Chapter 2

Review of Literature

Nutritional status is a sensitive indicator of a community's health and nutrition. It is essential for the diagnosis of health conditions, particularly in the case of tribal infants. Malnutrition has a substantial impact on all societal groups, but tribal infants and young children are particularly vulnerable due to their unique nutritional requirements for growth and development. The tribal health maintenance system is intricately linked with socio-cultural beliefs and practices, as indicated by numerous studies. The following are evaluations of previous studies that have examined the nutritional status of tribal children worldwide:

Global Scenario of Health and nutrition survey on tribal children

People in every nation are impacted by Undernutrition. Undernutrition is readily induced when individuals experience persistent hunger without access to food. The uneven prevalence rate of undernutrition can be attributed to several factors. The restricted sample size, non-representative sampling, and other variables are the primary contributors to the discrepancy in the prevalence of undernutrition.

Corvalan et al (2017) investigated the nutritional condition of children in Latin America and reported that childhood obesity has escalated in the region over the previous decade due to urbanization, retail food sales, socioeconomic changes, and public transportation. This research examines the causes leading to childhood obesity in Latin America by analyzing nutritional status, physical activity levels, discrepancies both between and within nations, and the difficulty in ensuring sufficient nutrition and physical exercise. Throughout the area, children confront a combined challenge of undernutrition and obesity. Despite significant advancements in combating undernutrition, childhood obesity is increasing due to diets that prioritize energy-

dense, nutrient-deficient foods and the prevalence of a sedentary lifestyle. In the past decade, alterations in socioeconomic conditions, urbanization, retail food availability, and public transit have all contributed to childhood obesity in the region.

Acham et al (2012) conducted an assessment of the nutritional status of pupils aged 9 to 15 in the Kumi district of Eastern Uganda. They found that the promotion of chemoprophylaxis and insecticide-treated nets could result in substantial advancements in the fight against malaria. The biennial albendazole dosage and the ubiquitous use of iodized salt for deworming should be maintained; iron deficiency anemia can be managed through nutrition education, the provision of nutritious school meals, and the prevention and treatment of malaria.

Nankinga et al (2019) investigated the correlation between mother work and the nutritional condition of children under five in Uganda, utilizing data from the 2016 Uganda Demographic and Health Survey (UDHS). A weighted sample of 3,531 children under five years, born to working women aged 15 to 49, was utilized. Chi-squared tests and multivariate logistic regressions were employed to analyze the association between mother employment and nutritional outcomes, while controlling for additional explanatory variables. The findings indicated that children of mothers with secondary education had reduced probabilities of stunting and underweight in contrast to children of moms lacking formal education. Children with normal birth weight had reduced likelihoods of stunting, wasting, and underweight status in comparison to those with low birth weight. Children whose moms participated in agricultural and physical labor had greater likelihoods of stunting compared to those whose mothers were employed in professional occupations. Moreover, children whose moms were worked by non-relatives had greater likelihoods of wasting and being underweight in comparison to those whose mothers were employed by family members. Additional factors of child nutritional status were area,

maternal age, and the age and sex of the child. Interventions designed to enhance the nutritional health of children of working women should advocate for breastfeeding, provide flexible employment circumstances, focus on individuals of low socio-economic level, and encourage feeding programs and the utilization of mosquito nets for both moms and children.

World Health Organization (WHO) 2005 reference population to assess the nutritional status of children. The data were analyzed with the WHO's Anthro program and SAS. Stunting was seen in 47.0% of the children; 11.8% were underweight, and 2.6% were wasted. Severe stunting was seen in 23.4% of the children; severe underweight in 3.1%, and severe wasting at 0.6%. Children aged 36-47 months exhibited the highest incidence of stunting at 58.0%, whereas the highest prevalence of wasting at 4.1% was observed in children aged 6-11 months. Boys exhibited greater stunting than girls ($p<0.01$), and older children were substantially more stunted than younger children ($p<0.0001$). At three years of age, girls exhibited a higher prevalence of wasting compared to boys ($p<0.01$). The significant frequency of chronic malnutrition indicates that stunting is a persistent issue inside this urban informal settlement, not just attributable to the relatively short political crisis. The prevalence of stunting in older children signifies inadequate growth and development during the initial two years of life. Food programs in Kenya have historically concentrated on rural regions and refugee camps.

