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INTRODUCTION

Research problem: Tribal adolescent girls from Kannur and Wayanad Districts are malnourished and following the poor personal and menstrual hygiene practices.

India, it is home to the highest concentration of "indigenous peoples". They are identified as 'Adivasis', with the population of 8.43 crores (8.2%) of the total population of the nation and live in about 15 percent of the nation's areas and are generally considered as the indigenous people or 'Scheduled Tribes'. This term 'scheduled tribes' is an administrative term considered for the purpose of administration, certain special constitution privileges, protection and benefits for specific sector of population, considered accidently not advantaged and backward.

Generally scheduled tribes of our country are primitive, most conservative, geographically isolated, shy, socially, educationally and economically vulnerable, which impede their growth and development in all walks of their life. These traits make them to distinguish from other communities of our country. In various ecological and geo-climatic conditions ranging from plains to forests, hills and inaccessible areas. Scheduled tribal groups of population are at different steps of social, economic and educational development. Some tribal population have adopted the mainstream way of life at one side of the spectrum and are 75 Primitive Tribal Groups (PTGs) while the other side, tribals are characterized by having a pre-agriculture level of technology, stagnant or declining population, extremely low literacy and a subsistence level of economy.

The constitution of our nation seeks to serve for all its citizen, among other things, social and economic justice, equality of status and opportunity and confirm to give the dignity of the individual. Thereby, these groups of tribal populations are also well recognized for their status upgradation in terms of nutritional, health, social and economic aspects.

Tribal population in India are economically and socially background and mostly live in forest and hilly territories isolated from the public. They have their own way of living and different sociocultural and eco-geographical settings, faulty feeding habits, irrational belief

systems and special tribal chores are likely to influence their health and nutritional status (Balgir, 2014).

The distribution of scheduled caste and scheduled tribes in the population, in terms of proportions, is quite different from the country as a whole. The proportion of scheduled caste is higher at 19.2 percent and that of scheduled tribes is lower at one percent, compared to the all India figures, of 16.5 percent and 8.1 percent respectively (Census, 2011). Small tribal community in the part of Dravidian language group which is spoken in South Eastern India and spread over the three states of Tamil Nadu, Kerala and Karnataka. Tribes are the aboriginal inhabitants of our country who have been living in a life based on the natural environment and have cultural patterns congenial to their physical and social environment.

India has the second largest tribal population in the world after Africa. Though Kerala has achieved outstanding progress in human development and its health status presents a picture of low overall mortality co-existing with considerable morbidity, mostly caused by diseases linked to under development, poverty and diseases of affluence (Panicker and Soman, 2009). Reports showed that tribes in Kerala underwent serious health issues. Recent changes in land use pattern and land alienation has adversely affected their traditional livelihood leading to food insecurity (Rajasenan et al., 2013). Poverty, lack of cleanliness, infrastructure inadequacy coupled with various health problems add fuel to fire for their low quality of life.

Studies including health indicators in rural Kerala emphasized that the lowest social class including the tribes have the highest death and birth rates (Kannan et al., 2014). But in reality, there exists differences in the health status of tribes and non-tribes in Kerala. Kerala enjoys an unique position in the health map of India and its health indicators are at par with the Western world have the lowest infant mortality and maternal mortality rate with the highest life expectancy coupled with high morbidity. Banerjee and Kuri (2015) adduces increase in life expectancy as one of the reasons for high levels of morbidity in Kerala. But conditions of tribes in Kerala are distressing. They are caught in the vicious cycle of poverty coupled with malnutrition, morbidity and mortality.

A study conducted by Haseena. (2015) in Attapady and Palakkad among tribes showed that majority of tribes lies in the category of severe poverty i.e. tribes in Attappady are affected in more than 50 percent deprivation indicators. More over young adolescent girls,

pregnant women and lactating mothers were found to be suffering from chronic malnutrition and anemia and leading to have high infant and maternal mortality rates (Shrinivasa et al., 2014).

