To evaluate and compare the nutritional and oral health status in tribal and nontribal children of Udaipur district, Rajasthan: A community-based comparative study

[1]Dr.Gourav, PG student, Pediatric and Preventive Dentistry, Darshan Dental College and Hospital, Udaipur, Rajasthan.

[2]Dr.Parul Rawat, Professor, Department of Pediatric and Preventive Dentistry, Darshan Dental College and Hospital, Udaipur, Rajasthan

[3]Dr.Ruchi. V. Arora, Professor, Head of the Department, Pediatric and Preventive Dentistry, Darshan Dental College and Hospital, Udaipur, Rajasthan.

[4]Dr.Nipun Jain, Senior Lecturer, Department of Pediatric and Preventive Dentistry, Darshan Dental College and Hospital, Udaipur, Rajasthan.

Corresponding Author: Dr. Gourav, PG student, Pediatric and Preventive Dentistry, Darshan Dental College and Hospital, Udaipur, Rajasthan.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Malnutrition is considered one of the main factors hindering India's global economic growth. Child nutrition is extremely important and vital at every stage of life. A child's nutrition helps build a healthy eating habit and nutritional awareness that they can use throughout their life. Since independence, various government policies and programs have been implemented to improve the lives, livelihoods, and health of tribal communities. Six decades later, tribal communities are still the most deprived segment of Indian society. Eighty percent of the five million chronically undernourished tribal children are living in eight states. In addition to a child's nutrition status, a child's oral health status plays an essential role in their growth. It has been observed that rural Indian communities, which account for more than 70 percent of India's population, have a low awareness and practice of oral health compared to the urban side. Therefore, the present study aims to assess and compare the nutritional and oral health status of tribal and nontribal children ages 6 to 12 years around Udaipur city of Rajasthan.

Keywords: Malnutrition, Underweight, Nutrients.

Introduction

The prevalence of malnutrition among children, particularly in rural and tribal areas of India, poses a significant public health challenge. Malnutrition encompasses various forms such as underweight,

stunting, wasting, and micronutrient deficiencies, all of which have profound implications on a child's physical and mental development. Children experiencing malnutrition are not only at risk of delayed growth but also have heightened susceptibility to infections, leading to increased mortality rates, especially among under-five children[1].

In India, despite efforts to combat malnutrition, the problem persists, particularly among marginalized communities like tribal populations. These communities, characterized by unique cultures and socio-economic backwardness, face considerable challenges in accessing adequate nutrition and healthcare services. Dependence on primitive agricultural practices and uncertain food supplies further exacerbates their vulnerability to under nutrition.

UNICEF reports indicate that a significant number of tribal children suffer from chronic malnutrition, impacting their overall well-being, educational attainment, and future productivity. The situation is particularly dire in states like Karnataka, Maharashtra, Rajasthan, and Odisha, where a large proportion of malnourished tribal children reside.

Addressing malnutrition requires a multi-faceted approach encompassing nutritional interventions, healthcare infrastructure improvement, and health education programs. Furthermore, efforts must focus on bridging the urban-rural divide in oral health awareness and practice. Initiatives like the WHO's Global School Health Initiative are crucial in leveraging school environments to promote oral health and overall well-being among children.

In conclusion, combating malnutrition among tribal and nontribal children in regions like Udaipur, Rajasthan demands coordinated efforts from government, NGOs, and international organizations. By addressing the root causes of malnutrition and improving access to essential services, we can work towards ensuring a healthier future for all children in India.

Materials & Methods

Non-tribal children attending the dental department of pediatric and preventive dentistry for treatment, tribal children from Udaipur District, and children and parents willing to provide informed consent were included in the study. Parents unwilling to participate were excluded from the study. Data collection involved thorough dental examination conducted by a single individual at Darshan Dental College and Hospital. This examination encompassed various dental health parameters, including oral hygiene, prevalence of dental caries, periodontal health, and other pertinent indicators.

