CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.1462011

Available online at: http://www.iajps.com Research Article

HEALTH CARE PROVISION FACTORS ASSOCIATED WITH CHILD IMMUNIZATION COVERAGE

Dr. Urva Khan, Dr. Azka Naeem, Dr. Hira Babar, Dr. Hussam Ali, Dr. Muhammad Usman Shahid
Mayo Hospital, Lahore

Abstract:
Immunization is a process whereby a person is made immune to an infectious disease, by administration of a vaccine (weakened or killed organisms)
Objective: *To determine health care provision factors associated with child immunization coverage in Pakistan.*
Design: *Cross-sectional study*
Settings: *Pediatrics ward of Mayo Hospital Lahore.*
Study period: *Three months after the approval of synopsis.*
Subjects and Methods: *A total of 100 subjects were interviewed in this cross-sectional study. Selection was made on laid down criteria after taking due consent. Interviews were conducted through a pretested questionnaire. Data was collected, compiled and analyzed through SPSS version 20. The demographic characteristics were discussed through frequency tables.*
Results: *In this cross-sectional study, 87% of women had all of their children vaccinated and 13% mothers were unable to get all of their children vaccinated completely. Out of these 13% mothers, children of 3% mothers suffered from diseases which contraindicated vaccination and remaining 10% had non-medical reasons both personal (9%) and social (1%). Family support, role of media and socio-economic status strongly affected immunization coverage.*
Conclusion: *Information transfer between mother and health care workers, regular visiting of the health care workers to houses, access to media, decreased waiting time at health care facility, less distance from health care facility, provision of antenatal care, hospital delivery of the child, family support, higher wealth index, father's professional job, lower maternal age and less number of children were associated with higher rates of immunization.*
Key words: *Immunization, Expanded Programme on Immunization, Health care provision factors.*

***Corresponding Author:**
Dr. Urva Khan,
Mayo Hospital,
Lahore

QR code

Please cite this article in press Urva Khan et al., ***Health Care Provision Factors Associated With Child Immunization Coverage.,*** *Indo Am. J. P. Sci, 2018; 05(10).*

INTRODUCTION:

Statistical analysis shows that upto 15% deaths of children under 5 years of age contribute to 50% of overall mortalities in Pakistan till date. [1] Immunization, being a process of rendering people immune to infectious diseases, [2] plays a key role in defining these mortality rates. Although implementation of Expanded Programme on Immunization, aglobal disease prevention program initiated by the WHO for vaccinating children and reducing mortality from EPI Target Infectious Diseases, [3]in Pakistan since 1974 has decreased under 5 mortalities yet these are quite high as compared to developed countries. Our present day need is to promote health care, which includes the diagnosis, treatment and prevention of diseaseand impairments, [4] and immunization in order to prevent under 5 mortalities. A study in Kabul in 2009 stated that complete immunization was associated with close proximity to health facility, attendance at antenatal care, outreach contact in rural areas and socioeconomic factors.[5] A study conducted in 2011 in Nigeria stated that 2/3 of children were not fully immunized due to missed opportunity or parents' objection to vaccine safety.[6] In a study conducted in 1996 in Baltimore 75% of children had at least one missed opportunity of immunization due to morbidity.[7] In a study in 2013 in Uganda, mother's education, exposure to media and maternal healthcare utilization affected immunization.[8] As per survey in 2010 in Dili, large family size, conflicting priorities, lack of support from husband and family were associated with decreased immunization.[9] A study in Pakistan in 2007 stated that 66% of children were incompletely immunized due to father's occupation as a manual worker and birth at home.[10] In a study conducted in Ethiopia in 2014, low rates of immunization were associated with lack of women's decision making autonomy and increased number of under 5 children in house.[11] In a survey in Greece in 2010 stated that the major factor affecting the provision of immunization was maternal age more than 30 years.[12] A study of Bangladesh in 2010 shows high wealth index to be associated with increased immunization[13] A study in 2007 in India relates the health worker density to coverage of vaccinations.[14] In an article in 2011 in Peshawar, Pakistan the factors associatedwere wrong perceptions regarding safety of vaccine, load shedding and lack of transport facility.[15] In 2008, an article of Karachi stated that the main factors involved in low rates of immunization were lack of incentives, restricted mobility of health workers, lack of interest of doctors and staff and flaws in monitoring of regular vaccination.[16] In 2005, a study in Nigeria cited that mothers do not take their children for immunization due to long waiting period with no vaccines , absence of service providers or disrespectful providers.[17]

