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# EFFICACY OF VACCINATION COUNSELLING ON AWARENESS, ATTITUDE AND PRACTICES AMONG ADOLESCENT STUDENTS IN RAJASTHAN, INDIA

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## ABSTRACT

Lack of awareness about the various vaccine preventable diseases and the huge risk of mortality and morbidity associated with the diseases like Chicken-pox, Typhoid, Hepatitis-A and Hepatitis –B is a challenge that needs urgent attention especially in adolescents. To assess the efficacy of vaccination counselling on the awareness, attitude and practices related to Chicken-Pox, Typhoid, Hepatitis-A and Hepatitis –B among school going adolescents using some of the constructs of Health belief model. A Pretest-Post test study was conducted among 502 school going adolescents studying in $9^{th}$, $10^{th}$ and $11^{th}$ standards to assess the efficacy of vaccination counselling on the awareness, attitude and practices related to vaccination against Typhoid, Chicken-pox, Hepatitis A and Hepatitis B, using a pre-tested structured questionnaire after getting permission from the school authorities and verbal consent from the respondents. The pre-test (T1) scores were low in all the three components of awareness, attitude and practices. After vaccination counselling, the post test (T2) scores increased, for all the components, the difference being statistically significant ($p<0.05$), using paired t-test of difference between means at 5% significance level. Vaccination is one of the most cost-effective disease prevention tools. Barriers related to non-immunisation in adolescents need to be addressed urgently to reduce the huge burden of disease associated with vaccine-preventable diseases. Besides making quality vaccines available at affordable prices, submission of immunisation completion certificate should be made mandatory before admission into schools and colleges.

**Keywords:** - Adolescents, Vaccination, Typhoid, Chicken-pox, Hepatitis-A, Hepatitis-B

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# INTRODUCTION

Despite huge economic growth and development in India, communicable diseases remain the leading cause of morbidity and mortality in children and adolescents. This is especially true for vaccine preventable diseases. Experience with smallpox eradication programme showed the world that immunisation was the most powerful and cost-effective weapon against vaccine preventable diseases[1]. Despite having national immunisation programs running for decades, countries have failed to eradicate vaccine-preventable diseases as sustainable financing to scale up interventions is lacking. World health organization (WHO) uses three guiding principles for prioritization of non-communicable diseases:

(i) diseases with a large-scale impact on mortality, morbidity and disability, such as human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS), tuberculosis (TB) and malaria

(ii) diseases that can potentially cause epidemics, such as influenza and cholera

(iii) Diseases that can be effectively controlled with available cost-effective interventions, such as diarrhoeal diseases and TB[2].

India is undergoing an epidemiologic, demo-graphic and health transition. Increase in the life expectancy and sedentary life-style is leading to rise in degenerative diseases and non-communicable diseases, while communicable diseases are still dominant and constitute major public health issues. Some of the commonly encountered ones are:

**1. Chickenpox**

- It is a highly contagious illness, caused by the Varicella-zoster virus (VZV), a type of herpes virus. It is often a mild illness, characterized by an itchy rash on the face, scalp and trunk and tiny fluid-filled blisters that dry and become scabs four to five days later. Serious complications, although rare, can occur mainly in infants, adolescents, adults and persons with a weakened immune system. These complications include bacterial infections of skin blisters, pneumonia, and encephalitis (inflammation of the brain).
- Chickenpox is a common childhood illness with 90 percent of the cases occurring in children younger than ten years of age. Before the availability of the Varicella vaccine almost everyone developed chickenpox.
- Maintaining high levels of Varicella immunization in the community is critical to controlling the spread of chickenpox. Most people who are vaccinated usually do not get

chickenpox. Those who are vaccinated and develop chickenpox usually have a mild form of the illness. They have fewer eruptions and recover faster[3].

