

# A Systematic Review to Identify the Factors for Partial Vaccination in Children

Haseeb Tauseef Bukhari<sup>1</sup>, Muhammad Ibrahim<sup>2</sup>, Kiran Tauseef Bukhari<sup>3</sup>, Humaira Zafar<sup>4</sup>

<sup>1</sup>Medical Student, Yusra Medical & Dental College, Islamabad

<sup>2</sup>Medical Student, Yusra Medical & Dental College, Islamabad

<sup>3</sup>Assistant Prof. of Haematology, Al Nafees Medical College & Hospital, Islamabad

<sup>4</sup>Assistant Prof. of Microbiology, Al Nafees Medical College & Hospital, Islamabad

## Abstract

**The objective of this review article is to identify the factors for partial vaccination in children. This is in view of high morbidity and mortality rates especially in under developed countries. The literature review had highlighted that lack of community education/awareness, socioeconomic programs, public health infrastructure and misbeliefs that vaccines cause disease, are the important factors.**

**Key words:** Awareness, Children, Incomplete vaccination, Reasons.

As per the laid guidelines of World health organization (WHO) and Center for disease control (CDC), vaccination for various preventable diseases is considered as an important revolutionary public health advances of the 20th century.<sup>1,2</sup> Morbidity and mortality rates can be reduced by this cost-effective lifesaving intervention. Everyone from the international, national and community level benefit through improvements in health and life expectancy which positively impacts their social and economic lives.<sup>1-3</sup> The facilitation for easy accessibility to vaccines, as well as the public awareness over the past two to three decades has resulted in a decreased prevalence of vaccine preventable diseases.<sup>4</sup>

According to a published report for the year 2008, almost two million children die globally per annum due to vaccine preventable diseases.<sup>5</sup> Like many developing countries, in Pakistan as well main reason is the failure for adequate vaccination coverage.<sup>5,6</sup>

PILDAT (Pakistan Institute of Legislative Development and Transparency) statistics for the year 2010, narrated that every 11th child i.e 87 per 1000 live births, born in Pakistan dies before the age of 5 years, which is compared to 8- 10%

of all deaths in the developed countries.<sup>7</sup> Around one third of all the under 5 deaths are due to vaccine preventable diseases. Although child mortality has decreased steadily over years, the progress has been slow and Pakistan might miss its Millennium Development Goals (MDGs) 2015 target of reducing under 5 deaths to 52/1000 live births.<sup>8,9</sup> Only 54% of the children in Pakistan receive vaccination, with the EPI coverage rates in KPK (including FATA) (38%) and Baluchistan (16%) being the lowest.<sup>10</sup> As an example, polio, a vaccine preventable disease, has been eradicated the world over except Pakistan and two other countries.<sup>10,11</sup> This is comparable with the immunization coverage in South Asia, which has risen to 50% from 5% in the 1970s, it is an unsettling fact that half the children remain unvaccinated.<sup>12</sup>

Local issues and national policies determine the ground reality of vaccination campaigns in any country, although global endorsement of immunization policies is carried out by international agencies such as WHO and UNICEF.<sup>9,10</sup> EPI (Expanded Program on Immunization), a project of WHO, aims to immunize all the children of the world against vaccine preventable diseases.<sup>5-13</sup> This program, started in 1974 and introduced to Pakistan in 1978, contains vaccines against 6 major vaccine preventable diseases. Reduction of disease burden through reduction in vaccine preventable diseases and achievement of MDGs is the fundamental purpose of this initiative.<sup>10,14</sup> It includes vaccination for pregnant women also against tetanus to protect neonates against neonatal tetanus, which has vertical transmission.<sup>15</sup>

The Government of Pakistan and its development partners have added hepatitis B (Hep B) and Haemophilus influenza type B (Hib) vaccinations to childhood vaccination schedule.<sup>15,16</sup> In 2008 pentavalent (DTP-Hep B-Hib) combination vaccine was introduced replacing separate diphtheria, tetanus and pertussis (DTP3), hepatitis B and Hib vaccine.<sup>17</sup> Now during the first year of life a child only needs five visits and another one in the second year of life to complete the vaccination schedule with four antigens against eight deadly diseases.<sup>18</sup> The global target of the vaccination programme is to give immunization to over 95% of infants

