfare department for accelerated and extended reach to rural areas in Socio-economic development. Infant feeding practices and skills-based nutrition education for the family have to be addressed rightly through peer group counsellors should be imposed in averting nutritional dermatoses.

The strength of the present study is to assess the objective mainly from rural backward areas, even though there are many studies conducted to know the common clinical pattern in Non -Nutritional Dermatoses, there are very few studies conducted specifically for Nutritional Dermatoses among 1 to 5 years children. Clinical examination and dietary assessment are used as a major tool in obtaining the results without any laboratory investigations.

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