Bulletin of Business and Economics
ISSN - 2409 - 9368
http://rfh.org.pk/jur/magazine-category/bbe

ASSOCIATION BETWEEN IMMUNIZATION AND OCCURRENCE OF DISEASE: A SECONDARY DATA ANALYSIS

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ABSTRACT

The current study was designed to find out the association between immunization and occurrence of general ailment and abdominal disease among children. The study adopted a cross sectional study with a nationally represented survey was conducted in Pakistan during 2012-2013. The data was collected through structured questionnaire from a sample of 95,000 households. Binary logistic regression analysis was applied after recoding the variables. Immunization has been treated as the independent variable while general ailment and abdominal disease have been treated as the dependent variables in the current study. The findings of the study showed a positive and significant relationship between immunization and occurrence of disease. Occurrence of general ailment among children decreases by 95% on average when child is immunized. Similarly, occurrence of abdominal disease also decreases by 60% on average when child is immunized. The results prove both the hypothesis of the study. The study concluded that immunization is directly related to the occurrence of the diseases. Immunization decreases the probability of general ailment and abdominal disease among children.

Keywords: Immunization, Reproductive Aged Mothers, Occurrence of disease, General Ailment, Abdominal Disease
JEL Codes: J13, J17

I. Introduction

Immunization is a process whereby a body is made immune or resistant to the contagious diseases through vaccines (WHO, 2001). In the modern era of medical science, the importance of immunization or vaccination is already established. The primary objective of the public health is preventing disease as it is easier and better to prevent the disease than to treat it after its occurrence. In order to avoid disease occurrence, preventive measures hold the prime importance. Life expectancy, during the last century, has increased primarily due to improvement in child survival. The proper vaccination prevents the occurrence of infectious diseases in children (Main et al. 2001). The vaccination is the most authentic and reliable source of preventive measure as it is the key tool for controlling and eliminating the life-threatening diseases. However, in Pakistani scenario, vehement anti-vaccine lobby prevails. People, especially in rural areas, in spite of the undeniable success of vaccination programs against these fearsome diseases, still believe that it has adverse effects for child-health, thus causing a suppress to use of child-immunization (Octavia et al. 2010). However, the facts are beyond this misperception of the people. Vaccination has greatly reduced the burden of infectious diseases. A comprehensive vaccination programme is a cornerstone of good public health practice and will reduce inequities and poverty (Browne et al. 2002). According to the World Health Organization report immunization, at an estimate, prevents 2 to 3 million deaths each year around the world. Immunization is highly effective and useful in controlling diseases in children. It helps children to control the ailment (Bilous et al. 2006). The Global Vaccine Action Plan introduced by World Health Organization is a plan to increase the availability of the vaccines all over the world. This plan aims at controlling millions of deaths by 2020. Immunization has helped the decline in a total number of deaths owing to measles during 2000 to 2007 and 80% of the world target population has been immunized all over the world (Wolfson et al. 2007). The child mortality rate in Kenya decreased from 115/1000 to 88/1000 in 2003 mainly due to well-organized vaccination programme. In Baltimore, the coverage of immunization or vaccination administration is very high. The increase in vaccination reduced the primary health care visits of the children to the hospital. This shows that immunization is very effective in preventive measures of child health care (Gedlu &, Tesemma 1997).

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In Pakistan, mostly the vaccination is given to the children under the age of 5 years. Owing to this, the Expanded Programme on Immunization was launched in 1978. The Federal Government has used 11.5 billion PKR during the period 2008-09 for this purpose. The Federal Government is also providing the vaccines, syringes and printed material for the campaign of the said Programme (Bhutta et al. 2004). Lack of awareness and confidence in international aid, in this regard, is an important issue regarding vaccination in Pakistan. Medical awareness and mobile immunization teams are of great importance in Pakistan (Fasih et al. 2000). Based on PLSM Survey conducted in 2004-05, it can be said that immunization decreases the likelihood chances of occurrence of diseases in children (Naeem et al. 2010). Furthermore, the total number of children born and immunized-ones are more helpful to control child sickness across rural geographical zones in Pakistan. The immunization has increased in Pakistan up to 89% in 2009; however, the EPI programme still has to be improved. The parliamentary committee on health needs to take into account all the stakeholders to improve the immunization in Pakistan (Sheik & Sheikh, 2003).

