

# RISK FACTORS OF WASTING AMONG UNDER FIVE CHILDREN– A CASE CONTROL STUDY

<sup>1</sup>Ms. Reshma A

Lecturer  
KIMS College of Nursing  
Thiruvananthapuram

Guided by

<sup>2</sup>Mrs. Geethakumari S

Associate Professor  
Govt. College of Nursing  
Thiruvananthapuram

**Abstract-** Child wasting refers to a child who is too thin for his or her height and is the result of recent rapid weight loss or failure to gain weight. A better understanding of the risk factors enables early and accurate diagnosis of the disease condition, resulting in earlier intervention, and thus reduces the morbidity and mortality associated with wasting among under - five children. The present study was intended to identify the risk factors of wasting among under - five children attending the Immunization Clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram. The research design adopted for the study was an epidemiological design – a case control study. The theoretical framework of the study was the Betty Neumann’s system model. The samples consisted of 70 cases and 70 controls. Consecutive sampling was used for the study. The cases were selected from the children below five years with wasting (WHZ score  $\leq 2$  SD) and the controls were well nourished under five children with a WHZ score of  $>2$  SD. A semi structured interview schedule, a standardized weighing machine and a stadiometer were used to collect the data and it was analyzed using descriptive and inferential statistics. It was found that age, gender, Socio Economic Status, birth weight, period of gestation, birth order, exclusive breast feeding, snacks instead of meal, deworming status, waste water disposal, and services from anganwadi had a statistically significant association with the incidence of wasting. After binary logistic regression, a girl has 15.9 times risk of developing wasting (95% CI = 1.8 - 137.6), higher birth order has 7.6 times risk of developing wasting (95% CI = 1.3 - 45.6), lack of exclusive breast feeding has 18.9 times risk of developing wasting (95% CI = 8.8 – 83.8) and snacks instead of meal has 12.3 times risk of developing wasting (95% CI = 1.4 – 109) were significant risk factors for the development of wasting among under five children.

**Key words:** Wasting; under five children; risk factors; case control study.

## INTRODUCTION

Children are considered the future of a nation. The health and nutritional status of the child population is a true reflection of the overall health and economic development of a country. Child malnutrition is a widespread public health problem having national and international consequences as adequate nutrition is an essential input for the well being of children. It is well documented that under-nutrition, particularly among children under the age of five years, is the most tragic form of human deprivation. Malnutrition in its several forms of under-nutrition, namely wasting, stunting and under-weight has been coined as the “silent emergency” by the United Nations Children’s Fund (UNICEF). It has been associated with endangering the health of women and children across the world.<sup>1</sup>

## Need and Significance

The National Family Health Survey, 2019-2020 (NFHS 5) provides information regarding the nutritional status of the children. The NFHS 5 District Fact Sheet of Thiruvananthapuram, Kerala shows children under 5 years who are wasted is 13.1% in NFHS 4, but it is increased to 17.4% in the NFHS 5. In case of severely wasted under five children is 3.9% in NFHS 4, it increases to 6.3% in NFHS 5.<sup>2</sup>

**Table 1: Prevalence of wasting among under - five children according to NFHS**

|                    | NFHS – 4 (2015-2016) | NFHS – 5 ( 2019-2020) |
|--------------------|----------------------|-----------------------|
| India              | 38%                  | 36%                   |
| Kerala             | 5.8%                 | 5.6%                  |
| Thiruvananthapuram | <b>13.1%</b>         | <b>17.4%</b>          |

A cross sectional study was conducted by Binu Areekkal, Tony Lawrence, Jose Joseph, Ajan M J, Ajith R in 2014, on prevalence of malnutrition among under five children in a semi urban area on Kottayam, Kerala, found that 31.5% of the study population was underweight, 21.8% stunted and 14.6% wasted. Out of the total 6.4% were severely underweight, 4.9% were severely stunted and

2.8% severely wasted. The prevalence of mild and severe under nutrition increases up to 12 – 24 months and then decreases. Thus the prevalence of severe underweight, stunting and wasting is comparatively low but the prevalence of mild underweight, stunting and wasting is unacceptably high.<sup>3</sup>