- In unimmunized populations, most people contract chickenpox by age 15, the majority between ages 5 and 9, but all ages can contract it. Chickenpox is usually more severe in adults and very young infants than children. Winter and spring are the most common times of the year for chickenpox to occur.
- The vaccination requires only two shots. The first vaccination is given at about 1 year of age, and the second (booster) is given at 4 years of age. If an older person has not had chickenpox, the shot may be given at any time. All children, except those with a compromised immune system, should have the vaccination. Vaccination has been associated with a 90% decrease in the incidence of chickenpox and significantly lower complication rates in those who do develop the symptoms[4].

**2. Typhoid**

- It is a severe, infectious and life-threatening disease. It is spread through unhygienic food, drinks and water where bacteria *Salmonella typhi* multiply. Person who consume contaminated water exhibit symptoms of fever with severe complications.
- Typhoid disease mainly affects children in school-going age. It is not very common in adults and older people. Clean hygienic habits, drinking only purified water, abstaining from eating raw leafy vegetables and food left in the open are important for its containment.
- In many developing nations, the public health goal is to prevent and control typhoid by safe drinking water, improved sanitation and adequate medical care but it is quite difficult to achieve. In India, it is a great threat and a major cause of death. Because it is a tough task to change the living style of people in short span. On this ground, many professionals believe that vaccinating high-risk populations is the best way to control typhoid fever.
- A single injection given 2 years onwards gives protection against typhoid for 3 years. It will shield person who is travelling to a country where typhoid fever is prevalent. Doses can be chosen between a four-dose oral vaccine and a single-dose injection. Both are up to 75 per cent effective at preventing the infection[5].

**3. Hepatitis**

- Hepatitis is a general term that means inflammation (irritation and swelling) of the liver. It is a significant cause of morbidity and socio-economic losses in many parts of the world. Two of the common forms are Hepatitis A (HAV) and Hepatitis B (HBV).
- Transmission of HAV is typically by the faecal-oral route. Infections occur early in life in areas where sanitation is poor and living conditions are crowded. All infants age 1 to 2 years should receive two doses of Hepatitis A vaccine spaced at least 6 months apart. Children not fully vaccinated by age 2 years can be vaccinated at subsequent visits. Two doses of the vaccine also are recommended for older children who live in areas where vaccination programs target older children, who are at increased risk for infection, or for whom immunity against hepatitis A is desired.
- Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus. It is a major global health problem and the most serious type of viral hepatitis. It can cause chronic liver disease and puts people at high risk of death from cirrhosis of the liver and liver cancer. Worldwide, an estimated two billion people have been infected with the hepatitis B virus (HBV), and more than 350 million have chronic (long-term) liver infections. A vaccine against Hepatitis B has been available since 1982. Hepatitis B vaccine is 95% effective in preventing HBV infection and its chronic consequences, and is the first vaccine against a major human cancer[6].
- The majority of the estimated 43,000 new Hepatitis B infections each year strike adolescents and young adults. The Hepatitis B virus is 100 times more infectious than Human Immuno-Deficiency Virus (HIV), the virus that causes Acquired Immuno-Deficiency Syndrome (AIDS).

According to a 2002 World Health Organization (WHO) report, adolescents aged 10-19 years, accounted for 15 percent of the disease and injury burden worldwide. More than 1 million people in this age group died each year and injuries and communicable diseases were prominent causes of disability-adjusted life years (or DALYs, a measure of the amount of health lost due to a particular disease or condition). Adolescence is the time of physical, social and psychological transitions for an individual. It is the time when a person is exposed to various environmental influences and the habits learnt during childhood are put to practice and strengthened. These habits include cleanliness to avoid infection, healthy eating, adequate exercise and avoiding careless and risky behaviours. All of these combined;

determine their future way of living and consequently the health problems they are susceptible to. Attention needs to be focused on the eradication of vaccine-preventable diseases that could reduce disease burdens effectively[7]. The reasons for adolescent immunization can be grouped in three broad categories:

- **To boost immunity that is waning**
- **To accelerate disease control or elimination efforts**
- **To counter a specific risk-** Travel represents a special need for adolescent immunization. Adolescents may enter a period of increased risk, for instance from hepatitis B virus, through embarking on a life style that involves drug abuse or sexual experimentation with a number of partners.

