# Relationship between Child Immunization and Household Socio-Demographic Characteristic in Pakistan

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**Abstract**

The purpose of this study is to document the child immunization and its association with the household, socio demographic characteristics which effect child immunization of children aged 12 to 23 months Pakistan.The analysis in this study is based on the Household level data taken from the Pakistan Social and Living Standard Measurement Survey (PSLM) 2010 - 2011 carried out by the Federal Bureau of Statistic, Government of Pakistan. Chi-square test and logistic regression is used for the analysis of data. The results indicate that in case of child immunization, not only child s age, but also child's gender,resident of the child and he/she parents education, household income and family size plays a significant role. The gender differentials are more prominent in rural areas where negative impact on child immunization also exists due to the higher income inequality, among, household.The analysis of socio demographic characteristic provides the researchers, educationists and policy makers with a critical review of the issues at hand, so that appropriate policies and programmers can be designed for increasing child immunization in the country.

**Keywords:** Child Immunization, householdsocio-demographic characteristic, Logistic regression, Chi Square, Pakistan

**Introduction**

The most useful and the safest intervention in Public Health is the immunization. It is an estimated that three million lives can be saved by vaccination as it prevent diseases. Measles was the leading cause of death in year 2000 in Latin America. During that time 777,000 death occurred due to Measles whereas and 2 million disabilities have also been reported. Later Latin America and other industrial countries built resistance to 90 percent against this disease. It has also been observed that Middle East and North Africa also showed pertinent results against eradication of this disease whereas East Pacific needs to do more work on it to meet challenges against measles (Adeyinke et.al 200**0)**.Different countries have different vaccination schedule.Pakistan is also following a schedule, related vaccination and implementation of this schedule is compulsory in the country. Polio is a disease which causes paralysis and vaccination process for it is given like first at the age of 2months than 4 months and than 6 months. Same pattern is being followed and recommended for Tetanus PantsuitsDipteri to prevent tuberculosis. The vaccination pattern against Chorinebacterium diphtheria bacteria is also 2, 4, and 6 months. This bacterium is present at the respiratory track in the nasal mucous membrane. DPT or Tetanus PentusisDipterous vaccination is being used against it. One of the vaccination known as Hepatitis B vaccination is also very much important to prevent liver related diseases like acute liver inflammation etc. Vaccines against measles are recommended to give at the age of the 9 months. meningitis, pneumonia (pneumonia) and epiglottises can be prevented  by vaccine of Haemophilusinfluenza type B (Hib) or B. Child can be protected from diphtheria and tetanus: for at least 10 years and there is possibility vaccination effects could prevent children from whooping cough: for at least 3 years more than this time. There is possibility that even vaccinated person could get disease later in life but it will not be as severe as non vaccinated person will face. The vaccinated child is protected from polio throughout life and measles.

According to World Health Organization, immunization has been found the most cost effective method for promotion of child health. It is playing a significant role in term of reducing cost related treatment of measles for provision of healthy childhood and minimizing poverty and sufferings. It is the primary objective of the Government Health Sector to increase reporting related immunization, as it is very difficult task to conduct household survey because mostly parents do not pay attention towards their children for timely Immunization due to different reasons. The reasons involve process of the immunization, lack of information about health cards, half information, forgetting immunization dates, underestimating the importance of immunization and confusion due to different type of immunization. Immunization is more protected and the most effective health to children and its reducing child mortality, morbidity and disability. It can be more protected for infants and cover child protection child abnormality and disability (Siddiqi et. al. 2005).

Directorate General Health Services, Government of the Punjab, 2009 found  from World Health Organization

