Role of Availability of Sanitation Facility on Health and Nutrition in Adolescent Girls of Ranchi Town of Jharkhand

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Abstract :-

This paper is an attempt to analyse the role of availability of sanitation facility in enhancing the status of health and nutrition in adolescent girls in Ranchi town. India, being a country in developmental transition, faces the dual burden of pre-transition diseases like undernutrition and infectious diseases as well as post-transition, lifestyle-related degenerative diseases such as obesity, diabetes, hypertension, cardiovascular diseases and cancers. According to National Family Health Survey (NFHS-4), 19.5% of Indian population comprises of adolescent. India has 120 million adolescent girls, accounting for nearly 10% of the country's population. WHO (2006) notes that in south-east Asian region, a large number of adolescent suffer from malnutrition which adversely affect their health and development. This huge number and poor status of health and nutrition of adolescent girls cannot be ignored. The availability of sanitation facility, undoubtedly, is one of the most important factors that determine the nutritional as well as health status of children and adolescents. With the help of empirical data collected from 200 adolescent girls of Ranchi town, using chi-square test the study concludes that there is statistically significant association between availability of sanitation facility and status of health and nutrition of adolescent girls. This implies with the improvement in the availability of sanitation facility standard, the health and nutritional status of adolescent girls also improved.

Key words: Adolescence, Nutrition Index, Stunting, Wasting, BMI, Availability of Sanitation Facility

Introduction:-

Adolescence is a journey from the world of childhood to adulthood. This is an important stage of growth and development in the lifespan of an individual. During this period individual move towards physical and psychological maturity, and economic independence and acquire their adult identity. This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioural changes take place (Patil et.al 2009). According to National Family Health Survey (NFHS-4), 19.5% of Indian population comprises of adolescent. India has 120 million adolescent girls, accounting for nearly 10% of the country's population (UNFPA-INDIA-2018). This number and poor status of health and nutrition of adolescent girls cannot be ignored. In the term of natural and human resources, Jharkhand is considered the richest state but it suffers from high incidence of malnutrition among children and anaemia among adults. Studies done by Menon et al (2008) and IFPRI (2008) indicate that Jharkhand ranked 16th among 17 major states of the country. The state 2012-13 records that 51% of children suffer from stunting(low height weight ratio) indicating long run chronic undernutrition rather than short term fluctuation in diet and also that there is negligible inter district variation (Smith and Haddad 2003) indicating that child malnutrition is a universal challenge in the state. AHS also records that approx 84% of women in Jharkhand are anaemia. Poor health is an established fact for Jharkhand but it is the health of adolescent girls that is of concern as they are the future mothers. The main focus of this study is to examine the role of Availability of Sanitation Facility in determining the health and nutrition of adolescent girls in the study area.

Objectives of the Study

The study aims to examine the health and nutritional status of adolescent girls in the study area and their association with availability of sanitation facility.

And in view of this objective the following hypotheses are formulated

- There is no association between availability of sanitation facility and nutritional status (measured by nutritional index) of adolescent girls of Ranchi Town.
- There is no association between availability of sanitation facility and health status as measured by Stunting, Wasting and BMI of adolescent girls in Ranchi town.

Data & Methodology

The study is based on primary data collected from 200 adolescent girls selected by proportionate stratified random sampling technique in Ranchi town, the capital of Jharkhand. Out of total of 53 wards 6 wards (3 tribal dominated wards- comprising of ward no. 10, 12 and 19 & 3 from non-tribal dominated wards- comprising of ward no. 21, 24 and 25) were randomly selected. As the period of adolescence covering 10 to 19 years is marked by two distinct stages (pre puberty period and post puberty period), the sample has been accordingly selected to cover Pre-puberty period (10 to 12 years) and Post puberty period (13 to 19 years). The study covered 68 adolescent girls of pre-puberty period and 132 of post-puberty period. Data for study has been collected through pre-framed schedule which collects information on nutritional status and health status together with the socio-demographic traits. Nutritional index has been computed for each respondent as the ratio of reported average daily food intake of past week by recall method and the required intake as suggested by Nutrition expert group I.C.M.R. Of the various categories of dietary recommendations, the balanced diet (gm) at moderate cost for school going urban children was found to be most suitable in the study, hence selected for Recommended Dietary Allowance (RDA).The following table shows the balanced diet (per day required consumption in grams) in adolescents.