A community based cross sectional study was conducted among 360 under-five children by Priyanka R., Vivin Vincent, Jini M. P., C. R. Saju on “An assessment of the nutritional status of underfive children in a rural area of Thrissur district, Kerala, India”. The result of this study was, out of 360 children, 48.9% were males and 51.1% were female. The prevalence of under-weight and stunting was 28.3% and 14% respectively. The prevalence of underweight and stunting was found to be higher among females. Risk factors like low birth weight, inadequate protein intake, respiratory infections and diarrheal disease in the past 1 year, and presence of worm infestation were significantly associated with under-nutrition. Full immunization was found to be protective against under-nutrition.<sup>4</sup> In Ernakulam district, a study was carried out only 51.8% of newborns were breast fed within an hour of birth and children exclusively breast fed upto 6 months was only 16.9% in comparison to the state of Kerala statistics of 65.3% and 22.3% respectively.<sup>5</sup>

The prevalence of wasting among under five children in Ernakulam district according to NFHS 5 was 15.39% .<sup>6</sup>

### Statement of the Problem

A study to assess the risk factors of wasting among under five children attending Immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.

### Objective of the Study

Identify the risk factors of wasting among underfive children attending Immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.

### Operational Definitions

- **Wasting:** Wasting is a reduction or loss of body weight in relation to height. In this study, wasting is assessed by weight – for – height Z score (WHZ)  $\leq 2SD$  based on WHO standards.
- **Cases:** Children between the age group of 2 to 5 years (24-60 months) with wasting which is measured by weight – for – height Z score (WHZ)  $\leq 2SD$  based on WHO standards, attending the Immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram
- **Controls:** Children between the age group of 2 to 5 years (24-60 months) without wasting which is measured by weight – for – height Z score (WHZ)  $> 2SD$  based on WHO standards, attending Immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.
- **Risk Factors:** The term risk factor refers to an attribute or characteristics that is significantly associated with the development of wasting among under five children.

The risk factors considered for the present study are,

1. **Socio economic status:** It refers to individuals with low educational achievement and/or low household income and it will reflect in the consumption of nutritious food items.
2. **Clinical factors:** In this study, birth weight, history of disease in past 6 weeks, history of repeated hospitalization, and deworming status are considered in the clinical factors.
3. **Obstetrical history:** In this study, the obstetrical history comprises, the period of gestation, birth order, birth interval, complication during pregnancy, and type of diet during pregnancy.
4. **Immunization status:** The immunization status of the child can be categorized according to three groups;
  - i) Fully Immunized: child had received one dose of BCG three doses of DPT, three doses of OPV, and one dose of measles.
  - ii) Partially Immunized: Some doses were given, but immunization was not complete.
  - iii) Unimmunized: child had received none of the vaccines.
5. **Feeding practices:** In this study, initiation of breast feeding after birth, exclusive breast feeding, breast feeding after 6 months, weaning practices and bottle feeding are considered to be in the feeding practices.
6. **Environmental sanitation:** Source of drinking water, water purification method, and waste water disposal are considered to be the factors of environmental sanitation in this study.
7. **Access to health care facilities and its services:** Poor access to appropriate, timely and affordable health care may be a risk factor of wasting. In this study, lack of access to Anganwadi centers and their services can be considered as one of the risk factor of wasting.
  - **Under-five children:** Children under the age of 5 years refer to a young human being whose age ranges from 2 to 5 years (24 – 60 months).
  - **Immunization clinics:** In this study, the immunization clinics are of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.

### Hypotheses

H<sub>1</sub>: Socio economic status is a significant risk factor for wasting among under - five children.

H<sub>2</sub>: History of illness is a significant risk factor for wasting among under - five children.

H<sub>3</sub>: Partial immunization is a significant risk factor for wasting among under-five children.

H<sub>4</sub>: Obstetrical history of the mother is a significant risk factor for wasting among under- five children.

H<sub>5</sub>: Inappropriate feeding practice is a significant risk factor for wasting among under -five children.

H<sub>6</sub>: Lack of environmental sanitation is a significant risk factor for wasting among under - five children.

H<sub>7</sub>: Inaccessible to health care facilities and their services is a significant risk factor for wasting among under - five children.