While vaccinations could be the prevention answer for all of the above mentioned diseases, barriers exist which prevent adolescents from receiving all recommended vaccinations. These barriers, according to the Health Belief Model (HBM), depends on the person's perception of four critical areas namely,

- Perceived severity- the severity of a potential illness,
- Perceived susceptibility- the person's susceptibility to that illness,
- Perceived benefits- the benefits of taking a preventive action,
- Perceived cost/barrier- the barriers to taking that action, and
- Self-efficacy- confidence in self to perform a particular behaviour; skill training in performing that behaviour (whether they know how to).{Figure 1}

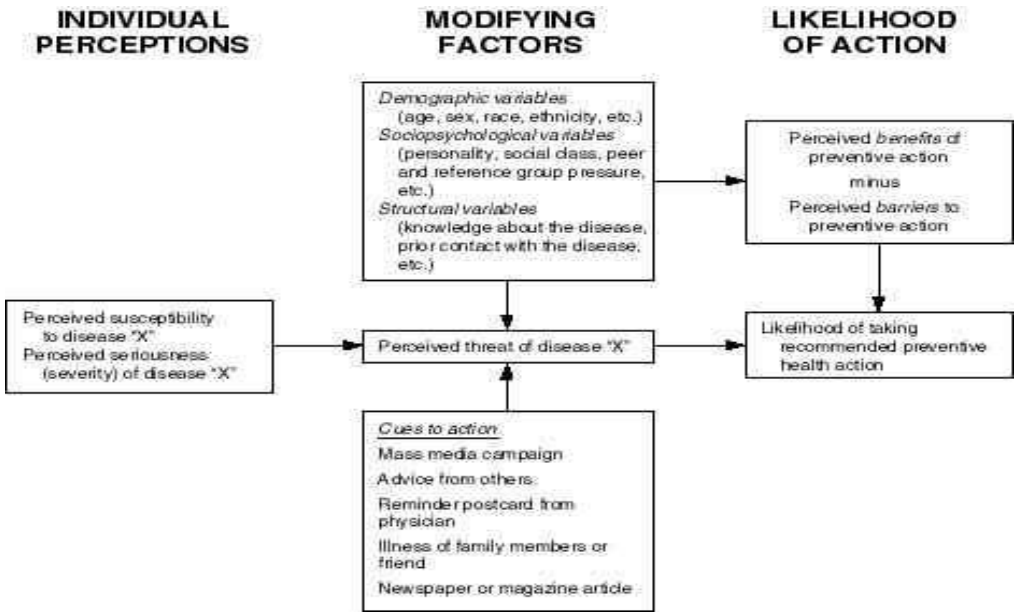


**Figure 1. Health Belief Model Constructs**

Adolescent Immunization has been low priority domain in India, only Tetanus Immunization to pregnant ladies and teenagers is a recommended adolescent vaccine. However in 2003, India Academy of Pediatrics[8] has published its recommendations on Adolescents Immunization by its Committee on Immunization. Vaccination Schedule in adolescents, as recommended by the academy is given in {Table 1}.

**Table 1: Vaccine schedule for Adolescents as given by IAP (Indian Academy of Pediatrics.*)***

| Vaccine | Age |
|---|---|
| Tetanus Toxoid | Booster at 10 and 16 yrs |
| Rubella Vaccine | As part of MMR vaccine or (Monovalent) 1 dose to girls at 12-13yrs of age, if not given earlier |
| MMR Vaccine | 1 dose at 12-13yrs of age (if not given earlier) |
| Hepatitis B. Vaccine | 3 doses(0,1 and 6m)if not given earlier |
| Typhoid Vaccine | TA,Vi or Oral typhoid vaccine every 3yrs |
| Varicella Vaccine | 1 dose up to 12-13yrs,and 2doses after 13 yrs of age(if not given earlier) |
| Hepatitis A Vaccine | 2 doses(0 and 6 months) if not given earlier |

