ORIGINAL ARTICLE

COVERAGE AND CAUSES OF MISSED HAEMOPHILUS INFLUENZAE TYPE B VACCINATION IN URBAN AND RURAL AREAS OF PESHAWAR

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Background: Haemophilus influenza type b (Hib) is a major cause of morbidity and mortality in Pakistan. Hib vaccine was introduced in 2009 in EPI programme. The purpose of this study was to find out the coverage and factors associated with non-immunization of Hib in urban and rural areas of Peshawar. **Methods:** Data was collected through random sampling in Peshawar University, Peshawar Saddar, Hashtnagri, Naway Kalay and Pawaka from 9th to 19th of June 2010. A questionnaire was used to interview parents of 600 children aged 1 year and below about demographics, Hib vaccination status, reasons for missed vaccination and views on immunization. Pearson's Chi-square test was used for statistical testing, and $p<0.05$ was considered significant. **Results:** Completely vaccinated children were 64.2%, 25% not vaccinated at all, and 11% were incompletely vaccinated. The reasons for not vaccinating were lack of awareness (26%), family problem/mother busy (18%), centre too far (16.9%), wrong ideas (12.2%), fear of reaction (5.4%), child illness (8.1%) and miscellaneous causes (13.7%). **Conclusion:** Low Hib vaccination coverage in Peshawar is mainly due to low awareness among people, poor economic conditions and illiteracy.

Keywords: Hib, Vaccination, Immunization, EPI, Haemophilus influenzae, Influenza

INTRODUCTION

Haemophilus influenza is a gram-negative bacterium. Of its 6 capsular types, type b (Hib) causes almost all systemic infections. It is an important cause of childhood meningitis and bacterial pneumonia in children less than five years of age, particularly infants. Other important manifestations of Haemophilus influenza include epiglottitis, osteomyelitis, septic arthritis and septicaemia. Transmission of Hib is by droplets originating from colonised persons and hence, these people are the most important disseminators of the organism. The incidence of disease due to Hib is higher in developing countries.[1] The Hib conjugate vaccine used in many countries, not only induces protective circulating antibodies and immunological memory in infants, but also results in decreased nasopharyngeal colonisation of Hib.[2–4] The vaccine is usually given in infancy at 6th, 10th and 14th week in combination with DPT and Hepatitis B-Pentavalent. USA's Centre for Disease Control (CDC) recommends a booster dose at 12–15 months of age.[5] In Pakistan, Hib was included in the EPI program in 2009.[6] WHO still lacks confirmed information about the coverage of Hib in Pakistan where many vaccine preventable diseases still exist and no surveillance has been done till now. Official figures reported 85% coverage in 2009 but it cannot be verified by independent resources.[7]

Therefore, we conducted this study to find out the coverage status and bottle-necks to Hib immunization in Peshawar and highlight issues which need to be addressed to increase coverage. The results could be compared with other regions of the country.

MATERIAL AND METHODS

This cross-sectional study was conducted from 9th to 19th June 2010 to determine the coverage of Hib and find factors associated with non-immunization. Peshawar (both urban and rural areas) was selected as it has the best medical services available as compared to other parts of the province. A questionnaire was used to interview parents with their informed consent. Through cluster random sampling, parents of 600 children, 1 year and below, were interviewed in different areas of Peshawar, i.e., Peshawar University Campus, Hashtnagri, Naway Kalay and Pawaka village. A confidence level of 95% and confidence interval of 4 was used to derive the sample size. Children above 1 year and those who spent the first three months of their life, i.e., their immunization life time, outside Peshawar were excluded.

Information was collected about the Hib immunization (Pentavalent) status, demographics, education of the family earner, occupation and income of the family earner, accessibility of EPI centre in terms of distance, behaviour of immunization staff, frequency of their visits by household workers, parents' views on immunization whether it was useful or not, and reason for non-immunization. Health education of parents was also assessed by asking the immunization schedule from the parents. Immunization record was collected by cards or mother's recall. Parents were also asked to choose the best time and place for immunization.

All data was analysed using the SPSS-16. Pearson's Chi-square test was used for statistics, and $p<0.05$ was considered significant.

RESULTS

Out of 600 children, 315 (52.5%) were females and 285 (47.5%) were males. Urban population was 52.8% while rural population was 47.2%. Education status of the family earner, who was most of time child's father, was 'higher education' in 24.5%, 'primary' in 15.6%, 'matric' in 10.5%, 'middle' 4.6%, 'traditional or maddrassa' education in 3%, and 'none' in 41.8%.