The livelihood options of the tribes are predominantly primitive in nature, with minimal dependence on other means of employment. Communities like Kattunaikas still depend upon forest for hunting, whereas other work as agricultural or nonagricultural laborers (Wayanad Initiative, 2006). Studies conducted by Rajasenan et al. (2013) on nine prominent tribal communities of Kerala from Wayanad, Idukki and Palakkad showed that health status of tribal community is not robust, they are very much below the state average in terms of the health indicators of morbidity, mortality, especially maternal and infant mortality and other demographic features. This is because of their peculiar dietary habits like drinking local alcohol and excessive use of tobacco. Health pattern is inferred by compiling their perception of own health situation as well as data regarding the stage of visiting medical practitioner, stage of ill health, loss of work days due to illness and their ill-healthy practices such as consumption of alcohol and tobacco. Though the tribes constitute only a little above one percent of the total population, there is an" over representation" of tribes in the states. Below Poverty Line (BPL) category with 44.3 percent as per the NSSO (2014-15). This situation of massive poverty amongst the tribes always leads to ill health conditions and immense difficulty in recovering from the ill health poverty snare (Abraham et al., 2013).

Study conducted by Haseena (2016) among tribes in Attapady of Palakkad District in Kerala showed that continuous infant and maternal mortality rate leads to Genocide, Ethnocide or even Cultureocide of tribes. Census report from 1951 to2011 showed that there was continuous decline of tribal communities in Attapady of Palakkad District. Increasing number of tribe community from 1991-2001 is 2893 whereas it becomes 506 tribes for the period of 2001-20011 tribal population. Among the three tribes in Attapady, Kurumbar community comes first in the district followed by Mudugar community and Irular community. Thomas (2014) documented that, during the period of 1996, death rate reported due to poverty was 25 whereas it increased to 32 during the period of 1999. This declining trend of under 5 years children would adversely affected their population rate and infant mortality is still continuing among the tribes in Kerala. Due to malnutrition, anemia and lack

of proper caring and diet among the tribal women of tribal community, maternal and infant mortality rate was also reported in Batheri of Wayanad District (2013).

According to the study conducted by ICDS (2014) pointed out that children in Attapady Panchayat have suffered from micro and macro nutritional deficiencies. Prevalence of underweight is higher among mothers and their children. Ninety one percent of pregnant women in Wayanad district were severely anemic and confirmed that poverty along with poor nutritional knowledge, lack of cleanliness, tobacco consumption and alcoholism are the major reasons behind the increasing morbidity and mortality rates among tribal communities. The condition of pregnant women and lactating mothers were so dangerous because of their poor health and nutritional status of the early adulthood especially among the adolescent tribal girls. Also confirmed that the mothers particularly young mothers had premature delivery because of their poor health status and their early marriage.

Maternal malnutrition, anemia, pregnancy induced hypertension, alcoholism and malabsorption are major reasons for premature delivery, undernutrition and anemia among tribal adolescent girls and young adult women in Wayanad and Palakkad Districts. All these studies emphasized the poor health condition of tribal women community and also emphasized that the socio-cultural beliefs and practices, inadequate quality and quantity of food and nutrients consumption pattern, poor hygienic practices and educational status influenced their health and nutritional status and precipitated to have health issues and increase the morbidity and mortality rate among the vulnerable group of population especially women segment of the tribal population.

Schedule tribe population, especially women segment of groups, continue to carry high burdens of diseases of the poor, namely under nutrition and infectious diseases. Micronutrient malnutrition is also a major problem among tribal women, including anemia and iodine deficiency disorders (Ghosh et al, 2013). High level of chronic under nutrition have been observed among young children and young adult population (Ghosh et al., 2016).

In a gender perspective, gender disparity is high in position among tribe people as compared to non-tribes. Poverty, lack of parental interest and motivation lead to malnutrition among young girls and adult women. Their educational deprivation of tribe people leads to economic exploitation which again results to poverty, deprivation and social oppression.

Apart from this, it is also indispensable for imparting education relating to human rights and their health and life style pattern.

