



VACCINATION COVERAGE OF MOTHERS DURING PREGNANCY WITH TETANUS TOXOID AND INFANTS AFTER BIRTH

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ABSTRACT

The aim of the study was to determine the vaccination status of infants and tetanus toxoid vaccination of their mothers during pregnancy, in administratively divided Allama Iqbal town Lahore and to determine the factors associated with low coverage, if any. A cross-sectional study was conducted using World Health Organization (WHO) 30 cluster sampling technique. Seven mothers along with infants were considered per cluster at random. The mothers were consented for interview through a structured proforma to search for the vaccination status of their children, and their own tetanus toxoid coverage. The demographics and potential risk factors for low vaccination were also noted. Eighty four percent of the infants were vaccinated. The tetanus toxoid coverage of mothers during the pregnancy was 90.5% for both doses of the vaccines. The significant factors associated with vaccination status were found to be socio-economic condition, mother's vaccination coverage, and educational level of the parents. The vaccination status of infants in administratively divided Allama Iqbal town Lahore was satisfactory. Mother's tetanus toxoid vaccination coverage was closely associated with child's vaccination status. Effective measures are needed to raise the vaccination status up to 100%.

Keywords: Tetanus toxoid, Vaccination, EPI, Mother, Infants

INTRODUCTION

The major cause of illness and death is the infectious diseases of the children. The use of vaccines in combating diphtheria, tetanus, pertussis, poliomyelitis, purulent meningitis, measles, mumps and rubella has been helpful to eliminate the severe outcomes of such diseases (Dobson *et al.*, 1993). All infants must be vaccinated. Premature births should be vaccinated at the usual chronologic age even if they are below the expected weight at that age. However, there are some contraindications, such as continued uses of corticosteroids in bronchopulmonary dysplasia, where children should not be vaccinated (O'Brodovich *et al.*, 1985). The World Health Organization (WHO) initiated the Expanded Program on Immunization (EPI) in May 1974 to vaccinate children throughout the world. In

1984, the WHO established a standardized vaccination schedule for the original EPI vaccines: *Bacillus Calmette-Guérin* (BCG), *diphtheria-tetanus-pertussis* (DPT), oral *polio*, and *measles* (Jamison *et al.*, 2006). In 1999, the Global Alliance for Vaccines and Immunization (GAVI) was created for improving child health in the poorest countries. The GAVI brought together a grand coalition, including the UN agencies and institutions like World Health Organization, United Nations International Children Emergency Fund, and the World Bank (GAVI Alliance Inc.). The EPI was started in 1978 in Pakistan and considered as a component of Accelerated Health Program in 1983. According to World Health Organization, infants under one year are 3.53% and 4.1% pregnant women of total population.

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The new budget allocated for 2009-12 has been approved a total cost of Rs. 480.926 million. Fifty million rupees have been utilized during the financial year 2009-10 (Directorate General Health Services, Government of the Punjab, 2009). The current goals of the EPI include full immunization of children less than one year of age, to eradicate poliomyelitis and to reduce maternal and neonatal tetanus to an incidence rate of less than 1 case per 1,000 births (World Health Organization Statistics Quarterly, 1991). Infant mortality is the death of an infant in the first year of life, often expressed as the number of deaths per 1000 live births (infant mortality rate). The major causes of infant mortality include dehydration, infection, congenital malformation and sudden infant death syndrome (SIDS) (Eilidh *et al.*, 2007). This epidemiological indicator is recognized as a very important measure of the level of health care in a country because it is directly linked to the health status of infants, children, and pregnant women as well as access to medical care, socioeconomic conditions, and public health practices (Hertz *et al.*, 1994).

A vaccine produces immunity to a disease by stimulating the production of antibodies. The most common method of administering vaccines is by injection, but some are given by mouth or nasal spray (World Health Organization, 2001).