I.I. RATIONAL OF THE STUDY

Heath is the prime objective of the whole world (Ali and Naeem, 2017; Ali, 2011; Ali, 2015; Ali, 2018; Ali and Bibi, 2017; Ali and Ahmad, 2014; Ali and Audi, 2016; Ali and Audi, 2018; Ali and Rehman, 2015; Ali and Senturk, 2019; Ali and Zulfiqar, 2018; Ali et al., 2016; Ali et al., 2021; Ali et al., 2021; Ali et al., 2015; Arshad and Ali, 2016; Ashraf and Ali, 2018; Audi and Ali, 2017; Audi and Ali, 2017; Senturk and Ali 2021). Child's morbidity is high among children in Pakistan. Children under the age of five years suffer from multiple ailments which include fever, cough, diarrhea and others. However, existing literature has indicated that fully immunized children are less prone to such diseases. In Pakistan people are least likely to utilize the services provided by the government with regard to the immunization. So, there is a dire need to shed light on the importance of immunization and how immunization can help in curtailing the ailment among children under five. The current study is an attempt to find out the how immunization can help in reducing the ailment among children. This study will elaborate the relationship between both the variable. The study is designed to fulfill two objectives which are stated as follows:

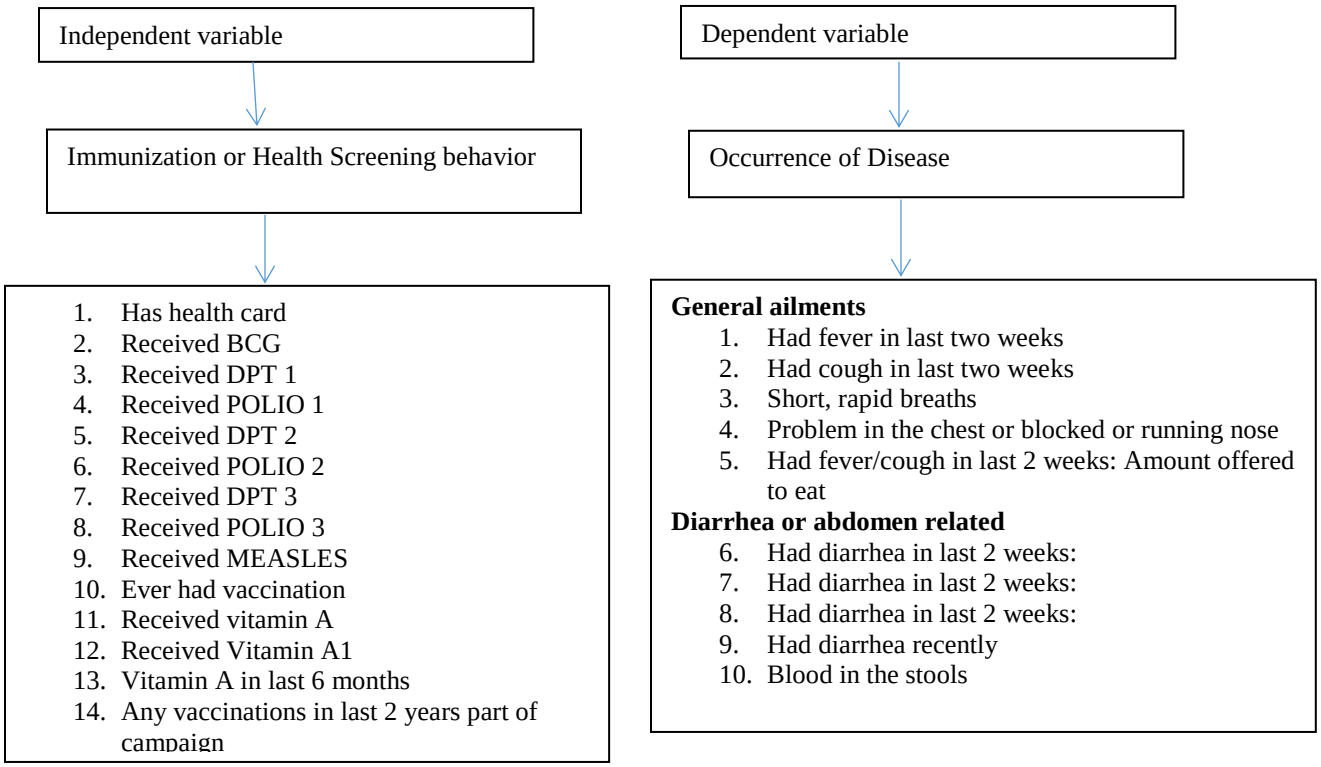
- To see how immunization affect the general ailment among children
- To explore the relationship between immunization and abdominal disease among children