The immunization coverage of Hib was 64% completely vaccinated, 11% incompletely vaccinated and 25% were not vaccinated at all. For 1st dose, 72.3% were vaccinated. For 2nd dose 66.7% were vaccinated and for 3rd dose 62.7% were vaccinated.

The reasons for no vaccination (n=261) were lack of awareness being the highest (26%) followed by family problems or being busy (18%), centre too far (16.9%), wrong ideas (12.2%), child illness (8.1%), fear of reaction (5.4%) and others causes (13.7%). Immuization card was present with 57.5% parents and memory recall was relied upon for those who didn't have vaccination cards.

Most of the parents had little knowledge on vaccination (34.5%), followed by enough (28.8%), moderate (17.7%), none (12.8%) and knowledge about everything important (6.2%). When asked whether the immunization programme was beneficial, 89.9% answered 'yes'. Negative views (11.2% n=67) about importance of vaccine were 'misconceptions' about vaccine like sterility/being harmful (40.2%), fear of 'reactions' after administration (34.3%), considering vaccine ineffective (19.4%) and previous bad experience (3.0%).

When asked about the frequency of visits by the health workers, most of them (35.8%) answered 'often' and (33.8%) answered 'Very often'. However, a good number answered 'seldom' (17.8%) and 'never' (12.5%). When asked how well the health worker/ vaccinator provided information about vaccination, most answered 'average' (27.7%), 'good' (27.2%), and 'very good' (27.5%), but a number answered poor (14.5%) and very few answered as excellent (2.8%). When asked about the place and time of immunization, 75.1% parents preferred their children to be immunized at home and 62% chose morning time for it.

Cross tabulation between education of parents and the immunization status showed a clear pattern of low immunization among uneducated and high immunization among educated families (Figure-1). High immunization rates were found for urban areas (71.3%) in comparison to rural areas (55.8%) (p<0.001). However, a significant pattern was not observed with respect to gender of children. The males and females immunized against Hib were 63.7% and 63.5% respectively (p=0.786).

Immunization was high (65.8%) for households' earner having government job, and private jobs (76%), but low among labourers (54.1%), (p<0.001). Similarly, mothers having government jobs were much more (81.8%) likely to have their children immunized compared to housewives (63.1%) (p<0.001).

The income had a significant effect on the immunization status of the child (p<0.001) (Figure-2). The immunization status of children progressively fell with distance, and significant fall (p=0.001) was observed above 10 Km (Figure-3). Similarly, respondents who considered immunization detrimental, had a very low immunization status (12.5%) compared to those who considered immunization beneficial (72.3%) (p<0.001). In household where EPI workers visited often, rate of immunization was higher (75.8%) than areas where health workers never visited (48.1%) (p<0.001).

