

Prevalence of under nutrition and associated factors among female higher secondary students in the schools of costal block panchayat in Kerala

Raj Eliza S.^{1*}, Nisha R S.², Philip S.³

DOI: <https://doi.org/10.17511/ijphr.2019.i2.02>


^{1*} Sharon Raj Eliza, Senior Resident, Department of Community Medicine, Government Medical College, Kottayam, Kerala, India.

² Nisha R S, Professor and Head, Department of Community Medicine, Government Medical College, Idukki, Kerala, India.

³ Sairu Philip, Professor and Head, Department of Community Medicine, Government TD Medical College, Alappuzha, Kerala, India.

Introduction: The health status of an adolescent determines the health status in her adulthood. Adolescent girls in the age group 15-19 years are closer to their mother hood and thus the low birth weight girls become the next generation of stunted mothers thus, perpetuating the vicious cycle of malnutrition. **Objectives:** 1) To determine the prevalence of under nutrition among female higher secondary students in the schools of Ambalapuzha block. 2) To determine the factors associated with under nutrition. **Methods:** Cross-sectional study was conducted among higher secondary female students in the schools of Ambalapuzha Block. Sample size was calculated using the formula $Z\alpha^2PQ/L^2$ ($Z\alpha$ -1.96, P -33, Q -67 L -12% of P). Considering design effect (1.5) and 10% non-response, 559 adolescents were studied. Stratified and cluster sampling method was used. Information was collected using semi structured questionnaire. Weights and heights were measured and body mass index calculated and compared with Tim Cole anthropometric standards. **Results:** Prevalence of under nutrition was found to be 45.8%. Factors associated with undernutrition were Hindu religion, nuclear family, father manual laborer or fisher man and absence of media influence on nutrition. Father being a manual laborer or fisherman was found to be an independent predictor of under nutrition. **Conclusion:** Prevalence of under nutrition was found to be high among female higher secondary students in Ambalappuzha Block

Keywords: Nutrition value, Adolescence, Nutritional deficiencies

Corresponding Author	How to Cite this Article	To Browse
Sharon Raj Eliza, Senior Resident, Department of Community Medicine, Government Medical College, Kottayam, Kerala, India. Email: sharoneliza123@gmail.com	Eliza SR, Nisha RS, Philip S. Prevalence of under nutrition and associated factors among female higher secondary students in the schools of costal block panchayat in Kerala. Public Health Rev Int J Public Health Res. 2019;6(2):53-60. Available From https://publichealth.medresearch.in/index.php/ijphr/article/view/100	

Manuscript Received
2019-03-05

Review Round 1
2019-03-15

Review Round 2
2019-03-21

Review Round 3

Accepted
2019-03-25

Conflict of Interest
No

Funding
Nil

Ethical Approval
Yes

Plagiarism X-checker
8%

Note



© 2019 by Sharon Raj Eliza, Nisha R S, Sairu Philip and Published by Siddharth Health Research and Social Welfare Society. This is an Open Access article licensed under a Creative Commons Attribution 4.0 International License <https://creativecommons.org/licenses/by/4.0/> unported [CC BY 4.0].



Introduction

Adolescence, a period of transition between childhood and adulthood, occupies a crucial position in the life of human beings [1]. About 21% of Indian population is adolescents [2]. Adolescent girls, constitutes nearly one tenth of Indian population and form a crucial segment of the society [3].

They are the future of the nation, forming a major demographic and economic force. Chronic undernutrition that causes stunting among young people delays growth and physical maturation, decreases the capacity to learn and to work [4].

Adolescent girls in the group 15-19 years are closer to their mother hood and thus in the absence of effective nutritional interventions, the low birth weight girls become the next generation of stunted mothers, thus, perpetuating the vicious cycle of malnutrition. Nutritional deficiencies increase the risks that girls and young women face during pregnancy and childbirth [5].

An accurate and valid data is required regarding the girth of the problem before initiation of prevention and control measures. Lack of regular, representative national surveys and variations in the adopted methodologies preclude accurate intercountry and intra-country comparisons [6].

