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Frequency of Completely Immunize Children According to Expanded Program on Immunization (Epi) of Age 1-5 Years

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ABSTRACT

Background: Vaccination is an important and economical way to lower mortality and prevent childhood illnesses. Even with the Expanded Program on Immunization (EPI) in place in Pakistan, a sizable fraction of kids still lacks adequate vaccinations. **Objective:** The objective of this study was to ascertain the prevalence of full vaccination among children between the ages of one and five as well as the main obstacles affecting vaccination uptake. **Methods:** A qualitative investigation was carried out at a Quetta tertiary care facility. 120 parents of children ages 1 to 5 were selected at random and interviewed using a semi-structured questionnaire. We gathered and thematically examined data on immunization status, EPI knowledge, and perceived difficulties. **Findings:** According to EPI criteria, only 56.7% of children received all recommended vaccinations. Lack of knowledge (72.5%), the distance to immunization facilities (51.7%), fear of adverse effects (37.5%), false information, and financial limitations were common obstacles. For about half of the caregivers, their main source of information was healthcare professionals. **Conclusion:** The results show that structural, educational, and cultural hurdles have resulted in notable discrepancies in vaccine coverage. To increase immunization rates, it is imperative to improve community-level engagement, service accessibility, and public health education.

INTRODUCTION

The worldwide death toll for children younger than five amounts to 29,000 daily events and these fatalities stem mostly from things that can be avoided. The death rate of 8 million infants who do not survive beyond their fifth birthday exists mainly among children during their first year in poor nations. The opportunity of survival to childhood in Ethiopia stands thirty times lower than in Western Europe for children [1,2].

The availability of vaccines helps prevent two to three million fatalities across the world in present times. Research has shown that the global vaccination coverage for children consistently maintained its steady status since the last few years [4].

According to World Health Organization (WHO) guidelines, full vaccination status of children occurs when they reach one year old and have completed three vaccinations each of diphtheria pertussis tetanus toxoids (DPT) and received three polio vaccine doses and measles vaccine together with tuberculosis Bacillus Calmette Guerin (BCG). Ethiopia started implementing the pentavalent vaccine which combined DPT with HepB and Hib after introducing both viruses in 2007. This marked the end of DPT vaccine usage [6,7].

Data from World Health Organization indicates that since 2011 global coverage exceeded 83% for DTP vaccines as well as for individual doses of measles vaccine and three-consecutive doses of polio vaccine. The unvaccinated share worldwide exceeded one-fifth at twelve months particularly among infants living in developing countries because they failed to receive necessary childhood vaccinations [4,8].

A high infant mortality rate in developing countries demonstrates that expanded program on immunization target diseases represent a key contributor to high levels of childhood mortality and sickness [9]. The urgent vaccination process helps decrease both fatal and life-

threatening infections among children under five years of age. World Health Organization positions immunization among interventions with the strongest potential to affect health results [9].

The crucial goal of EPI for children at one year of age includes receiving their first doses of BCG, PENTA3, OPV3, and measles vaccines. [10] The influence of these practices varies depending on the specific nation [11]. The substantial growth in vaccination coverage throughout the past few decades provided industrialized countries with herd immunity coverage though many developing nations are struggling to maintain appropriate rates [12]. Every governmental effort has failed to stop under immunization among citizens.

Public health organizations persist in their attempt to reach 100% vaccination coverage yet multiple regions show inadequacy in their rate of vaccination. Vaccination-preventable disease outbreaks remain highly likely within rural communities according to health data [10].

There are particular regions which maintain inadequate vaccination rates even after governmental organizations combined with non-governmental entities pursued 100% coverage. Rural communities represent a geographical area where vaccine-preventable diseases remain particularly dangerous [10]. The delivery systems face numerous built-in problems because people with their negative biases and judgmental attitudes and their lack of interest [13].

The method of preventing severe diseases through vaccines remains the cost-effective option for safeguarding children from malnutrition-related fatalities while functioning as the prime metric to monitor health equality between various social groups. Scientists from diverse global regions have investigated low vaccination rates while discovering that parents' perspectives and comprehension directly influence their decision towards immunization [14, 15].