Immunization is the process whereby a person is made immune or resistant to an infectious disease. Vaccines stimulate the immune system of human body to protect from a disease. Thus, vaccination is a tool to control and eliminate severe infectious diseases in more vulnerable populations. Immunization does not demand any lifestyle modification (World Health Organization, 2001). Each country has its own vaccination schedule. Following are the vaccines which should be administered compulsorily in Pakistan:

Guerin BCG or Bacillus Cellmete is given at age 0-2 months to prevent tuberculosis. Polio vaccine is given at birth, age 2 months, 4 months and 6 months. Polio causes paralysis. DPT or Tetanus Pentusis Dipteri is also given at the age of 2, 4 and 6 months. This disease is caused by bacteria named *Corynebacterium diphtherie*, which are present in the nasal mucous membranes of the respiratory tract. Hepatitis B vaccination is administered to avoid acute liver inflammation, liver damage or liver cancer. The vaccine is given to infants at the age of 0 (at birth), 1 and 6 months. Measles vaccine is given to 9 months old baby. Haemophilus influenzae type B (Hib) or B vaccine works to prevent meningitis, pneumonia (pneumonia) and epiglottitis. This vaccine is given at the time of infants aged 2 months, 4 months and 6 months. After completing the vaccination programme, the child is protected from diphtheria and tetanus: for at least 10 years, or possibly longer, from whooping cough: for at least 3 years. If a vaccinated person gets the disease in

later life, it's a milder version. The child is projected from Polio during life and for Measles a long-lasting and probably lifelong protection.

Vaccines are not free from side effects like other medications. Some parents focus on the side effects of the vaccines and resist for their children from being immunized. These side effects are allergy in general or specifically inflammation at vaccination spot which disappears within a few days. The child may get a fever for a few days but not for up to 10 days after vaccination against diphtheria, tetanus, whooping cough and polio.

SUBJECTS AND METHODS

This study was carried out in Lahore; the historical city and the capital of the Punjab with a population of about 8.5 million. Lahore city is administratively divided into nine towns, which are further sub-divided into 150 Union Councils (UCs). This study was carried out in administratively divided Allama Iqbal town, Lahore which consists of 19 union councils that include urban, semi-urban and rural areas. The total population of administratively divided Allama Iqbal town is about 1.1 million (Executive District Office, Health, Government of Punjab, 2010).

A cross-sectional survey was carried out based upon 30 by 7 cluster sampling technique of World Health Organization (World Health Organization, 2001). Seven children and their mothers were selected from each cluster. As Allama Iqbal town is divided into 19 union councils, two clusters, each from eleven union councils and one cluster each from eight less populated union councils were selected at random. A structured proforma was designed to collect data. The mothers were interviewed about the vaccination status of their infants and their own tetanus toxoid coverage. Infants of 15months were considered and a vaccine delay of more than 15days was considered as inappropriate. Expanded Program of Immunization cards were checked wherever available otherwise mothers were investigated verbally. The information gathered included the basic demographics, socio-economic status, health facilities available, vaccination coverage of mothers and their children. The possible factors causing non-compliance with the immunization were also noted.

RESULTS AND DISCUSSION

The 5.2 % of mothers had received one dose of tetanus toxoid vaccine during pregnancy and 90.47 % had received second dose of tetanus toxoid vaccine during pregnancy. The mothers who received both doses of tetanus toxoid vaccine during pregnancy were 90.5%. Thus, they are regarded as properly vaccinated. There are many reasons for not receiving complete doses of tetanus toxoid vaccination. Fifteen percent of mothers stated that vaccines are useless, 40% reasoned dose missing due to

the location of vaccination centers at distant places. Forty percent have socio-psychological reasons while remaining 5% believed that it was harmful to the fetus. The vaccination status of infants residing in Allama Iqbal town was 83.56 percent as shown in Figure 1.

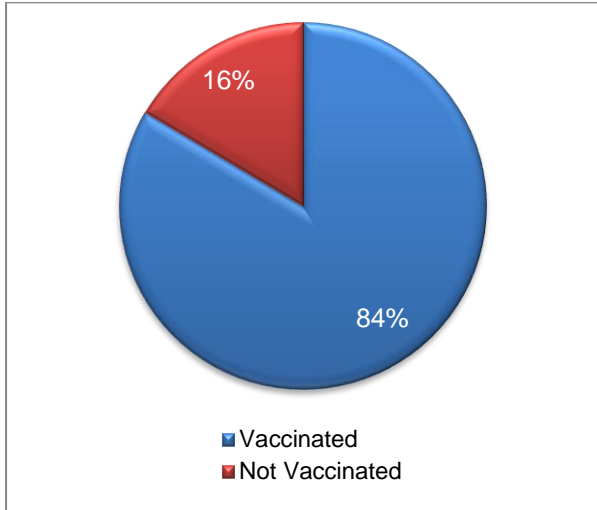


Figure 1: Vaccination status of the infants in Allama Iqbal Town

The infants timely vaccinated were 61.42%, complete but delayed 30.47%, and incompletely vaccinated 8.09% (Figure 2).