Corresponding Author:  
Dr. Humera Zafar  
Email: dr.humairazfara@yahoo.com

and child-bearing-age females.<sup>19</sup> Inadequate level of vaccination against preventable childhood diseases still remains an important public health problem in Pakistan. The reasons for incomplete vaccination are poorly understood which may significantly vary according to geographical areas.<sup>20</sup> Standard measure of vaccination coverage is the number of children who have received all of their vaccine doses according to their national program irrespective of their ages. To get maximum protection against vaccine preventable diseases, a child should be fully vaccinated within the recommended interval.<sup>19,20</sup>

An understanding of the underpinnings of various factors that influence vaccination coverage is necessary for improvements to take a proper direction. Such factors would comprise of parental beliefs about vaccines, including their awareness of vaccine preventable diseases, information and views about the vaccines themselves. Other aspects to be taken into account are the health infrastructure and practices of health professionals, major facets themselves, which are in turn affected by the attitude and motivation of vaccinators, availability of vaccines, absence of vaccinators, quality and safety of vaccines, and maintenance of cold chain.<sup>11,14,17</sup> Bridging these major issues is the complex relationship between vaccinators and the general public.<sup>19,20</sup>

Lack of vaccination in Pakistan does not have a clearly defined chain of cause and effect. It is a complex effect of many different causes. The government of Pakistan appoints vaccinators to areas whose duties include safe provision of pentavalent as well as other vaccines. They also provide health education to parents, including information about all possible side effects.<sup>21</sup> Other concerns related to health staff include mistrust (34.1%), with 24.7% giving a history of previous unpleasant experience at health facility. Around 14.1% report that health staff was absent, markedly higher than the 5.4% observed in another underdeveloped country.<sup>22</sup> Parents reporting a fear of vaccinators using dirty syringes include 55.3% of those who didn't have their children vaccinated. This implies a general awareness about the hazards of reusing dirty syringes, as well as the need for vaccinators to visibly dispose of needles in front of parents after vaccinations. Parents report a long wait at health facilities (64.7%) compared to 15.2% in another study, suggesting a lack of health facilities per set population, with 14.1% stating that health staff was absent seen in study done in Nigeria and India also. These data imply that the duties of vaccinators are not being carried out as well as they could be, to the extent that parents forego vaccination.<sup>22,23</sup>

Approximately 20.3% of parents stated that they were not told by a doctor or any other health educator to vaccinate their children. Although this is a higher and disturbing number than a study conducted in rural Nigeria.<sup>20</sup> The data further highlights a need to raise public awareness. In another study parental concern about vaccine safety is a major barrier to complete immunization. Around 40% of those parents who have not immunized their children believe

that vaccines cause diseases and/or side effects. Studies done in Nigeria and India,<sup>20,21</sup> and in other underdeveloped countries, reports a close i.e.38.8% for the same variable, while one in America, and Italy, developed countries, reports a markedly low 9.6% and 6.4% respectively.<sup>22,23</sup>

This is speculated to be due to higher awareness of vaccines and vaccine preventable diseases in developed countries.<sup>24,25</sup>

A negative perception of vaccine or immunization safety was a key finding in this study. Many parents also believed that vaccines are expired (27.1%) and thus ineffective and dangerous; also reported in the studies done by Nazish and Abdul Raheem et al.<sup>8,20</sup> If vaccinators do not receive an adequate amount of vaccines for long times, they might understandably resort to using expired ones. This speculation ties in with the fact that 17.6% of parents of those children partially vaccinated or never vaccinated report a shortage of vaccines at health centers. Some parents reported complications from previous vaccines (9.4%), although the figure here seems to be lower than some rurally conducted researches. This could very well be due to rural populations attributing any and all collateral diseases to vaccines, although a 9.4% incidence taken from different populations (urban, rural and urban slums) suggests a high probability of vaccines having practical side effects.<sup>10,22,23</sup>

A majority of middle and high income groups, parents used to complete the vaccinations, while those who fail to have their children vaccinated fall on the low end of the socioeconomic spectrum. Other similar studies have also demonstrated that low household income can be associated with low immunization, one cause being lack of transportation (31.8%) to vaccination sites.<sup>26,27</sup> Where money is an issue, immediate needs take precedence over something that might happen in the future.<sup>27</sup> Some parents say they did not know that vaccines were available free of charge. This implies a false belief that money is required for vaccinations.

