

## Assessment of Defaulters of Vaccination against Poliomyelitis during Routine Immunization & Supplementary Immunization Campaigns

- 1. Mr.Faique Ali Kalhoro**  
Union Council Management Officer, Sindh
- 2. Prof. Dr.Khalida Naz Memon**  
Professor, Department of Community Medicine,  
Liaquat University of Medical & Health Sciences, Jamshoro.
- 3. Dr. Rehmatullah Kandhro (Corresponding Author)**  
MSc Community Dentistry  
Community Dentistry Department  
Liaquat University of Medical & Health Sciences, Jamshoro.
- 4. Prof. Mohammad Najeeb Memon**  
Prof. Community Medicine, Bilawal Medical college, Jamshoro.
- 5. Dr. Nizakat Ali Kalhoro**  
Medical officer , THQ Ghotki
- 6. Dr. Muhammad Faisal Qureshi**  
Senior Medical Officer, LUH Hyderabad

**ABSTRACT****Background:**

The childhood vaccine-preventable diseases are commonly prevalent in developing countries. The aim of this research was to identify & assess the defaulters of vaccination against poliomyelitis.

**Objective:**

To assess defaulting in routine immunization among children at taluka Qasimabad, Sindh.

**Methodology:**

**Study Setting & Design:** This was a cross sectional, community-based study.

**Study Population:**

Registered defaulters of routine immunization at age 0-59 months reporting at EPI centers during period of three months (April-June 2019)

**Sample Size & Sampling Technique:**

Two hundred & sixty children were selected through convenient sampling technique.

**Data Collection Tool & Analysis:**

Data was collected on a preformed questionnaire at designated EPI centers through volunteers' teams. The gender of children, socio-demographic profile of the parents, distance of EPI center, ante-natal & post-natal visits, vaccination status, reasons for vaccine defaulting were the variables of special interest. Chi-square test was used to seek associations with a 0.05 level of significance.

**Results:** The mothers' educational level was significantly linked to their ignorance of the value of routine immunization ( $p=0.03$ ), and the adverse reactions to immunization were likewise significantly linked to their failure to comply with routine immunization ( $p=0.04$ ). The number of ante-natal visits undertaken by mothers were associated with childrens' vaccination status ( $p=0.04$ ). Parents opined that the vaccine had negative side effects after vaccination ( $p=0.00$ ).

**Conclusion:**

The defaulting in vaccination is closely related to the number of ante-natal & post-natal visits undertaken by mothers, the educational status of parents, awareness regarding importance of childhood vaccination & parental fear of adverse effects arising from vaccination. Multi-sectoral approach is needed in raising awareness on this issue.

**Key words:** defaulters, vaccination, poliomyelitis, routine immunization, assessment, vaccine campaigns.

## INTRODUCTION

Immunizations is one of the currently most inexpensive public health interventions<sup>1</sup>.The vaccine-preventable diseases (VPDs) account for 17% under-five annual fatalities<sup>2,3</sup>.Theseremain significant public health concern in developing nations &are responsible for approximately 1.5 million deaths among children<sup>4</sup>.This necessitates multiple contributions to build on the accomplishments made sofar<sup>5</sup>.The program aiming to stop the spread of the poliovirus through surveillance, immunization was started in Pakistan in 1978 with the support of the Centers for Diseases Control and Prevention (CDC), United National Children Emergency Fund (UNICEF), and Rotary International with the support of the World Health Organization (WHO)<sup>6</sup>. During 2014, WHO and collaborators highlighted children as target for difficult initiatives to enhance routine immunization reporting<sup>7,8</sup>. The decade from 2010 to 2019 is appropriately referred as the "Decade of Vaccines"<sup>9,10</sup>.All the national & international organizations have joined forces to create the Global Polio Eradication Initiative (GPEI) to stop the spread of the poliovirus through surveillance and immunization<sup>11</sup> wherein supplementary immunization is emphasized through social mobilization (SM) planning techniques<sup>12</sup>.

Where marginalized people live, low accessibility of routine immunizations and the absence of vaccination as a social expectation<sup>13</sup>.The parental decision to forego childhood vaccines is acknowledged as a major factor in the uptake rate being less than ideal<sup>14</sup>.Despite significant resources were invested in immunization and surveillance to achieve poliovirus eradication, here, yearly cases of WPV ranged from 20 to 306 since 2000<sup>15</sup>.