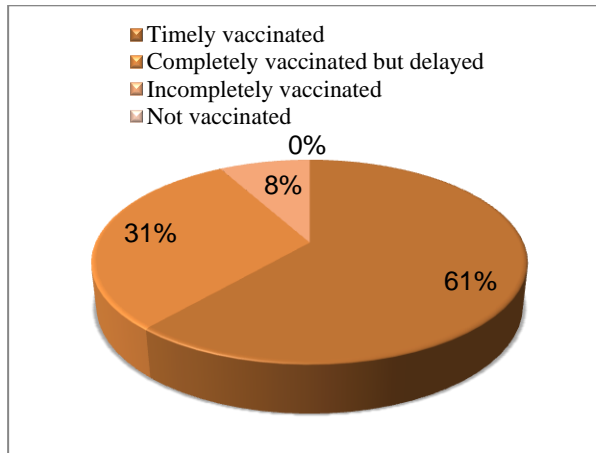


Figure 2: Time and completeness of vaccination status in infants in Allama Iqbal Town

Table I and Figures 3 and 4 summarize the vaccination status of infants studied and shows the percentage of infants that were vaccinated. The coverage of individual vaccines was 98.09% for BCG, 97.61% for OPV (dose 1), 87.14% for OPV (dose 2), 87.61% for OPV (dose 3), 87.61% for Pentavalent (dose 1), 87.14% for Pentavalent

(dose 2), 87.61% for Pentavalent (dose 3), 86.66 for Measles (dose 1) and 44.28% for Measles (dose 2). Pentavalent vaccine includes DPT, Hep-B and Hib.

Table I: Vaccination status for individual vaccines

Vaccines	Infant s	
	Number	Percent
BCG	206	98.09
OPV + Pentavalent (dose 1)	205	97.61
OPV + Pentavalent (dose 2)	183	87.14
OPV + Pentavalent (dose 3)	184	87.61
Measles (dose 1)	182	86.66
Measles (dose 2)	93	44.28

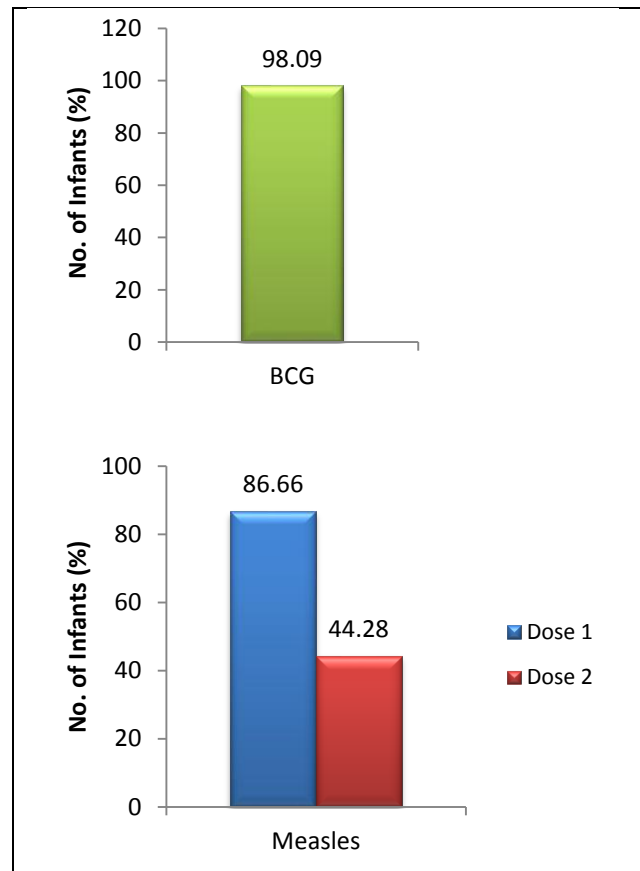


Figure 3: vaccination status of BCG and Measles in infants in Allama Iqbal Town

The reasons for not getting the infants appropriately vaccinated were also inquired from the mothers. Eighty one cases of delayed or incomplete vaccination were noted. Out of these 0.9% mothers perceived vaccinations as unnecessary, and 13.58% reported that their children were sick, 50.61% said they were busy while 25.92% reported their own sickness.