Statistics Quarterly, 1991 statistics, which showed that for the year 2009-12 allocated budget was Rs. 480.926 million and fifty million rupees have been consumed in one year from 2009-10. The behavior and individuals is influenced to a great extent due to the socio- demographic position with reference to education and income of individual and further influence on the health preventive efforts through immunization which ultimately resulting child survival to be very correct in this study that better health is responsible for higher socioeconomic status . Although maternal education is not fully responsible for immunization process but it can be considered as an important factor along with the income level and profession of the mother. Parents trends to understand importance of immunization leads timely vaccination of their children. This study highlighted that  profession of the mother also influence on immunization process and its differs with reference to nature of job of the mother as mother related to clerical jobs sales services considered lower  chances about fulfilling responsibility of full immunization. It is already understood that people with lower income level  or socio demographic status are less chance to get vaccinated their children on due dates because they have to take off for timely immunization process which ultimately burdunize  them. It has been learnt that mothers with high income and higher positions in the society are highly associated to fulfill their responsibility related immunization. In minimizing child mortality, morbidity, and disability .Vaccine are among the most effective prevention. Appropriate vaccine is introduced for infants so that they could use it in routine which ultimately resulted in huge decrease of vaccination process against preventable diseases. Since the start of the expanded program on immunization in middle and lower income countries,   worth mentioning death rate of 2 million have been reduced from Tuberculosis, Diphtheria, Tetanus, Peruses, Polio, and Measles.

By using recall and record measures it has been observed that increase in immunization is noteworthy from 2008 to 2009 and then 2010 to 2011 in rural areas that were 74 to 79 percent, whereas there was also increase in urban areas from 60 to 62 percent from 2008 to 2009 than 2010 to2011. In the year 2008 to 2009 rural areas was 40 percent whereas it was increased to 49 percent in 2010 to 2011.

Global Polio Eradication has reduced 99 percent incidents worldwide since its initiation in 1988. With the immunization of morbidity and mortality ,Immunization add considerably to the accomplishment of Millennium Development Goal to achieve a two_ thirds reduction in mortality  refer for children under the age of 5 year between 1990 and 2015. This study has been conducted with the help of secondary data from authentic Government source. The data regarding immunized children is critically studied to determine the relationship between Socio-Demographic characteristics and child immunization in Pakistan, with reference to impact of different factors so that this study could help decision makers for actions in future.

## 2. LITERATURE REVIEW

Anjali, et al (2011) found that many children diseases are increasing day by day but their complications can be removed by vaccination process to increase immunity against diseases. They highlighted that a noteworthy difference has been noticed before and after intervention. The percentage of vaccinated children increased from 2007 to 2009. They are at the view that parents civilization is very much related to this process whereas factors like age, sex, insurance, and distance travelled have nothing to do with immunization results or rates.

Thattakkat, et al (2006) examined immunization with reference to hospitalization and referrals cases to see unfavorable events. This study defined hospital based immunization is not appropriate and there is need to sensitize public about this important aspect. The study also emphasized that pediatrics departments focus on their practice and try to get means for improve their service among health care professionals with the help of additional knowledge, practice related child care especially regarding immunization.

Kim et al (1990) study found that formal education of women has a great impact on the child health as learned educated women are more concerned about the immunization of their children. Educated women perform protective functions related their children health but education is also related to awareness on immunization schedule. Similarly, Orenstein &Tilghman, (1996)findings have impressed a sturdy need for education program for the public about Vaccination, since main shortages have been recognized. Additional studies are stoutly recommended Along with debate on this vital public health matter. On the other hand, Stratified &Singarimbun et al., (1999) explored the hypothesis that educated women on formal grounds results in enhanced child survival due to awareness of the shielding function of the major childhood immunizations. Education is also correlated with enhanced consciousness of proper immunization schedules. Despite the fact of mother's formal education level, definite immunization knowledge is associated with an increased likelihood of using immunization. The Indonesian investigation is imperative as a model for protective health operations among other populations with low education levels in females. Recently, Kumar &Mohanty (2011) conducted a study on socio-demographic differentials in coverage of basic child immunization in India and the states of Bihar and Gujarat using three rounds of National Family Health Survey data. Results indicated that there has been a considerable increase in partial immunization in most of the states, but the increase in full immunization coverage is relatively slow in most of the states. In conjunction with standard of living, mother's education, mass media exposure, and availability of health card is a significant predictor in explaining the full immunization coverage irrespective of

time.

Koehlmooset al., (2011) indicated that for eradication of measles 90 to 95 percent treatment required through vaccination. The measles rate in Bangladesh currently reached to 80%-85% percent. Four sites have been selected to carry out this study all were having low routine exposure of the vaccination. Key officers have been selected by purposive and snowball sampling for interviews and document evidence have been prepared. It has been found that program did not meet the level aimed by the Government. The efforts realized to prepare framework so that health care interventions could be made for eradication of viral diseases.