There is a lacuna in studies conducted in Kerala on the under nutrition status of their adolescent females based on National Institute of Nutrition (NIN) definition of under nutrition and association between domestic violence and undernutrition.

Ambalappuzha is a coastal Block Panchayat in central Kerala which mainly constitutes poor fisherman families. There are more number of females than males with female to male ratio 1041 [7]. It constitutes the field area of Urban Health Training Centre which is under the Department of Community Medicine, Government T D Medical College, Alappuzha.

The present study tries to find out the prevalence of under nutrition among the late adolescent females of Ambalappuzha Block Panchayat which consists mainly of fisherman community and the factors responsible for this.

Objectives

01. To determine the prevalence of under nutrition among female higher secondary students in the schools of Ambalappuzha Block Panchayat.

02. To determine the factors associated with undernutrition among female higher secondary students in schools of Ambalappuzha Block Panchayat

Methodology

Study Design: cross- sectional study

Study Population: Higher secondary female students in the schools of Ambalappuzha Block Panchayat.

Sample Size: According to the NFHS 3 data the prevalence of malnutrition among female youth (15-24 years) in Kerala was about 33 % and prevalence of undernutrition among 15-19 year age group Indian females was 46.8%. The sample size calculated using the formula $Z_{\alpha/2}PQ/L_2$ is 337. ($Z_{\alpha/2} = 1.96$, $P = 33\%$, $Q = 67\%$, $L_2 = 12\%$ of P). Considering design effect (1.5) and 10% non - response rate, the minimum sample size was found to be 557. A total of 559 adolescents were studied.

Sampling Method: stratified and cluster sampling. There are 9 higher secondary schools in Ambalappuzha block divided into 3 strata -5 govt, 2 govt-aided and 2 private. Total number of female higher secondary students in the 5 govt school is 450 (90 in each school), 2 govt aided schools is 900 (450 in each school) and in the 2 private school is 50 (25 in each school).

Total number of female higher secondary students in Ambalappuzha block = 1400. Sample size required is 557. To get a proportionate sample from govt , govt aided and private school, number of students to be taken from govt school = $450/1400 * 557 = 179$, from govt aided school = $900/1400 * 557 = 359$ and from private school = $50/1400 * 557 = 20$.

To get the required sample size, all female higher secondary students from 2 govt schools, 1 govt aided school and 1 private school was chosen. Schools were taken as clusters. The schools were chosen randomly by lottery method. All the female higher secondary students in the selected school was enrolled into the study

Study Procedure: Information was collected from the adolescents using the semi structured questionnaire. Weights were determined using a platform weighing scale in kilograms. Height was measured using a non stretchable measuring tape in metres.

The body mass index was calculated. Data was

Entered into Excel sheet and analysed using appropriate software. Qualitative variables was expressed as proportions/percentages and quantitative variables as mean with standard deviation.

The association between undernutrition and risk factors was checked using the Pearson Chi square test. Students T test was used to compare the mean BMI between different groups. Binary logistic regression analysis was done to find out independent predictors of undernutrition among higher secondary students of Ambalappuzha Block.

Results

A cross sectional study was conducted to estimate the prevalence of undernutrition and the factors associated among higher secondary female students in the schools of Ambalappuzha Block Panchayat.

Platform weighing scale and non-stretchable measuring tape was used to measure weight and height respectively of the adolescent and Body Mass Index was calculated using the formulae

Body mass index (BMI) = $\frac{\text{Weight (Kg)}}{\text{Height}^2 \text{ (meters)}}$

Height² (meters)

According to the Tim Cole Anthropometric standard recommended by the National Institute of Nutrition, Hyderabad, an adolescent is considered to be under nourished if the Body Mass Index is less than 5th percentile for that particular age and sex.

General characteristics of the study subjects, family characteristics, health profile, food intake frequency and utilization of community nutrition services, substance use, influence of media on dietary intake and domestic violence was inquired using self-prepared semi structured questionnaire.