### Methodology

**Research design:** The research design selected for the present study was an epidemiological design – An unmatched case control study.

**Setting of the study:** The present study was conducted in the Immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.

**Population :** The population for the present study consisted of children with wasting (cases) and with normal height for weight, according to WHZ score (controls) attending the immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.

**Sample and Sampling Technique:** In the present study the sampling technique was consecutive sampling, because it includes all the subjects that are available, which makes the sample better representation of the entire population.

**Cases:** Cases are defined as the children between the age group of 2 to 5 years (24- 60 months) with wasting which is measured by weight-for-height Z score (WHZ)  $\leq 2SD$  based on WHO standards, attending Immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram

**Controls:** Controls are defined as well nourished children between the age group of 2 to 5 years (24- 60 months) with weight-for-height Z score (WHZ)  $> 2SD$  based on WHO standards, attending Immunization clinics of Sree Avittom Thirunal Hospital Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.

- **Inclusion Criteria**

- The children between the age group of 2 to 5 years and their parents who are willing to participate.

- **Exclusion Criteria**

- Children with congenital anomaly affecting physical growth.

### Sample size

Based on a cross sectional study on “Nutritional status and the Factors Associated with it among Children Aged 1-5 Years in a Rural Area of Jammu”,<sup>43</sup> the sample size was calculated by the formula for each risk factors and the highest number of sample size is taken for both case and control arm. The calculated sample size was 70 cases and 70 controls.

### Description of the tool

The tools used for the study were Semi structured interview schedule, weighing machine, stadiometer and immunization card.

The techniques used are interview, in vivo bio- physiologic method and record review method.

The semi structured interview schedule comprises of two sections

- Section 1: Socio-demographic information
- Section 2: Health related information
  - Clinical factors of wasting
  - Obstetrical history of the mother
  - Immunization status
  - Feeding practices
  - Environmental sanitation
  - Health care facilities and their services

### Data collection process

After obtaining clearance from the institutional human ethics committee, the children who satisfied the inclusion criteria were selected for the study. After obtaining informed consent from the parents, data were collected by interview, measured the height and weight of the child and reviewed the immunization card. Duration of the data collection was approximately 30 minutes for each parent.

The data collection period of the study was six weeks. Data was collected from 70 children with wasting as per the WHZ Score ( $\leq 2SD$ ) as cases from the immunization clinics, and 70 children with good nourishment as per the WHZ Score ( $> 2SD$ ) as controls from the immunization clinics.

The anthropometric measurement was done by using standardized weighing machine and stadiometer. Instructed the parent to remove the shoes of the child and instructed the child to stand with his feet together with his back to measure, arm and hand down, head erect and eyes straight. Height and weight measurements were taken and recorded. Informed the values to the parent.

### Data analysis and interpretation

The data obtained from the interview and assessments were analyzed on the basis of the objectives of the study by both descriptive and inferential statistics using SPSS (Statistical Package for Social Sciences) version 27.

The sociodemographic data and risk factors were tabulated and percentage were calculated. The Odds Ratio and Logistic Regression were used to assess the exposure rate of risk factors between cases and controls.

**Table 2: Univariate analysis of socio demogarpthic data with wasting among under five children**

(n=140)

| Socio demographic data |         | Case(n=70) |      | Control(n=70) |      | $\chi^2$ | df | p | OR(95% CI for OR) |
|------------------------|---------|------------|------|---------------|------|----------|----|---|-------------------|
|                        |         | N          | %    | N             | %    |          |    |   |                   |
| Age                    | <4 year | 51         | 72.9 | 26            | 37.1 |          |    |   |                   |