Jacint, et al (2005) assessed the influence of resources and households' structure on immunization in Jamaica, Tarindad, and Tobago. This study compared various households like single parents, double parents and extended, also measured income level and its effect on immunization. They also tried to see effect of resources and income on immunization. They use data from the Jamaica 1996 and Trinidad and Tobago 1997 and found that income of households partially forecast immunization of children in both contexts. The major policy implications  was  to come into sight from this study that income status and household structure are vital for understanding  of child immunization in the Caribbean. On the other hand, Nisar, (2010) highlighted reasons of failures which include non health sectors with reference to conflict and war, parents refusal, population size from Afghanistan. Non immunization ration is one reason is people ignorance leads towards resulting death rate. The researcher suggested that at grass root level immunization knowledge and practice needs to be implemented.

Victoria, (2007)Socio-demographic characteristics  have more significant improving in data producing while in the nutrition, health and number of increase having fifty six progressive countries. The data are aimed to assist as a basis of frank data for use in arranging analyses and growing initiatives to benefit poor people. Uzma and Butt (2008) highlighted different socio economic factors and child mortality with regard to different age level in Pakistan. They try to test the role of households and chances of child mortality. The study followed a sequential model for getting higher response category. It has been learnt from study that mother feeding protects children from exposure of different diseases. Besides that education is playing a significant role for child caring practices but it is also associated other factors like parents care, level of income and environmental conditions.

Diamond et al., (1996) observed the impact of the immunization program in four rural localities of Bangladesh. Using a multilevel distinct time hazards model, this paper highlights the demographic and socioeconomic distinctiveness which impact the uptake of vaccination. Though, even after controlling for these pragmatic factors, a substantial quantity of difference between households persists due to unobserved specialties. There is also a big quantity of geographical disparity in the uptake of vaccination with proof of village level variation within involvement areas. World Health Organization,( 2009)reported that Pakistan have Poor admission to health/immunization services due to chiefly amid children living in remote rural areas,  distance, manipulated vision considering chance of disease/benefits of immunization amid rural poor, infrequent relations discussions considering immunizations, manipulated mobility of women, fear and misconceptions considering vaccinations.

Rohini&Pande (2003) found examined older siblings survival rate with reference to sex composition. The data was used by National Institute of India from 1992 to 1993 .Logit Model was the method of the study. The study found that children are less immunized due to sex difference. Same sex siblings are also affecting the results of immunization. This study also found that parents are interested to keep balance in sex composition but preference to have boy is persisting more in number.

WHO, (2010) reported that million of the children are saved due to immunization every year around the world; this is process in which a person gets immunization against infectious diseases. The research was particularly conducted to see the minorities' attitude towards immunization. The 20th century there is a big revolution in health sector in which one of the important factor is immunization. Small pox and polio have been wiped out through vaccination. Likewise measles, diphtheria, and other diseases have been controlled.

## 3. CONCEPTUAL FRAMEWORK

In this study researcher find the child immunization and its association with household socio demography characteristics. Child immunization is taken as dependent variable whiles the Gender, Parents education, Area and Province or Region are taken as independent variables.