Education sector is the core area of mankind and human resource development. Health Education is the first prerequisite of overall development. Katte (2017) opined that 850 million people in the world were illiterate and out of them, about 50 percent were in India alone. High morbidity and high mortality particularly among infants and children are an index not only of a community's low health level but also of inadequate health education of women. Illiterate mothers lacked knowledge about nutrition and their surroundings also have some effect on the child's health. So it is essential to impart the nutritional guidance to the tribal adolescent girls, the future mothers in order to prevent the nutritional deficiency and to promote health status.

The status of women in the society is a significant reflection of the level of social justice in society. Women's status is often described in terms of their level of income, employment, education, health and fertility as well as their role in the family and society. However, after a comparative analysis of the various indicators like political organization, religion, and ritual practices among the different tribes in India, it has been observed that the status of tribal women is comparatively lower than that of tribal men. Moreover, the condition of tribal women has gone from bad to worse as the result of the impact of social structure which has affected the social structure of tribal society (Shivaprasad et. al., 2011).

Tribal women in poor health are more likely to give birth to low weight infants. They are also less likely to be able to provide food and adequate care for their children. Finally a women's health affects the household economic wellbeing, as a women in poor health will be less productive in the labour force, while women in their community face many serious health concerns such as reproductive health, violence against women, nutritional status, unequal treatment of girls and boys (Katie, 2013).

Tribal women's health status varies widely both within and among countries because of such factors as local disease prevalence, health related behaviour and women's educational attainment, exposure to health information, influence on decision making and access to health care. Poverty, environmental degradation, civil conflict and migration also influence women's health. Highest level of malnutrition among women are found by several studies. The cause of malnutrition includes inadequate food supply, inequitable distribution of food

within the household, improper food storage and preparation, taboos against eating certain foods and lack of knowledge about nutritious food malnutrition hampers women's productivity, increase their susceptibility to infections and contributes to numerous debilitating and fatal conditions (Kumar, 2016)

Modi et al (2019) stated that malnutrition was more prevalent in the tribal community. Some degree of malnutrition was seen in 83.5 percent in children and 72.4 percent in young mothers. Malnutrition is a common health issue in tribal areas and has greatly affected the general physique of the population. Malnutrition lowers the ability to resist infection, leading to chronic illness and in the post weaning period leads to permanent brain impairment. Good nutrition is required throughout life and is particularly vital for women to continue to remain in good health and to do everyday household work. Nutritional anemia is a major problem for women in India especially and more in rural and tribal belts. Maternal malnutrition is predominantly a serious health problem among the tribal women especially too those who have closely spaced multiple pregnancies. Such health condition also reflects the complex socio economic factors that have serious bearing in their health. The nutritional status of pregnant women is also crucial for the infants' chances of survival and subsequent growth and development. It directly influences the reproductive performance of the women and the birth weight of their children. Nutrition also affects lactation and breast feeding which are key elements in the health status of infants and young children and a contributory factor in birth spacing (Thakur and Gautam, 2015).

Findings from the studies of Malakar and Roy (2014)), among tribal groups showed that maternal and child care is largely neglected. Proper and preventive health practices like proper hygiene and sanitation, systematic immunization and vaccination of expectant mothers as well as new born were not given importance and were neglected, because of their poor nutrition and health related knowledge and their poor socioeconomic status.

From inception to termination of pregnancy, no specific nutritious diet is consumed by the tribal women. The consumption of iron, calcium and vitamins during pregnancy is poor and inadequate when compared to ICMR RDA. More than 90 percent of deliveries are conducted at home with the supports of the elders in the family. In addition, a lot of females suffered from ill health due to pregnancy and child birth in the absence of well-defined concept of health consciousness. As far as the child care is considered, most of the tribal

illiterate mothers are observed to breast feed their babies and adopted harmful practices of discarding colostrum, delaying the initiation of breast feeding and delaying the introduction of supplementary food, vaccination and immunization of infants and children have been inadequate among tribal groups. Since the personal hygiene is very poor and advisable to have proper care and support to promote their healthy hygienic habits of the vulnerable groups of tribal population.