|                    |                          |    |      |    |      | 18.0 | 1 | <0.001* | 4.5 (2.2 - 9.3) |
|--------------------|--------------------------|----|------|----|------|------|---|---------|-----------------|
|                    | >4 year                  | 19 | 27.1 | 44 | 62.9 |      |   |         |                 |
| Gender             | Girls                    | 42 | 60   | 23 | 32.9 |      |   |         |                 |
|                    | Boys                     | 28 | 40   | 47 | 67.1 | 10.4 | 1 | 0.001*  | 3.1 (1.5-6.1)   |
| Family type        | Nuclear                  | 15 | 21.4 | 13 | 18.6 |      |   |         |                 |
|                    | Joint                    | 55 | 78.6 | 57 | 81.4 | 0.18 | 1 | 0.673   |                 |
| Number of children | 1                        | 26 | 37.1 | 36 | 51.4 |      |   |         |                 |
|                    | >=2                      | 44 | 62.9 | 34 | 48.6 | 2.89 | 1 | 0.891   |                 |
| SES                | Below Upper middle class | 33 | 47.1 | 13 | 18.6 |      |   |         |                 |
|                    | Upper middle and higher  | 37 | 52.9 | 57 | 81.4 | 13.0 | 1 | <0.001* | 3.9 (1.8 - 8.4) |

\*Significant at 0.05 level

The table 2 shows that, age, gender and socio economic status have significant association with wasting among under- five children.

**Table 3: Univariate analysis of clinical factors with wasting among under - five children (n=140)**

| Clinical factors                    |          | Case (n=70) |      | Control (n=70) |      | $\chi^2$ | df | p       | OR(95% CI for OR)  |
|-------------------------------------|----------|-------------|------|----------------|------|----------|----|---------|--------------------|
|                                     |          | N           | %    | N              | %    |          |    |         |                    |
| Birth weight in Kg                  | <2.5     | 18          | 25.7 | 2              | 2.9  |          |    |         |                    |
|                                     | >2.5     | 52          | 74.3 | 68             | 97.1 | 14.9     | 1  | <0.001* | 11.8 (2.6 - 53)    |
| History of disease in past 6 weeks  | Yes      | 67          | 95.7 | 48             | 68.6 |          |    |         |                    |
|                                     | No       | 3           | 4.3  | 22             | 31.4 | 17.6     | 1  | <0.001* | 10.2 (2.9 - 36.2)  |
| History of repeated hospitalization | Yes      | 16          | 22.9 | 1              | 1.4  |          |    |         |                    |
|                                     | No       | 54          | 77.1 | 69             | 98.6 | 15.1     | 1  | <0.001* | 20.4 (2.6 - 159)   |
| Deworming status                    | Not done | 28          | 40   | 3              | 4.3  | 25.89    | 1  | <0.001* | 14.89 (4.25-52.05) |

|                |    |    |    |      |
|----------------|----|----|----|------|
| Deworming done | 42 | 60 | 67 | 95.7 |
|----------------|----|----|----|------|

**\*Significant at 0.05 level**

Table 3 depict that, the clinical factors such as birth weight, history of disease in past 6 weeks, history of repeated hospitalization and deworming status have significant association with wasting among under - five children.

**Table 4: Univariate analysis of obstetrical factors of mother with wasting among under - five children (n=140)**

| Obstetrical factors           | Case (n=70)      |    | Control (n=70) |    | $\chi^2$ | df   | p | OR(95% CI for OR) |                 |
|-------------------------------|------------------|----|----------------|----|----------|------|---|-------------------|-----------------|
|                               | N                | %  | N              | %  |          |      |   |                   |                 |
| Period of gestation           | 34-37 weeks      | 36 | 51.4           | 11 | 15.7     | 20.0 | 1 | <0.001*           | 5.7(2.6 - 12.6) |
|                               | >37 weeks        | 34 | 48.6           | 59 | 84.3     |      |   |                   |                 |
| Birth order                   | Second or higher | 41 | 58.6           | 15 | 21.4     | 20.1 | 1 | <0.001*           | 5.2(2.5 - 10.9) |
|                               | First child      | 29 | 41.4           | 55 | 78.6     |      |   |                   |                 |
| Birth interval                | 1 year           | 40 | 57.1           | 34 | 48.6     | 1.03 | 1 | 0.310             |                 |
|                               | >1 year          | 30 | 42.9           | 36 | 51.4     |      |   |                   |                 |
| Complication during pregnancy | Yes              | 30 | 42.9           | 0  | 0        | 38.8 | 1 | <0.001*           |                 |
|                               | No               | 40 | 57.1           | 70 | 100      |      |   |                   |                 |
| Type of diet during pregnancy | Normal diet      | 61 | 87.1           | 70 | 100      | 9.61 | 1 | 0.001*            |                 |
|                               | Restricted diet  | 9  | 12.9           | 0  | 0        |      |   |                   |                 |

**\*Significant at 0.05**

Table 4 shows that, period of gestation, birth order, complication during pregnancy and type of diet during pregnancy have statistically significant association with wasting among under - five children.