This study is conducted to critically analyze the factors and predictors of compliance and acceptance of complete immunization coverage of children in Pakistan and to discuss the parameters not covered in previous studies to ensure complete and effective implementation of 100% immunization in Pakistan for prevention of infectious diseases in children.

MATERIALS AND METHODS:

A cross-sectional study was conducted to find out the health care provision factors associated with child immunization coverage in children visiting Pediatrics Ward of Mayo Hospital, Lahore during 3 months after the approval of our synopsis. The subjects questioned by all our team members were willing and co-operative mothers of children less than 2 years of age provided mother and/or children not suffering from any co-morbidity. Four questionnaires were dropped because of increased age of children of interviewed mothers. Instrument used for data collection was a pre tested questionnaire concerning demographic profile, child immunization history, and certain factors to be assessed, like socioeconomic status, maternal age, father's employment, family's support, distance of health facility centre, waiting time at health facility center, role of media, information transfer between heath personnel and mothers, safety concerns, number and ages of children, antenatal care, availability and proper storage of vaccine and attitude of caregivers, while keeping all ethical and social considerations in mind. Data entry and analysis was done by statistical software SPSS version 20.

RESULTS:

According to our study, 87% of women had all of their children vaccinated and 13% mothers were unable to get all of their children vaccinated completely. Out of these 13% mothers, children of 3% mothers suffered from contraindicating disease and remaining 10% had non-medical reasons both personal (9%) and social (1%). Variables strongly affecting our study were; family support, role of media, husband's occupation, maternal age, socioeonomic status and primary education of mothers. Detailed frequency tables describing demographic characteristics are as discussed as follows:

FACTORS	FREQUENCY	PERCENTAGE
Maternal education		
A) None	44	44
B) Primary or above	25	25
C) Matric or above	31	31
Socioeconomic status		
A) Income below Rs.10,000	50	50
B) Income Above Rs.10,000	50	50
Current Maternal age		
A) Below 30 years	45	45
B) 30 years or above	55	55
Maternal age at birth of first child	88	88
A) Below 25 years	12	12
B) 25 years or above	92	92
Maternal age at birth of last child	8	8
A) Below 35 years		
B) 35 or above		
Maternal employment		
A) Housewife	88	88
B) Employed	12	12
Husband employment		
A) None	2	2
B) Professional	15	15
C) Non-professional	83	83
▪ Labourer	53	53
▪ Mechanical job	30	30
Awareness		
A) All children are not immunized	6	6
B) Some are immunized	7	7
C) All children are immunized	87	87

Reason of lack of immunization A) Medical reason (contraindicating disease) B) Personal reason C) Social reason	 3 9 1	 3 9 1
Factors	Frequency	percentage
Child delivery A) At home B) At hospital	 39 61	 39 61
First Vaccination A) At birth B) Later on	 62 32	 62 32
Number of children A) Less than 5 or 5 B) More than 5 Ages of children A) Less than 10 years or 10 years B) More than 10 years	 79 21 73 27	 79 21 73 27
Wealth Index A) Less than 10 people in family B) 10 or more than 10 people in family C) Less than 2 or 2 rooms in house D) More than 2 rooms in house	 63 36 45 54	 63 36 45 54
Trust in Government A) Government vaccination centre B) Private vaccination centre	 83 11	 83 11