## MATERIAL AND METHODS:

This Pretest- Post test study was conducted among 600 students, aged 13-18 years, studying in 9$^{th}$, 10th and 11$^{th}$ standards in the three schools in Pilani, Rajasthan run by the Birla Education Trust, during the months of August - November 2011 after obtaining the permission from the school authorities. The participants were explained the objectives of the study and verbal consent of all the respondents was obtained before administering a pre-tested structured questionnaire to obtain the demographic data and data regarding the awareness, attitude and practices related to diseases like Typhoid, Chicken-Pox, Hepatitis-A and Hepatitis B. Each correct/ favourable answer was given a score of 1and zero score was awarded for each incorrect/unfavourable answer. All the pre-test scoresT1 were calculated. Teaching related to various aspects of Chicken-pox, Typhoid, Hepatitis-A and Hepatitis B was done through a series of interactive lectures, discussions and demonstrations using visual aids like charts, posters and multi-media presentations. Reading material related to vaccine preventable diseases was also circulated among the participants. Special focus was laid on the importance of immunisation in children and adolescents in creating a healthy nation. After a gap of 3 weeks, the questionnaire was re-administered and the post-test scores T2, calculated after coding and entering the data in Microsoft Excel. The difference between the T1 and T2 scores was statistically analyzed using the paired t-test of difference between means at 5% significance level.

## RESULTS AND DISCUSSION:

Out of 600 filled questionnaires, only 502 paired responses were obtained after the vaccination counselling sessions, so the data analysis was done for 502 paired responses only.

49.6% respondents were females while 50.4%were females. The age of the respondents varied between 13-18 years with a mean of 14.82 years. Majority 81% of the participants named school as the major source of information, followed by books (77%), electronic and print media (62%) respectively. Family and friends were also found to be good sources of information {Table 2}.

**Table 2: Distribution of respondents based on their Demographic data**

| S. No. | Characteristic | No. |
|---|---|---|
| 1. | Total number of samples collected | |
| | Pre-intervention | 600 |
| | Post-intervention( paired data) | 502 |
| 2. | Total number of female respondents | 249 |
| 3. | Total number of male respondents | 253 |
| 4.* | Mean age of respondents (years) | 14.82 $\pm$ 1.24 |
| 5** | Sources of information about vaccination | |
| | School | 80.88% |
| | Friends | 44.62% |
| | Family | 55.18% |
| | Print media( Newspapers) | 61.35% |
| | Electronic media | 62.15% |
| | Books | 76.69% |

*= mean $\pm$ S.D

** Multiple responses obtained

Although, 94% respondents had heard about vaccination, only 25% could actually define vaccination which after counseling increased to 68%-the difference in mean score( T2-T1) being statistically significant ($p<0.05$). Awareness related to Chicken-pox and Typhoid was high-95.6% and 87.05% respectively while that for Hepatitis-A and Hepatitis-B was low at 59.16% and 60.36% respectively which increased post-intervention to 98.6%,91.83%,83.07% and 82.87%-the difference in mean score( T2-T1) being significant( $p<0.05$). Awareness about the causative organisms and the susceptible age groups for these communicable diseases ranged between 6.57%-14.49% and 27.49%-49.80% respectively that increased after counseling to a maximum of 53.39% ($p<0.05$) and 51%-the difference not being statistically significant ($p>0.05$). Level of awareness related to the organs affected by these infections ranged between 23.71%-95.62%, that increased post- counseling to a maximum of 96.61%-the difference in mean score( T2-T1) being significant for Typhoid, Hepatitis A, Hepatitis B ( $p<0.05$) but not for Chicken-Pox ($p>0.05$).Regarding the preventive measures to be adopted for prevention, 49.60%,

72.91%,81.67% and 81.47% respondents reported being unaware of the same related to Chicken-Pox, Typhoid, Hepatitis-A and Hepatitis-B respectively, the meanT1 score ranging between 0.19-0.63 that significantly increased post counseling to a maximum of 1.09 ($p<0.05$) {Table 3}.

