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"Assessment of Knowledge Regarding Poliomyelitis Immunization among Pregnant Women in Sitamarhi District"

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Abstract

Poliomyelitis is a viral illness that mostly affects babies and young children. About half of all cases (about 50%) happen in babies. Different risk factors can cause paralytic poliomyelitis in people who are already infected with the poliovirus. A field survey conducted among rural pregnant women (N=400) further underscored deficiencies in awareness. Almost seven out of ten people who answered (69.5%) didn't know much about polio, and one-fourth (25%) only had a fair level of understanding. In this study, 47.5% of respondents reported stiffness and pain in the neck and back muscles, which are recognized prodromal symptoms of the disease. Paralytic polio, although uncommon, occurs in under 1% of infections when the virus penetrates the central nervous system, leading to varying levels

of paralysis. In terms of its effect on the nervous system, 43.5% of respondents strongly agreed that polio harms the nerves, and 49% said that it could cause mild paralysis. These results highlight the pressing necessity for focused health education initiatives to enhance awareness of poliomyelitis and its prevention within at-risk populations. **Key words** - Infant mortality, low-cost measures, immunization, IPV, OPV

Introduction

Infants aged 0–1 year constitute approximately 2.7% of India's total population. Globally, out of around 140 million children born annually, a significant 90% are still born in developing nations (UNICEF & UN IGME, 2023). Despite notable progress where survival rates for newborns have improved substantially, with the infant mortality rate declining by more than 50% in the past two decades the initial hours, days, and months of life remain a crucial period for infant health and survival (WHO, 2023).

A significant percentage of infants, approximately 18%, are born with low birth weight, increasing their vulnerability to infections and various diseases (Christian et al., 2023). This vulnerability persists in causing infant mortality in numerous developing nations. About two-thirds of all infant deaths still happen in the first month of life, which shows how important it is to get care and help right away after birth (WHO, 2023).

The weaning phase presents additional challenges, as about one in four surviving children do not receive adequate nutrition either in quality or quantity to replace the nutrients initially supplied by maternal milk (IIPS & MoHFW, 2021). This nutritional deficiency can lead to long-term health impairments, affecting growth, cognitive development, and overall well-being.

India's current infant mortality rate is about 27 per 1,000 live births (2022), which is a big drop from the previous rate of 74 per 1,000. However, it is still much higher than the rate of 8 per 1,000 in developed countries. These numbers show how far India and other countries like it have come. "The rate of death for children under 5 years (U5MR) in India is about **32 per 1,000** live births, and the neonatal mortality rate (NMR) deaths among newborns within the first 28 day is about **19–20 per 1,000** live births (MoHFW, 2023)."

There are many low-cost measures available to save millions of children's lives, such as immunization, breastfeeding, birth spacing, growth monitoring, improved weaning, and oral rehydration therapy. Attention remains focused on these aspects of child health care in developing countries. Mother and Child Health (MCH) is not a new specialty; it is a method of delivering health care to vulnerable groups within the population, particularly children under five years and women of reproductive age (15–49 years). These groups together still comprise about 30–31% of India's total population (IIPS & MoHFW, 2021).

Infant Mortality Rate

The infant mortality rate (IMR) is defined as "the ratio of infant deaths registered in a given year to the total number of live births registered in the same year; usually expressed as a rate per 1,000 live births" (Meredith Davis, JB, 1983). It is calculated using the following formula:

$$\text{IMR} = \frac{\text{Number of death of children less than 1 year of age in a year} \times 1000}{\text{Number of lives births in the same year}}$$

The infant mortality rate (IMR) is universally regarded as a key indicator of a community's health status, the general standard of living, and the effectiveness of maternal and child health (MCH) services (UNICEF & UN IGME, 2023). Infant mortality receives special attention from demographers for several reasons: (a) it represents the largest single age category of mortality; (b) deaths in this age group result from a unique set of diseases and conditions to which the adult population is less exposed or vulnerable; and (c) infant mortality can be quickly and directly impacted by specific health programs, often changing more rapidly than the general death rate (WHO, 2023).

To strengthen MCH services, the Government of India has launched several schemes, including the Universal Immunization Programme (MoHFW, 2023). Communicable diseases vary in type, with poliomyelitis being a major example of an intestinal infection (Park, 2011).

Poliomyelitis

Poliomyelitis is caused by three types of viruses (polio 1, 2, 3). It is an acute intestinal viral infection caused by an RNA virus. While primarily an infection of the human alimentary tract, the virus can infect the central nervous system in about 1 per cent of cases, leading to varying degrees of paralysis and, possibly, death (WHO, 2016).