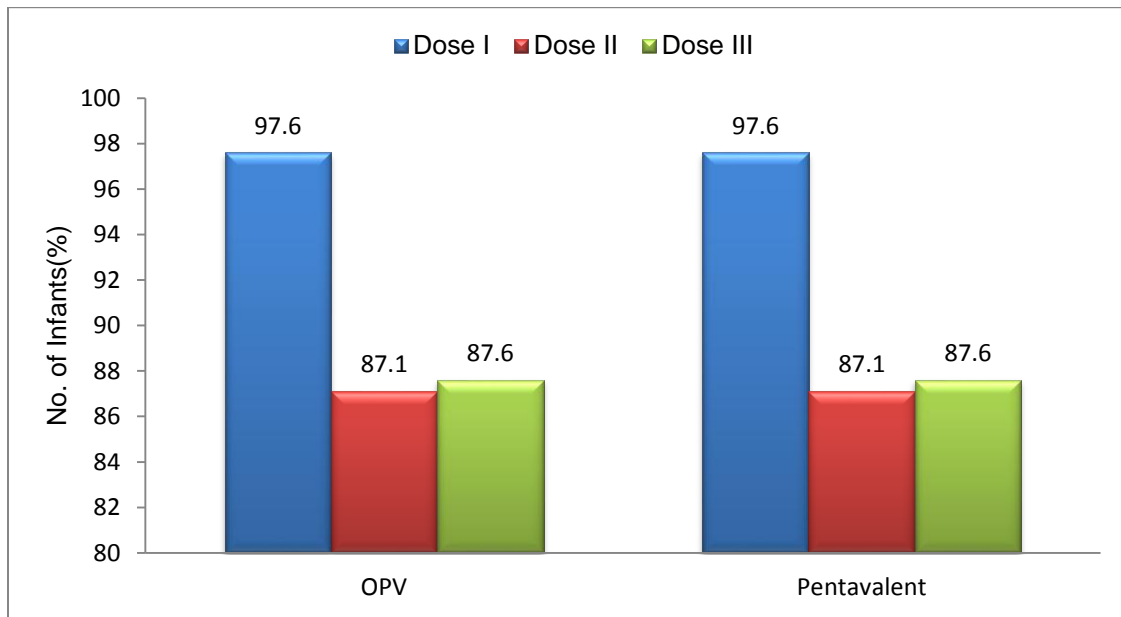


Figure 3: Vaccination status of OPV and Pentavalent vaccines

DISCUSSION

The vaccination status for infants in our study was 83.56%. A baseline study done in four regions of Pakistan showed EPI coverage of 48% (Tarin *et al.*, 1999). In spite of the fact that in this study a relatively narrow criterion was considered, better immunization coverage was noted. World Health Organization in 2008 reported BCG coverage as 98%, DPT3 as 98%, OPV3 as 98%, measles as 100% and Hepatitis B vaccine as 99% in Pakistan. The causes of missing or low vaccination in this study are consistent with studies conducted in other regions of Pakistan (Mansuri *et al.*, 2003). Major reasons include mother being busy, laziness of parents, minor sickness of child, mother or both and lack of faith in immunization program. The short supply of vaccine in rural areas is also a major problem of improper vaccination. Other causes include forgetting scheduled dates by the parents, and self kind and baseless beliefs about immunization. The tetanus toxoid coverage of mothers receiving both doses in our study was 90.5% which is better and satisfactory. However, there are many reasons for not receiving tetanus toxoid vaccination. These include perception of useless vaccination, vaccination centers at distant places, socio-psychological reasons and harms to fetus.

CONCLUSION

It is concluded that education and socio-economic status plays a significant role in the vaccination coverage of mothers during pregnancy and their child. Mother’s tetanus toxoid vaccination coverage is closely associated

with child’s vaccination status. Efficient measures are needed to educate parents for better vaccination coverage.

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