This study by identifying the defaulters of vaccination against poliomyelitis facilitates the program managers to effectively use resources to increase vaccination coverage and, as a result, lower the burden of vaccine-preventable diseases in children.

## METHODOLOGY:

### Study Setting, Study Design& Period of Study:

Community-based cross sectional study undertaken at EPI centers in taluka Qasimabad Sindh, Pakistan from April-June 2019.

### Study Population:

Registered defaulters of routine immunization at EPI centers age 0-59 months were the study subjects while the parents/care givers of these defaulters were the respondents in research.

**Sampling Technique:**

Convenient sampling.

**Sample Size:**

The 0-59 months aged children population in Taluka Qasimabad is estimated as 2.8% of the total population. The required sample size was calculated as 260 using the prevalence-based approach (19%) at 95% confidence intervals, 5% as the margin of error, and an additional 10% when accounting for non-responders.

**Data Collection Tool:**

After obtaining the district health officer's approval, volunteer teams collected information on routine immunization defaulters from EPI centers and vaccine providers; the information was then translated into the local language and collected from the Qasimabad population using a pre-structured questionnaire using a list provided by PCR, EPI centers, and vaccine providers. From the Hyderabad Polio Control Room District Health Officer (PCR-DHO), OPV/Polio vaccination defaulters' logbook was obtained. All participants received the appropriate training for data collection.

**Variables of the study:**

The gender of child, socio-demographic profile of the parents, distance of EPI center, ante-natal & post-natal visits, vaccination status of child, status of RI & OPV among routine immunization defaulters, reasons for vaccine defaulting were the variables of special interest.

**Data Analysis:**

Data was analyzed in SPSS for windows version 22.0. The frequency tables and bar charts were used to depict data for categorical variables. Chi-square ( $\chi^2$ ) test was applied as test of significance to seek associations between variables at 95% confidence interval & at p-value 0.05.

## RESULTS

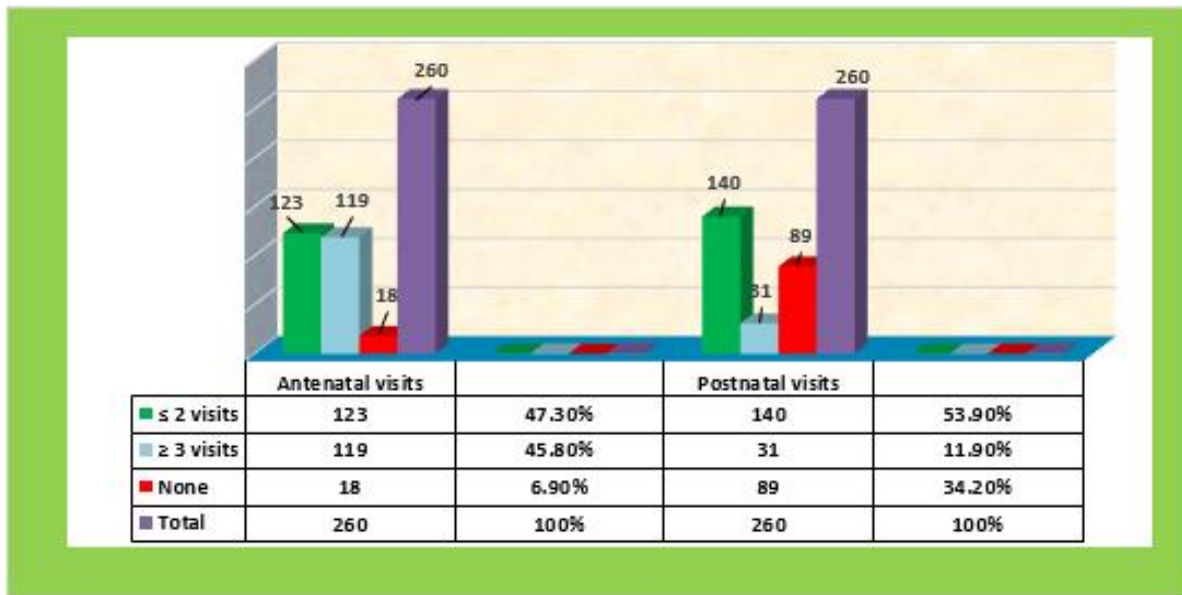
**Table No: 1**  
**Demographic Characteristics Of Parents/Caregivers**