Table 1: Balanced Diet (gm) at Moderate Cost for School Children and Adolescents

Foodstuffs	**School Children**				**Adolescent Girls**	
	10-12 years		13-15 years		16-18 years	
	V*	NV**	V*	NV**	V*	NV**
Cereals	290	290	400	400	320	320
Pulses	70	60	70	50	70	50
Green Leafy Vegetables	100	100	100	100	150	150
Other Vegetables (roots & Tubers)	75	75	150	150	150	150
Fruits	100	100	100	100	100	100
Milk	600	400	600	400	600	400
Fat & Oils	30	30	30	30	30	30
Mean, Fish and eggs	---	60	---	80	---	80
Sugar & Jiggery	30	30	30	30	30	30
Peanut	40	30	40	30	50	30

Source- I.C.M.R, Handbook of Food and Nutrition, Swaminathan, M. S.,(2010)

*Vegetarian **Non-vegetarian

The nutrition indices have been classified into three categories – Low (0.25 - 0.5), Medium (0.5 – 0.75) and High (< 0.75). For studying differences in health status of adolescent girls by different level of family income, the standard criteria of BMI, based on anthropometric method has been computed for each sampled adolescent girls. Using standard reference table of WHO (2007) they have been classified as Severe Thinness (<-3SD), Thinness (<-2SD), Normal (>-2SD and <+1SD), Overweight (>+1SD but <+2SD), Obesity (>+2SD). However the present study combines severe thinness & thinness in one group and overweight & obese in another group as no. of adolescent girls in these groups is less. Finally BMI has grouped into three categories namely 1) Severe Thinness & Thinness 2.) Normal and,3.) Overweight & Obese.

The study focuses on computing the nutritional status and health status of adolescent girls in Ranchi town. It also attempts to establish the relationship between nutritional status as well as health status of adolescent girls according to availability of sanitation facility. Availability of Sanitation Facility has been grouped into 4 types

1- Very Good 2- Good 3-Average 4- Poor

The above classification is based on following criteria-

IST very good- a separate toilet, septic tank and running water in toilet, more than one tap,

2nd good –at least one toilet and no running water

3rd average- separate toilet, use stored water

4th poor- public toilet

Data obtained on health and nutrition status from each sampled girl have been averaged and have been tabulated across different groups of sanitation facility. After classification and tabulation of data descriptive (%,) as well as inferential techniques (chi-square test) has been used to analyse the data. Then null hypothesis has been tested at 5% level of significance. The study has been carried out in two stages. Nutritional status has been measured by nutritional intake index and health status has been measured by Stunting, Wasting and BMI. In first stage nutritional intake index has been computed for each respondent. Nutritional index has been computed for each respondent as the ratio of actual daily food intake and the required intake as suggested by Nutrition expert group I.C.M.R. of

the various categories of dietary recommendations. In second stage Stunting, Wasting Index has been calculated by actual/ required height-for-age and weight- for- height respectively according to WHO/NCHS reference. BMI has been computed using the formula=kg/m^2 for each adolescent girls.

Nutritional Status of Adolescent Girls according to Sanitation Facility in the Study Area

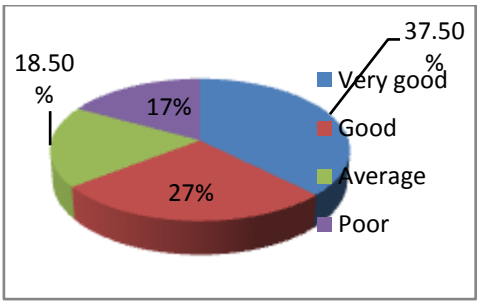
The sanitation-nutrition nexus refers to the multiple connections between sanitation practices and nutritional outcomes. Adequate sanitation facility, together with good hygiene and safe water, are fundamental to good health. The distribution of adolescent girls by sanitation facility in the study area is given by the given table and graph-

Table 2; Composition of Sampled Adolescent Girls by sanitation facility of Ranchi Town

Total	Availability of Sanitation Facility				Total
	Very good	Good	Average	Poor	
	75*(37.5%)*	54*(27%)*	37*(18.5%)*	34*(17%)*	200

Source; Own Computation from Primary Data

Figure No. 1 Composition of Sampled Adolescent Girls by availability of sanitation facility of Ranchi Town



Source; Table No. 2

From the above table and graph it has been observed that there are 37.50% households have proper sanitation facilities having a separate toilet, septic tank and

running water in toilet, more than one tap, 27% are having at least one toilet and no running water, 18.5% are having separate toilet, use stored water for sanitation and 17% are having public toilets.