**Table 5: Univariate analysis of immunization status with wasting among under - five children (n=140)**

| Immunization status | Case (n=70) |   | Control (n=70) |   | $\chi^2$ | df | p |
|---------------------|-------------|---|----------------|---|----------|----|---|
|                     | N           | % | N              | % |          |    |   |

|                     |                     |    |      |    |     |      |   |       |
|---------------------|---------------------|----|------|----|-----|------|---|-------|
| Immunization status | Fully immunized     | 69 | 98.6 | 70 | 100 | 1.01 | 1 | 0.316 |
|                     | Partially immunized | 1  | 1.4  | 0  | 0   |      |   |       |

Table 5 shows that there is no statistically significant association between immunization status and wasting among under - five children.

**Table 6: Univariate analysis of feeding practices with wasting among under - five children (n=140)**

| Feeding practices                      |                       | Case (n=70) |      | Control (n=70) |      | $\chi^2$ | df | p       | OR(95% CI for OR) |
|--|-----------------------|-------------|------|----------------|------|----------|----|---------|-------------------|
|  |                       | N           | %    | N              | %    |          |    |         |                   |
| Initiation of breast feeding           | Within ½ hour         | 47          | 67.1 | 70             | 100  | 27.52    | 1  | <0.001* |                   |
|  | Between ½- 2 hours    | 23          | 32.9 | 0              | 0    |          |    |         |                   |
| Exclusive breast feeding               | Yes                   | 45          | 64.3 | 68             | 97.1 | 24.3     | 1  | <0.001* | 0.5(0.01-0.23)    |
|  | No                    | 25          | 35.7 | 2              | 2.9  |          |    |         |                   |
| Breast Feeding after 6 months          | Yes                   | 48          | 68.6 | 60             | 85.7 | 5.8      | 1  | 0.016*  | 0.4(0.2 - 0.8)    |
|  | No                    | 22          | 31.4 | 10             | 14.3 |          |    |         |                   |
| Initiation of complementary feeding    | <=5 th months onwards | 25          | 35.7 | 2              | 2.9  | 23.88    | 1  | <0.001* | 18.89(4.26-83.7)  |
|  | >=6 th months onwards | 45          | 64.3 | 68             | 97.1 |          |    |         |                   |
| Type of diet for the child             | Vegetarian diet       | 2           | 2.9  | 0              | 0    | 2.03     | 1  | 0.154   |                   |
|  | Mixed diet            | 68          | 97.1 | 70             | 100  |          |    |         |                   |
| Number of feeds per day                | <=5 times             | 52          | 74.3 | 63             | 90   | 5.89     | 1  | 0.015*  | 0.32(0.12-0.82)   |
|  | >5 times              | 18          | 25.7 | 7              | 10   |          |    |         |                   |
| Bottle feed                            | Yes                   | 59          | 84.3 | 11             | 15.7 | 65.8     | 1  | <0.001* | 28.8(11.6 - 71.5) |
|  | No                    | 11          | 15.7 | 59             | 84.3 |          |    |         |                   |
| Health issues related to bottle feed** | Yes                   | 1           | 1.7  | 0              | 0    | 0.19     | 1  | 0.662   |                   |
|  | No                    | 58          | 98.3 | 11             | 100  |          |    |         |                   |
| Snacks instead of meal                 | Yes                   | 28          | 40   | 3              | 4.3  | 25.9     | 1  | <0.001* | 14.9(4.3 - 52.1)  |
|  | No                    | 42          | 60   | 67             | 95.7 |          |    |         |                   |

\*Significant at 0.05 level

\*\*n=70

Table 6 depicts that, initiation of breast feeding, exclusive breast feeding, breast feeding after 6 months, initiation of complementary feeding, number of feeds per day, bottle feed and snacks instead of meal have significant association with wasting among under - five children.