Demographic Characteristics of Parents/ Care Givers	Frequency (no=260)	Percentage %
<b>Age of Respondent</b>		
≤ 20 years	16	6.2 %
21 to 30 Years	123	47.3 %
31 to 40 Years	100	38.5 %
≥ 40 years	21	8.1 %
<b>Mean±standard deviation: 30.15±4.76 years</b>		
<b>Relationship with child</b>		
Father	68	26.2 %
Mother	168	64.6 %
Other	24	9.2 %
<b>Religion of Respondent</b>		
Muslims	205	78.8 %
Non-Muslims	55	21.2 %
<b>Gender of Respondent</b>		
Male	82	31.5 %
Female	178	68.5 %
<b>Educational Status of Father</b>		
Uneducated	77	29.6 %
Primary	57	21.9 %
Secondary	66	25.4 %
Higher Education	26	10.0 %
Graduate	33	12.7 %
Postgraduat	1	0.4 %
<b>Occupation Of Father</b>		
Student	7	2.7 %
Unemployed	20	7.7 %
Self Employed	144	55.4 %
Government Employed	24	9.2 %
Private Service	65	25.0%
<b>Educational Status of Mother</b>		
Uneducated	142	54.6 %
Primary	89	34.2 %
Secondary	26	10.0 %
Higher Education	1	0.4 %
Graduate	2	0.8%
<b>Occupation of Mother</b>		

Unemployed	6	2.3 %
Self Employed	36	13.8 %
Private Service	10	3.8 %
Housewives	208	80.0 %
<b>Monthly Income of Parents</b>		
Less than 12000 PKR	65	25 %
13000 to 60000 PKR	184	70.8 %
More than 60000 PKR	11	4.2 %
<b>Distance of EPI Centre</b>		
Under 1 Km	99	38.1 %
1 to 2 Km	60	23.1 %
More than 2 Km	101	38.8 %