Tay et al. (2022) assessed the nutritional status and significant contributing elements within Malaysia's Orang Asli group. Over the years, several Orang Asli communities were relocated to more developed metropolitan areas under a government-sanctioned scheme. They were provided with enough facilities and healthcare services to enhance general well-being. Despite persistent undernutrition among the Orang Asli, data indicates a rising prevalence of overweight and obesity among this demographic. This discovery may be ascribed to an urbanized lifestyle that

frequently results in detrimental eating habits, contributing to a heightened incidence of obesity, chronic illnesses, food insecurity, and poor nutritional intake.

Galgamuwa et al. (2017) conducted a cross-sectional research on preschool and school-aged children in three rural villages of Sri Lanka from January to August 2014, indicating that child undernutrition is a significant public health issue in the plantation sector of Sri Lanka. Demographic and household information were recorded, and anthropometric measures were obtained to compute weight-for-age (WAZ), height-for-age (HAZ), and BMI-for-age (BAZ). Data analysis was conducted using Anthroplus, Epi Info, and SPSS versions. Results: A total of 547 children (ages 1–15 years, mean age 7.0 ± 3.6 years, 53% female) participated in the study. 35.6%, 26.9%, and 32.9% of children were classified as underweight, stunted, and wasted, respectively. Under-nutrition was particularly prevalent among primary school pupils. Maternal work, a large number of siblings, elevated birth orders, and the presence of female children were substantially correlated with under-nutrition in preschool children. Residing in compact dwellings, a high number of family members, limited monthly income, and mother work were substantially correlated with under-nutrition in school-aged children.

Health and nutrition survey on tribal children in India

Childhood undernutrition is a significant public health issue in India, particularly among tribal populations. Dietary deficiencies and childhood undernutrition, particularly among indigenous children, have been examined in several research.

Rao et al. (2006) evaluated the food consumption and nutritional condition of the teenage demographic from tribal regions in certain States of India. The National Nutrition Monitoring Bureau's database from 1998-99 was employed for this purpose. The investigation encompassed

data from 12,789 teenagers aged 10 to 17 years. Four percent of teenage females were married, while fewer than 1% were either pregnant (0.4%) or breastfeeding (0.7%) at the time of the poll. The average consumption of many food items, particularly income-elastic commodities like pulses, milk and dairy products, oils and fats, and sugar and jaggery, fell below the recommended limits set by ICMR. The consumption of all dietary items, save green leafy vegetables, was inferior to that of their rural counterparts. The consumption of all nutrients was below the recommended levels, whereas the intake of micronutrients such as iron, vitamin A, and riboflavin was severely insufficient across all age and sex categories. Approximately 63% of adolescent males and 42% of females were classified as undernourished (below the 5th BMI age percentiles of NHANES). A notable correlation between undernutrition and socio-economic factors such as family structure, landholding size, and the employment of the household head was identified. Consequently, there is a necessity to design comprehensive programs aimed at the holistic advancement of the indigenous community, with particular emphasis on teenagers.

Debnath and Bhattacharjee (2014) identified the determinants of malnutrition in Indian tribal children. This study aims to investigate the factors contributing to malnutrition among tribal children in India. The inquiry relies on secondary data gathered from the National Family Health Survey-3. We employed a classification and regression tree model, a non-parametric methodology, to achieve the purpose. Our data indicates that breastfeeding practices, economic status, maternal prenatal care, and women's decision-making autonomy are inversely correlated with malnutrition in tribal children. We recognize maternal malnutrition and urban household concentration as the two risk factors for child malnutrition. The observed correlating characteristics may be utilized for the design and targeting of preventative programs for malnourished indigenous children.