Antenatal care A) No B) Yes C) Tetanus toxoid injections during pregnancy	 28 71 70	 28 71 70
Health facility distance A) less than 5km B) more than 5 km C) People not using any transport D) People using transport	 74 21 67 27	 74 21 67 27
Factors	Frequency	percentage
Waiting time at health facility centre A) Less than 2 hours B) More than two hours	 89 5	 89 5
Availability of vaccine at centre A) Available all the time B) Not available all the time C) Missed dose due to lack of vaccine	 90 4 4	 90 4 4
Health worker density according to official requirements A) No B) Yes	 8 86	 8 86
Vaccine safety concern A) No B) Yes Adverse reaction to vaccine A) No B) Yes	 58 40 79 19	 58 40 79 19

Family support A) No B) Yes	 12 86	 12 86
Missed dose A) No B) Due to any disease C) Due to personal problems	 64 12 17	 64 12 17
Attitude of caregivers A) Co-operative B) Satisfactory C) Vigilant	 91 91 93	 91 91 93
factors	frequency	percentage
Visit by health worker A) No B) At scheduled times C) Not at scheduled times	 4 94 1	 4 94 1
Role of media in immunization awareness A) Electronic or print media B) Doctors or relatives	 16 80	 16 80
Effect of load shedding on Immunization A) No B) Yes	 92 3	 92 3
Proper storage of vaccine A) Yes B) No	 94 0	 94 0
Information transfer between health personnel and mothers A) No B) Yes	 10 84	 10 84

DISCUSSION:

Immunization of children below 2 years of age is a worth discussing issue in Pakistan due to prevalence of vaccine preventable infectious diseases in our society. So it is important to discuss the factors associated with child immunization coverage that include both governmental and personal factors. This study attempts to point out shortcomings in immunization process, to ensure 100% immunization in Pakistan. We discussed 27 different factors affecting immunization as per previously published studies. Family support was strongly associated with child immunization coverage in our study. 86% of mothers had their family's support and had

maintained vaccination cards while 12% who did not have their family's support did not get their children vaccinated. These results were opposed by the study of Donna Strobino, Virginia Keane, Elizabeth Holt, Nancy Hughart, Bernard Guyer which stated that parental attitudes and family support do not explain under immunization.[18] Husband's employment quite strongly affected immunization of children as out of 83% non-professional men, labourers which constitute 53% of our case group have less percentage of children immunized due to increased working hours. While the remaining 30% of men with mechanical jobs and 15% professionally employed men had significantly high immunization rates. The study of J.C. Okoroa, N.C. Ojinnakab, A.N. Ikefunab and N.E. Onyenwec of Nigeria supported our result that immunization coverage of children whose fathers are professional employees is relatively much higher than the immunization coverage of those whose father are either unemployed or unskilled workers.[19] On the contrary, our result was opposed by the study of Elias Legesseand, WorkuDechasa of Ethiopia which stated that factors associated with full immunization were fatherbeing a farmer, having household family income greater than 1000 ETB and mothers' with sufficient knowledge on immunization.[20]

Role of media was one of the strongest factor that affected immunization of children. 80% mothers got information of vaccination from their doctors and relatives and 16% from electronic and print media which accounted for the 87% immunization rate in our case group. A study of S. Zimicki, R.C. Hornik,C.C. Verzosa in Philippines in 1990 [21] and that of Charles S. Wiysonge, Olalekan A. Uthman , Peter M. Ndumbe of Africa[22] supported our results that high level of access to media, high-quality radio and television advertisements and a mass communication campaign can significantly improve vaccination coverage.