By studying literature the flowing linkage between the dependent variable as child immunization and independent variables gender, parents education, area and province or region. More over figure also 1 shows association between the dependent and independent variables.
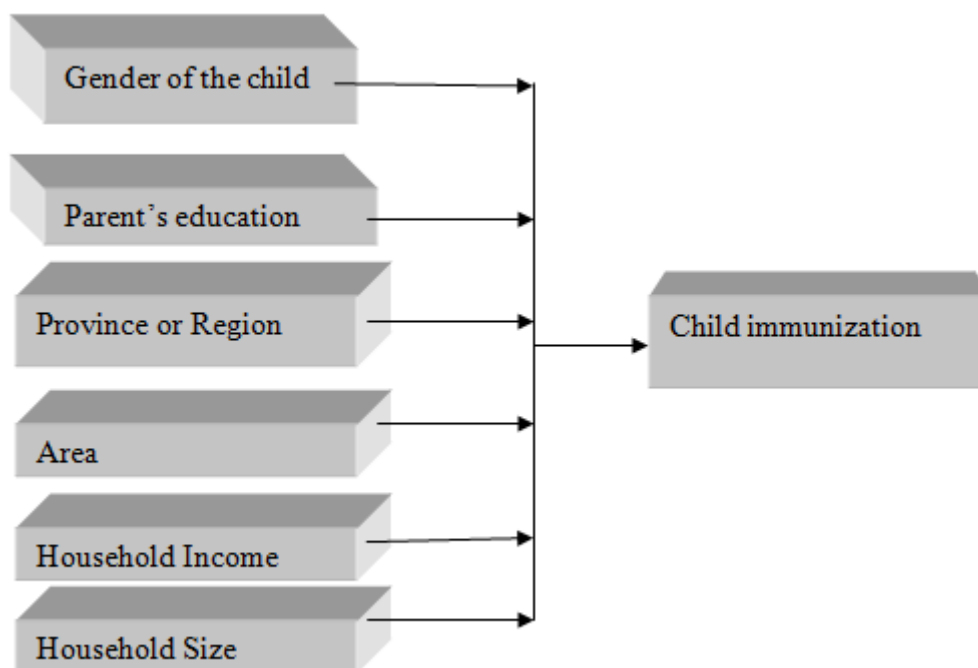
### 3.1. HYPOTHESIS:

Based on the literature review and conceptual framework, the following hypotheses are tested in the study.

H1**:**Gender of the child has a significant impact on child immunization in Pakistan.

H2**:** Parent's education has a significant impact   on child immunization in Pakistan.

H3: Residential area has a significant impact on child immunization in Pakistan.

H4: Province or region has a significant impact on the child immunization in Pakistan.

H5: Household income has a significant impact   on child immunization in Pakistan.

H6: Family size has a significant impact   on child immunization in Pakistan.

### 4. METHODOLOGY

The analysis in this study is based on the Household level data taken from the Pakistan Social and Living Standard Measurement Survey (PSLM) 2010 - 2011 carried out by the Federal Bureau of Statistic, Government of Pakistan. Thus, the study is based on secondary data, conducted at national level.

### 4.1. SAMPLE DESIGN

Data use in this research is based on the Pakistan social and living standards .Measurement Survey (PSLM), 2010-2011, conducted by federal Bureau of Statistic, Government of Pakistan. All urban and rural of Pakistan are included in the universe of this survey except for the military restricted occupied areas.

### 4.1.1. SAMPLINGFRAME

Sample frame of this survey consists of city towns divided into enumeration block groups, having 200_250 households each that can be identifiable through sketch maps. Each of these enumeration blocks has been divided into three types of income groups. These are low, middle and high which considering the majority people, life standard .Population Census 1998 provide the list of villages which is taken as a rural frame. This sample survey is stratified random sample collected at national level.

The sample size for all provinces has been fixed at 76546 households selected from 5413 sample villages or enumeration blocks. The survey is designed to produce reliable data at the level of district .The survey is a two stage stratified random sample.

The villages in the rural areas and enumeration block urban areas are the primary sampling unit of this survey.

The households within sample PSUs are secondary sampling units (SSUs). The selection of the numbers of household from each sample PSU of rural and urban areas is 16 to 20 respectively through the use of systematic sampling technique with a random start.

### 5. ANALYSIS AND DISCUSSION

### 5.1. Relationship between Dependent variable and Independent Variable:

The results in table shows the relationship between immunization and categorical variables Gender, age, education level, area, household income, household size (independent variables).

The association between immunization and gender of kids is statistically significant. The finding shows that about 61% of male kids headed areimmunized as compared to 39% of female children. The association is significant at 5 % level of significance with probability 0.0105.

The relationship between immunizationand education level of households indicated that majority of the educated householdimmunized their children. The results showthat 67% of the educated parents immunized their children as compared to 33% of uneducated parents. While 26.4% of the educated parents not immunized their children's as compared 73.6% of the uneducated parents who did not immunized their children. The association between immunization andeducation level of parents is statistically significant at 5% significance level.