The study aimed to contribute valuable insights into the dental health disparities among tribal and non-tribal children in the Udaipur District, Rajasthan, thereby facilitating the development of targeted interventions to improve oral health outcomes in these populations.
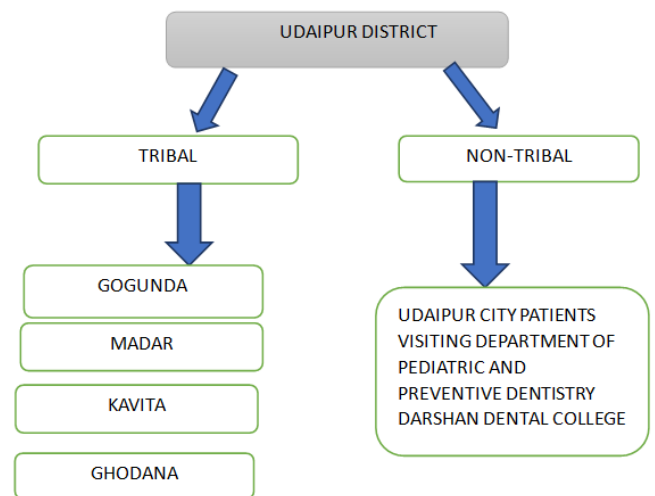
Flow Chart
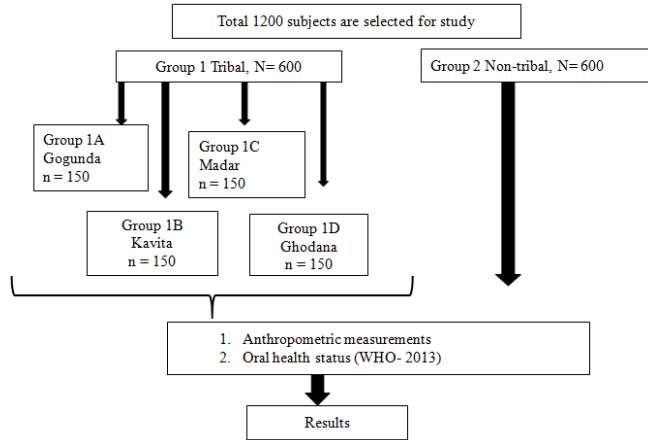
Anthropometric measurements were for children 6-12 year using a Portable Weighing machine. A Stadiometer with a long ruler attached to a base. It has a sliding horizontal headpiece that's adjusted to rest on top of the head. It's a quick way of accurately measuring your height. A non-stretchable measuring tape. (For measuring mid-upper arm and chest circumference) Vernier calliper was be used to measure the skin fold thickness of the arm. It lightly pinches the skin and underlying fat in several places. This quick and simple method of estimating body fat requires a high level of skill to get accurate results.

Table 1: Intergroup comparison of age and anthropometric measure.

		N	Mean	Std. Deviation	Std. Error Mean	P value
Age	Tribal	600	10.190	3.1113	.1270	0.456, NS
	Nontribal	600	10.327	3.2302	.1319	
Weight	Tribal	600	20.495	12.5973	.5143	0.168, NS
	Nontribal	600	19.433	14.0244	.5725	
Height	Tribal	600	4.43	.583	.024	0.001*
	Nontribal	600	4.57	.606	.025	
BMI	Tribal	600	12.3926	6.33338	.25856	0.670, NS
	Nontribal	600	12.2424	5.85123	.23888	

Table 2: Intergroup comparison of chest circumference and skin fold thickness.

		N	Mean	Std. Deviation	Std. Error Mean	P value
Chest circumference	Tribal	600	19.673	10.2227	.4173	0.011*
	Nontribal	600	21.383	12.9916	.5304	
Skin fold thickness	Tribal	600	15.328	8.6613	.3536	0.576, NS
	Nontribal	600	15.658	11.5527	.4716	

Table 3: Intergroup comparison of oral hygiene index scores

			OHIS score			Total
			Fair	Good	Poor	
Group	Nontribal	N	155	406	39	600
		%	25.8%	67.7%	6.5%	100.0%
	Tribal	N	170	369	61	600
		%	28.3%	61.5%	10.2%	100.0%
Total		N	325	775	100	1200
		%	27.1%	64.6%	8.3%	100.0%
P value						0.026*

Table 4: Intergroup comparison of periodontal status

			Periodontal status		Total
			Absence of gingival bleeding	Gingival bleeding present	
Group	Nontribal	N	219	381	600
		%	36.5%	63.5%	100.0%
	Tribal	N	260	340	600
		%	43.3%	56.7%	100.0%
Total		N	479	721	1200
		%	39.9%	60.1%	100.0%
P value					0.009*

Table 5: Intergroup comparison of DMFT index

		N	Mean	Std. Deviation	Std. Error Mean
Dmft index	Tribal	600	1.382	1.8152	.0741
	Nontribal	600	1.643	2.1865	.0893
P value					0.024*

The tables present intergroup comparisons across various parameters between tribal and nontribal populations.