Venkaiah et al. (2002) examined the dietary habits and nutritional status of rural adolescents in India, revealing that teenage females in these areas may be more vulnerable to nutritional deficiencies due to early marriage and pregnancy prior to completing their physical development. In each State, 120 villages were chosen from eight districts. Twenty households were picked from five clusters in each of the chosen villages. Data about the socio-demographic profile was gathered from all 20 families, while anthropometric measurements, including weight, height, and clinical indicators of nutritional inadequacy, were obtained from all accessible teenagers within the selected houses. Dietary information for all members was gathered via a 24-hour dietary recall in every fourth sampled family, specifically five households. The outcome variables for nutritional status included the proportion of underweight individuals (below the median minus 2 standard deviations of NCHS weight-for-age standards), stunted individuals (below the median minus 2 standard deviations of NCHS height-for-age standards), and body mass index. The nutritional intakes were evaluated against the recommended dietary allowances (RDA).Anthropometric and socio-economic data for 12,124 teenage boys and girls, together with food information for 2,579 people from 1996 to 1997, was accessible for study. The primary employment of the questioned household heads was agriculture. Over one-third (37.3%) of households with teenagers lacked any land ownership. The monthly per capita income was around Rs 250 at 1996-1997 values. Approximately 23% of teenage females were married before to reaching the age of 18. Approximately 25% of married teenage females had small height, and 18.6% were classified as underweight. They are classified as 'at danger.' Approximately 39% of adolescents had stunting (median 7, 2 standard deviations below NCHS height-for-age), regardless of sex. The incidence of undernutrition (below the median of 7 with 2 standard deviations of NCHS weight for age) is greater in males (53.1%) compared to girls (39.5%). The

prevalence of stunting was greater (42.7%) among adolescents from the scheduled caste population. Among girls, the prevalence of underweight was significantly lower in each age group compared to their male counterparts. Approximately 70% of teenagers ingested over 70% of the Recommended Dietary Allowance for energy. The consumption of micronutrients, including vitamin A and riboflavin, was severely insufficient. Adolescent females in rural regions may have heightened nutritional stress due to early marriage and premature pregnancy prior to the completion of their physical development.

Tubid (2015) reported that malnutrition adversely affects the long-term socioeconomic status of individuals, especially among rural tribal populations in India. Young tribal children are more susceptible to malnutrition than their older counterparts due to parental ignorance regarding the importance of breastfeeding, nutrimix food consumption, immunization, care for sick children, clean drinking water, and sanitation practices.

Health and nutrition survey on tribal children in different states in India

Under-nutrition and malnutrition persist as a perennial issue in Asian nations including Indian subcontinent (Ghosh, 2006). India is a very ancient nation with a unique position in the world due to its riches, variety, and population of recognized ethnic groups that demand particular attention from the perspectives of social, economic, educational, health, and nutritional security. Despite tremendous advancements in science, technology, and the fields of preventive and curative health, some people continue to live in the middle of nature, far from civilized society, and lead pitiful lives that are influenced by their traditions, customs, beliefs, and myths (Das et al., 2022). They are referred to as tribal. They are regarded as indigenous people. There are over 75 prehistoric tribes in this sacred land (Bhuyan and Behera, 2022).

Health and nutrition survey on tribal children in Maharashtra:

Sonowal (2010) reported that tribal children in Maharashtra, India has suffered from several health and nutritional issues because of a lack of land and forest resources, a lack of adequate job opportunities at the local level, and exposure to non-tribal domains. Among several health problems faced by the tribal groups, the problem of malnutrition and under-nutrition has been seen as the direct consequence of socio-economic disorganization of tribal societies. The study tried to find out the impact of socio-cultural, political and economic environment on nutritional status of tribal children in Maharashtra, India.