In our study, husband's income representing socioeconomic status was a significant factor affecting immunization as 50% of women with husband's monthly income more than Rs.10,000 have much more immunization rate than the other group. This was supported by the study ofAnne R. Pebley, Noreen Goldman, Germán Rodríguez of Guatemala[23] and also by the study of Ghulam Yasin, Asim Iqbal Qureshi, Muhammad Aslam and SafinaNaz of Multan[24] which states that females, whose husbands were educated and whose annual income was high, had higher percentage of vaccination of themselves and their babies. This was contradicted by the study of Miguel Lanaspaa, Reyes Balcellsa, CharfudinSacoor in Taninga,Mozambique stating that vaccination coverage in Taninga was very high, despite the low socio-economic status of the population.[25]

Our study indicated that health facility distance from the locality greatly affected the immunization coverage. 74% of mothers were subjected to less than 5 km of distance from health facility 67% of mothers did not use any transport, hence, immunization coverage among these mothers was quite high. The study of Elisabeth Dowling Root, Marilla Lucero and Hanna Nohynek supported our results which stated that distance to health services negatively affects local level vaccine efficacy.[26] Similarly, Waiting time greatly affected immunization coverage in our study. 89% of mothers did not have to wait more than 2 hours and due to increased compliance child immunization coverage was quite high among these mothers. This was supported by the study of A L Morrow, H D Lakkis and J C Bowers of Virginia in 1998. [27]

Maternal qualification was not a significant factor affecting immunization of case group children because 69% of women we interviewed had below matric qualification and only 31% women had educational status of matriculation or above. But, out of these 69% women, 25% with education till primary or middle tend to have much more child immunization rates. Our result was supported by the study of B. A. Abuya, E. O. Onsomu, J. K. Kimani, D. Moore of Kenya in 2010 which stated; children born tomothers with only a primary education were 2.17 timesmore likely to be fully immunized compared to thosewhose mothers lacked any formal education.[28] Whereas, it was opposed by the study of Sam S. Kim, Jemima A. Frimpong, Patrick A. Rivers and Jennie J. Kronenfeld that low maternal educational levels and low socioeconomic status were associated with high 4:3:1:3 series completion rates.[29]

According to our study, maternal age played a very important role as mothers who were currently less than 30 years old quite effectively maintained their child's vaccination cards but majority out of 88% mothers who were less than 25 years old at the time of first child's birth did not have their first child immunized due to inexperience and lack of guidance.This was supported by study of Nancy A. Otienoa, Bryan O. Nyawandaa, Allan Audia of Kenya which stated that Children with mothers aged 25–34 and 35–44 years were more likely to be vaccinated than children with mothers less than 25 years of age.[30] This was opposed by danial A salman, Philip J Smith,William K Y Pan, Ann Mary Navan, Saad B Omer, Neal A Haslay who said that

associations between maternal age and preschool immunization coverage are unclear.[31]

Our survey indicated that 61% of mothers gave birth to their children in hospitalsand 62% of mothers got their first vaccination of children at birth (including 61% hospital delivered and 39% home delivered children) and had more maintained vaccination cards. It also showed that 71% of mothers who registered for antenatal care programs had higher immunization coverage rates, than 28% mothers without any antenatal care registration, due to surveillance of doctors. These results were supported by the study of Jin Young Choi, Sang Hyop Lee which stated that prenatal care serves as a trigger in increasing the chances for access to subsequent health care services in India.[32] In our study, 64% of mothers properly maintained their children's vaccination cards without any missed doses while 12% mothers had to miss the scheduled dose due to co-morbidity of child and 17% due to personal problems, like conveyance problems and leading to decreased immunization coverage. The study of James A. Taylor, Paul M. Darden and Dennis A. Brooks opposed our results and stated thatParental preferences regarding vaccination practices designed to reduce missed opportunities were not associated with the immunization status of their children. Parental perceptions of barriers to vaccination do not seem to be a significant cause of underimmunization. [33]
Information transfer between mothers and health personnel was an important factor determining compliance. 84% mothers who assured proper information transfer between themselves and health personnel indicated increased compliance of immunization than the remaining 10%. Our result was supported by the study conducted by Ahmet Topuzoglu, Pinar Ay, SeyhanHidiroglu, YucelGurbuz of turkey in 2006 which stated; lack of effective communication and information transfer between the health personnel and the mothers formed an important obstacle. [34]

