

# Impact of TT Vaccination among Adolescent Girls through Nutrition Education in Sirajgonj District of Bangladesh

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**Abstract-** Mention Nutritional knowledge, personal hygiene and immunization awareness can be gained through nutrition education. In this study, five hundred adolescent girls between ten to nineteen years were selected as samples. In baseline study the participants were randomly assigned to a control and an intervention group and both group had the same number of adolescent girls. In end line, 241 adolescent girls from intervention group and 236 from control group were finally interviewed. This study showed that adolescents who took TT vaccine and who did not take TT vaccine were either normal or malnourished (67.24 vs. 56.77). Adolescent girls were significantly ( $p < 0.05$ ) increased whereas moderate and severe thinness girls were almost less than those who did not take TT vaccine. TT Immunization increased through nutrition education counseling and played a significant role in reducing the thinness among the adolescent girls. In compare with those did not take TT vaccine, nutrition education also appreciably contributed on vaccination coverage between control and intervention group (28.8 to 44.0;  $p < 0.001$ ). This TT immunization awareness can be grown up through nutritional education.

**Index Terms-** Adolescent girls, Immunization, Tetanus toxoid, Nutrition education

## I. INTRODUCTION

Vaccination is the administration of antigenic material (a vaccine) to stimulate an individual's immune system to develop adaptive immunity to a pathogen. Vaccines can prevent or ameliorate morbidity from infection. The Tetanus Toxoid (TT) vaccine is given during adolescent period to prevent the risk of tetanus to adolescents as well as her unborn baby because they are considered as "mother to be" and the future nation depends on them (Measham and Chatterjee, 2000). Adolescence refers to a period of 10-19 years while rapid physical, psychological and emotional changes occur and additional nutritional demands increased for their proper development of the body (Abdur Razzak et al., 2016). Neonatal and maternal tetanus infections remain an important cause of death in many countries. Few studies have reported tetanus toxoid antibody levels of adolescent girls. As part of the Expanded Programme on Immunization most girls receive up to 3 injections in early childhood, and many subsequently do not receive booster vaccinations until pregnant

(Loretta Brabin et.al. 2000). Tetanus is a life-threatening bacterial disease that is caused by the toxin of a bacterium called *Clostridium tetani*. This awareness can be grown up through nutritional education. Nutrition education" means individual or group sessions and the provision of materials designed to improve health status that achieve positive change in dietary habits, and emphasize relationships between nutrition and health, all in keeping with the individual's personal, cultural and socioeconomic preferences (Oregon WIC Program). Previous studies also showed that nutrition education or counseling on elder person had a fruitful outcome (BNNMB, 2003). The aim of this study was to evaluate the impact of TT vaccination coverage and in improving the nutritional status among adolescent girls through nutrition education.

## II. MATERIALS AND METHODS

In this study five hundred adolescent girls were selected as samples in the age group of ten to nineteen years to analyze the impact of TT vaccination coverage and in improving the nutritional status among adolescent girls through nutrition education. In baseline study precisely the same number ( $n=250$ ) of adolescent girls was randomly assigned to a control and an intervention group from rural areas of Sirajgong district of Bangladesh. For TT vaccine nutrition education other than the course curriculum was provided only to the intervention group whereas no education was provided to the control group. For TT vaccine nutrition education was provided to all of the subjects through one to one or group discussion using relevant charts, leaflets, posters etc. After two years intervention providing the groups was assessed at the end line of the study. 241 adolescent girls from intervention group and 236 from control group were finally interviewed at end line, to evaluate the impact of TT vaccination coverage and in improving the nutritional status among adolescent girls through nutrition education. Drop out occurred for married and or pregnant adolescent girls those were not included in this study due to their unwillingness to continue the study and marriage at the time of study. Interviewing methods was face to face and study variables like socio-demographic, nutrition, vaccination and anthropometric measurements were considered for this study. Here height and weight were measured using standard anthropometric techniques.

Nutritional status was measured based on the BMI for age Z scores. These Z scores were calculated using WHO Anthro Plus software where data was analyzed by using statistical package for social science (SPSS) software. The normality of the continuous variables was checked using Chi-square test was done

### III. RESULTS

Table 1 shows TT vaccination coverage of the adolescent girls was significantly ( $P < 0.001$ ) increased in the intervention group (44.0%) compared to the control group (28.8%) among the adolescent girls.