**CHART NO:1**

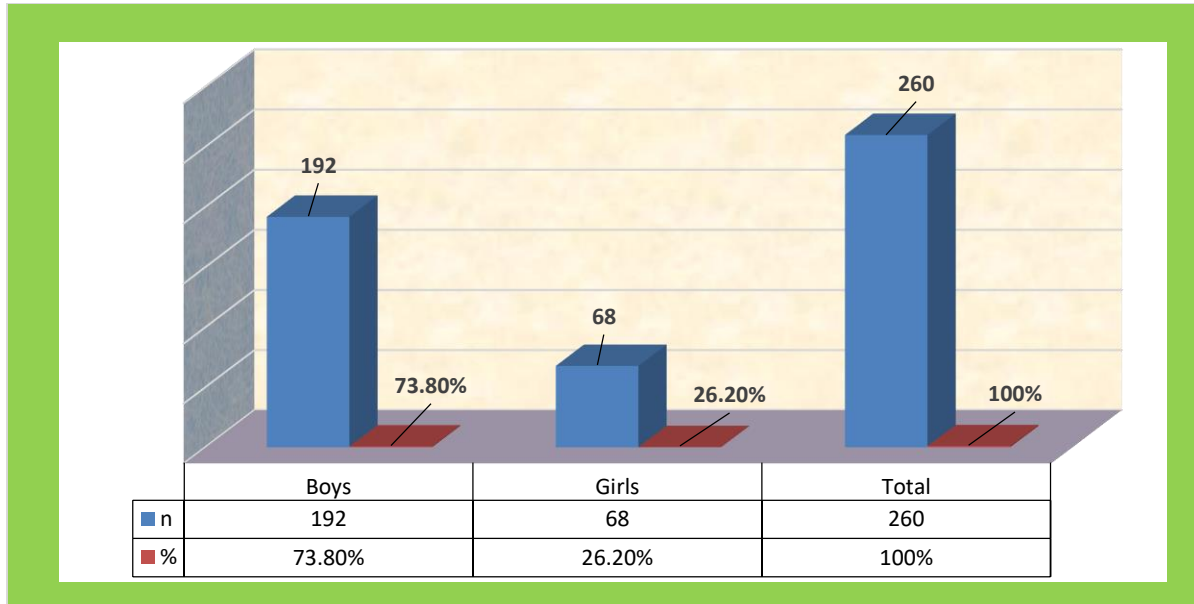
**ANTE-NATAL & POST-NATAL VISITS UNDERTAKEN BY MOTHERS**



**TABLE NO: 2.**  
**ASSOCIATION BETWEEN PARENTS' EDUCATIONAL LEVEL AND THE  
 DELAY IN RECEIVING ROUTINE IMMUNIZATION**

Factors	Associations with	p-value (fathers)	p-value (mothers)	
<b>Educational status of parent</b>	○ Lack of Awareness about routine Immunization	○ <b>0.02*</b>	○ <b>0.03*</b>	
	○ Child is healthy, so needed no vaccination	○ <b>0.01*</b>	○ 0.10	
	○ Time taken to reach Health facility	○ <b>0.04*</b>	○ 0.15	
	○ Out reach sessions not conducted by health team	○ 0.79	○ 0.93	
	○ Know about RI importance	○ <b>0.03*</b>	○ 0.66	
	○ AEFI	○ <b>0.04*</b>	○ 0.74	
	○ Mother too busy	○ 0.34	○ 0.71	
	○ Plan to do vaccinate child later on	○ <b>0.04*</b>	○ 0.18	
	○ Due to miscellaneous reasons	○ <b>0.03*</b>	○ 0.49	
	○ Side effects of RI	○ <b>0.03*</b>	○ <b>0.00*</b>	
	○ Antenatal care visits	○ <b>0.00*</b>	○ <b>0.03*</b>	
	○ Postnatal care visits	○ 0.06	○ <b>0.00*</b>	
		<b>Source of Information About Routine Immunization</b>	<b>p-value (fathers)</b>	<b>p-value (mothers)</b>
		○ Doctor	○ 0.30	○ <b>0.01*</b>
		○ Lady Health Worker	○ <b>0.03*</b>	○ <b>0.03*</b>
		○ Vaccinators	○ <b>0.02*</b>	○ <b>0.09*</b>
		○ Polio Campaign team	○ 0.96	○ 0.93
		○ Poster Banners	○ <b>0.00*</b>	○ <b>0.01*</b>
		○ Loud Speakers	○ <b>0.01*</b>	○ 0.42
	○ Neighbors	○ 0.20	○ 0.22	
	○ Community leaders	○ 0.81	○ 0.98	
	○ Mass Media (Radio, TV)	○ 0.77	○ 0.88	
<b>Reasons for defaulting routine immunization</b>		<b>ANC p-value</b>	<b>PNC p-value</b>	
	○ Fear of side effects	○ <b>0.00*</b>	○ <b>0.03*</b>	
	○ Lack of knowledge about importance of vaccine	○ <b>0.00*</b>	○ <b>0.01*</b>	
	○ Due to miscellaneous not vaccinated their child	○ <b>0.00*</b>	○ <b>0.03*</b>	
	○ AEFI	○ <b>0.00*</b>	○ 0.32	
	○ Plane to vaccinate later	○ <b>0.03*</b>	○ 0.12	
<b>Vaccination Status</b>	○ Vaccination status of child (Partially / Not vaccinated)	○ <b>0.04*</b>	○ <b>0.00*</b>	