It is true that the major focus of various studies related to health issues in tribal areas is, on malnutrition. However, in the present context, it has become absolutely essential to conceptualize such studies which lay emphasize on assessment of the health status of various tribal groups with respect to obesity, metabolic measures, dietary profile and physical activities. Like all other developing countries, large scale urbanization/modernization has been taking place in India with effective changes in life style including food habits and decreased physical activities, attributable to evolving circumferences of chronic conditions. Even tribal groups are subjected to have such changes in their life. The benefits of development in education, health and income generation has resulted in a significant amount of their main steaming. A number of tribal groups are capitalizing on opportunities that are available to them, with a desire to acquire a better life style with modern life comforts.

In this process of acculturation, their food habits are likely to undergo substantial changes and so does the level of their physical activity. Thus, in the present circumferences, many of the tribal population are becoming susceptible to various metabolic risk factors that may be related to their dietary profile and physical activity. Therefore, it is worth investigating the prevalence of malnutrition and their association with dietary pattern among adolescents and adult population of tribal groups of different geographic regions. This type of investigation will help to understand the magnitude and the intensity of problems related to malnutrition and their relationship with dietary profile in culturally heterogeneous groups of different geographical regions of India.

In general, tribal population and the primitive tribal groups in particular are highly disease prone and do not have required access to their basic health facilities. They are mostly exploited, neglected and vulnerable to various disease with high degree of malnutrition, morbidity and mortality (Balgir, 2010). Their misery is compounded with poverty, illiteracy, ignorance of the causes of disease, hostile environment, poor sanitation, lack of safe drinking

water, and blind believes towards food, health, and preventive measures (Balgir, 2017). In order to promote their health status, it is essential to have nutritious diet with proper healthy life style pattern.

Health is a fundamental to an abundant life and natural process sound health is within the reach of everyone, provided the individual is willing to adopt a sensible pattern of living. Among several factors, which influence the quality of living, nutrition is the simple, and most important factor in promotion and maintenance of health.

Bamji et al (2016) opines that nutrition during adolescence is of paramount important because it is a foundation for life time health, strength and intellectual vitality. Adolescent age group is the window of opportunity to correct nutritional status of the children, because the intervening correction during this period can prevent the future consequences of nutritional deficiencies. As compared to studies on tribal pregnant women and under five, only a few studies are available on the nutritional status and health status of adolescents especially in tribal areas. Evidence showed that proper nutrition intervention promote the health status of the vulnerable group of tribal population.

Adolescence is characterized by the growth spurt with rapid growth with increased muscle mass, growth of organs, expansion of blood volume and linear increase in the long bones. This continuous growth and development period need proper nutritional care and support to promote and maintain their nutritional and health status. Healthy adolescents are leaders of tomorrow's community, thrill of the society and hope of the nation. Sound health of youth means health and wealth of any nation or society. Health of adolescents, is an important key to determine the growth and development of the nation. To promote their health status and to prevent the prevalence of malnutrition, nutrition based intervention in terms of dietary supplementation, health education, diversification and fortification are the most rational and sustainable methods. Besides encouraging the use of environmental source of macro, micro and phytochemicals, there is a need for promotion of more potent food sources at their doorsteps. Raising of kitchen/community nutrition garden is an another attractive and least expensive strategy to reach the quality and adequate quantity of nutrition for their standard of life, especially for adolescents and young adults. Young tribal girls enter the reproductive age as victims of undernourishment and anemia, and face greater health risks

as a result of early marriage, frequent pregnancies, unsafe deliveries, and sexually transmitted diseases.

Menstrual discomforts are common phenomenon occurring at the age of adolescents. Nearly 75 percent of adolescent girls experience some forms of menstrual problems, including delayed menstruation, pain, irregularities, heavy menstrual bleeding and so on which are the main reasons for the teenage girls to visit the health clinic in their locale (Eijk et al., 2016). Environmental aspects also have a positive influence on the menstrual pattern of an adolescent girl (Sharma et al., 2008). There are some studies revealed that the life style pattern have a positive influences on menstrual cycle pattern. The age at menarche has progressively reduced by almost four months in every 10 years difference (Eijk et al., 2016).