**Table 7: Univariate analysis of environmental sanitation with wasting among under - five children (n=140)**

| Environmental sanitation  |                        | Case (n=70) |      | Control(n=70) |      | $\chi^2$ | df | p       | OR(95% CI for OR)   |
|---------------------------|------------------------|-------------|------|---------------|------|----------|----|---------|---------------------|
|                           |                        | N           | %    | N             | %    |          |    |         |                     |
| Source of drinking water  | well                   | 43          | 61.5 | 39            | 55.7 | 0.47     | 1  | 0.49    | 1.27<br>(0.64-2.48) |
|                           | Pipeline supply        | 27          | 38.5 | 31            | 44.3 |          |    |         |                     |
| Water purification method | Boiling                | 56          | 80   | 55            | 78.6 | 0.04     | 1  | 0.83    |                     |
|                           | Other methods          | 14          | 20   | 15            | 21.4 |          |    |         |                     |
| Waste water disposal      | Open drainage system   | 51          | 72.9 | 30            | 42.9 | 12.9     | 1  | <0.001* | 3.6<br>(1.8 - 7.3)  |
|                           | Closed drainage system | 19          | 27.1 | 40            | 57.1 |          |    |         |                     |

**\*Significant at 0.05 level**

Table 7 shows that, there is a significant statistical association between waste water disposal and wasting among under - five children.

**Table 8: Univariate analysis of health care facilities with wasting among under - five children (n=140)**

| Health care facilities and its services |     | Case (n=70) |      | Control (n=70) |      | $\chi^2$ | df | p      | OR(95% CI for OR) |
|---|-----|-------------|------|----------------|------|----------|----|--------|-------------------|
|   |     | N           | %    | N              | %    |          |    |        |                   |
| Services from anganvadi                 | Yes | 68          | 97.1 | 59             | 84.3 | 6.9      | 1  | 0.009* | 6.3(1.4 - 29.8)   |
|   | No  | 2           | 2.9  | 11             | 15.7 |          |    |        |                   |

**\*Significant at 0.05 level**

Table 8 shows that, there is a significant association between availing services from anganwadi and wasting among under - five children.

In univariate analysis using chi square and odds ratio, age, gender, Socio Economic Status, birth weight, period of gestation, birth order, exclusive breast feeding, snacks instead of meal, deworming status, waste water disposal, and services from anganwadi were statistically found to have a significant association with the incidence of wasting among under five children.

**Table 9: Significant risk factors after binary logistic regression**

| Risk factors          | B     | S.E.  | Wald  | df | p            | Adj. OR     | 95 % CI for Adj. OR |
|-----------------------|-------|-------|-------|----|--------------|-------------|---------------------|
| Age                   | 0.284 | 1.362 | 0.043 | 1  | 0.835        | 1.3         | 0.1 - 19.2          |
| Gender - girls        | 2.764 | 1.103 | 6.283 | 1  | <b>0.012</b> | <b>15.9</b> | 1.8 - 137.6         |
| Socio Economic Status | 1.585 | 0.871 | 3.314 | 1  | 0.069        | 4.9         | 0.9 - 26.9          |

|                                  |         |       |        |   |              |             |             |
|----------------------------------|---------|-------|--------|---|--------------|-------------|-------------|
| Birth weight in kg               | -0.14   | 1.439 | 0.009  | 1 | 0.923        | 0.9         | 0.1 - 14.6  |
| Period of gestation              | 1.664   | 0.993 | 2.811  | 1 | 0.094        | 5.3         | 0.8 - 37    |
| Birth order - higher             | 2.023   | 0.917 | 4.866  | 1 | <b>0.027</b> | <b>7.6</b>  | 1.3 - 45.6  |
| Lack of Exclusive breast feeding | 3.999   | 1.347 | 8.814  | 1 | <b>0.003</b> | <b>18.9</b> | 8.8 – 83.8  |
| Snacks instead of meal           | 2.512   | 1.112 | 5.108  | 1 | <b>0.024</b> | <b>12.3</b> | 1.4 - 109   |
| Deworming status                 | 2.515   | 1.393 | 3.259  | 1 | 0.071        | 12.4        | 0.8- 189.7  |
| Waste water disposal             | 1.19    | 0.961 | 1.534  | 1 | 0.215        | 3.3         | 0.5 - 21.6  |
| Services from anganwadi          | 2.176   | 1.557 | 1.953  | 1 | 0.162        | 8.8         | 0.4 - 186.5 |
| Constant                         | -39.666 | 8.484 | 21.857 | 1 | 0            | 0           |             |