**CHART NO: 2.**  
**DISTRIBUTION OF CHILDREN ACCORDING TO GENDER**



**TABLE NO: 3**

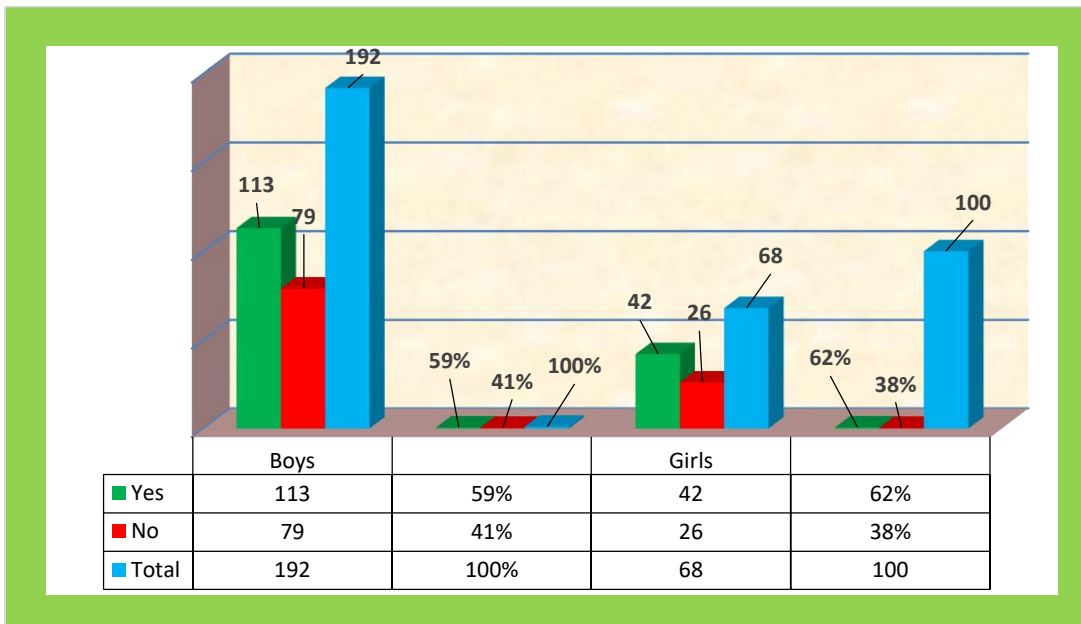
**VACCINATIONSTATUS**

**IN THE ROUTINE IMMUNIZATION DEFAULTERS**

<b>Routine Immunization Status</b>		<b>OPV doses during last SIAs</b>	
<b>Partially Vaccinated</b>	200(76.9 %)	<b>Received</b>	207(79.6 %)
<b>Not Vaccinated</b>	60(23.1 %)	<b>Not Received</b>	53(20.4 %)
<b>Total</b>	260(100 %)	<b>Total</b>	260(100 %)



**CHART NO: 3**  
**GENDER-WISE DISTRIBUTION OF VACCINE DEFAULTERS**



## DISCUSSION:

The purpose of the current study was to evaluate routine immunization defaulters; 260 respondents provided information about the polio immunization status of their children under one year of age. The majority of the interviewees, 123 (47.3%), were between the ages of 21 and 30 years, while 100 (38.5%) were between the ages of 31 and 40 years. This is in contrast to a case control study conducted by Negussie A et al. in the Arbegona District of southern Ethiopia on 182 subjects recruited as cases and 365 as controls; between all of cases, 154 (84.6%) and 294 (81.2%) among controls, the primary respondents were mothers<sup>16</sup>.

A cross-sectional study in Lucknow revealed that the Muslim children were 80.8% and non-Muslims were 38 (19.2%)<sup>17</sup>. The similar percentage was observed in the current study where 78.8% were Muslims and 55 (21.2%) were non-Muslims. In terms of the fathers' employment status, 55.4% of the subjects' fathers were self-employed; this is in contrast to a study by Vissiliki P et al. revealing 16.46% of fathers as jobless, 10.20% had jobs in the public sector, 51.96% were private employees<sup>18</sup>.

In a cross-sectional study by Guillaume NM et al., 34% of mothers reported working outside the home and 66% reported being housewives<sup>19</sup>; however, the current study revealed 80.0% of mothers as housewives. A total of 616 children between the ages of 12 and 23 months participated in a survey by Phukan RK et al. in Assam, India wherein 64% of the subjects lived at the distance of less than 2 km from the health facilities & the immunization status was found significantly associated with distance of health facility<sup>20</sup>; this is in contrast to findings of the current research revealing 34.1% children living at <1km, 23.1% living within 1-2 km and it was strongly related to the vaccination received ( $p = 0.03$ ), this is endorsed by finding in another research by Russo G et al<sup>21</sup>. Another study revealed fathers educational status as significantly associated with the vaccination coverage<sup>18</sup>, the findings are just similar to those of current research where lack of belief in routine immunization was found to be substantially correlated with parents educational status ( $p=0.00$ ). A study in Karachi revealed 45.4% of participants having monthly income of <10000 rupees<sup>22</sup>.

The 73.8% of the subjects were boys and parent of 58.9% had retained EPI card whereas 41.1%; whereas 26.2% of the defaulters were girls & 61.8% of their parents had retained their EPI cards.