Table 2 depicts the percentage changes of nutritional status of the adolescent girls based on their BMI for age Z scores (BAZ) between those did not take TT vaccine and those take TT vaccine. In base line, percentage of sever (6.16 vs 1.06) and moderately (18.23 vs 9.57) thinness were significantly ( $P < 0.001$ ) less from combined groups those did not take TT vaccine and those take TT vaccine. Percentage of normal (46.55 vs 53.19;  $P < 0.05$ ) and mild (29.06 vs 36.17;  $P < 0.05$ ) adolescent girls was significantly more from combined groups those did not take TT vaccine and those take TT vaccine. In end line, percentage of sever (6.27 vs 2.30) and moderately (12.54 vs 8.05) thinness were significantly ( $P < 0.001$ ) less from combined groups those did not take TT vaccine and those take TT vaccine. Percentage of normal adolescent girls was significantly more (56.77 vs 67.24;  $P < 0.001$ ) from combined groups those did not take TT vaccine and those take TT vaccine. Between the baseline and end line of the study which indicates that those took TT vaccine has significantly ( $P < 0.05$ ) less severe and moderate thinness adolescent girls among those did not take TT vaccines. On the other hand those took TT vaccine has significantly ( $P < 0.01$ ) more normal adolescent girls among those did not take TT vaccines. Also in baseline of the study mild (29.06 vs 36.17;  $P < 0.05$ ) adolescent girls was significantly more from combined groups those did not take TT vaccine and those take TT vaccine.

Table-1: Percentage of the TT vaccination coverage variable of the adolescent girls in the intervention and the control group.

Characteristics	Control	Intervention
Have taken TT vaccine	28.8	44.0**
Have not taken TT vaccine	71.2	56.0

\*\* Significance level at  $p < 0.001$

Table-2: Association between malnutrition based on BAZ<sup>1</sup> and TT vaccination

	Baseline		End line	
	Took TT vaccine	Did not take TT vaccine	Took TT vaccine	Did not take TT vaccine
Normal	53.19	46.55*	67.24	56.77*
Mild	36.17	29.06*	21.26	22.77
Moderate	9.57	18.23*	8.05	12.54*
Severe	1.06	6.16*	2.30	6.27*
Over weight	0	0	1.15	1.65*

<sup>1</sup>=BMI (Body Mass Index) for Age Z score

to look for the significant difference on categorical variables between the intervention and control group. Also independent sample t-test was done for assessing the significant difference in anthropometric Z scores between the groups where significant, level was set at  $P < 0.05$ .

### IV. DISCUSSIONS

Vaccination rates are continually considered a substitute measure of protection. Vaccines are the most lucrative public health intervention (World Development Report, 1993). Children and adolescents are at risk for unsatisfactory immunization coverage. Much effort has been spent attempting to increase the vaccination program among children. The effective vaccines against tetanus have been available since 1940s. Peter J. Gergen et. al. found that many Americans did not have immunity to tetanus, and the rates were lowest among the adolescent. They also correlated between vaccination rates and immunity (96 percent) among six-year-olds (Peter J. Gergen et. al., 1995). Before this program, TT vaccine acceptance was favorable but relevant knowledge was low but after nutrition education program, participants had greater knowledge and a more positive attitude ( $p < 0.001$ ), with more adolescent girls (28.8% before vs. 44% after). Tracy T.C. Kwan et. al. showed that among Hong Kong Chinese adolescent girls the vaccination rate was 41.6% to 58.9% and peer support were 32.8% before vs. 56.9% after (Tracy T.C. Kwan et.al., 2011). Earlier exposure to tetanus toxoid through the completion of a primary series of vaccinations may allow an anamnestic response on exposure to tetanus despite the presence of low circulating antibody levels. Other potential factors contributing to the low rate of morbidity include appropriate post exposure wound prophylaxis and decreased exposure to tetanus spores. In most cases, tetanus occurs among adults who are unvaccinated or whose history of vaccination is unknown (Prevots R et.al., 1992). Ruben et al. (1973) showed 98.7 percent of girls who received two doses of DTP two months apart between six months to two years of age had protective levels of tetanus antibody. At least three vaccinations against tetanus are required to ensure adequate, long-lasting immunity (Simonsen O, 1989). This study also found that adolescent girls who took TT vaccine had significantly ( $P < 0.05$ ) less severe and moderate thinness in compare with those who did not take TT vaccines.

### V. CONCLUSION

TT vaccination coverage and impact were available among adolescent girls through nutrition education counseling or sessions. Malnutrition occurred more among those adolescent girls did not take TT vaccine. Immunization is increased through proper awareness building to the adolescent girls and their parents or guider. Though nutrition education significantly improved the vaccination coverage and nutritional status of the adolescent girl's malnutrition were still persisted significantly among the adolescents in both groups. Urgency is required to address this situation. Besides door to door immunization nutrition-sensitive programs might crucial for these adolescent girls.

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