Table 3; Number (in figure and %) of Adolescent girls having low, moderate and high Nutrition Index according to availability of sanitation facility

Nutritional Status	Very good	Good	Average	Poor	Total
Low	5*(06.66%)*	7*(12.96%)*	7*(18.91%)*	10*(29.41%)*	29
Moderate	32*(42.66%)*	28*(51.85%)*	22*(59.45%)*	21*(61.76%)*	103
High	29*(38.66%)*	21*(38.88)*	9*(24.32%)*	9*(26.47%)*	68
Total	75	54	37	34	200

Source: Own Computation from Primary Data

Figure No. 2 Number (in figure) of Adolescent girls having low, moderate and high in nutrition index according to availability of sanitation facility

Source Table No. 3

To test whether there is any impact of sanitation facility on nutrition status of adolescent girls, following hypothesis have been formulated as,

H_0: Availability of sanitation facility has no impact on nutritional status of adolescent girls. And Alternative Hypothesis is,

H_1: Availability of sanitation facility has impact on nutritional status of adolescent girls.

Table 4; Association between Nutritional Status and availability of sanitation facility

Nutritional Status	Very good	Good	Average	Poor	Total
Low	5	7	7	10	29
Moderate	32	28	22	21	103
High	29	21	9	9	68
Total	75	54	37	34	200
EXPECTED VALUE					
Av. N.I	Very good	Good	Average	Poor	
Low	10.875	7.83	5.365	4.93	
Moderate	38.625	27.81	19.055	17.51	
High	25.5	18.36	12.58	11.56	
Chi-Square= 0.033071					

Source-Own Computation from Primary Data

Here, the computed value of chi-square (.033071) is less than .05, as we tested at 5% level of significance, hence null hypothesis is rejected. Hence, **there is association between nutritional status and availability of sanitation facility.** This means that availability of sanitation facility affects the nutritional status of adolescent girls in the study area.

Health of Adolescent Girls and Availability of Sanitation Facility- Status and Association

To find the status of health of adolescent girls, three indicators have been used. It also attempts to establish the relationship between health status and Availability of sanitation facility using Chi-Square Test.

Association between stunting and availability of sanitation facility in the area

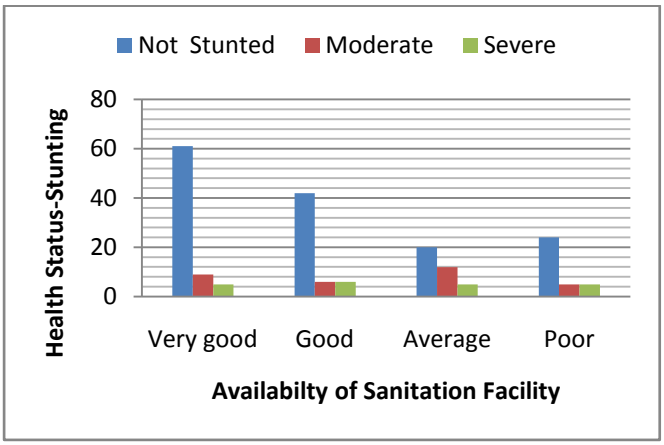
The status of health (Stunting as health indicator) of sampled adolescent girls in the study area according to Availability of sanitation facility has been given through following table and graph-

Table 5: No. (in fig. and %) of Adolescent girls having not stunted, moderate and severe stunting according to availability of sanitation facility

	Very good	Good	Average	Poor	Total
Not Stunted	61*(81.33%)*	42*(77.77%)*	20*(54.05%)*	24*(70.58%)*	147
Moderate	9*(12%)*	6*(11.11%)*	12*(32.43%)*	5*(14.70%)*	32
Severe	5*(06.66%)*	6*(11.11%)*	5*(13.51%)*	5*(14.70%)*	21
Total	75	54	37	34	200

Source: Own Computation from Primary Data

Fig. No. 4 No. (in fig.) of Adolescent girls having not stunted, moderate and severe stunting according to availability of sanitation facility



Source; Table No.5

From the above table and graph it has been seen that the highest proportion of adolescent girls who are not stunted are falls into very good category in which a household has a separate toilet, septic tank and running water in toilet more than one tap. The highest moderate stunted adolescent girls are from those households having separate toilet and used stored water. To test whether there is any association between Stunting and availability of sanitation facility, given hypothesis has been formulated,

H_0: Availability of sanitation facility has no role on determining the stunting status of adolescent girls.