In table 9, the variables which are found significantly associated with wasting during univariate analysis with  $p < 10\%$  were subjected to multivariate analysis binary logistic regression shows that;

- Girl has 15.9 times risk to develop wasting with 95% CI (1.8 - 137.6)
- Higher birth order has 7.6 times risk to develop wasting with 95% CI (1.3 - 45.6)
- Lack of exclusive breast feeding has 18.9 times risk to develop wasting with 95% CI (8.8 – 83.8)
- Snacks instead of meal has 12.3 times risk to develop wasting with 95% CI (1.4 – 109)

The major findings of the study are as follows;

In univariate analysis using chi square and odds ratio, age, gender, Socio Economic Status, birth weight, period of gestation, birth order, exclusive breast feeding, snacks instead of meal, deworming status, waste water disposal, services from anganwadi were statistically found to have a significant association with the incidence of wasting among under five children.

After binary logistic regression, girl child has 15.9 times risk for developing wasting at 95% CI (1.8 - 137.6), higher birth order has 7.6 times risk for developing wasting at 95% CI (1.3 - 45.6), lack of exclusive breast feeding has 18.9 times risk for developing wasting at 95% CI (8.8 – 83.8) and snacks instead of meal has 12.3 times risk for developing wasting at 95% CI (1.4 – 109) were risk factors for development of wasting among under five children.

## CONCLUSION

Based on the study findings, the following conclusions were drawn: -

1. There is statistically significant association between incidence of wasting and gender. Girls are more prone to develop wasting.
2. There is statistically significant association between incidence of wasting and birth order. Higher birth order is a risk factor for development of wasting among under - five children.
3. There is statistically significant association between incidence of wasting and lack of exclusive breast feeding.
4. There is statistically significant association between incidence of wasting and snacks instead of meal.



**Nursing implications****Nursing service**

1. The study findings can be used by the nursing personnel working in the Pediatric wards, Immunization clinics and community settings. Nurses can make a contribution to decreasing the morbidity related to wasting among under - five children by reducing the incidence of wasting among under - five children.
2. The study findings can be used by the nursing personnel working in the Pediatric wards, Immunization clinics and community settings. Nurses can make a contribution to decreasing the mortality related to wasting by early identification of wasting among under - five children attending pediatric wards and outpatient departments and those who are in the community setting.
3. On the basis of the study, training programmes may be conducted among nurses to improve their skills for assessing the risk of development of wasting and early identification of cases in the pediatric wards, outpatient departments and immunization clinics.
4. Training programmes may be conducted for the nurses in the community sector for early identification and prevention of wasting among under - five children.
5. The knowledge generated from the study can be used for early detection and treatment of wasting among under - five children.

**Nursing administration**

1. Conduct induction training and in-service education regarding the risk factor, symptoms and signs of severe wasting among under - five children.
2. Nurse administrators should assign competent nursing staffs in the child health departments who are able to screen and educate the parents of the high risk children.
3. Nurse administrators should create clinical nurse specialist post in the service sector to enhance the quality of nursing care in screening, early detection and treatment of the children with wasting.
4. Nurse administrators can identify the areas of improvement, which will help them to take appropriate action.

**Nursing education**

1. Due weightage should be given to the early detection and accurate management in the curriculum of both under graduate and post graduate courses.
2. Diploma, graduate and post graduate students should get posting in the pediatric wards, outpatient departments and immunization clinics to develop skills in providing holistic care.
3. Nursing educators can discuss the findings of the studies while conducting the classes.
4. Nurse educators should prepare the students to screen the high risk children in the community setting.
5. Nurse educators can organize health education programmes for the parents of under five children in view of active managements for the prevention of the wasting among under five children.
6. Nurse educators should encourage the students to provide the health education regarding the prevention of wasting among under five children.