Prevalence of Under nutrition in the study participants

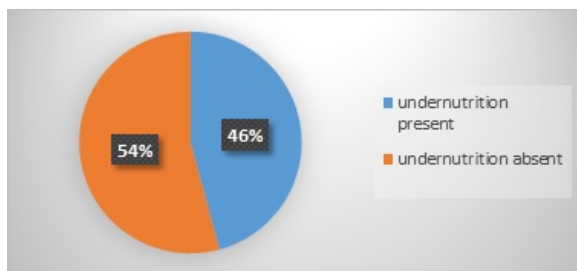


Figure-1: Prevalence of under nutrition in the study participants (n=559)

The prevalence of undernutrition among adolescent girls in the present study was found to be 45.8% Mean age of study participants was 16.57 years. Among the study subjects undernutrition was maximum in the age group 17-18

Bivariate Analysis: Bivariate analysis was done to find out factors associated with undernutrition in the study subjects. The study participants were divided into 2 groups-presence or absence of under nutrition, based on Tim Cole anthropometric standards. Those study subjects whose weight was less than 5th percentile for that particular age was considered undernourished.

Accordingly 256 (45.8 %) of them were found to be undernourished. The outcome variable was undernutrition. Pearson Chi square test was used. p value was considered significant if p <0.05. Students T test was also used to compare mean BMI in different groups.

The independent general characteristics that were analyzed are

01. Religion
02. Socioeconomic status
03. Type of school:
04. Family type and number of members in the family
05. Birth order
06. Parental relationship
07. Occupational and educational profile of parents
08. Acute and chronic disease
09. Whether deworming done in the last 6 months
10. Bowel habits
11. Menstrual flow and cycle regularity
12. Preference of type of food- grouped as vegetarian or mixed diet.
13. Food frequency
14. Non availability of food at home
15. Intake of iron and folic acid tablets
16. Utilization of supplementary nutrition from anganwadi
17. Influence of media on dietary habits
18. Whether facing domestic violence

When Chi square test was applied the following factors were found to be significantly associated

With undernutrition.

01. Religion
02. Type of family
03. Number of members in the family
04. Father's occupation
05. Presence or absence of chronic disease
06. Influence of media

Table-1: Factors associated with under nutrition in the study subjects

Variable	Undernutriti on present	Undernutriti on absent	Chi square value	P value
Religion				
Hindu religion	193(48.9%)	202(51.1%)	5.094	0.025
Christian/Muslim	63(38.4%)	101(61.6%)		
Type of family				
Joint/three generation/extended nuclear family	42(32.6%)	87(67.4%)	11.839	0.001
Nuclear family	214(49.8%)	216(52.7%)		
Number of members in the family				
>4 members	101(38.5%)	161(61.5%)	10.432	0.02
<4 members	155(52.2%)	142(47.8%)		
Fathers occupation				
fisherman/manual laborer	167(49.9%)	168(50.1%)	5.537	0.002
All other occupation	89(39.7%)	135 (60.3%)		
Presence of chronic disease				
Present	3(12.5%)	21 (87.7%)	11.199	0.001
Absent	253(47.3%)	282 (52.7%)		
Influence of media				
Present	30(24%)	95 (76%)	30.81	0.00
Absent	226(52.1%)	208 (47.9%)		

Thus Hindu religion, nuclear family, < 4 members in the family, father manual laborer or fisher man, absence of chronic disease, and absence of media influence on nutrition was found to be associated with undernutrition in the study participants.

When students T test was used to compare mean BMI in different group, significant difference in BMI was noted in the groups

01. Father fisherman / manual labourer and father having other occupation
02. Subjects who consume egg once a week and those who consume less than that
03. Subjects with media influence on diet and those who do not

Table-2: Students t test results with significant

Difference in mean BMI in the study subjects

Variable	BMI	t value	p value
Father occupation			
fisherman/manual laborer	18.5	3.345	0.001
All other occupation	19.6		
Consumption of egg			
At least once a week	19.61	2.783	0.006
Less than once a week	18.69		
Influence of media			
Present	21.5	9.254	0.00
Absent	18.2		

Multivariate Analysis: Binary logistic regression was performed to analyze the factors predicting undernutrition in the study subjects. All variables with p value less than 0.05 in bivariate analysis were considered as independent variables and undernutrition was taken as the dependent variable.