Visit of health care workers in houses at scheduled times was also an important factor determining compliance of vaccination. 94% Mothers of our case group stated that vaccinators visited their house on scheduled times and no missed doses were encountered while 4% denied it and had missed doses. This result was supported by the study of Soma Chowdhury Biswas, Abu Darda and FaisulAlam conducted in Bangladesh showing that out of different factors like education, occupation, economic condition, mother's age at birth, sex of child, mother's TT immunization acceptance, mother's health facility visit, health worker's visit to mothers, the most important variable identified is the health worker's visit to mothers.[35] 79% of mothers had less than 5 children and 27% of mothers had majority of children above 10 years of age. Both the groups had higher immunization rates than 21% of mothers having more than 5 children and 73% of mothers who had majority of children less than 10 years of age. This was supported by Elizabeth T. Luman, MS, Mary Mason McCauley, MTSC, Abigail Shefer, MD,Susan Y. Chu who stated in their study thatfactors most strongly associated with undervaccination included mothers having multiple children.[36]

In our study, most of the mothers, 87%, were unemployed accounting for comparatively higher i.e. 87% of immunization status as compared to 13% of employed mothers. The study of AkinolaAyoolaFatiregun, , Anselm O. Okoro supported our results as it indicated maternal unemployment and fewer than 3 children to be the determinants of complete immunization.[37] And our result was contradicted by the study of Miranda Mindlin, Richard Jenkins, Catherine Law stated in their study that vaccination uptake appeared at least as good or better for children of employed as unemployed mothers.[38]
Availability of vaccine in facility centres was not an issue as per mothers of our case group as 90% of mothers stated all time availability of vaccine while just 4% of mothers had to miss scheduled dose due to lack of vaccine. Stokley S, Santoli JM, Willis B, Kelley V, Vargas-Rosales A, Rodewald LE also stated in their study that vaccine shortages affected immunization programs' and providers' ability to administer vaccines in a timely manner.[39]
Other factors like marital status of mothers, their residence, ethnic disparity, trust in government, vaccinator's attitude, effect of load shedding, proper storage of vaccine and vaccine safety concern did not significantly affect immunization coverage; contradicting the study of Michael Favin, Robert Steinglas and Rebecca Fields which indicated that main reasons of under immunization of children were access to services, health staff attitudes and practices, reliability of services, false contraindications, parents' practical knowledge of vaccination, fear of side effects, conflicting priorities and parental beliefs.[40]

CONCLUSION:

Higher rates of immunization were associated with information transfer between mother and health care workers, regular visiting of the health care workers to houses, access to media, decreased waiting time at health care facility, less distance from health care

facility, provision of antenatal care, hospital delivery of the child, family support, higher wealth index, father's professional job, lower maternal age and less number of children. While other factors like marital status of mothers, residence, ethnic disparity, trust in government, vaccinator's attitude, effect of load shedding, proper storage of vaccine and vaccine safety concern did not significantly affect immunization coverage.

REFERENCES:

1. Ahmed H. Immunization in Pakistan. Islamabad: Pildat; May 2010.
2. Who.int. WHO | Immunization [Internet]. 2015 [cited 22 May 2015]. Available from: http://www.who.int/topics/immunization/en/.
3. Wikipedia. Expanded Program on Immunization [Internet]. 2015 [cited 22 May 2015]. Available from: http://en.wikipedia.org/wiki/Expanded_Program_on_Immunization.
4. Wikipedia. Health care [Internet]. 2015 [cited 22 May 2015]. Available from: http://en.wikipedia.org/wiki/Health_care.
5. Hemat S, Takano T, Kizuki M, Mashal T. Health-care provision factors associated with child immunization coverage in a city centre and a rural area in Kabul, Afghanistan. Vaccine. 2009;27(21):2823-2829.
6. Abdulraheem I S , Onajole A T , Jimoh A A G, Oladipo A R.Reasons for incomplete vaccination and factors for missed opportunities among rural Nigerian children. Journal of Public Health and Epidemiology. 2011;3(4):194_203.
7. Holt E, Guyer B, Hughart N, Keane V, Vivier P, Ross A, Strobino D.The contribution of missed opportunities to childhood underimmunization in Baltimore.pediatrics. 1996;97(4):474_480.
8. Bbaale E. Factors Influencing Childhood Immunization in Uganda. J Health PopulNutr. 2013;31(1).
9. Amin R, De Oliveira T, Da Cunha M, Brown T, Favin M, Cappelier K. Factors limiting immunization coverage in urban Dili, Timor-Leste. Global Health: Science and Practice. 2013;1(3):417-427.
10. Bugvi A, Rahat R, Zakar R, Zakar M, Fischer F, Nasrullah M et al. Factors associated with non-utilization of child immunization in Pakistan: evidence from the Demographic and Health Survey 2006-07. BMC Public Health. 2014;14(1):232.
11. Wado Y, Afework M, Hindin M. Childhood vaccination in rural southwestern Ethiopia: the nexus with demographic factors and women's autonomy. Pan African Medical Journal. 2014;17.
12. Danis K, Georgakopoulou T, Stavrou T, Laggas D, Panagiotopoulos T. Socioeconomic factors play a more important role in childhood vaccination coverage than parental perceptions: a cross-sectional study in Greece. Vaccine. 2010;28(7):1861-1869.
13. Rahman M, Obaida-Nasrin S. Factors affecting acceptance of complete immunization coverage of children under five years in rural Bangladesh. SaludPública de México. 2010;52(2).
14. Anand S, Bärnighausen T. Health workers and vaccination coverage in developing countries: an econometric analysis. The Lancet. 2007;369(9569):1277-1285.
15. Naeem M, Adil M, Abbas S, Ziaul Islam M. Coverage and Causes of Missed Oral Polio Vaccine in Urban and Rural Areas of Peshawar [Internet]. ayubmed.edu.pk. 2011 [cited 22 May 2015]. Available from: http://www.ayubmed.edu.pk/JAMC/23-4/Naeem.pdf.
16. Mangrio N, Alam M, Shaikh B. Is Expanded Programme on Immunization doing enough? Viewpoint of Health workers and Managers in Sindh, Pakistan. J pak med association. 2008;58.
17. Abdulraheem I S. , Onajole A T , Jimoh A A G. and Oladipo A. R. Reasons for incomplete vaccination and factors for missed opportunities among rural Nigerian children. Journal of Public Health and Epidemiology.2011 ;3(4):194-203.
18. Strobino D, Keane V, Holt E, Hughart N, Guyer B. Parental Attitudes Do Not Explain Underimmunization. PEDIATRICS. 1996;98(6):1076-1083.
19. Sciencedirect.com. Sociodemographic influences on immunization of children with chronic neurological disorders in Enugu, Nigeria [Internet]. 2015 [cited 16 June 2015]. Available from: http://www.sciencedirect.com/science/article/pii/S1879437814000230
20. Legesse E, Dechasa W. An assessment of child immunization coverage and its determinants in Sinana District, Southeast Ethiopia.BMC Pediatrics. 2015;15(1).
21. Improving vaccination coverage in urban areas through a health communication campaign: the 1990 Philippine experience. Bull World Health Organ. 1994;72(3):409-422.
22. Wiysonge C, Uthman O, Ndumbe P, Hussey G. Individual and Contextual Factors Associated with Low Childhood Immunisation Coverage in Sub-Saharan Africa: A Multilevel Analysis. PLoS ONE. 2012;7(5):e37905.
23. Pebley A, Goldman N, Rodriguez G. Prenatal and Delivery Care and Childhood Immunization