In Table 1, Age and anthropometric measures like weight, height, and BMI were compared. There were no significant differences in age and BMI between the groups, but height showed a significant difference (p = 0.001), with nontribal individuals being taller.

Table 2 compared chest circumference and skin fold thickness, revealing a significant difference in chest circumference (p = 0.011), with nontribal individuals having larger measurements. However, there was no significant difference in skin fold thickness.

Table 3 examined oral hygiene index scores, showing a significant difference (p = 0.026) with nontribal individuals having better oral hygiene.

Table 4 Analysed periodontal status, indicating a significant difference (p = 0.009) with tribal individuals showing a higher prevalence of gingival bleeding.

Table 5 compared the DMFT index, revealing a significant difference (p = 0.024) with nontribal individuals having a higher mean DMFT index compared to tribal individuals.

Overall, these findings suggest variations in anthropometric measures, oral hygiene, periodontal status, and dental health between tribal and nontribal populations, with implications for healthcare interventions and policies tailored to each group's specific needs.

Result

The results of the study provide valuable insights into the oral health and nutritional status of Tribal and Nontribal children in Udaipur District, Rajasthan. Gender differences were observed in oral health patterns, with significant variations noted between males and females within both Tribal and Nontribal groups. This underscores the potential influence of gender on oral health outcomes.

In terms of anthropometric measurements, although there was no significant difference in age or weight between the two groups, significant disparities were found in height and chest circumference. Nontribal children generally exhibited greater height and chest circumference compared to Tribal children, indicating potential differences in growth and development patterns.

The study also explored dietary preferences, revealing that the majority of participants adhered to a vegetarian diet, with no significant difference observed between Tribal and Nontribal groups. This suggests a common dietary pattern prevailing among the studied population.

Regarding oral health status, significant differences were observed between Tribal and Nontribal groups based on OHIS scores. Nontribal children tended to have a higher proportion of good oral health status compared to Tribal children. Additionally, a significant association was found between OHIS scores and the presence of gingival bleeding, indicating potential variations in periodontal health between the two populations.

Furthermore, analysis of the DMFT index highlighted differences in dental health between Tribal and Nontribal children, with Nontribal children exhibiting a higher mean DMFT index compared to Tribal children. This suggests disparities in dental caries experiences between the two groups.

Overall, these findings underscore the importance of addressing disparities in oral health and nutritional status among Tribal children. Targeted interventions aimed at improving oral hygiene practices, access to dental care, and nutritional support may help mitigate these differences and promote better health outcomes in Tribal communities.

Discussion

The study was conducted in Udaipur District, Rajasthan, which aimed to evaluate and compare the nutritional and oral health status of tribal and non-tribal children aged 6 to 12. The findings revealed significant differences between the two groups across various parameters.

Height, weight, chest circumference, and skinfold thickness were measured as indicators of nutritional status. Tribal children generally exhibited lower height and chest circumference than their non-tribal counterparts.

However, weight showed a significant difference between the two groups. The difference in weight for Tribal vs. Non-Tribal children may be due to various socio-economic variables such as access and use of MCH services (Maternal & Child Health Services), demographic socio-economic variables, and behavioral variables [1].

Our findings are consistent with previous studies highlighting the prevalence of malnutrition among tribal children, attributed to factors such as poor socioeconomic conditions and limited access to healthcare services.

Oral health was assessed using the OHI-S and DMFT indices. According to the present study,Tribal group had a mean BMI of 12.3926 and the Nontribal group had a mean BMI of 12.2424. However, there was no statistically significant difference in BMI between the two groups. This might be the reason behind insignificant differences in BMI i.e. variations in body fat were less likely to be caused by socioeconomic position [2].

In the present study Chest circumference was significantly higher in the non-tribal group, indicating that tribal and non-tribal children between 6-12 years of age both differ significantly in the variable of 'chest circumference' [3].

Skin fold thickness for age and sex indicates the amount of body fat stored under the skin in adults and kids. If your BMI is high and your SSFT is low, you have a large amount of muscle mass; if your BMI is high but your SSFT is high, you have a high amount of body fat[4].