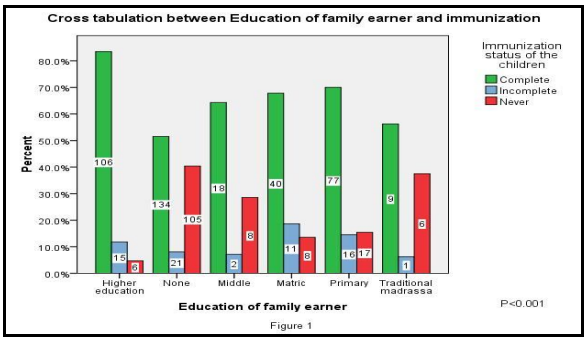

Figure-1: Main earner's education and immunization

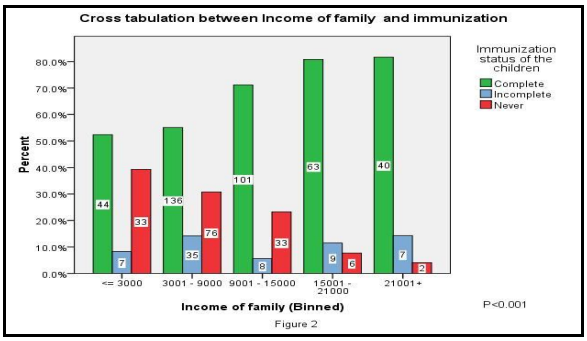

Figure-2: Income of family and immunization

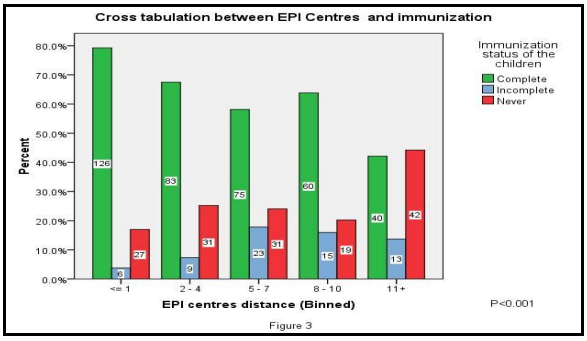

Figure-3: EPI centres distance and immunization

DISCUSSION

The complete vaccination coverage for Hib in Peshawar was found to be 64%. A majority is incompletely vaccinated, thus, making them susceptible. This coverage is far less than the official data of 2009 in WHO record, which reports 85%.[4] In Australia, 95% reduction has been seen in diseases of Hib.[8,9] But this was achieved only after having 90% Hib coverage in children below one year.[10]

Our study revealed that most parents have inadequate knowledge about immunization, and this is the major cause of low coverage.[11] Mothers, who were educated well, had immunized their children as compared to the uneducated ones. Many studies have shown positive effect of maternal knowledge on immunization coverage too.[12,13] But mothers also complained of not being educated well by the EPI staff, that's why many do not consider immunization useful and have wrong ideas regarding immunization[14] indicating the need for health education[9]. It was observed that mothers' knowledge regarding immunization is more important as compared to her education status. Therefore, every health care centre should have a health education section to educate people. Pamphlets should be given free of cost in all health facilities.[15] Electronic media should be involved as its current role is insignificant, especially for Hib.

Economic condition of people was highly affecting the immunization rates. A high immunization rate was found among families with higher income. The relationship between income and immunization may be odd for availing free services like immunization, however, lack of immunization in poor families is due to factors associated with poverty, i.e., poor education, inability to access health centres and lack of time by the caretaker, e.g., in case of labourers. This finding is not uncommon and has been shown in other studies too.[14]

Immunization was high for people in government and private jobs rather than labourers, probably due to income disparities between their jobs and difference in education. Our study points out the dependence between education, income and economic conditions and this has been reported by others too.[16]

There was a sharp decline in coverage rate when the health centre was more than 10 Km away. Many people could not afford to bring their children to centres for immunization due to lack of availability of time, money and social factors, so they suggested that immunization should be done at their homes. But there is also a need for more centres in suitable locations to cover large population. Such recommendation is reported by UNICEF and seen in other parts of Asia too.[17]

The frequency of visits by health workers was reported as often (one visit at least in 3 months) by 40.3% people. But with this, the coverage and health education status of people is very low. To many people home visits are the only chance to immunize children; therefore, they should be increased especially in rural areas. Studies conducted in Nigeria[18], Ghana[19] and Italy[20] also indicated the need of home visits and their positive effect on immunization coverage.

High immunization rates were found in urban areas due to availability and accessibility of centres, hospitals and better socioeconomic conditions. Immunization was low in villages because most of the mothers in villages are either not educated at all or very less educated. Women's mobility is also decreased in rural areas as they have to be accompanied by males, therefore, field visits by the EPI staff and most importantly education of male members of family is required.[21]

No relation was found between sex of the child and immunization, indicating that social and cultural factors regarding sex in immunization don't come to play at such young age. But this relation was not seen in a study conducted about Hepatitis B vaccination in school going children.[22]

There are certain limitations in cross-sectional studies like ours. Many factors in a population are interdependent and have a synergistic effect (e.g., low income, low literacy, lack of information), making it difficult to build a clear relationship, so future approaches to such studies should give importance to the complex interdependent nature of such variables. Studies in urban areas should also consider the high migration rates of the people as they can give misinterpretation about immunization coverage. Our province also holds a significant number of Afghan Refugees which clearly affects the results of the study.

CONCLUSION

Immunization coverage is very low in Peshawar due to lack of awareness about immunization, illiteracy, poor economic conditions, family problems/parents being busy, unavailability of EPI centres and misconceptions regarding immunization. Therefore, if these issues are addressed at, the coverage could be significantly increased.

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