Table 6; Association between Health Status -Stunting and sanitation facility

Health status	Availability of Sanitation Facility				
	Very good	Good	Average	Poor	Total
Not Stunted	61	42	20	24	147
Moderate	9	6	12	5	32

Severe	5	6	5	5	21
Total	75	54	37	34	200
Expected frequency					
Health status	**Availability of Sanitation Facility**				
	Very good	**Good**	**Average**	**Poor**	**Total**
Not Stunted	55.13	39.69	27.20	24.99	
Moderate	12.00	8.64	5.92	5.44	
Severe	7.88	5.67	3.89	3.57	
chi square= 0.05167					

Source-Own Computation from Primary Data

Hence null hypothesis is rejected as the value of chi square is equal to .05.It means **there is association between availability of sanitation facility and health status (in case of Stunting as health indicator) of adolescent girls.** This implies that health status-stunting depends on availability of sanitation facility.

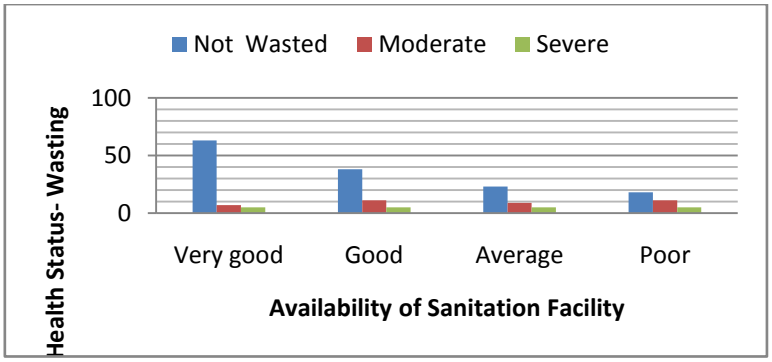
Association between wasting and availability of sanitation facility in the study area

The status of health (Wasting as health indicator) of sampled adolescent girls in the study area according to family type has been given through following table and graph-**Table 7: No. (in fig. and %) of Adolescent girls having not wasted, moderate and severe wasted according to availability of sanitation facility**

	Availability of Sanitation Facility				
	Very good	**Good**	**Average**	**Poor**	**Total**
Not Wasted	63*(84%)*	38*(70.37%)*	23*(62.16%)*	18*(52.94%)*	142
Moderate	7*(09.33%)*	11*(20.37%)*	9*(24.32%)*	11*(32.35%)*	38
Severe	5*(06.66%)*	5*(09.25%)*	5*(13.51%)*	5*(14.70%)*	20
Total	75	54	37	34	200

Source: Own Computation from Primary Data

Fig. No. 5. No. (in fig.) of Adolescent girls having not wasted, moderate and severe wasted according to availability of sanitation facility



Source; Table No.7

From the above table and graph it has been observed that the highest proportion of adolescent girls who are not wasted are falls into very good category in which a household has a separate toilet, septic tank and running water in toilet more than one tap. The highest moderate stunted adolescent girls are from those households having at least one toilet and no running water and also separate toilet and used stored water. To test whether there is any association between Wasting and sanitation facility, following hypothesis has been formulated as,

H_0: Availability of sanitation facility has no role on determining the health wasting status of adolescent girls.

Table 8; Association between Health Status- Wasting and availability of sanitation facility

Health status	**Availability of Sanitation Facility**				
	Very good	**Good**	**Average**	**Poor**	**Total**
Not Wasted	63	38	23	18	142
Moderate	7	11	9	11	38
Severe	5	5	5	5	20
Total	75	54	37	34	200
Expected frequency					
Health status	**Availability of Sanitation Facility**				
	Very good	**Good**	**Average**	**Poor**	**Total**
Not Wasted	53.25	38.34	26.27	24.14	
Moderate	14.25	10.26	7.03	6.46	
Severe	7.50	5.40	3.70	3.40	
Chi- Square= 0.03830765					

Source-Analysis from primary data

Hence null hypothesis is rejected as the value of chi square is less than .05.It means **there is association between availability of sanitation facility and wasting status of girls.**