The results show that 57% of the peoples in rural areas did not immunized their children as compared to 43% people in urban area who did not immunized their children. While 58% of people in rural area immunizedtheir as compared 42% people in urban areas.

In the table the study was divided in four different region (Punjab, Sind, KPK and Baluchistan), shows it's that the overall percentage of the province, In Punjab 96% children were immunized and 4% of children were not immunized. In Sind the immunization ratio is high as compared to other region of Pakistan, the 97% of children were immunized in Sindh, and 3% of children were not immunized. In Khyber Pakhtunkhwa the 93% of children were immunized and 7% were not immunized. In Baluchistan the 95% children were immunized and 5% were not immunized. The chi- square test applied to test the association between immunization of children and their provincial background shows that these two variables are significantly associated .Thus, the hypothesis that the immunization of the children and region of the residence of the children are significantly associated is proved.

The table show that about 32% of the household size comprised of 1-5 members who did not immunized their children, while 68% household size is more than 6 they did not immunized their children. In the similar way 20 % of the households head age 1-5 years is as compared to 80% of age of more than 6 who's immunized their children. Household size and immunization is significantly associated with probability less than 0.0001.

Household level of income is associated significantly with immunization at 5% level with probability less than 0.0001. About 40% of the household heads having income greater than Rs. 10000/- are did not immunized their children as compared to 60% whose income is less than or equal to Rs.10000/-. On the other hand 21 % people having income more than Rs.10000/- immunized their children as compared to the 71% people whose income is less than or equal to Rs. 10000/-.

**Table 8: Relationship between Immunization and gender, Household income, education level, housholdsize, area, provinces**

| Variable | Not Immunized n1 (%) | Immunized n2 (%) | $x^2$-value | P-Value |
|---|---|---|---|---|
| **Gender** | | | | |
| Female | 210(39%) | 5391(44.5%) | 6.54 | 0.0105 |
| Male | 328(61%) | 6698(55.5%) | | |
| **Educational Level** | | | | |
| Uneducated | 142 (73.6%) | 3953 (33%) | 9.34 | < 0.0001 |
| Educated | 396 (26.4%) | 8136 (67%) | | |
| **Area** | | | | |
| Rural | 363(57%) | 8957(58.5%) | 11.68 | 0.0006 |
| Urban | 175(43%) | 3132(41.5%) | | |
| **Household size** | | | | |
| 6 or more | 343(67.3%) | 9708(80%) | 17.39 | <0.0001 |
| 1-5 or more | 195(32.7%) | 3381(20%) | | |
| **Province** | | | | |
| Punjab | 160 | 4896(40.5%) | 57.45 | 0.0023 |
| Sindh | 96 | 3652(30%) | | |
| KPK | 175 | 2487(20.5%) | | |
| Baluchistan | 109 | 1060(9%) | | |
| **Household Income** | | | | |
| 1000-10000 | 325(60%) | 8546(70.9%) | 26.06 | <0.0001 |
| More than 10000 | 213(40%) | 3543(29.3%) | | |

## 4.2. Logistic regression analysis

Logistic regression technique is used to determine the relationship between immunization (dependent variable) and independent variables.

The odd ratio revealed that male children's were 1.29 times more likely to immunizeas measure up to femalechildren's.

 On the other hand families with low size were 1.46 times more likely to immunizetheir children as measure up to the higher family size.

The educated households are 1.3 times interested to send their kids for labour work as compared to educated household's heads. Similarly the people in urban area were 1.37 times more likely to immunize their children as compared to people in rural areas.

The odd ratio indicates that the people with high income were 1.58 times more likely to immunize their children as compared to the families with low income.