Ghosh and Varerkar (2019) conducted research to evaluate the extent of under-nutrition among tribal children under six years of age, as well as their eating patterns and food behaviours in the Vikramgad block of Palghar District. The research was founded on a survey administered to 375 tribal homes with children aged 1 to 6 from April to June 2017. The sample was obtained by a two-stage stratified random sampling method. Measurements of both height and weight were obtained from each of the 375 youngsters. The evaluation of their nutritional condition was conducted utilizing the 2006 WHO Child Growth Standard. Furthermore, multivariate logistic regression models were utilized to analyze the independent impacts of predictor factors on stunting, wasting, and underweight. Our study level data indicate that 59% of children experienced stunting. The prevalence of wasting and underweight was 20% and 53%, respectively. The dietary recall data indicated that 83% of the youngsters had ingested food from only three categories. Moreover, the predominant diet consumed by the children was rice and dal (legumes). Merely 13% of the youngsters attained a basic standard of dietary diversification.

Health and nutrition survey on tribal pre-school children in Madhya Pradesh

Rao et al (1994) carried out a health and nutrition investigation on tribal preschool children across three ecological zones in Madhya Pradesh, India: Jhabua (West Zone), Sarguja (East Zone), and Bastar (South Zone). They assessed the relative contributions of agriculture, forestry, and a combination of both to the economy and observed that their intake of food and nutrients was significantly poorer among preschool children in Jhabua compared to those in Bastar and Sarguja. The research investigated the health and nutritional status of tribal preschool children across several eco zones in Madhya Pradesh, India. The sample consisted of a multi-stage random selection of communities based on the accessibility of health services. One thousand four hundred and one pre-school aged children were chosen from Sarguja (351), an agricultural and wooded region; from Bastar (731), a forest-based economy; and from Jhabua (319), an agricultural economy. Food consumption was assessed by a 24-hour recall survey, and a clinical examination was conducted to evaluate nutritional status. Growth deficiencies were assessed using measuring techniques described by Gomez and Waterlow. The standard values were derived from the 50th percentile of the US National Center for Health Statistics. The nutritive content of Indian cuisine was calculated using Gopalan et al.'s Food Composition Tables. The findings indicated that the primary staple food grains in Sarguja and Bastar were rice, whereas millets, maize, and jowar constituted the fundamental grains consumed in Jhabua. Milk consumption was minimal throughout all districts; nevertheless, they also ingested a diverse array of pulses, leafy greens, root vegetables, tubers, and wild fruits. Cereal consumption was greatest in Bastar (210 g) and Sarguja (193 g) among children aged 1-3 years. These regions exhibited a greater consumption of grains and millets than the recommended dietary limits established by ICMR. Children in Jhabua had a reduced consumption of grains and millets. Only Sarguja (31 g) approached the necessary pulse intake of 35 g. The pulse intake was 13 grams in

Bastar and 7 grams in Jhabua. The consumption of green leafy vegetables, other vegetables, roots and tubers, milk, fats and oils, and sugar and jaggery was below the required levels in all three districts. In Jhabua, just 35% of the necessary caloric intake was achieved by youngsters, in contrast to 60% in the other two districts. Jhabua exhibited the greatest deficiency in meeting the necessary protein intake. This tribal group had lower clinical manifestations of protein-energy malnutrition and vitamin A insufficiency relative to other populations in the rural regions. Iodine deficiency was observed in 4% of children in Sarguja. Tribal children exhibited reduced stature and lower weight compared to the NCHS benchmark. youngsters from Sarguja had greater height and weight compared to other rural youngsters in Madhya Pradesh. Malnourishment rates were 11.7% in Sarguja, 23.5% in Bastar, and 26.0% in Jhabua; stunting rates were 50%, 48%, and 59%, respectively. According to Waterlow's Classification, 33.6% in Sarguja, 27.1% in Bastar, and 17.3% in Jhabua were classified as normal.

Health and nutrition survey on tribal children in Chhattisgarh

Sinha et al. (2019) conducted research to assess the nutritional and health condition of children under five years old in the rural villages of Bastar, Chhattisgarh, India. The study involved 140 children (55 males and 85 girls), revealing that around 40.7% were affected.