The infant mortality rate in Pakistan stands at 80 per 1000 live births making it a developing nation with a total population of 150 million people. The percentage of children who receive BCG vaccinations through the EPI reaches 80% while DPT3 and polio3 reach 65% and measles stands at 67% (10). Pakistan shows poor tetanus toxoid coverage at 56% among pregnant women according to research published in 2016 and 2017. [16–17] The areas that have the highest incidence of tetanus neonatorum exist in rural Pakistan because pregnant women lack TT protection and follow traditional practices of using cow dung on umbilical cords and wrapping newborns in sheepskin. Research through verbal autopsy in Pakistani territories identified acute respiratory infections (11.6%) and tetanus (11.7%) and diarrhea syndrome (21.6%) as the three main factors that led to infant deaths.

The vaccination rate in the Northwest Frontier province of Pakistan revealed that only 65% of children aged three years or younger received proper vaccination. The mother's busy schedule combined with administration challenges at EPI clinics and missing vaccines was the basis for failure to keep up with EPI schedules. 13 The EPI program addresses illnesses that heavily affect neonatal mortality rates so improving vaccine use can lower death rates. [18]

The principal objective of this study is to identify the number of children within 1–5 years who have received all their vaccinations through the Expanded Program on Immunization criteria.

LITERATURE REVIEW

The Expanded Program on Immunization (EPI) is one of the most economical public health initiatives in recent years to cut down the child mortality globally. Major advances have been made in the previous few decades, yet the immune coverage of children is still below ideal, particularly in developing countries, with the avoidable morbidity and mortality. This review of the literature focuses on the effects of factors involving research conducted in Pakistan as well as low-income countries on immunization among children ages 1 to 5 years old, the efforts to achieve full coverage and the consequences of low vaccination rates on public health.

According to several studies, high vaccination rates are key to preventing diseases such as polio, measles, tetanus, pertussis and diphtheria [19]. World Health Organization (WHO) guidelines define a child to receive all prescribed doses of BCG, OPV and DPT (or pentavalent) and measles vaccines on time by the time it is a year old, it is a fully vaccinated child. Although this suggestion has been made, many children in low-income areas are partially or totally unvaccinated due to a number of sociocultural, financial and practical obstacles [20].

Parental attitudes and views play a very important role in the adoption of immunization services. Research has found that lack of knowledge regarding the importance of vaccinations as well as the EPI schedule are among the major reasons behind low vaccinations in rural areas [21]. Misperceptions of vaccine safety; ignorance of discontagious diseases that are preventable by immunization; and mistrust of the medical establishment— all things that menace parents' willingness to follow the vaccination schedule — are responsible. Studies have found that cultural attitudes and laziness on parental part is more reason for low vaccination rate, some parents believe that vaccines are harmful or unnecessary [23].

However, immunity services still exert significant influence upon whether it is completely immunized. Another common problem in rural and isolated areas of developing nations is inadequate healthcare infrastructure, for instance, a deficiency of vaccines, qualified medical staff, and well-equipped immunization site. Despite this, geographical obstacles, limited transportation, and higher travel distances to reach immunization services are lured for parents to travel large distances to receive immunization services resulting into lower coverages [25]. These issues exacerbated by irregular vaccine supply and inadequate management of cold chain make it harder for immunization services to deliver services of a quality and availability.

Economic issues also influence vaccinations' coverage. Further, poverty and financial constraints limit many families in low-income settings to put making preventative healthcare measures a priority in the face of their immediate needs [27]. But in cases where vaccines are free or nearly so, caregivers don't get immunization services for their children for indirect expenses, transportation, lost daily income, and missed work [28]. Further, the finances provided by the government for immunization services in these areas have not been adequate and they have been further complicated by the lack of resources in the economy favoring wasteful allocation of resources [29].

Raising awareness and implementing of community-based projects have proven time and time again that they can have a massive impact on immunization rates. Religious leaders' and community leaders' outreach initiatives with local health professionals have successfully changed the minds of the skeptics and improve acceptance of vaccination [30]. Moreover, integrating immunization services into other initiatives aimed at the mothers and children has been shown to improve vaccine uptake [31]. Besides boosting vaccination rates, this integrated approach pumps heat into the whole health system by building trust among both community and healthcare provider.

