Original Research Article

A study to assess the nutritional status of children with cleft lip and/or cleft palate and its correlation with breast feeding at a tertiary health care centre

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ABSTRACT

Background: Cleft lip with or without cleft palate is one of the most common congenital anomalies. In 2008, the World Health Organization included cleft lip and palate in their Global Burden of Disease initiative. The incidence of cleft lip and palate in India is enormous: one in 781 live births. The growth of children with these deformities is often impaired in comparison to healthy children. Several studies describe a growth lag in either weight or height of cleft children. The objective of the study was to observe the nutritional status of children with cleft lip and/or cleft palate and its correlation with breastfeeding.

Methods: A cross sectional study was conducted at Department of Pediatrics, AVBRH Sawangi (Meghe), Wardha for the period of two years from August 2010 to March 2012. All children below 15 years with cleft lip and/or palate admitted in the pediatric ward, NICU or postnatal ward were included in the study. A Total of 200 children were included in the study and analyzed.

Results: Male to female ratio was 1.4:1. The commonest type of defect was both the defects present together (62%) which was significantly more than individual defects (23.98=2$\aleph$, p<0.0001). It was followed by isolated cleft lip (25.5%) and isolated cleft palate (12.5%). Malnutrition was more common in children who were deprived of breast milk (χ^2=22.61, Significant). Significantly more children (69.6%) below the age group of 5 yrs were malnourished. (χ^2=16. Significant).

Conclusions: Our results confirm that, malnutrition is more prevalent in children with orofacial clefts. Lack of breast feeding is a significant contributor to severe malnutrition and recurrent infections in these children.

Keywords: Breastfeeding, Cleft lip, Cleft palate, Malnutrition Nutrition

INTRODUCTION

It is estimated that orofacial clefts occur in ~1/700 to ~1/1000 live births in different populations around the world, with substantial variability related to geographic origin, ethnicity, and socioeconomic conditions. About 70% of orofacial cleft cases are nonsyndromic, i.e. with affected individuals showing no other physical or developmental anomalies. The frequency and distribution of orofacial clefts also varies widely among different populations.[1]

There are differences in incidence rates across racial groups, with the lowest reported incidence among

African–American populations (approximately 0.5 per 1000) and Caucasian populations (approximately one per 1000 births), and higher incidence among Native American (approximately 3.5 per 1000), and Asian populations (approximately1.7 per 1000). Although reports vary considerably, it is estimated that out of the total number of infants with a CL/P, approximately 50% have a combined cleft lip and palate (CLP), while 30% have an isolated CP, and 20% an isolated CL; a CL extending to include the alveolus occurs in approximately 5% of cases. Clefts are usually unilateral; however, in approximately 10% of cases, clefts are bilateral.[2]

In 2008, the World Health Organisation included cleft lip and palate in their Global Burden of Disease initiative. The incidence of cleft lip and palate in India is enormous: one in 781 live births. An estimated 35,000 children are born with cleft lip/palate every year. Cleft lip with or without cleft palate is one of the most common congenital anomalies.[3]

The growth of children with these deformities is often impaired in comparison to healthy children due to Feeding difficulties after birth, may be part of holoprosencephaly complex and have hypothalamic pituitary deficiency and Increased frequency of airway infections, middle ear disease and intestinal infections.[4,5]

Apart from growth, development is another important aspect of child care. Development may be affected in these children due to other associated defects, syndromic status or malnutrition.

A pediatrician/neonatologist is usually the first person to take care of a neonate born with a cleft and the first to talk to the parents and one of the most challenging issue for the pediatrician is to advise them regarding the best mode of feeding as it is vital that infants get adequate nourishment in no stressful way, beginning with the first oral feeding. This important task will ensure optimum growth. Hence this study was conducted to check the nutritional status of children with cleft lip and or palate. The objective of the study was to observe the nutritional status of children with cleft lip and/or cleft palate and its correlation with breastfeeding.

METHODS

A cross sectional study was conducted at Department of Pediatrics, AVBRH Sawangi (Meghe), Wardha for the period of two years from August 2010 to March 2012.