Children exhibited stunting, with 29.3% experiencing wasting and around 44.3% classified as underweight. The community-based cross-sectional study was undertaken in the villages of Dimrapal, Biringpal, and the Pandripani catchment region of RHTC Tokapal. A door-to-door survey was performed from July to September 2017. Data was gathered via a preformulated semi-structured questionnaire. Interviews were conducted with mothers who had children under the age of five. The classification of anthropometric measures in children was conducted according to World Health Organization (WHO) criteria.

Health and nutrition survey on tribal children in Tamil Nadu

Anitha et al. (2021) asserted that the examination of tribal health must consider their distinct perspectives on illnesses, health concerns, dietary practices, human anatomy, and religious beliefs, along with their engagement with contemporary society. The primary aims of the study were to ascertain the prevalence and factors influencing the nutritional condition of tribal children in Pillur beat, Coimbatore District, Tamil Nadu. The research was founded on a survey administered to 60 indigenous children aged 4 to 11 from January to March 2020. A Chi-square test was employed to evaluate nutritional status according to weight-for-age, height-for-age, and weight-for-height using anthropometric measures. The dietary habits of the indigenous children were recorded by formal interviews and responder surveys. The nutritional condition of tribal youngsters in India is perilous. Of the sixty assessed tribe youngsters, 53.33% did not exhibit any nutritional insufficiency, whereas 46.67% had some form of nutritional deficiency. Moreover, the predominant foods consumed by the tribal children were rice, millets, and lentils. This study has focused on the production and identification of herbal products and therapeutic plants for three species. The findings imply that nutritional programs and health policies must be established for tribal children to address the issue of undernutrition. The insights gathered from the study can assist policymakers in creating synergies between nutrition initiatives and poverty alleviation methods.

Health and nutrition survey on tribal children in Karnataka

Narayanappa et al. (2015) assessed the health and nutritional condition of Jenukuruba tribal children in Mysore, Karnataka, India. This research aimed to evaluate the nutritional and health status of Jenukuruba tribal children in the Mysore district. Approaches: A community-based

cross-sectional study conducted over a duration of two years. A total of 4,207 youngsters aged 0 to 15 years from the Jenukuruba tribal community were included. preformatted proforma. Anthropometric measures were documented. Weight-for-age, height-for-age, and BMI were computed. A clinical examination was conducted to assess for anemia, vitamin A insufficiency, and other comorbidities. The 24-hour dietary recall approach is employed to evaluate the consumption of calories and proteins. Mean calorie and protein consumption assessed and contrasted with the Recommended Dietary Allowances of Indian standards. Results: 1393 individuals (33.1%) exhibited stunting, with height below the 3rd centile, and 1588 individuals (35.7%) were classified as underweight, with weight beneath the 3rd centile, according to WHO growth charts. 1175 (27.9%) of children had a BMI below the 5th percentile, 127 (3.3%) were classified as overweight with a BMI between the 85th and 95th percentiles, and 9 (0.2%) were categorized as obese with a BMI beyond the 95th percentile. 53.4% had varied degrees of protein-energy deficiency. 2083 individuals (49.5%) of the research group exhibited microcephaly. In conclusion, the health and nutritional status of Jenukuruba tribe children is markedly inadequate. Immediate and suitable intervention programs are necessary to enhance their health and nutritional condition.

Health and nutrition survey on tribal children in Kerala

Krishnan (2004) conducted a cross-sectional survey with 297 children (162 males and 135 females) aged 6 to 60 months in Noolpuzha Panchayat, Wayanad, Kerala. The investigator measured length, height, and weight using conventional measuring boards and an electronic weighing scale (SECA 881). Univariate and bivariate analyses were employed to investigate the sociodemographic and environmental components linked to malnutrition. The prevalence of stunting and underweight in the sample was 40% and 54%, respectively. The characteristics

correlated with an increased prevalence of malnutrition were socioeconomic position, maternal educational attainment, birth order, tribal affiliation, and hygiene behaviours.