According to our study, the skin fold thickness did not show any significant difference between tribal and non-tribal children. There was no statistically significant difference observed between the Tribal and Nontribal groups, as evidenced by a higher p-value of 0.576.

Skin fold testing, despite being based on common measurements, is highly variable and has not yet been widely used in clinical practice [5].

According to our data, 67.7 percent of non-nontribal kids achieved a perfect OHIS score, while 61.5 percent of tribal kids achieved a perfect score [6]. According to the study, 88.6% of children enrolled in private schools had good oral health status and 86% of children enrolled in corporate schools had good oral health status. There was a statistically significant difference in economic status between the children enrolled in corporations and private schools.

Mbawalla HS, Masalu JR, Åstrøm AN reported, that children from low-income households, those whose parents could not afford dental care, and those with low educational attainment reported oral impacts more often than their peers, poor oral health, inadequate brushing and flossing, low dental attendance, and frequent consumption of sugary drinks [7].

In the present study, the mean DMFT value was higher in non–tribal children as compared to tribal children in our study.

According to John JB(2015),the prevalence of caries among tribal school children was 89.3%, whereas in suburban school children, it was 77%, and in urban school children it was 55%. The difference in mean DMFT between the tribal school children, suburban school children, and urban school children was statistically significant [8].

The tribal people are more likely to suffer from malnutrition (undernutrition) due to their reliance on primitive agricultural methods, their daily occupation as daily wagers, and the unpredictable nature of the food supply. Lack of adequate food leads to protein deficiency and chronic lack of energy. Additionally, malnutrition hurts oral health as nutrition is essential for the growth, development, and maintenance of the oral tissues and dentition. Non-tribal children tended to have better oral hygiene and a lower prevalence of dental caries compared to tribal children. These differences could be attributed to factors like access to dental care, dietary habits, and oral hygiene practices[9].

Overall, the study underscores the significant health disparities between tribal and non-tribal children in Udaipur District. It emphasizes the importance of addressing these disparities through targeted interventions to improve nutrition, access to healthcare, and oral hygiene education among tribal communities. By addressing these issues, policymakers can work towards ensuring equitable health outcomes for all children, regardless of their socio-economic background or tribal status.

Conclusion

Based on the findings of this study, the tribal population's health is very poor due to remote location and poor access to healthcare. Poor staple diet and poor education are the primary reasons for poor health. Primary healthcare is an effective and efficient solution to address the primary causes and threats to health and wellbeing today as well as the emerging challenges to health and wellbeing tomorrow.

References

1. Das S, Dasgupta A, Das MK. Nutritional Status of Tribal and Non-Tribal Children (Under 5) in Purulia District of West Bengal: A Comparative Study.

2. Słowik J, Grochowska-Niedworok E, Maciejewska-Paszek I, Kardas M, Niewiadomska E, Szostak-Trybuś M, Palka-Słowik M, Irzyniec T. Nutritional status assessment in children and adolescents with various levels of physical activity in aspect of obesity. Obesity facts. 2019 Oct 22;12(5):554-63

3. Sen J, Mondal N. Socio-economic and demographic factors affecting the Composite Index of Anthropometric Failure (CIAF). Annals of human biology. 2012 Mar 1;39(2):129-36

4. Corsi DJ, Subramanyam MA, Subramanian SV. Commentary: Measuring nutritional status of children. International journal of epidemiology. 2011 Aug 1;40(4):1030-6

5. Pinni J, Avula JS, Bandi S. Association of dental caries with socio-demographic and nutritional factors among school children in Guntur district of Andhra Pradesh, India. pediatric dental journal. 2019 Dec 1;29(3):111-5.

6. Sen J, Mondal N, Dey S. Assessment of the nutritional status of children aged 5–12 years using upper arm composition. Annals of human biology. 2011 Nov 1;38(6):752-9.

7. Renuka M, Rakesh A, Babu NM, Santosh KA. Nutritional status of Jenukuruba preschool children in Mysore district, Karnataka. J Res Med Sci. 2011;1:12-7

8. Mondal N, Sen J. Prevalence of undernutrition among children (5–12 years) belonging to three communities residing in a similar habitat in North Bengal, India. Annals of human biology. 2010 Apr 1;37(2):199-217

9. Shirisha P. Socioeconomic determinants of nutritional status among 'Baiga'tribal children In Balaghat district of Madhya Pradesh: A qualitative study. PloS one. 2019 Nov 21;14(11):e0225119.