After doing binary logistic regression occupation of the father being manual labourer or fisherman was found to have adjusted odds ratio significant, with 95 % confidence interval more than 1 and is found to be an independent predictor of undernutrition in female higher secondary children of Ambalappuzha block (model significance p< 0.001)

Table-3: Independent predictor of undernutrition in the study subjects after binary logistic regression

Variable	p value	Adjusted odds ratio	95% confidence interval
Father fisherman /manual labourer	0.006	1.66	1.15-2.39

R2= 0.160

Factors associated with under nutrition were Hindu religion, nuclear family, < 4 members in the family, father manual laborer or fisher man, absence of chronic disease, and absence of media influence on nutrition of which father being a manual laborer or fisherman was found to be an independent predictor of undernutrition.

Discussion

Prevalence of under nutrition: The prevalence of under nutrition in the female higher secondary students according to the present study taking Tim Cole anthropometric standards was found to be 45.8%.

In National Family Health Survey-3 (2005-2006) the prevalence of under nutrition was 47% in girls aged 15-19 years taking cut-off point for BMI as 18.5 to

Define thinness or acute undernutrition [8].

A rapid survey was conducted in Kerala by Ministry of Women and Child Development, Government of India with the technical support from UNICEF, India in the year 2013-2014 among adolescents aged 15-18 years which showed that the prevalence of under nutrition in Kerala (BMI<18.5) was 42.6 in rural areas and 47.2 in urban areas [9].

A study on adolescents aged 15-17 years in a rural school in Thiruvanthapuram district; Kerala in 2013-2014 period, by Nazeema Beevi et al found that the prevalence of undernutrition among females in the above age group was 46.4% [10]. The prevalence of under nutrition in the present study was thus found to be similar to other studies conducted in the state and country

Factors associated with under nutrition

Religion: Our study found significant association between religion of the study participants and undernutrition. In the present study majority of the study participants were Hindus (70.6%), second majority were Muslims (15.4%) and Christians constituted the least number (14%). Which was similar to NFHS 3 data where majority of people in Kerala belong to Hindu religion (59.5%) second major religion being Muslim (23.1%) and 17.1% Christians (0.3% constituted other religion) [11].

In 2012 a study was conducted by Dr. Ashok Kumar on adolescents in rural Tamil Nadu found that prevalence of undernutrition were common among the girls in Hindu community [12], which is similar to our study which shows association between Hindu religion and under nutrition.

Family characteristics: Our study found that there is significant association between undernutrition among adolescents and type of family (nuclear) and number of members in the family (less than 4). A community based study conducted by Amitava Pal in 2016 in West Bengal among 10 to 17 year old adolescents and its association with socio-demographic factors found positive association between underweight and nuclear family with number of members in the family <4 [13].

In our study majority of the study participants belonged to nuclear families 76.5 % which is similar to NFHS 3 data which shows that majority of people in Kerala (54.8%) belonged to nuclear families [11].

Our study also found significant association between occupation of the father (manual laborer or

Fisherman) and undernutrition among adolescents. K Venkaiah et al conducted a study on rural adolescents in Varanasi in 2002 and found that families of laborers were significantly associated with underweight [14].

Ambalappuzha block, where the study was done mainly consists of poor families where majority of the men were semiskilled laborers (35.5%) and women were housewives (78.7%). A study by M.Z. Goldani in Brazil in 2013 showed that individuals whose fathers at the time of their birth were engaged in unskilled jobs or were unemployed were on average 1.18 kg/m² heavier than those whose fathers had non manual occupations when reach adolescence [15].