**Table 3: Distribution of respondents based on their Awareness level about Chicken-Pox, Typhoid, Hepatitis-A and Hepatitis-B**

| S.No | Question | Mean score ( mean ± S.D) | | t-cal. | t-crit. p<0.05 df=501 | Inference |
|---|---|---|---|---|---|---|
| | | Pre-intervention | Post-intervention | | | |
| 1. | Heard about vaccination | 0.94 ± 0.24 | 1.00 ± 0.04 | 5.74 | 1.96 | S* |
| 2. | Define the term vaccination | 0.25 ± 0.44 | 0.68 ± 0.47 | 16.32 | 1.96 | S* |
| 3. | Knowledge about causative organism of Chicken pox | 0.15 ± 0.36 | 0.53 ± 0.50 | 16.37 | 1.96 | S* |
| 4. | Knowledge about causative organism of Typhoid | 0.14 ± 0.35 | 0.43 ± 0.50 | 12.85 | 1.96 | S* |
| 5. | Knowledge about causative organism of Hepatitis A | 0.07 ± 0.25 | 0.38 ± 0.49 | 14.23 | 1.96 | S* |
| 6. | Knowledge about causative organism of Hepatitis B | 0.08 ± 0.26 | 0.37 ± 0.49 | 13.12 | 1.96 | S* |
| 7. | Knowledge about the organ(s) affected by Chicken pox | 0.96 ± 0.20 | 0.97 ± 0.18 | 0.87 | 1.96 | NS** |
| 8. | Knowledge about the organ(s) affected by Typhoid | 0.43 ± 0.50 | 0.56 ± 0.50 | 4.93 | 1.96 | S* |
| 9. | Knowledge about the organ(s) affected by Hepatitis A | 0.35 ± 0.48 | 0.67 ± 0.47 | 11.38 | 1.96 | S* |
| 10. | Knowledge about the organ(s) affected by Hepatitis B | 0.24 ± 0.43 | 0.52 ± 0.50 | 10.46 | 1.96 | S* |
| 11. | Knowledge about preventive measures for Chicken pox | 0.63 ± 0.69 | 1.09 ± 0.74 | 11.99 | 1.96 | S* |
| 12. | Knowledge about preventive measures for Typhoid | 0.33 ± 0.59 | 0.88 ± 0.77 | 15.65 | 1.96 | S* |
| 13. | Knowledge about preventive measures for Hepatitis A | 0.19 ± 0.42 | 0.57 ± 0.68 | 12.91 | 1.96 | S* |
| 14. | Knowledge about preventive measures for Hepatitis B | 0.19 ± 0.40 | 0.44 ± 0.59 | 9.81 | 1.96 | S* |

t cal.-t calculated
t-crit. - t-critical
S*- Statistically Significant
NS*- Not significant
df= degree of freedom

Regarding the attitude of the respondents towards vaccination, the mean pre-test T1score was 3.98 and 3.56 for questions whether vaccinations protects people against communicable diseases and the respondents willingness to participate in health promotion programs. Post counseling, mean T2 scores increased to 4.26 and 3.85- the difference being statistically significant ($p< 0.05$) (Table 4)