The literature includes the contribution of health education to expansion of immunization coverage. Such educational programs for mothers and caregivers have been associated with complete immunization rates among children. Awareness of the disease's vaccines prevent and the benefits of early initiation of vaccination helps caregivers to follow the recommended vaccination schedule [33]. Studies reveal that social media, radio ads, as well as television ads are very effective in spreading important information and raising the awareness of the need to have vaccinations [34].

Despite these tactics, still marked differences remain in vaccination coverage. The reason urban residents have better immunization rates compared to that of the rural areas is that they have more access to healthcare facilities and have higher levels of education [35]. This urban-rural divide brings to surface the urgency of specialized solutions to address the different challenges the people living in rural live with. Addressing the three main priorities of providing the increasing availability of skilled healthcare personnel, ensuring an uninterrupted supply of vaccines, and strengthening the health care infrastructure in the rural areas is a major task for policymakers [36].

RESEARCH OBJECTIVE

The main aim of this study is to determine frequency of immunization of children 1 to 5 years of age as per EPI criteria. This study aims to measure the children who had gotten all EPI recommended vaccines during their first birthday including BCG, pentavalent (DPT, HepB, Hib), OPV, and measles by percentage, in children aged 1–5. The study also looked at the associations between the above sociodemographic characteristics (parental education, socioeconomic position and location), as well as parental views and their vaccination behaviors, and identified obstacles to full immunization. The results are aimed at providing evidence-based perspectives on what may inform policy and public health interventions that could increase vaccination and decrease unnecessary morbidity and mortality of children.

METHODOLOGY

This qualitative study was designed to ascertain baseline frequency and variables which influence children 1 to 5 years of age receiving all recommended vaccines as per the Expanded Program on Immunization (EPI) guidelines. The site of study was a tertiary care hospital in Quetta. Total of 120 individuals were chosen through randomness. The sample consisted of caregivers, however mainly mothers, of children aged 1 to 5 who visited the pediatric outpatient department. Data was collected using semi structured interview guide and the data were collected through semi structured interview based on EPI coverage, vaccination schedule awareness, perceived obstacles and enablers to full immunization. Audio recording of each of the interviews was done with permission and the verbatim transcription was made. To do this, thematic analysis was used to uncover themes and patterns that occur repeatedly. Ethical permission was received by the institutional review board, and all interviews had been preceded by informed consent by each participant.

RESULTS

Table 1

Demographic Profile of Caregivers (n = 120)

Demographic Variable	Frequency	Percentage (%)
Age of Caregiver		
20–29 years	46	38.3
30–39 years	58	48.3

40 years and above	16	13.4
Education Level		
No formal education	35	29.2
Primary education	42	35.0
Secondary and above	43	35.8
Relationship to Child		
Mother	94	78.3
Father	12	10.0
Other (e.g. grandmother)	14	11.7