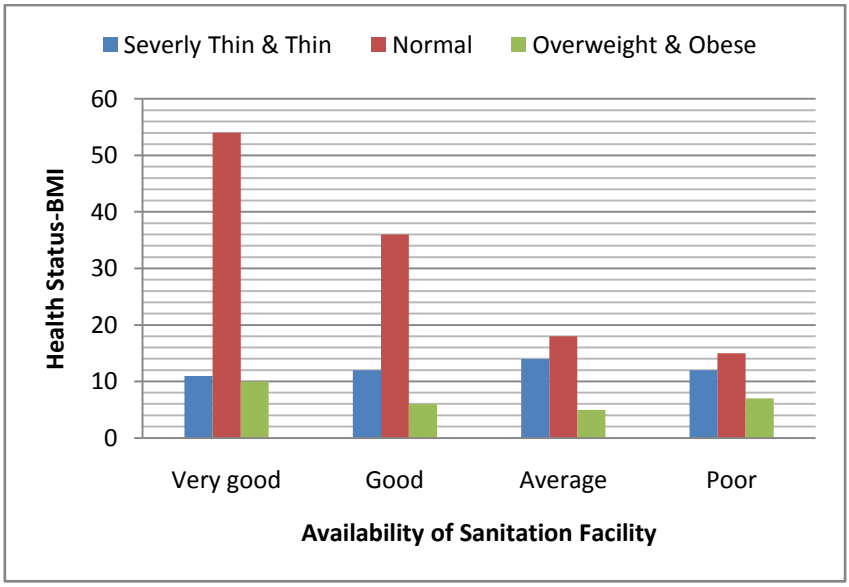
Association between BMI and availability of sanitation facility in the study area

Table No.9: Distribution of different levels of BMI of adolescent girls in the study area according to availability of sanitation facility

Health status	Availability of Sanitation Facility				
	Very good	Good	Average	Poor	Total
Severely Thin & Thin	11*(14.47%)*	12*(21.81%)*	14*(40%)*	12*(35.29%)*	49
Normal	53*(69.73%)*	37*(67.27%)*	16*(45.14%)*	17*(50%)*	123
Overweight & Obese	12*(15.78%)*	6*(10.90%)*	5*(14.28%)*	5*(14.70%)*	28
Total	76	55	35	34	200

Source; Own Computation from Primary Data

Fig. No.5 Distribution of different levels of BMI of adolescent girls in the study area according to availability of sanitation facility



Source; Table No. 9

From the above table and graph it has been found that in the study area the highest proportion of adolescent girls having normal BMI and also overweight and obese are from very good source of sanitation facility in which households have a separate toilet, septic tank and

running water in toilet, more than one tap. Severely thin and thin adolescent girls are from that family who used public toilets.

Table 10; Association between Health Status- BMI and availability of sanitation facility

Health status	**Availability of Sanitation Facility**				
	Very good	**Good**	**Average**	**Poor**	**Total**
Severely Thin & Thin	11	12	14	12	49
Normal	53	37	16	17	123
Overweight & Obese	12	6	5	5	28
Total	76	55	35	34	200
Expected frequency					
Health status	**Availability of Sanitation Facility**				
	Very good	Good	Average	Poor	Total
Severely Thin & Thin	18.38	13.23	9.07	8.33	
Normal	46.13	33.21	22.76	20.91	
Overweight & Obese	10.50	7.56	5.18	4.76	
Chi- Square= 0.042610065					

Source-Own Computation from Primary Data

Hence null hypothesis is rejected as the value of chi square is equal to .05.It means **there is association between availability of sanitation facility and BMI of adolescent girls.** So, it may safely conclude that availability of sanitation facility is an important factor which affects the health status- BMI of adolescent girls in the study area.

Findings

Availability of sanitation facility is an important factor which affects health and nutritional status of an individual. The findings of this paper are

- In the study area, there was 37.50% households had proper sanitation facilities having a separate toilet, septic tank and running water in toilet, more than one tap, 27% was having at least one toilet and no running water, 18.5% was having separate toilet, use stored water for sanitation and 17% was having public toilets.
- In each category of sanitation facility, the highest concentration was in moderate nutritional index category.

- There is significant association between nutritional intake of adolescent girls and availability of sanitation facility.
- There is significant relationship between availability of sanitation facility and stunting, wasting & BMI of adolescent girls.

Conclusions

Availability of sanitation facility has definite and significant effect on health and nutritional status of children and adolescents girls. Healthy environment has prime necessity for good health. In the study area most of the bread earners of the family were engaged in agriculture and casual labours with irregular income. This is the reason parents are not able to provide adequate diet and also proper sanitation facility to their children leading to poor health of the adolescent girls. So improving the economic condition of the family is of paramount importance. Therefore skill enhancements by using different training facility, generation of employment opportunities and provisions for self employment by sanctioning loans and government initiatives are suggested as policy measures to improve their living conditions.

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