All children below 15 years with cleft lip and/or palate admitted in the pediatric ward, NICU or postnatal ward were included in the study. The children were classified into different groups based on the type of defect as follows:

- Cleft lip
  a. Unilateral
  b. Bilateral
- Cleft palate
  a. Unilateral
  b. Bilateral
- Both defects
  a. Unilateral
  b. Bilateral

All the parents of children with cleft lip/palate were interrogated to get detailed information about feeding practices, problems faced during feeding with special emphasis on breast feeding. Exact age in years, months and days was calculated by subtracting the date of birth as informed by the parents from the date of testing as given in Denver Development Screening Test manual.[6] However, for about 15% of children, this method could not be applied as parents did not remember the exact date of birth. In those cases, correct age was obtained by using events and festivals to the nearest month of their birth. Age adjustment for prematurity was done for children less than 2 years of age who were born more than 2 weeks before the expected date of delivery (as given in Denver Development Screening Test manual) for accuracy of developmental assessment.

Anthropometry included Weight, Length/Height, Head circumference and mid arm circumference (mid arm circumference for children from 3 months to five years of age). Anthropometric parameters were plotted on WHO growth charts for children up to 5 years of age and on IAP growth charts for children for children more than 5 years of age.

The weight of the child in nude or with minimal light clothing was recorded on Electronic Scale. Daily standardization of the machine was done. Weight recording was done to the accuracy of 10gms.

Length was taken for the children up to 2 years of age. It was recorded on Infantometer. The child was placed supine on the infantometer and head was held firmly in position against a fixed upright head board. Legs were straightened, keeping feet at right angles to legs with toes pointing upwards. Its free feet board was brought in firm contact with the child's heels.[7]

Height was taken in the children more than 2 year of age using Wall Mounted Scale keeping the head of the child in Frankfurt's plane (the line joining the floor of the external auditory meatus to the lower margin of orbit) with biauricular plane being horizontal. Heels were slightly separated and heels, buttocks and back were brought in contact with the Wall while taking the height. Height was measured to the nearest of 0.5 cm.[7] Mid Arm Circumference was measured using a fibre glass tape. firstly, a point midway between the acromion process of the scapula and the olecranon of ulna while the child holds left arm by his side and the measurement was taken at that midpoint. Mid arm circumference of less than

11cm (for children below 5 yrs) was taken as one of the criteria for SAM.

For IAP classification Weight/Age for children upto five years of age was calculated and interpreted as follows[8]:

- Grade I-71-80%
- Grade II-61-70%
- Grade III-51-60%
- Grade IV-≤50%

Weight for Height was studied as per WHO reference cards (given below) and those below-3SD were classified as severe acute malnutrition (SAM). If the weight for height was falling between 2SD and 3 SD then they were categorized as moderate acute malnutrition. Weight for height ≤3SD and/or edema was considered as Severe acute malnutrition (SAM).[9]

RESULTS

A Total of 200 children were included in the study and analyzed. In present study 57.5% of patients were below 6 yrs and 42.5% were in the age group of 6-15 yrs. Among those below 6 yrs age group maximum were in the age group of 0-1 yrs. Male to female ratio was 1.4:1.

Table 1: Age wise and sex wise distribution of patients.

Age group (0-15yrs)	Male (n=118)	Female (n=82)	Total (n=200)	χ^2
0-1 years (n=36)	15 (41.7%)	21 (59.3%)	36 (18%)	1.NS
1-2 years (n=27)	17 (63%)	10 (37%)	27 (13.5%)	1.81 NS
2-3 years (n=21)	11 (52.4%)	10 (47.6%)	21 (10.5%)	0.04 NS
3-4 years (n=20)	7 (35%)	13 (65%)	20 (10%)	1.8 NS
4-5 years (n=8)	03 (37.5%)	05 (62.5%)	08 (4%)	0.5 NS
5-6 years (n=3)	02(66.7%)	01 (33.3%)	03 (1.5%)	0.33 NS
6-15 years (n=85)	63 (74%)	22 (26%)	85 (42.5%)	19.77 S
Total	118 (59%)	82 (41%)	200	6.48 S

Table 2: Breastfeeding and Malnutrition (n=78)

Total breastfed and malnourished (n=18)			Total nonbreastfed and malnourished (n=60)		
Grade 1+2	Grade 3+4	Total	Grade 1+2	Grade 3+4	Total
16 (84.2%)	2 (15.8%)	18 (23.1%)	39 (65%)	21 (35%)	60 (76.9%)

Table 3: Nutritional status of children below 5 yrs (as per IAP classification)

Normal Nutritional Status	Malnourished children					Grand total
34 (30.4%)	GR1	GR2	GR3	GR4	Total	n=112
	31 (39.7%)	24 (30.8%)	16 (20.5%)	7 (9%)	78 (69.6%)	(100%)

More number of females attended the hospital in 0-6 yrs age group whereas more number of males were brought to hospital in 6-15 yrs age group. The difference was not statistically significant in any of the age groups below 6 yrs, however it was significant in the age group of 6-15 years.