Health and nutrition survey on tribal children in Tripura

Debbarma et al (2018) conducted a cross-sectional study in three rural schools (Sukhiabari Jr. B School, R.S Colony Sr. B School, and Kalidas Debbarma Smriti Sr. B School) in the Khowai district of Tripura, India, and found that malnutrition was more pronounced in girls than in boys.A total of 155 students, comprising 78 boys and 77 girls, aged 6 to 12 years, participated in the research. The sample was chosen using the cluster random sampling method. The subjects mostly comprised families from lower socio-economic backgrounds, predominantly Hindu, with some from the Christian minority, and were representative of average Indian children. The youngsters underwent evaluation of their nutritional condition by clinical examination and anthropometric measurement. The children's weight and height were measured, and height-for-age (stunting), weight-for-height (wasting), and weight-for-age (underweight) indices were computed. Among 155 schoolchildren, 53.83% of boys and 72.71% of girls exhibited wasting, with 16.12% of the children demonstrating a severe degree of wasting. Stunting was seen in 37% of boys and 58.44% of the population. Rice intake, family size, infection, immunization, and latrine availability were substantially correlated with malnutrition. Hair alterations were seen in 80.64% of cases. Changes in teeth were seen in 56.12% of cases. Skin alterations were seen in 65.80% of children. The research demonstrated that schoolchildren in Sukhiabari village experienced both acute and chronic nutritional stress. Advocating suitable eating practices via efficient nutritional education would serve as a potent preventative strategy.

Health and nutrition survey on tribal children in West Bengal

Numerous studies have been conducted on the nutritional condition of children at both national and state levels; however, there is a paucity of research specifically concerning tribal children in West Bengal. Chandra et al (2021) identified undernutrition in tribal children under five in Burda village, Purulia, West Bengal, characterized by stunting, wasting, and inadequate dietary intake of calories, protein, and fat, recommending a multisectoral strategy. juveniles. This cross-sectional study involved a sample of 68 tribal children under the age of five, selected by thorough enumeration and meeting the inclusion criteria after receiving ethical approval from the Institutional Ethics Committee. Anthropometric measures were obtained to identify the forms of undernutrition present among the subjects using World Health Organization Anthro software. A 24-hour dietary recall of children's consumption was conducted over 7 days to evaluate the average daily intake of calories, protein, and fat, which was then compared to the recommended daily allowances. Thirty point eight percent of youngsters were stunted, thirty point eight percent were wasted, and fourteen point seven percent were both stunted and wasted. The intake of calories, protein, and fat was very low. The chi-square test indicated a significant correlation between undernutrition and gender, paternal education, family type, socioeconomic status, and birth order; however, binary logistic regression revealed a significant connection solely with socioeconomic status. Malnutrition, characterized by stunting, wasting, and inadequate dietary intake of calories, protein, and fat, was seen in these youngsters. A multi-sectoral strategy is recommended.

Das et al. (2021) compared the nutritional status of children under five years of age from tribal and non-tribal backgrounds in Purulia District, West Bengal, and determined that the heightened prevalence of undernutrition among tribal children was attributable not to ethnic disparities but

to socioeconomic factors distinguishing the two groups. A community-based cross-sectional research was done in the Purulia area of West Bengal with 112 children under five years of age, both tribal and non-tribal. Demographic, socioeconomic, maternal, and birth variables were documented using a pre-designed, pre-tested structured questionnaire presented by an interviewer. Anthropometric assessments were conducted in accordance with regular operating procedures. The prevalence of undernutrition among tribal children under five years old was 69.6%, whereas among non-tribal children it was 50.9%. Malnutrition was much higher in tribal children under five compared to their non-tribal counterparts [OR= 2.22 (1.28-3.85)]. However, the notable disparity in nutritional status between tribal and non-tribal children diminished when corrected for socioeconomic characteristics [AOR=0.52(0.21-1.28)]. In the final model, after adjusting for all factors, there was no significant difference in nutritional status between tribal and non-tribal children [AOR=0.56(0.15-2.17)].