Figure 1

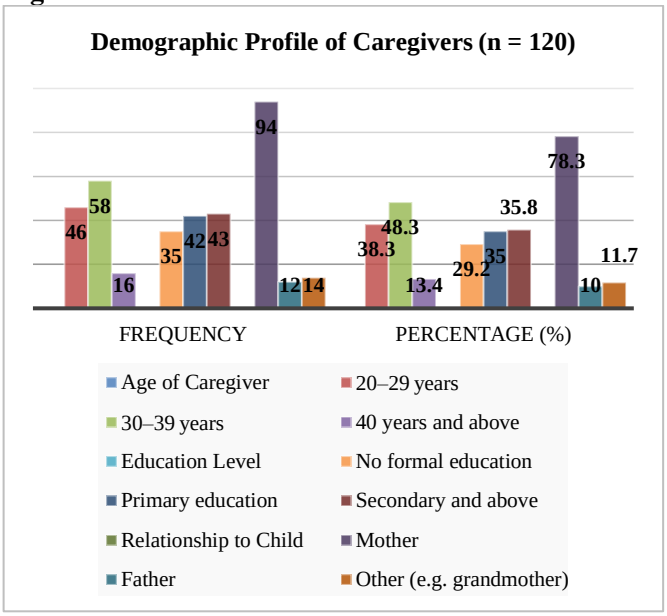


Table 2

Reported Barriers to Complete Immunization

Barrier Identified	Frequency (Mentioned in Interviews)	Representative Quote
Lack of awareness	87	"I didn't know he needed more after the first vaccine."
Distance to facility	62	"The hospital is too far, and I can't afford the transport."
Fear of side effects	45	"After the first vaccine, he had fever, so I got scared."
Misinformation	29	"Some people said the vaccine causes infertility."
Financial constraints	22	"We couldn't afford to miss work that day."

Table 3

Frequency of Complete vs Incomplete Immunization

Immunization Status	Frequency	Percentage (%)
Completely immunized	68	56.7
Partially immunized	39	32.5
Not immunized	13	10.8

Table 4

Number of EPI Doses Received by Children (Based on Interview Data)

Number of EPI Doses Received	Number of Children	Percentage (%)
All required doses (Complete)	68	56.7
3–5 doses (Partially immunized)	31	25.8
1–2 doses only	8	6.7
No doses received	13	10.8

Figure 2

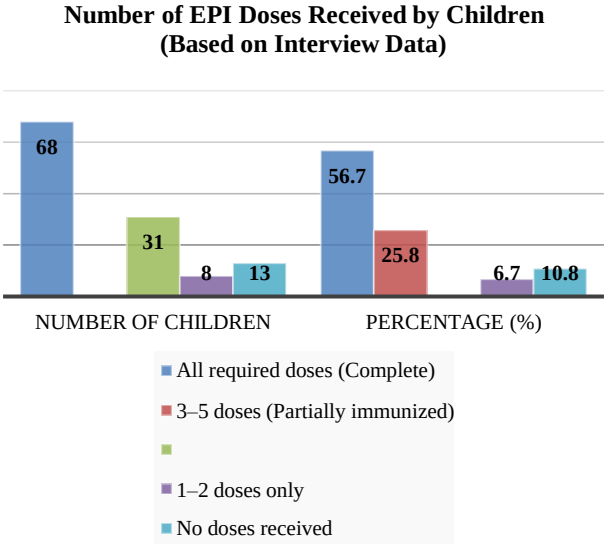
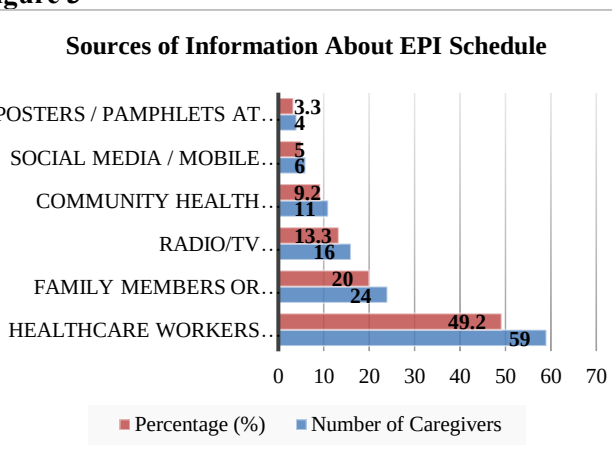


Table 5

Sources of Information About EPI Schedule

Source of Information	Number of Caregivers	Percentage (%)
Healthcare workers (doctors/nurses)	59	49.2
Family members or relatives	24	20.0
Radio/TV announcements	16	13.3
Community health workers (LHWs)	11	9.2
Social media / mobile messages	6	5.0
Posters / pamphlets at hospital	4	3.3

Figure 3



DISCUSSION OF RESULTS

This qualitative study discusses the results regarding the frequency of full immunization of children (1-5 years) with the Expanded Program on Immunization (EPI) standards and what still has been hindering take up of vaccination. The results show that only 56.7 per cent of the children received all the doses of the EPI. While only slightly over half this number is well down on the ideal rate for vaccine coverage. A big piece of child

population are at risk of unnecessary diseases such as measles, polio, and diphtheria due to a notable lack of vaccination compliance.