Our study also found significant difference in BMI between study participants whose fathers were manual laborer as compared to study participants whose fathers were involved in other occupation or of the study subjects

Chronic infection: Our study found significant association between absence of chronic infection and under nutrition but in a review by WHO on 'Malnutrition and Infection – A review – Nutrition policy discussion' in 1989, Andrew Tomkins and Fiona Watson describes about the malnutrition infection vicious cycle [16].

It describes about the mechanism of chronic disease causing undernutrition. In our study thyroid disease (hypothyroidism) was the most common chronic disease in the adolescents and hypothyroidism causes obesity than undernutrition [17]. In our study thyroid disorder was present in 1.4% of the study participants.

A college based study conducted by Kumaravel Velayudham et al in 7 colleges of Madhurai in Tamil Nadu in 2015 found that the prevalence of thyroid disorder among female college students aged 18-25 years was found to be 12.5 % [18]. This difference might be due to the fact that the study was conducted in a coastal area of Kerala where fish /meat was consumed daily by 32.9% of the population and 80.9% of the population took fish / meat at least once a week.

Fish has high iodine content and can protect against thyroid diseases. The operational definition for chronic disease in the present study was taken as - any disease reported by the study participant to have been present for more than 1 year. Thus thyroid disease that has been diagnosed within the

Last one year was taken into account.

Influence of media: In the present study significant association was found between absence of media influence on dietary intake and undernutrition. Among the study participants 22.4% were influenced by media in taking decision regarding their nutrition.

In a study from Chennai done in the age group 11 to 17 years it was reported that, 82% buy food products and snacks based on advertisement, 42% follows diet and 42% exercise to get the body like their favorite media personality [19].

The low influence may be due the fact that most of the study subjects belonged to BPL families (54%) where choice of food may not be available and Ambalappuzha being a coastal area the main food available is fish.

A qualitative study by Jinan C Banna et al on influences on eating among adolescents in a periurban area in Lima, Peru in 2015 describes the media influence on nutrition [20]. Jennifer. L. Harris in 2009 described the relationship between television viewing and unhealthy eating causing obesity [21].

A study in Malaysia among young adolescent (13 to 15 years) by David S. Bickham in 2013 showed significant increase BMI in those who paid primary attention to media as compared to other activities like reading, sports etc [22] which is similar to our study which also showed significant difference in BMI among those who were influenced by media in taking decision regarding their diet and nutrition and those who were not.

Consumption of egg: Our study also showed significant difference in BMI among subjects who consume egg once a week and those who consume less than that. In a study on 'The relationship between body mass index and lifestyle in a Brazilian adult population: a cross-sectional survey' by Maria Rosáron in 2007 showed correlation between consumption of egg and mean BMI in women [23].

On multivariate analysis occupation of father of the study subjects (manual laborer or fisherman) was found be the only independent predictor of undernutrition among female higher secondary students in Ambalappuzha Block Panchayat. This is similar to the study by Amitava pal et al in 2015 which showed fathers occupation as an independent predictor of under nutrition [13].

Conclusion

Prevalence of under nutrition was found to be high among female higher secondary students in Ambalappuzha Block. Father being a manual laborer or fisherman was found to be an independent predictor of undernutrition.

Reference

- UNICEF. Progress for Children- A report card on adolescents. Socio-demographic profile of adolescents. Number 10 April 2012 UNICEF, Figure: 2,1 Page 6. [Crossref]
- Adolescent Health Division, Ministry of Health and Family Welfare, Government of India. India_RKSK_Strategy_Operational_Framework-translating strategy into programmes [Internet]. 2014. [Crossref]
- Govt of India. Planning Commission. Empowerment of women and development of children. 2001 [cited 2017 Jul 29]. Available from [Article] [Crossref]
- Behrman J, Alderman H, Hoddinott J. Hunger and malnutrition. *Glob Crises Glob Solut*. 2004;363-420. [Crossref]
- Hélène Delisle, V chandramouli et al. Should Adolescents Be Specifically Targeted for Nutrition in Developing Countries?, To Address Which Problems, and How?. 2005 [cited 2017 Aug 3]. [Crossref]
- WHO. Regional Office for the South-East Asia Region. Health Situation in the South-East Asia Region- 2001-2007. Geneva; Herndon: World Health Organization Stylus Publishing, LLC. 2009 [cited 2017 Nov 10]. Available from: [Article] [Crossref]
- Ambalappuzha Block Panchayat, official website. [cited 2017 Oct 19]. Available from: [Article] [Crossref]
- Parasuraman S, Kishor S, Singh SK, Vaidehi Y. A profile of youth in India. National Family Health Survey (NFHS-3), India, 2005-06. Mumbai-International Institute for Population Sciences. 2009. [cited 2017 Mar 18]. Available from: [Article] [Crossref]