These findings are comparable to another study conducted in suburbs of Bahawalpur showing only 26% of the parents having retained EPI cards<sup>23</sup>. Another study conducted in Eastern Ethiopia in which 694 children of 51% of the defaulters of vaccination were males and 49% were females & 77.8% parents had retained EPI cards of their children<sup>24</sup>. Another study investigating the vaccination status of children revealed the vaccination coverage for BCG+OP-0 as 98.8%<sup>25</sup>. Contrasting to this a Karachi based study revealed BCG+OP-0 coverage as 26.3%<sup>26</sup>. Gul R et al revealed 11% children as being partially immunized<sup>27</sup>. Similar were the findings by other researchers, too<sup>28,29</sup>. Furthermore, in our study, 79.6% of the children were reported having received OPV dose during previous SIAs as compared to findings of Tabatabaei et al showing 38% of the children receiving additional OPV doses during SIAs<sup>30</sup>.

### **CONCLUSION/&RECOMMENDATIONS:**

This analysis revealed that partially immunized children have higher default rates in routine immunization status than children who are not immunized. The defaulting in vaccination is closely related to the number of ante-natal & post-natal visits undertaken by mothers. The educational status of parents, awareness regarding importance of childhood vaccination & parental fear of adverse effects arising from vaccination are common reasons of vaccination defaulting. At all levels, there should be community involvement through awareness sessions. Governmental and nongovernmental organizations should collaborate locally and support local initiatives to organize seminars, focus groups, and accountability activities without fear of interference from political sources.

### **ETHICAL APPROVAL:**

Prior to the initiation of the study an ethical approval was obtained from Liaquat University of Medical & Health Sciences Jamshoro. (NO.LUMHS/REC/-772)

### **CONFLICT OF INTEREST:**

NO conflict of interest is declared by the authors of this study.

**References:**

1. Lindstrand A, Cherian T, Chang-Blanc D, Feikin D, O'Brien KL. The world of immunization: achievements, challenges, and strategic vision for the next decade. *The Journal of infectious diseases*. 2021 Oct 1;224(Supplement\_4):S452-67.
2. Patel MM, Steele D, Gentsch JR, Wecker J, Glass RI, Parashar UD. Real-world impact of rotavirus vaccination. *The Pediatric infectious disease journal*. 2011 Jan 1;30(1):S1-5.
3. World Health Organization (2012) Immunization Surveillance, Assessment and Monitoring Vaccine Preventable Disease.[http://www.who.int/immunization/monitoring\\_surveillance/](http://www.who.int/immunization/monitoring_surveillance/)
4. Pezzotti P, Bellino S, Prestinaci F, Iacchini S, Lucaroni F, Camoni L, Barbieri MM, Ricciardi W, Stefanelli P, Rezza G. The impact of immunization programs on 10 vaccine preventable diseases in Italy: 1900–2015. *Vaccine*. 2018 Mar 7;36(11):1435-43.
5. Eva M. Riedmann (2010) Report: State of the world's vaccines and immunization, *Human Vaccines*, 6:2, 157-163, DOI: 10.4161/hv.6.2.11326, <https://doi.org/10.4161/hv.6.2.11326>.
6. Curry DW et al. Assessing the Effectiveness of House-to-House visits on Routine Oral Polio Immunization Completion and Tracking of Defaulters, *J HEALTH POPUL NUTR* 2014 Jun;32(2):356-366.
7. WHO, Expanded Program on Immunization in Pakistan.  
<http://www.emro.who.int/pak/programmes/expanded-programme-on-immunization.html>.
8. Nelson KN et al, Assessing strategies for increasing urban routine immunization coverage of childhood vaccines in low and middle-income countries: A systematic review of peer-reviewed literature. *Vaccine*. 2016 Nov 4;34(46):5495-503.
9. Haddad S, Bicaba A, Feletto M, Fournier P, Zunzunegui MV. Heterogeneity in the validity of administrative-based estimates of immunization coverage across health districts in Burkina Faso: implication for measurement, monitoring and planning. *Health policy and planning*. 2010 Feb 25;25(5):393-405
10. Kaboré L, Méda CZ, Sawadogo F, Bengue MM, Kaboré WM, Eshoh AT, Gervaix A, Galetto-Lacour A, Médah I, Betsem E. Quality and reliability of vaccination documentation in the routine childhood immunization program in Burkina Faso: Results from a cross-sectional survey. *Vaccine*. 2020 Mar 17;38(13):2808-15
11. Osaghae I, Agrawal P, Olateju A, Alonge O. Facilitators and barriers of infectious diseases surveillance activities: lessons from the Global Polio Eradication Initiative-a mixed-methods study. *BMJ open*. 2022 May 1;12(5):e060885.