Previous studies reveal that educational status also has a high association with high vaccination uptake. This study supports the same assertion. Out of total unvaccinated, 65.6% of parents who never vaccinated their children were either uneducated or had only primary education, while a majority of the parents who had their children vaccinated were educated beyond secondary level. Vaccination education was also found to be lacking.<sup>10,22,29</sup>

## **Conclusion**

Identifying and rectifying the factors responsible for partial vaccination of children will result in reducing the morbidity and mortality rates of vaccine-preventable diseases.

## **Recommendations**

Considering that more than 50% of those who remain unvaccinated touch upon the practices of health workers being a deterrent to vaccination, this study suggests that further light needs to be shed on the matter.

Vaccinators are the main line of propagation of vaccines, as well as education of parents on vaccines. Public opinion varies significantly due to the actions of these individuals. Vaccinators should be properly educated about their duties and the need to further educate parents. GAVI guidelines should be taught and followed.

Public perception, as in many similar studies, comprises of numerous misconceptions about vaccines that may, in some cases, have a basis in fact. The public health infrastructure needs to be updated and competently run. The requirement of awareness campaigns, especially in low socioeconomic areas, is apparent. The best tool for the job would be to utilise existing media platforms (TV, newspapers, radios) to spread awareness. Regional leaders and men of influence, including political leaders as well as religious leaders can be taken onboard to give extra weight to the vaccination mission. An additional measure that could be implemented is that patients could be educated from gynaecology and paediatric wards about the importance of vaccinations. Similarly, the village “dais” could be brought on the team to spread awareness.