Some of asymmetrical menstrual features like, premenstrual discomforts and pain, irregular menstrual cycle, discomfort and pain with menstrual discharge, and excess loss of blood during menstruation may affect the reproductive health of this girls in future (Baridalyne and Reddaiah, 2004). One recent study conducted by Chandra-Mouli and Patel (2017) in the Southern part of India revealed the fact that dysmenorrhea is gradually increasing among the adolescent population and the menstrual discomforts like tiredness, muscular cramps, and headaches become very common among them. The study discussed that these kind of discomforts affect the productivity among the females. Therefore, comprehensive menstrual education programs make the girls to aware of their menstrual problems and reproductive health care. Dietetics

Knowledge of overall development and active participation among Adivasi girls is essential for their accelerated socio-economic development. In a social set up like India's, their participation has to be ensured through tangible measures, taken at various levels, which result in their empowerment in the real sense. Empowerment of adolescent girls is one of the concepts that has developed in connection with improving their status. Empowerment includes higher literacy level, better health care, awareness of rights and responsibilities, improved standards of living, self-reliance, self-esteem and self-confidence. Their primitive way of life, economic and social backwardness, low level of literacy, outdated system of production, absence of value systems, sparse physical infrastructure in backward tribal areas and demographic quality of tribal areas.

One of the best and effective intervention strategy for mass awareness on nutrition and health for adolescent girls is integration of nutrition education with the formal education system. Report of the Technical Meeting of the Asia Pacific Network for Food and Nutrition on School based Nutrition (Food and Agriculture Organization, 2007) upholds the fact that nutrition education is not systematically integrated into school curricula in the region. The syllabi of the state board education system though have incorporated selected components of health and nutrition, but the content is meagre to produce visible impact on the knowledge levels of students on nutrition and its applications in daily life. The nutrition and health topics included are mere textual information with very little or no practical components. Moreover, these topics are dealt with just for an examination point of view. This scenario can well explain the likelihood of the knowledge gaps of adolescents who completed their school education.

Health and nutrition education are closely related, sometimes expressed as twin pillars for assuring wellbeing of an individual. A healthy person has a better chance of achieving his or her potential, an educated person has a better chance of remaining healthy and contributing to the development of their families, communities and countries. Only healthy children can derive greater benefit from schooling. Healthy children can attend school regularly and pay attention in their classes. Good education is a key factor for gender equality and women empowerment (Ghosh 2013).

There have been a number of researches on the tribal society, but only few studies focus on the status of tribal adolescent girls in India. The health of adolescent girls in particular is conceptualized within the social contact in which they are embedded. Since research in these areas of tribal adolescent girl's health status is scant, it would be of immense value to study their health status, nutritional and cultural pattern to acquire knowledge related to these aspects. As a tribal adolescent girl occupies an important place in the future of her own tribal society. As well as, there is an urgent need to uplift their health and nutritional status. Focusing this, diversified efforts and concerted endeavors have to be undertaken to promote their health and nutritional status. Among the various diversified efforts, production of nutritious food items at their door steps is the most important concerted endeavor.

The most urgent need today, is to increase the production of nutritious food in a sustainable manner and improve farm income to ensure household food and nutritional security, while conserving the natural resource base. Vegetables are the vital sources of

minerals, vitamins, phytochemicals and dietary fibers and play an important role in supplying nutrition to human health. Vegetables require comparatively lesser quantities of agro inputs to grow (Singh, 2004). With these backdrops, the research gap was identified, and constructed the scopes, research questions, and objectives accordingly.

Identification of the research gap

A close review of the existing literature designates that nutritional education studies have been conducted globally. However, there has not been much effort to study the nutritional and hygiene status of the tribal girls in India, especially in Kerala. Nutrition-based studies from Kerala are very limited and studies on tribal nutritional status can be counted in the fingers. There are no higher level research studies on the nutritional and menstrual health status of tribal girls from Aralam or Pulpally. Therefore, the current study is expected to fill this gap and promote the health and wellbeing of the future tribal communities.