The commonest type of defect was both the defects present together (62%) which was significantly more than individual defects (χ^2=23.98. p<0.0001). It was followed by isolated cleft lip (25.5%) and isolated cleft palate (12.5%). In isolated cleft lip and cleft palate category there were more number of unilateral defects and it was statistically significant as compared to bilateral defects (χ^2=6.81, p=0.009). However, when both the defects were present together then there were almost equal number of unilateral and bilateral defects (49% unilateral and 51% bilateral) and the difference was not statistically

significant (χ^2=0.11, p=0.73). In isolated cleft lip category more, number of males were affected as compared to females, but it was not statistically significant (χ^2=0.51, p>0.05). In unilateral cleft palate category females were strikingly more affected than males and it was statistically significant (χ^2=105.3, p<0.0001). When both the defects were present then males and females were almost equally affected.

Majority of patients belonged to middle class (upper middle + lower middle) and it was statistically significant when compared with upper class (χ^2=100.12) and lower class (χ^2=53.67). In the middle-class category, most of the subjects belonged to lower middle class (46%) and very few belonged to upper middle class (14%). Malnutrition was more common in children who were deprived of breast milk. (χ^2=22.61, Significant). Severe form of malnutrition (gr3 and gr4) was more common in

non-breastfed group of children and this was statistically significant (χ^2=15.69). Significantly more children (69.6%) below the age group of 5 yrs were malnourished. (χ^2=16. Significant). Out of the total malnourished children maximum number of children (39.7%) had grade 1 PEM. The number of malnourished children had a decreasing trend as the severity of malnutrition increased from grade1 to grade 4 and this was statistically significant (χ^2=16.46).

Table 4: Severity of the defect with breastfeeding.

Type of defect		Breastfeeding	
		Yes (n=53)	No (n=147)
Cleft lip	(u) n=40	24(60%)	16(40%)
	(b) n= 11	4(36.4%)	7(63.6%)
Cleft palate	(u) n=19	6(31.6%)	13(69.4%)
	(b) n=6	2(33.3%)	4(66.7%)
Both	(u) n=61	11(18%)	50(82%)
	(b) n=63	6(9.5%)	57(90.5%)
Total (n=200)		53(26.5%)	147(73.5%)

In present study only 26.5% of children were breastfed and it was found to be statistically significant. As the severity of defect increased the practice of breastfeeding came down (χ^2=3.37, P=0.18. Not significant).

More children were breastfed in isolated cleft lip group than isolated cleft palate group, but it was not statistically significant (χ^2=1.28, p=0.25).

Breastfeeding practice was strikingly less when both the defects were present together and this was statistically significant (χ^2=9.05, p=0.002) Moderate acute malnutrition (MAM) 34.8% was more common than severe acute malnutrition (SAM) 12.5% and this was statistically significant (χ^2=11.79). With this classification 47.3% children were malnourished.

Table 5: Showing proportion of SAM and MAM as per who criteria(n=112).

Nutritional status	Number	Percentage
SAM	14	12.5
MAM	39	34.8
Total	53	47.3

Table 6: Severity of defect vs malnutrition (< 5 years).

Type of defect		Grade of malnutrition	
		I+II total	III +IV total
Cleft lip	(u) n=8	7 (87.5%)	1 (12.5%)
	(b) n= 2	2 (100%)	0 (0%)
Cleft palate	(u) n=6	5 (83.3%)	1 (16.7%)
	(b) n=3	2 (66.7%)	1 (33.3%)
Both	(u) n=28	21 (75%)	7 (25%)
	(b) n=31	16 (58.1%)	13 (41.9%)
Total (n=78)		55 (70.5%)	23 (29.5%)

Chronic malnutrition was more common than acute malnutrition (χ^2=5.33. statistically significant) and acute on chronic malnutrition (χ^2=9.51). Acute malnutrition (32.1%) was more common than acute on chronic malnutrition (24.1%) however it was not statistically significant (χ^2=0.81, not significant). 43.8% had chronic malnutrition.