## References

- Centre for Disease Control and Prevention (CDC). Immunization information system progress: United States, 2004. *MMWR Morb Mortal Wkly Rep.* 2005;54 (1):1156-57.
- Daniel AS, Jason WS, Stephen T. Public Health and the Politics of School Immunization Requirements in USA. *Immunol.* 2002;40 (3):849-66.
- World Health Organization. The “high-risk” approach: the WHO recommended strategy to accelerate elimination of neonatal tetanus. *Wkly Epidemiol Rec.* 1996; 71:33-36.
- Michel Z, Jos V, Debra K, Bjorn M, Prashant Y, Antwi A, Heidi L. The imperative for stronger vaccine supply and logistics systems. *Vaccine.* 2013; 73(2): 80. DOI: 10.1016/j.vaccine.2012.11.036.
- Nawab KM, Mazhar A, Babar TS. Is Expanded Program on Immunization doing enough? Viewpoint of Health workers and Managers in Sindh, Pakistan. *JPMA.* 2008; 58(1):64.
- Aiken KD, Clark SJ, Reasons hospitals give for not offering hepatitis B vaccine to low-risk newborns. *Clin Pediatr.* 2002; 41(9): 681-6.
- Immunization in Pakistan. PILDAT, 2010. [www.pildat.org/publications/publication/.../ImmunizationinPakistan.pdf](http://www.pildat.org/publications/publication/.../ImmunizationinPakistan.pdf)
- Nazish S, Altaf K, Nighat N, Azfar AS. Assessment of EPI (Expanded program of immunization) vaccine coverage in a peri-urban area. *JPMA.* 57 (8):391:2007.
- Masud, T, Navaratne KV. The Expanded Program on Immunization in Pakistan: Recommendations for improving performance. HNP Discussion Paper, World Bank 2012. [worldbank.org/.../Resources/281627.../EPIinPakistan.pdf](http://worldbank.org/.../Resources/281627.../EPIinPakistan.pdf)
- Naeem M, Adil M, Abbas SH, Khan MZ, Naz SM, Khan A. Coverage and causes of missed oral polio vaccine in urban and rural areas of Peshawar. *J Ayub Med Coll Abot.* 2011; 23(4): 98-102.
- Steven M, Neil A, Noor MA, Khalid O, José Legorreta S. Anne Cockcroft, Equity and vaccine uptake: a cross-sectional study of measles vaccination in Lasbela District, Pakistan. *BMC Int. Health & Human Rights.* 2009; 9(1):7. doi:10.1186/1472-698X-9-S1-S7
- Federal Bureau of Statistics [Pakistan], 2012-13. Pakistan Demographic and Health Survey, Islamabad: National Institute of Population Studies (NIPS). 2013. <https://dhsprogram.com/pubs/pdf/FR290/FR290.pdf>
- Tayyab M, Kumari VN. The Expanded Program on Immunization in Pakistan Recommendations for improving performance, Health, Nutrition and Population (HNP) Discussion Paper, World Bank, Islamabad, Pakistan, 2012. [siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/EPIinPakistan.pdf](http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/EPIinPakistan.pdf)
- An Assessment of Vaccine Supply Chain and Logistics Systems in Thailand, September 2011, PATH, World Health Organization, Health Systems Research Institute, and Mahidol University. [www.path.org/publications/files/TS\\_opt\\_vac\\_sup\\_thai.pdf](http://www.path.org/publications/files/TS_opt_vac_sup_thai.pdf)
- Asfandyar S, Bushra I, Anabia E, Maria R, Hiba AS, Hina AU, et al. Reasons for non-vaccination in pediatric patients visiting tertiary care centers in a polio-prone Country. *Archives Public Health.* 2013; 71:19. doi: 10.1186/0778-7367-71-19.
- Sanderson C, Masud T, Galayda V. Pakistan New Vaccines Decision-Making Exercise, 2010(2). [worldbank.org/.../281627.../VaccineIntroPakistan.pdf](http://worldbank.org/.../281627.../VaccineIntroPakistan.pdf)
- WHO EMRO expanded program of immunization. <http://www.emro.who.int/pak/programmes/expanded-programme-on-immunization.html>.
- Health department, Punjab government. <http://health.punjab.gov.pk/?q=epi>
- Pakistan vaccinators salaries. [www.gavi.org/Library/News/Statements/2015/Pakistan-vaccinators--salaries/](http://www.gavi.org/Library/News/Statements/2015/Pakistan-vaccinators--salaries/)
- Abdulraheem IS, Onajole AT, Jimoh AA, Oladipo AR. Reasons for incomplete vaccination and factors for missed opportunities among rural Nigerian children. *J Public Health Epidemiol.* 2011; 3(4): 194-203.
- Ingale A, Dixit JV, Deshpande D. Reasons behind incomplete Immunization: A cross sectional study at Urban Health Centre of Government Medical College, Aurangabad. *Natl J Community Med.* 2013; 4(2): 353-356.
- Luman ET, Barker LE, Shaw KM, McCauley MM, Buehler JW. Timeliness of childhood vaccinations in the United States. *JAMA.* 2005; 293:1204-1211. DOI: 1204-1211.10.1001/jama.293.10.1204 PubMed: 15755943
- Angelillo IF, Ricciardi G, Rossi P, Pantisano P, Langiano E, Pavia M. Mothers and vaccination: knowledge, attitudes, and behaviour in Italy. [www.who.int/bulletin/archives/77\(3\)224.pdf](http://www.who.int/bulletin/archives/77(3)224.pdf)
- Klevens RM, Luman ET. US children living in and near poverty: risk of vaccine-preventable diseases. *Am J Prev Med.* 2001; 20 (4): 55- 60.
- Bates AS, Wolinsky FD. Personal, financial, and structural barriers to immunization in socioeconomically disadvantaged urban children. *Pediatrics.* 1998; 101 (41): 591-6.
- Carr J, Martin M, Clements C, Ritchie P (2000). Behavioural Factors in Immunization. In *Behavioural Science Learning Modules.* World Health Organization Geneva, 1-10. [e:\[www.academicjournals.org/.../article/article1379427155\\_Abdulraheem%20et%20al.pdf](http://www.academicjournals.org/.../article/article1379427155_Abdulraheem%20et%20al.pdf)
- Glauber JH. The immunization delivery effectiveness assessment score: a better immunization measure? *Pediatrics.* 2003; 112: 39-45. doi: 10.1542/peds.112.1.e39.
- Zimmerman RK, Ahwesh ER, Mieczkowski TA, Janosky JE, Barker DW. Influence of family functioning and income on vaccination in inner-city health centers, *Arch Pediatr Adolesc Med.* 1996; 150:1054-61.
- James AT, Paul MD, Dennis AB, Hendricks JW, Richard C, Alison BB. Association between Parents’ Preferences and Perceptions of Barriers to Vaccination and the Immunization Status of Their Children: A Study from Pediatric Research in Office Settings and the National Medical Association. [www.pediatrics.aappublications.org/content/110/6/1110](http://www.pediatrics.aappublications.org/content/110/6/1110)