II. Methodology

The present study used the data from Pakistan Demographic Health Survey 2012-13. This was a study conducted in collaboration among Government of Pakistan with technical support of USAID and National Institute of Population Studies. The sample for the said study was 14000 households and data was collected from females of reproductive age group i.e. 15 to 45 years. The study used cross-sectional survey wherein quantitative information was collected through questionnaire. The said survey gathered information regarding respondents' socio-demographic characteristics along with the information against different health indicators including fertility, family planning, infant and child mortality, reproductive health, child health, nutrition, adult and maternal mortality, vaccination and occurrence of different diseases.

II.I. HYPOTHESIS

The current study hypothesizes that "immunization or administration of vaccination decreases the chances of occurrence of diseases among children". The immunization is taken as the independent variable while the dependent variable for the current study is the occurrence of disease. The independent variable for the current study was immunization or vaccination. The immunization or vaccination refers to how many times the respondents received the vaccination. The variables of (BCG, DPT, POLIO 1, DPT 2, POLIO 2, Vitamin A1, POLIO 3, MEASLES, vitamin A, DPT 3) were, at first, recoded into the category of Yes or No and then all the variables were computed to form the independent variable of Immunization. All the above-mentioned variables collectively formed the independent variable of immunization. The dependent variable in the current study was the occurrence of diseases in children. The DHS has the questions relating to the occurrence of diseases in children. The occurrence of disease in this study refers to how many times in the previous weeks the child has undergone any type of ailment. However, keeping in view the objectives of the current study occurrence of the disease was sub-divided into two categories. In the first category, general ailment was discussed while, in the second category, the abdominal disease was discussed. In order to perform the bivariate analysis and simple logistic regression, the dependent variable was converted into Yes and No category. Following diagram illustrates how both dependent and independent variables were constructed for the purpose of the current study.



II.II. INCLUSION CRITERIA

DHS observed certain criterion that must be ensured before collecting the data from the women. Following are important points of inclusions criteria.

- Women should be resident of that particular district and area with having valid CNIN
- Women should be married with the reproductive age of 15-49 years
- Women should be a member of particular household.

II.III. EXCLUSION CRITERIA

In order to conduct the survey it was important to determine the exclusion criteria of the selected population. As the population of the current study mothers of reproductive age however, not all women were interviewed. On the basis of inclusion criteria following were the exclusion criterion for the survey.

- Women not having health cards were also excluded from the survey
- In order to observe the ethics of the research women not willing to provide information were excluded from the study.
- Women before the age of 15 and above the age of 49 were excluded from the survey population

III. RESULTS

The data for the current study was analyzed by using two different software. In the first place data was primarily analyzed by using SPSS software. SPSS was used to filter the data and for the purpose of descriptive statistics. As the data was having many missing responses hence it was important to filter the data prior to the inferential analysis. In the second instance R-Software was used to find out the relationship between immunization and occurrence of the disease.

The table-1 shows the data of socio-demographics of the ever-married women according to the DHS-2012-13. The above table shows that 38% of the women are urban resident while 62% of the women are rural area resident. In the second column, age of the respondents has been reported; 41.4% of the respondents belong to the age group between 15 to 29 years; 33.6% of the respondents are between the age of 30 to 39 years and in the end 25% of the respondents are between the ages of 40 to 49 years. Educational level is the last and most important category of socio-demographic characteristics of the respondents. Here 66.5% of the respondents are illiterate and 13.4% of the respondents are having primary level education. Similarly, 13.4% of the respondents have passed the secondary level education and only 6.6% of the women were higher level educated. Two major models were formed to find out the relationship between the variables. In the first model relationship has been shown between immunization and

general ailment among the respondents of the study while in the second the relationship was seen between immunization and abdominal disease. Following is the detail of both the models.