Table 10: Relationship between child labour and other social and demographic variables

| | Child labour | |
| --- | --- | --- |
| Variable | OR [95% C.I] | p-value |
| **Gender** | | |
| Female | * | |
| Male | 1.29 [1.0549-1.5026] | 0.01054 |
| **Educational Level** | | |
| Uneducated | * | |
| Educated | 1.3 [1.11-1.64] | <0.0001 |
| **Area** | | |
| Rural | * | |
| Urbanization | 1.37   [1.11-1.64] | 0.0006 |
| **Household size** | | |
| 6 or more | * | |
| 1-5 | 1.46 [1.22-1.75] | <0.0001 |
| **Household Income** | | |
| 1000-10000 | * | |
| 10000 or more | 1.58 [1.32-1.88] | <0.0001 |

**OR = Odds ratio, CI = Confidence Interval; *: Reference Category**

## 6. CONCLUSION

The current study evaluated numerous social and demographic characteristics contribution towards the prevalence of child immunization in Pakistan.It was observed that household significantly associated with socio-demographic factors i.e. gender, household income, family size, education level of the household heads and area the results agrees with (see (Uzma& Butt (2008); Victoria, (2007);Kumar &Mohanty (2011) Anjali, et al (2011)).

The hypothesis that immunization of children and gender children are significant associated is established. The results show that the male children are more immunized as compared to female children's.

The hypothesis that immunization of the children and parents education is significantly associated is proved. The results indicate that the educated parents immunize their children as compared to uneducated parents.

The hypothesis that the immunization of the children and areas of their residence are significantly associated is proved. The results reflected that people in urban area more likely to immunize their children as compared to people in rural area.

The hypothesis that immunization of the children and household income are significantly related is proved. The results shows that people with high income are immunize their children as compared to people with low income.

The hypothesis that immunization of the children and family size are significantly related is proved. The results show that families with low in size areinterested to immunize their children as compared to people with high income.

The results indicate that in case of child immunization, not only child s age, but also child's gender,resident of the child and he/she parents education, household income and family size plays a significant role. The gender differentials are more prominent in rural areas where negative impact on child immunization also exists due to the higher income inequality, among, household.

## 7. RECOMMENDATION

This study contributes for future decision making process for increasing immunization with reference to Pakistan scenario because it highlighted rural and urban socio economic factors this effects full immunization of the children. It further highlighted the role of educated parents' role on the immunization in Pakistan along with their demographic influence on immunization process.The analysis of socio demographic characteristic provides

the researchers, educationists and policy makers with a critical review of the issues at hand, so that appropriate policies and programmers can be designed for increasing child immunization in the country.

**References**

Babalola, S. (2009). Determinants of the uptake of the full dose of Diphtheria Pertussis Tetanus vaccines (DPT3) in northern Nigeria: a multilevel analysis. Maternal and child health journal, 13 (4), 550-558.

Bloom, et al. (2012). The effect of vaccination on children's physical and cognitive development in the Philippines. Applied Economics, 44 (21), 2777-2783.

Boerma, T. &Abouzahr, C. (2009). World Health Statistics. [report] WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland.

Dayrit, et al. (1999). A national program for control of acute respiratory tract infections: the Philippine experience. Clinical infectious diseases, 28 (2), 195—199

Dejong, et al. (2005). Do household structure and household economic resources predict childhood immunization? Evidence from Jamaica and Trinidad and Tobago. Population Research and Policy Review, 24 (1), 27--57.

Hyat, et al. (2003). Disability as a "Family Affair": Parental Disability and Childhood Immunization. 600-606.

Iram, U. & S. Butt, M. (2008). Socioeconomic determinants of child mortality in Pakistan: Evidence from sequential probit model. International Journal Of Social Economics, 35 (1), 63–76. Retrieved from: http://www.emeraldinsight.com/journals.htm?articleid=1641950

Janssens, W (2011). Externalities in program evaluation: the impact of a women's empowerment program on immunization. Journal of the European Economic Association, 9 (6), 1082--1113.

Kim, S. &Ugurbil, K. (1997). Functional magnetic resonance imaging of the human brain. Journal Of Neuroscience          Methods,          74          (1),          p.          229–243.          Retrieved          from: http://neurosci.info/courses/systems/FMRI/kim_fmri.pdf

Kroger, et al. (2006). General recommendations on immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR. Recommendations and reports: Morbidity and mortality weekly report. Recommendations and reports/Centers for Disease Control, 55 (15), 1--48.

Kuma&Mohanty (2011). Socio-economic differentials in childhood immunization in India, 1992--2006. Journal of Population Research, 28 (4), 301--324.