**Table 4: Distribution of respondents based on their Attitude towards Chicken-Pox, Typhoid, Hepatitis-A and Hepatitis-B**

| S. No | Question | Mean score( mean ±S.D) | | t-cal. | t-crit. p<0.05 df=501 | Inference |
|---|---|---|---|---|---|---|
| | | Pre-intervention | Post-intervention | | | |
| 1. | Attitude towards vaccination as an effective preventive tool against diseases | 3.99 ± 0.85 | 4.27 ± 0.71 | 6.27 | 1.96 | S* |
| 2. | Attitude towards participation in vaccination awareness programme | 3.57 ± 1.41 | 3.85 ± 1.19 | 3.94 | 1.96 | S* |

t cal.-t calculated
t-crit.- t-critical
S*- Statistically Significant
NS*- Not significant
df= degree of freedom

Regarding the practices related to vaccination{Table 5}, post-counselling, there was an improvement in the vaccination status among the respondents that increased by 16% for Chicken-pox, 10% for anti-typhoid vaccine, 12% for Hepatitis A and 6% for Hepatitis-B vaccine.

**Table 5: Distribution of respondents based on their Vaccination Status (Practices related to Chicken-Pox, Typhoid, Hepatitis-A and Hepatitis-B)**

| S. No. | Question | Mean score( mean ± S.D) | | t-cal. | t-crit. p<0.05 df= 501 | Inference |
|---|---|---|---|---|---|---|
| | | Pre-intervention | Post-intervention | | | |
| 1. | Vaccination status of Chicken pox | 0.46 ± 0.50 | 0.64 ± 0.56 | 6.39 | 1.96 | S* |
| 2. | Vaccination status of Typhoid | 0.35 ± 0.48 | 0.44 ± 0.50 | 3.90 | 1.96 | S* |
| 3. | Vaccination status of Hepatitis A | 0.29 ± 0.46 | 0.36 ± 0.48 | 3.90 | 1.96 | S* |
| 4. | Vaccination status of Hepatitis B | 0.29 ± 0.45 | 0.34 ± 0.48 | 2.61 | 1.96 | S* |

t cal.-t calculated
t-crit. - t-critical
S*- Statistically Significant
NS*- Not significant
df= degree of freedom

This study highlights the importance of conducting health awareness programs in schools related to immunisation as the awareness level is low especially regarding hepatitis and Hepatitis B (50-60%). These findings are consistent with the study conducted among 2800 university students in Lahore[9].The main source of information in this study was reported to be schools, books, media and family, while doctors and para-medical workers were the main informants about

immunization in a study conducted in US[10] and among respondents of children aged 12-23 in India[11]. In this study 62% respondents learnt about immunization from the print and electronic media, these findings being consistent with those done among family practice patients [12]. Although, 94% respondents had heard about vaccination, only 25% could actually define it pre-counselling. This highlights the need for making chapters in the science books related to communicable diseases and their prevention more student friendly and interesting for them by incorporating some practical activity like visit to an immunization clinic. Media and health care providers too, must play an important role in educating and removing misconceptions in both the parents as well as the adolescents regarding immunization.

Vaccinating adolescents is important before they enter adulthood, as the vaccination rates drop. Timing is important for vaccines like Chicken- pox as the disease become more severe with advancing age and usually strikes when the immunity is low like stress during exams thereby further aggravating stress due to missed study periods. If a child has already suffered from Chicken-Pox/Hepatitis-A in the past, the respective vaccines need not be given[13].

Besides low awareness level, another important factor leading to low immunization rates in adolescents is lack of decision making/low self-efficacy in getting themselves vaccinated. This problem can be overcome to a great extent by designing special pro-vaccine programs for them and making submission of immunization certificate along with birth certificate mandatory[14] as this will go a long way in creating awareness and also overcoming other barriers. The challenge to the growing Pharma sector is, also, to provide quality newer vaccines targeted towards adolescents at affordable prices to overcome the barrier of cost.

## CONCLUSION:

Vaccination is one of the most cost-effective disease prevention tools. Barriers related to non-immunisation in adolescents need to be addressed urgently to reduce the huge burden of disease associated with vaccine-preventable diseases. Besides making quality vaccines available at affordable prices, submission of immunisation completion certificate should be made mandatory before admission into schools and colleges.

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