Table I. Socio demographic characteristics of ever married women of reproductive age (15-49); N=10,023	
Variables	**Percentages (%)**
Place of residence	
Urban	38
Rural	62
Age of respondent	
15-29	41.4
30-39	33.6
40-49	25
Education level	
Illiterate	66.5
Primary	13.4
Secondary	13.4
Higher	6.6

III.I. MODEL 1

Model one explains the strength and nature of relationship between immunization and general ailment. Following table and the coefficients explains the relationship between two variables.

Table II. Relationship between immunization and general ailment

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-1.10392	0.03114	-35.447	0.000
Immunization (Yes)	-0.06182	0.041	1.508	0.000

The child is ($e^{-0.06182} = 0.94$), i.e. 94% less likely to get disease if he/she is ever immunized as compare to the child who never being immunized. The disease in the first model is only related to general ailment of the respondents. The P-value is also significant which shows that the relationship between independent and dependent variable is significant in nature. The coefficient of the table shows that the nature of the relationship between both the variables is positive and strong. Increase in the level of immunization decreases the probability of general ailment among children.

III.II. MODEL 2

Model two predicts the relationship between immunization and abdominal disease among children. Following table shows how both the variables are related to one another and what is the nature and strength of the relationship.

Table III. Relationship between immunization and abdominal ailment

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-1.10392	0.03114	-35.447	0
Immunization (yes)	-0.5108256	0.041	1.508	0

The child is ($e^{-0.5108256} = 0.60$), i.e. 60% less likely to get disease if he/she is ever immunized as compare to the child who never being immunized. This model explains how immunization can help in controlling the abdominal diseases. The P-value shows that the relationship between the variables is significant in nature. Furthermore, the coefficient indicates that the nature and strength of the relationship is also positive and moderate. Increase in the level of immunization decreases the probability of occurrence of abdominal disease among children.

IV. DISCUSSION

The findings of the current study are based on a large scale and large sample size which makes the study more valid. Use of large scale sample size determines that the findings of the study can be generalized to a larger population. Hence, formation of polices becomes easier and more effective. Most of the studies related to the topic under investigation have used the huge sample size same has been done in the current study. In the same context studies on the immunization are mostly based on secondary data analysis by using different health related surveys (Weerasinghe et al. 2007). So, current study is aligned with the existing literature which enhances the credibility of the current study. The findings of the study show that immunization can help in reducing the ailment and occurrence of the disease among children. Same has also been found in a study in Australia where the findings show that

vaccination can curtail the occurrence of preventable diseases (Lawrence et al. 2002). Immunization has been found to be an important protective factor in reducing the ailment among children which has been proved in the course of the current study and strengthen by the studies across the research community. The current study found that abdominal diseases can be controlled and reduced by vaccination. Empirical literature has evidently shown that children are more prone to abdominal diseases in their early life hence it is very important to cater the issue by properly immunizing the children under the age of five years. Similarly, vaccination has been found a great cover against epidemic disease (Gilbert et al. 2001). So, the findings of the current study are associated with the existing literature. There has been strong evidences that children are vulnerable to the occurrence of the diseases during their early life span and it is very important to control them as most of the children die before reaching the age of 2 years and five years. Immunization protects the children and enhances their immunity level among diseases (Ali, 2000). So, the study strongly recommends and advocates that the children under the age of five years must complete the immunization process. It is the prime responsibility of the government and health department to ensure the health screening and immunization of the children. Parents, health department and education are important stakeholders in this regard and policies must be framed to involve all the stakeholders in creating awareness and completing the process of immunization among children keeping in view the cultural sensitivity of the Pakistan (Stanton, 2004).

V. CONCLUSION

The objective of the study was to find out the association between immunization and occurrence of disease in the shape of general ailment and abdominal disease. The findings of the study show that immunization has implication on child's occurrence of disease. In the first place the study concludes that immunization decreases the likelihood of occurrence of general ailment among children. As the general ailment was measured by using multiple indicators such as cough, chest pain and fever, hence, it was found that immunization decreases the chances of all such general ailment. In the second place, the study concluded that immunization decreases the probability of occurrence of abdominal diseases. Abdominal disease was measured by using frequency of diarrhea among children; the study proves that immunization can reduce the chances of abdominal disease.

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