DISCUSSION

The management of cleft lip and /or palate is a complex and lifelong issue. The staggering magnitude of the need for early identification of problems of growth and development and early intervention for the same is indicated by the results of present study.

In the present study maximum number of patients were below six years (57.5%) and when we studied the age distribution in detail we found that maximum number were in the age group of less than one year (18%). In a similar study done by Patil et al in Nagpur, the mean age of reporting for treatment of cleft deformities was 6 months and in study done in Coimbatore the mean age of reporting was only 5 months.[10,11] In a study in east Africa the mean age of presenting to the hospital was 9.5 months.[12]

As far as distribution of different types of defect is concerned, we found that both cleft lip and palate present together (CLP) was the commonest (62%) followed by isolated cleft lip (CL) (25%) and isolated cleft palate (CP) was the rarest (12.5%). Similar results were found in many other studies. Lowry and Renwick in Canada compared the incidence of cleft deformities between Indians and non-Indians and they observed that among Indians CLP was the commonest deformity constituting 78% of the total, followed by, CP (14%) and CL (8%).Whereas among non-Indians 43% had CLP, 33% had CP and 23% had CL.[13] In a study done in Estonia, 42% of clefts were CLP , 19% were CL and 39% of cases were CP.[14] Harville and Wilcox studied the distribution of isolated cleft lip and cleft lip with cleft palate. They found that among 1.8 million Norwegian livebirths ,there were 1,572 cases of cleft lip with cleft palate and 1,122 cases with cleft lip only. However J.C. Murray et al reported in their study that combined cleft lip and palate was not as common as single structure involvement and cleft lip was more common than cleft palate.[15,16]

In the current study, majority (69.6%) of the children below five years were malnourished as per IAP classification of protein energy malnutrition. When classified according to WHO classification to see duration of malnutrition (wasting and stunting), we found that 32.1% were wasted, 43.8% were stunted and 24.1% were stunted as well as wasted, indicating that overall stunting (chronic form of malnutrition) was most common (43.8%+24.1%=67.9%) and this was statistically significant. Nopolous et al and Rudman et al also reported that these children significantly lag behind

in height.[17,18] This data is significantly higher than that for children without cleft lip and cleft palate. According to recently released National Family Health Survey, NFHS-3, carried out in 2005-2006, 43% of children below 5 years of age are underweight, 48% of children are stunted and 20% of children are wasted.[19] According to UNICEF statistics 2008, 47 percent of Indian children under five are categorised as underweight (moderate and severe),18% as severe underweight, 16% are wasted and 46% are stunted.[20] When we classified the malnourished children into severe acute malnutrition(SAM) and moderate acute malnutrition(MAM) as per WHO criteria, we found that moderate acute malnutrition (MAM=34.8%) was more common than severe acute malnutrition (SAM=12.5%) and this was statistically significant (Table 6). SAM remains one of the major killers of children under five; it contributes to approximately 1 million child deaths every year. Globally, it is estimated that 26 million children under five years are severely acutely malnourished, most of whom live in South Asia and in sub-Saharan Africa. India alone is home to 8,105,000 children with SAM (31.2 % of the world's severely wasted children).[21] The present study shows that oral defect is one of the important contributing factor for severe acute malnutrition as it compromises feeding.

In order to correlate malnutrition with severity of defect, we categorized malnutrition as less severe form (grade 1 and grade 2 as per IAP) and more severe form (grade 3 and grade 4 as per IAP) and compared the occurrence of less severe and more severe form of malnutrition in different forms of defects. We concluded that malnutrition is more common in severe form of defects and further severe form of malnutrition is more common in more severe defects and this was statistically significant. Present study is comparable with many other studies.[22,23] Pandya and Boorman reported that there was an increasing rate of failure to thrive from 32% for unilateral cleft lip and palate to 38% for bilateral cleft lip and palate.[24] Montagnoli et al found that Isolated cleft lip children showed less marked impairment of weight (23.8%) compared to the cleft lip with cleft palate group (35.7%). In the isolated cleft palate group 34.4% of the children were underweight. Similar results were found in study done by Coy et al.[22]

CONCLUSION

Our results confirm that, malnutrition is more prevalent in children with orofacial clefts. Lack of breast feeding is a significant contributor to severe malnutrition and recurrent infections in these children. Our data suggests that a sincere attempt towards breast feeding in these children can significantly maximize their growth potential.

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