A thorough examination of the data shows that the 10.8 percent of the children were without any vaccinations and the 32.5 percent did not receive complete vaccinations. These figures are alarming since EPI vaccines are given free of charge and have been shown to be the most successful methods of reducing child morbidity and mortality. This, however, speaks of a problem that is etched, perhaps, at structural and sociocultural levels as opposed to being purely logistical or economical.

One of the most important conclusions from the study is that awareness and education of caregivers in the vaccination rates. Twenty-nine-point two percent of those interviewed by the caregivers had no formal education, while 35% had only finished primary school. This low level of formal education was very closely linked to children lacking or not having received immunizations. The frequently quoted statement,' I didn't know he needed more after the first vaccine,' reflects that many caregivers did not realize this was an entire EPI schedule. Thus, a big proportion of caregivers begins immunizing without completing future doses because you do not know their vaccination calendar.

Physicians and nurses remain the most popular and reliable information source for providing such information, as the majority of caregivers said that they learned about EPI from healthcare providers. It doesn't seem like it's enough to have total coverage just by relying on medical professionals. Family members (20%), the media (13.3%) and community health workers (9.2%) were other sources which had less impact. Interestingly enough, digital/social health communication methods (5%) were least used sources which means that digital health communication methods have some work to do.

Both perceptual and structural barriers to full immunization were found by the study. Ignorance was mentioned as the most often barrier cited by 87 caregivers. The last was that of physical inaccessibility, in which 62 individuals noted that it was impossible for them to travel far to reach medical facilities. Transportation concerns were particularly difficult for low-income families who could not pay the trip expenses. Financial restrictions related to the cost of vaccinations; these restrictions did not necessarily directly relate to the cost of vaccinations but to indirect ones like a day of work, or transportation. This is demonstrated even when healthcare services are free.

Fear of adverse effect was another well cited deterrent (mentioned by 45 caregivers) (some of the caregivers had expressed the fear after witnessing their children's post vaccination fevers). This suggests that caregivers aren't treated adequately with post-vaccination counseling about how people typically respond to vaccines. In addition, 29 caregivers suggested that vaccines cause infertility or other health problems, among other false things. The myths, which have their culture basis, call for such attention to be given to vaccine hesitancy and awareness programs are greatly needed.

However, these numbers should be noted in the light of the urban rural split and socio-economic asymmetries that probably also regulate these numbers. The study most likely attracted caregivers who were able to access health services or were relatively better informed. The rates shown here may be far lower than truth in isolated or underprivileged communities. In addition, even the entry does not guarantee compliance, as the fact shows that only 56.7% of the children who were dispatched to health facility received all the needed doses.

Also, the information details the importance of enhancing community level initiatives. For instance, 9.2 percent of respondents rely on Lady Health Workers (LHW) as a source of information, limiting the scope and effectiveness of these community-based initiatives. The ability of LHWs to offer individually tailored door-to-door services makes them potential actors for raising awareness and tackling vaccine hesitancy at the local level.

CONCLUSION

This study aimed at identifying the prevalence of full immunization among children under 5 years and the major determinants of the vaccination adherence as influenced by the Expanded Program on Immunization (EPI). However, according to the findings, there was quite a wide other gap in reaching universal immunization coverage: just 56.7 percent of youngsters had gotten all of the advised vaccinations. Even with free vaccinations, a lot of children remain partially or totally unvaccinated and are in danger of diseases that can be prevented and further increase the morbidity and mortality rate among children.

There are a number of interrelated variables leading to low vaccination rates. The first major obstacle is lack of caregiver knowledge and instruction of the entire EPI regimen, leaving many of the population to stop getting vaccines after first dose. Additionally, in many cases, low-income families cannot afford to travel to healthcare facilities, and if it is not prohibitive in time off from work, they are unable to do so. False information and doubts about the side effect of the vaccine also further discourage parents to follow the vaccination schedule.

Furthermore, the media and the community health workers had a very low role in the provision of EPI information, whereas healthcare professionals are the main source of information, suggesting unrealized

potential for appropriately comprehensive public health messaging. To boost vaccination uptake, it is imperative to increase health education, and increase outreach through community-based interventions and also clear cultural misconceptions.

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