Scope of the study

This study is intended to conduct among the tribal girls. This study examined misconceptions related to nutrition, menstruation and other health practices. It also provides an opportunity to articulate appropriate remedies for nutritional and menstrual problems, and can encourage the use of government efforts to improve the overall health of tribal girls who are malnourished. School girls are expected to adopt a positive attitude towards nutrition and hygiene practices in later life. It provides an initial exploratory basis for tribal girls' attitudes and beliefs about nutrition health and menstruation. Girls may develop and maintain strategies for dealing with health problems. Further scopes are,

- The research work would highlight the impact of nutrition and menstrual awareness programs among the tribal girls of Aralam Panchayat of Kannur and Pulpally Panchayat of Wayanad, which would help the government and other welfare organizational teams to recognize their needs with respect to health and wellbeing.
- The research would analyze the health and risk problems among the tribal girls. This will be useful to understand the nutritional status of the tribal girls.
- This research would analyze the Knowledge, Attitude, and Practice (KAP) in the perception of nutrition and menstrual hygiene as a continuous assessment and it

would help them to attain a thorough baseline of their awareness. It would make them to sustain in a healthy life and to create a healthy future generation.

- The research can be stand as a source for further studies related to promotion of health and promotion of health problem.

Research questions

1. What are the differences in socio-economic status of the tribal and nontribal subjects?
2. Is the level of nutritional and menstrual knowledge equal among of tribal and nontribal girls from the same region different?
3. What are the differences between nutritional status and dietary pattern of tribal and nontribal girls from the same locale?
4. What are the nutrient sources available in the tribal area?
5. Whether nutrition intervention programs influence the nutritional status in terms of height, weight, and BMI of selected tribal participants.
6. Which factors influences the intervention programs on the nutritional intake of selected tribal participants?
7. Do nutritional guidelines and interventions influence the clinical signs of anemia among the selected participants?
8. Does lifestyle reform have any impact on the health status of selected tribal participants?
9. Whether nutrition education programs help to improve nutritional knowledge, attitudes, and practices among the selected tribal participants?
10. Does menstrual hygiene education have any impact on menstrual knowledge, attitudes and practices among the selected tribal participants?

Objectives

1. Elicit information related the socioeconomic profile, dietary and life style pattern of the selected tribal and nontribal girls (10-15yrs),
2. Appraise the nutritional and menstrual knowledge among the selected tribal and nontribal girls,
3. Assess the nutritional status of the selected tribal and nontribal girls,

4. Gather the information related to the under exploited food sources available at the door steps of the tribal communities,
5. Evaluate the effect of nutrition interventions on nutritional status of selected tribal girls,
6. Articulate the effect of lifestyle reform on the health status of selected tribal girls, and
7. Evaluate the influence of education programs on nutritional and reproductive health knowledge, attitudes, and practices (KAP) among tribal girls.

In this perspective the following hypothesis were formulated.

Hypothesis

H0.1. There is no significant differences in the nutritional knowledge between the tribal and nontribal subjects from the same area.

H0.2. There is no significant differences in the menstrual knowledge between the tribal and nontribal subjects from the same area.

H0.3. Nutrition intervention program does not have any significant influences on the height, weight, and BMI among the selected tribal girls.

H0.4. Nutritional intervention program does not make any significant impact on the dietary intake of selected tribal girls.

H0.5. There is no significant influences on the clinical symptoms of anemia among the selected tribal girls by nutrition intervention programs.

H0.6. Lifestyle reform does not have any effect on the menstrual status of selected tribal girls.

H0.7. Nutrition education programs does not have any influence on nutritional knowledge, attitudes, and practices among tribal girls.

H0.8. Menstrual hygiene education does not produce any effect on menstrual knowledge, attitudes and practices among the tribal girls.

Limitations of the study

Biochemical estimation to assess the health status of the tribal girls was not carried out in this study due to the strict objection from the Kerala Tribal Welfare Department.

(Appendix 5) Collection of data and blood samples from the primitive tribal groups were very difficult and restricted in Kerala State Government. Primitive tribals are very conservative and reluctant to share their socio economic, dietary and lifestyle related data.