09. Ministry of Women and Child Development, Government of India. Rapid survey on Children 2013-2014. [cited 2017 Jul 25]. Available from: [Article] [Crossref]
10. P NB, L M, Bindhu A. A study of adolescent health problems in a rural school in Thiruvanthapuram district, Kerala, India. *Int J Community Med Public Health*. 2016 Dec 21;4(1)100. [Crossref]
11. International Institute for Population Sciences, Deonar, Mumbai. National Family Health Survey (NFHS-3) India-2005-2006, Kerala. 2008 [cited 2017 Aug 9]. Available from: [Article] [Crossref]
12. Kumar A. Nutritional status of adolescent girls in rural Tamilnadu. *Religion*. 2012;102;42. [Crossref]
13. Pal A, Pari AK, Sinha A, et al. Prevalence of undernutrition and associated factors- A cross-sectional study among rural adolescents in West Bengal, India. *Int J Pediatr Adolesc Med*. 2017;Mar;4(1)9-18. doi: [Article] [Crossref]
14. Venkaiah K, Damayanti K, Nayak MU, et al. Diet and nutritional status of rural adolescents in India. *Eur J Clin Nutr*. 2002 Nov;56(11)1119-25. doi: [Article] [Crossref]
15. Goldani MZ, Haeffner LS, Agranonik M, et al. Do early life factors influence body mass index in adolescents?. *Braz J Med Biol Res*. 2007;Sep;40(9)1231-6. [Crossref]
16. Gillespie S, Mason J. Malnutrition and Infection— A review – Nutrition policy discussion paper No 5. UN-Adm Comm Coord-Sub comm Nutr ACCSCN. 1989;Oct;5. [Crossref]
17. Laurberg P, Knudsen N, Andersen S, et al. Thyroid function and obesity. *Eur Thyroid J*. 2012 Oct;1(3)159-67. doi: [Article] [Crossref]
18. Velayutham K, Selvan SS, Unnikrishnan AG. Prevalence of thyroid dysfunction among young females in a South Indian population. *Indian J Endocrinol Metab*. 2015 Nov-Dec;19(6)781-4. doi: [Article] [Crossref]
19. R Priyadarshini, Jasmine S Sundar, Valarmathi S, Kalpana S, Parameswari Srijayanth. Impact of media on the physical health of urban school children of age group 11-17yrs in Chennai - A cross sectional study. *IOSR J Humanit Soc Sci*. Volume 9, Issue 5 (Mar-Apr;2013)30-5. [Crossref]
20. Banna JC, Buchthal OV, Delormier T, Creed-Kanashiro HM, Penny ME. Influences on eating- a qualitative study of adolescents in a periurban area in Lima, Peru. *BMC Public Health*. 2016;Jan;15;16. Available from: [Article] [Crossref]
21. Harris JL, Bargh JA. Television viewing and unhealthy diet- implications for children and media interventions. *Health Commun*. 2009 Oct;24(7)660-73. doi: [Article] [Crossref]
22. Bickham DS, Blood EA, Walls CE, et al. Characteristics of screen media use associated with higher BMI in young adolescents. *Pediatrics*. 2013 May;131(5)935-41. doi: [Article] [Crossref]
23. Peixoto Mdo R, Benício MH, Jardim PC. The relationship between body mass index and lifestyle in a Brazilian adult population- a cross-sectional survey. *Cad Saude Publica*. 2007 Nov;23(11)2694-740. [Crossref]