**Nursing research**

1. Similar studies can be carried out in a large sample size.
2. Different population can be assessed using similar studies in different setting and geographical areas.
3. A prospective cohort study can be conducted for various high risk population.
4. An age matched study can be carried out in the similar setting.
5. A qualitative study of morbidity related to wasting can be conducted.
6. A comparative study can be conducted to assess the knowledge regarding the prevention of the wasting among under five children in urban and rural population.
7. A quantitative study to evaluate morbidity associated with wasting among under - five children.
8. A study can be conducted to analyse the quality of life of a child with wasting.
9. A qualitative study can be conducted to assess the problems faced by the children suffering from severe wasting.

**Limitations**

1. The study setting is limited to the immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.
2. The study population is limited to the under five children attending the immunization clinics of Sree Avittom Thirunal Hospital, Thiruvananthapuram and Integrated Family Health Centre, Pangappara, Thiruvananthapuram.
3. The sample size was limited to 70 each of the cases and controls
4. The study was an unmatched study.
5. The duration of the study was limited to six weeks.
6. Samples were not adequate to analyse the effect of type of diet for the child, bottle feeding, initiation of breast feeding, immunization status, type of diet during pregnancy and complications during pregnancy for the development of under – five child wasting.

**Recommendations**

1. Training health care workers: health care workers need higher levels of training in the early diagnosis of wasting among under - five children.
2. Promote public awareness about the signs of severe wasting among under five children through Information, Education and Communication(IEC).
3. Timely referral to the pediatrician should be strengthened to improve the outcome.
4. Improve the surveillance of nutritional status among under five children via community health nursing surveys.
5. The primary focus should be devoted to the early and accurate identification of risk factors for wasting among under - five children.
6. Conduct training programmes for nurses and physicians to improve the efficiency of the current health system to have a better outcome.

**REFERENCES:**

1. Bellamy C. The state of the World's Children -Focus on Nutrition. UNICEF,New York. Oxford University Press; 1998: p.9
2. National Family Health Survey – 5, 2019-20 International Institute for Population Sciences (Deemed University) District Fact Sheet Thiruvananthapuram Kerala. <http://www.lipsindia.ac.in>
3. BinuAreekkal, Tony Lawrence, Jose Joseph,Ajan M J, Ajith R; “Prevalence of malnutrition among underfive children in a semi urban area in Kottayam, Kerala”; Journal of Evolution of Medical and Dental Sciences · June 2014 DOI: 10.14260/jemds/2014/2816.
4. Priyanka R., Vivin Vincent, Jini M. P., C. R. Saju; “An assessment of the nutritional status of underfive children in a rural area of Thrissur district, Kerala, India”; International Journal of Community Medicine and Public Health Priyanka R et al. Int J Community Med Public Health. 2016 Dec;3(12):3479-3486.
5. District fact sheet, Ernakulam; <https://rchiips.org>
6. WHO <https://www.who.int>healthtopics>
7. Ministry of Health and Family Welfare, Govt. of India; Participant Manual Facility based care of severe acute malnutrition; 2013; Page no: 4
8. Grantham- McGregor S, Cheyung Y B, Cueto S, et al. Developmental Potential in the first 5 years for children in developing countries. Lancet 2007;369:60-70. DOI:10.1016/S0140-6736(07)60032-4
9. Wu G, Imhoff-Kunsch B, Girard AW. Biological mechanisms for nutritional regulation of maternal health and fetal development. PaediatrPerinatEpidemiol 2012;26 Suppl 1:4-26.doi:10.1111/j.13653016.2012.01291.xpmid:<http://www.ncbi.nlm.nih.gov/pubmed/227425>
10. Fanzo J, Hawkes C, Udomkesmalee E, et al.2018 global nutrition report: shining a light to spur action on nutrition,2018.
11. <https://www.unicef.org/nutrition/child-wasting>
12. Motbainor A, Taye A; Wasting in under five children is significantly varied between rice producing and non-producing households of Libokemkem district, Amhara region, Ethiopia; BMC Pediatrics; 2019; 19:300 <https://doi.org/10.1186/s12887-019-1677-2>.