Kumar, A. &Mohanty, S. (2011). State of child health among poor and non-poor in urban India. Genus, 67 (1), 1-19.

Lee, J. (1996). Adult immunization priorities in the United States. The Milbank Quarterly, 285--307.

Lewit&Mullahy (1994). Immunization of young children. The Future of Children, 236--247.

Mckenna, ey al. (2002). Immunization registries: costs and savings..Public Health Reports, 117 (4), 386.

Nisar, N., Mirza, M. &Qadri, M. H. (2010). KNOWLEDGE, ATTITUDE AND PRACTICES OF MOTHERS REGARDING IMMUNIZATION OF ONE YEAR OLD CHILD AT MAWATCH GOTH, KEMARI TOWN, KARACHI. Pakistan Journal of Medical Sciences, 26 (1).

Orenstein, W. &Tilghman, J. (1996). A closer look at adult immunization in the United States. The Milbank Quarterly, 74 (2), 309--316.

PEREZ KOEHLMOOS, T., UDDIN, J. & SARMA, H. (2011). Impact of Measles Eradication Activities on Routine Immunization Services and Health Systems in Bangladesh. The Journal of infectious diseases, 204.

Quadros, C. (1980). More effective immunization [and discussion]. Proceedings of the Royal Society of London. Series B. Biological Sciences, 209 (1174), 111—118.

Riddiough, M. (1982). Federal policy for pneumococcal immunization and its implementation in the Medicare program. Infection Control, 309--315.

Robinson, et al. (1993). The president's child immunization initiative--a summary of the problem and the response. Public health reports, 108 (4), 419.

Rohini, P. &Pande (2003). Selective Gender Differentials in Childhood Nutrition and Immunization in Rural India: The Role of Siblings. Demography, 40 (3), 395-418.

Services, T. (1992). The Public Health Service Action Plan to Improve Access to Immunization Services. Public Health Reports (1974-), 243--251.

Silva, E. (1989). Development and strategies of the Colombian vaccination program. Review of Infectious Diseases, 11 (Supplement 3), 505--506.

Singarimbun, A., Mahardika, H., Srigutomo, W. &Fauzi, U. (2008). Apreliminary result of seismoelectric responses study on shallow fluid-saturated layer: numerical modeling using transfer function approach. Indonesian J. Phys, 19 (3), p. 61–68.

Steele, F., Diamond, I. & Amin, S. (1996). Immunization uptake in rural Bangladesh: a multilevel analysis. Journal of the Royal Statistical Society. Series A (Statistics in Society), 289--299.

Streatfield, K., Singarimbun, M. & Diamond, I. (1990). Maternal education and child immunization.

Demography, 27 (3), 447--455.

Thattakkat, K., Jayakumar, S. &Sharief, N. (2006). High rate of inappropriate referrals to specialized day care unit for immunization. Clinical Governance: An International Journal, 11 (2), 108-113. doi:10.1108/14777270610660484

Tinkew, B., Gordon, F. D. J. & Jacinta (2005). Do Household Structure and Household Economic Resources Predict Childhood Immunization? Evidence from Jamaica and Trinidad and Tobago. Population ResearchAnd Policy Review, 24 (1), 27-57.

Victor, L. & Chatterjee, A. (2003). Vaccine and immunization resources on the World Wide Web. Clinical infectious diseases, 36 (3), 355--362.

Victoria (2007). National immunization program schedule for Victoria from July 2007. [report] Department of Health, Victoria, Australia.

Wallace, A., Ryman, T. & Dietz, V. (2012). Experiences integrating delivery of maternal and child health services with childhood immunization programs: systematic review update. Journal of Infectious Diseases, 205 (1), 6-19.

Whyte, M., Whyte IV, J., Cormier, E. & Eccles, D. (2011). Factors Influencing Parental Decision Making When Parents Choose to Deviate From the Standard Pediatric Immunization Schedule. Journal of Community Health Nursing, 28 (4), 204--214.

Woods, D. & Mason, D. (1992). Six areas lead national early immunization drive..Public Health Reports, 107 (3), 252.

World Health Organization (2010). State of the world's vaccines and immunization. [report] World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland.

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