12. Thompson KM, Kalkowska DA. An updated economic analysis of the Global Polio Eradication Initiative. *Risk Analysis*. 2021 Feb;41(2):393-406.
13. Curry DW, Perry HB, Trimizi SN, Goldstein AL, Lynch MC. Assessing the effectiveness of House-to House visits on routine immunization completion and tracking of defaulters. *Journal of Health, population, and nutrition*. 2014 Jun;32(2):356.
14. ShamshulAzhar S, Nirmal K, Nazarudin S, Rohaizat H, Azimatun Noor A. Factors influencing childhood immunization defaulters in Sabah, Malaysia. *Int Med J Malaysia*. 2012;11:17-22.
15. Imran H, et al. Routine immunization in Pakistan: comparison of multiple data sources and identification of factors associated with vaccination. *International health*. 2018 Feb 8;10(2):84-91.
16. Negussie A, et al. Factors associated with incomplete childhood immunization in Arbegona district, southern Ethiopia: a case control study. *BMC Public Health*. 2015 Dec;16(1):27.
17. Gupta P, Parkash D, Srivastava JP. Determinants of immunization coverage in Lucknow district. *North American Journal of Medicine sciences*. 2015 Feb;7(2):36.
18. Vassiliki Pet al. Determinants of vaccination coverage and adherence to the Greek national immunization program among aged 2-24 months at the beginning of the economic crises (2009-2011). *BMC Public Health*. 2014 Dec;14(1):1192.
19. Mwamba GN, et al. Vaccination coverage and factors influencing routine vaccination status in 12 high risk health zones in the province of Kinshasa City, Democratic Republic of Congo (DRC), 2015. *The Pan African medical journal*. 2017;27(Suppl 3).
20. Phukan RK, Barman MP, Mahanta J. Factors associated with immunization coverage of children in Assam, India: over the first year of life. *Jouranal of Tropical Pediatrics*. 2008 May 1;55(4):249-52.
21. Russo G, et al. Vaccine coverage and determinants of incomplete vaccination in children aged 12-23 months in Dschang, West Region, Cameroon: a cross sectional survey during outbreak. *BMC Public Health*. 2015 Dec;15(1):630.
22. Gul S, Khalil R. Immunization knowledge and practices among mothers attending a pediatric clinic in Karachi, Pakistan. *International Journal of advance in Medicine*. 2016. Dec 29;3(3):656-1.
23. Badar S, Qadri SK, Shaikh MS, Hussain W. CHILDHOOD IMMUNIZATION COVERAGE IN URBAN SLUMS OF BAHAWALPUR CITY.

24. Mohammed H, Atomsa A. Assessment of child immunization coverage and associated factors in Oromia regional state, eastern Thopia. *Science, Technology and Arts Research Journal* 2013;2(1):36-41.
25. Rasheed M, et al. Expanded Programme of Immunization (EPI) Status among children of Factory Workers. *JIsb Med Dental Coll.* 2104;2:62.
26. Siddiqui S, et al. Frequency of immunization of children upto five years of age according to vaccination card in Karachi-A multicenter study. *Ann Abbasi Shaheed Hosp Karachi Med Dent Coll.* 2017 Mar 1;22(1):12-9.
27. Gul R. Immunization coverage rate of children under one year of age and common factors responsible for immunization failure. *Northwest Journal of Medical Sciences.* 2018 Jul 19;2(2).
28. Ireye F, et al. Determination of Routine Vaccination Coverage Using Estimated and Survey Generated Population in Orhionmwon Local Government Area in South-South Nigeria. *J Infect Dis Med.* 2017;2(112):2576-1420.
29. Hailu S, Astatkie A, Johansson KA, Lindtjorn B. Low immunization coverage in Wonago district, southern Ethiopia: A community-based cross-sectional study. *PloS one.* 2019;14(7).
30. Tabatabaei SM, et al. Rural-Urban Differences in Reasons for Incomplete Vaccination in children under Six years, Southeast Iran 2013. *International Journal of Infection.* 2015;2(3).