in Guatemala: Do Family and Community Matter?.Demography. 1996;33(2):231.
24. Socio-economic factors affecting the trend towards vaccination of mother and infants in multan city.Journal of Research (Science), BahauddinZakariya University, Multan, Pakistan. 2004;15(1):107-112.
25. Lanaspa M, Balcells R, Sacoor C, Nhama A, Aponte J, Bassat Q. The performance of the expanded programme on immunization in a rural area of Mozambique.ActaTropica. 2015;149:262-266.
26. Root E, Lucero M, Nohynek H, Anthamatten P, Thomas D, Tallo V et al. Distance to health services affects local-level vaccine efficacy for pneumococcal conjugate vaccine (PCV) among rural Filipino children. Proceedings of the National Academy of Sciences. 2014;111(9):3520-3525.
27. Morrow A, Rosenthal J, Lakkis H, Bowers J, Butterfoss F, Crews R et al. A Population-based Study of Access to Immunization Among Urban Virginia Children Served By Public, Private, and Military Health Care Systems. PEDIATRICS. 1998;101(2):e5-e5.
28. Abuya B, Onsomu E, Kimani J, Moore D. Influence of Maternal Education on Child Immunization and Stunting in Kenya. Maternal and Child Health Journal. 2010;15(8):1389-1399.
29. Kim S, Frimpong J, Rivers P, Kronenfeld J. Effects of Maternal and Provider Characteristics on Up-to-Date Immunization Status of Children Aged 19 to 35 Months. Am J Public Health. 2007;97(2):259-266.
30. Otieno A N, Nyawanda B, Audi A, Emukule G, Lebo E, Bigogo G. Demographic, socio-economic and geographic determinants of seasonal influenza vaccine uptake in rural western Kenya, 2011 [Internet]. Sciencedirect.com. 2015 [cited 16 June 2015]. Available from: http://www.sciencedirect.com/science/article/pii/S0264410X13014989
31. Salmon D, Smith P, Pan W, Navar A, Omer S, Halsey N. Disparities in preschool immunization coverage associated with maternal age. Human Vaccines. 2009;5(8):557-561.
32. Choi J, Lee S. Does prenatal care increase access to child immunization? Gender bias among children in India.Social Science & Medicine. 2006;63(1):107-117.
33. Taylor J, Darden P, Brooks D, Hendricks J, Wasserman R, Bocian A. 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. PEDIATRICS. 2002;110(6):1110-1116.
34. Topuzoglu A, Ay P, Hidiroglu S, Gurbuz Y. The barriers against childhood immunizations: a qualitative research among socio-economically disadvantaged mothers. The European Journal of Public Health. 2007;17(4):348-352.
35. Chowdhury S, Darda A, Alam F. Factors Affecting Childhood Immunisation in Bangladesh [Internet]. Academia.edu. 2015 [cited 16 August 2015]. Available from: http://www.academia.edu/5251571/Factors_Affecting_Childhood_Immunisation_in_Bangladesh.
36. Luman E, McCauley M, Shefer A, Chu S. Maternal Characteristics Associated With Vaccination of Young Children. Pediatrics [Internet]. 2003 [cited 15 June 2015];111(Supplement 1):1215-1218. Available from: http://pediatrics.aappublications.org/content/111/Supplement_1/1215.short
37. Fatiregun A, Okoro A. Maternal determinants of complete child immunization among children aged 12–23 months in a southern district of Nigeria. Vaccine. 2012;30(4):730-736.
38. Mindlin M, Jenkins R, Law C. Maternal employment and indicators of child health: a systematic review in pre-school children in OECD countries. Journal of Epidemiology & Community Health [Internet]. 2009 [cited 14 June 2015];63(5):340-350. Available from: http://jech.bmj.com/content/early/2009/02/04/jech.2008.077073?jech.2008.077073v1
39. Stokley S, Santoli J, Willis B, Kelley V, Vargas-Rosales A, Rodewald L. Impact of vaccine shortages on immunization programs and providers. American Journal of Preventive Medicine. 2004;26(1):15-21.
40. Favin M, Steinglass R, Fields R, Banerjee K, Sawhney M. Why children are not vaccinated: a review of the grey literature. International Health. 2012;4(4):229-238.