Poliomyelitis is considered eradicable because humans are the only hosts. Mass immunization campaigns, such as the Pulse Polio Programme, achieve this by administering the oral polio vaccine (OPV) simultaneously within a short period, interrupting the transmission of wild poliovirus. This effect is maximized when vaccination coverage reaches 100 per cent of the at-risk population, specifically children under three years of age (Kew, 2012).

In India, polio primarily affects infants and young children, with about 50 per cent of cases reported in infancy. The most vulnerable age group is between six months and three years. A notable sex difference exists, with the ratio of affected males to females being 3:1 (Park, 2011).

Mode of Transmission

Faecal-Oral Route

In developing countries, the main route of poliomyelitis spread is through poor hygiene practices. The infection can spread directly through contaminated fingers or indirectly through contaminated water, milk, food, flies, and everyday objects (WHO, 1985; Al-Moukhtar & Al-O, 2011).

Paralytic Polio

The virus invades the central nervous system (CNS), causing varying degrees of paralysis. The predominant sign is asymmetrical flaccid paralysis. Affected children may have difficulty sitting, requiring support from their hands and partially flexing their hips and knees. The paralysis is descending, starting at the hip and moving down to the distal parts of the extremity.

Other symptoms may include facial asymmetry, difficulty swallowing, weakness or loss of voice, muscle pain and soreness, neck and back stiffness, followed 2–3 days later by weakness or paralysis in groups of muscles in the lower limbs, upper limbs, and muscles involved in breathing (McCloskey, 1979).

It is important to note that for every case of paralytic polio, there are at least 100–1,000 children who develop non-paralytic polio and recover without any paralysis (Kew, 2012). Besides severe disability due to paralysis, death can occur from brain involvement and paralysis of the muscles involved in breathing.

Immunization

Immunization is the sole effective means of preventing poliomyelitis. It is essential to immunize all infants by six months of age to protect them against polio (WHO, 2016). Two types of vaccines are used worldwide:

- **Inactivated (Salk) polio vaccine (IPV)**
- **Oral (Sabin) polio vaccine (OPV)**

The inactivated polio vaccine (IPV) contains all three types of polio virus, inactivated by formalin. The oral polio vaccine (OPV), described by Sabin in 1957, contains live attenuated virus (types 1, 2, and 3).

Prevention

Pulse Polio Immunization Sessions (PPIS) involve administering OPV to all children aged 0–5 years across the country on a single day, regardless of their previous immunization status. These supplemental doses do not replace those given in routine immunization (MoHFW, 2003; Angadi et al., 2013).

The routine immunization schedule for OPV includes 2 drops at birth (along with BCG), at 6–8 weeks, 10–12 weeks, and 14–16 weeks (with DPT), at 7–9 months (with measles), at 15–18 months (with DPT booster), and at 4½ years (with DPT booster). The vaccine can lose its potency if not stored under strict cold chain conditions (Park, 2011).

To prevent infection, proper environmental sanitation (safe disposal of sewage) and personal hygiene (safe drinking water, handwashing with soap and water) are essential.

Material and Methods

The study was conducted in the Dumra block of Sitamarhi District, Bihar. Four hundred households

were randomly selected. Data were collected using a pretested interview schedule, constructed after identifying dependent and independent variables. Statistical tools used were percentages and frequencies.

Results & Discussion

Table -1 Knowledge about Infant Immunization: Polio (N=400)

Sl. No.	Aspects	Categories	Frequency	Percentage
1.	Sign and Symptoms of Polio	Stiffness and Pain in neck and back	182	47.5
		Muscles Breathing problem	108	27
		Fever	100	25
		All of these	100	25
2.	Polio effect nerves	Yes	174	43.5
		No	226	56.5
3	Polio causes mild Paralysis	Yes	196	49
		No	204	51

Signs & Symptoms of Polio: In India, polio primarily affects infants and young children, with about 50% of cases occurring in infancy (Park, 2011). Among 400 responses, 47.5% accurately identified stiffness and pain in the neck and back muscles as symptoms of polio, whereas 25% acknowledged all principal symptoms.

Polio affects Nerves: Paralytic polio occurs in less than 1% of infections. Regarding the effect of polio on nerves, 43.5% of respondents strongly affirmed that it affects nerves, while 49% reported that polio causes mild paralysis (Ahmad et al., 2015. The findings reveal a considerable awareness of polio symptoms, although a limited comprehension of its neurological consequences and ability to induce paralysis.

Table -2 Distribution of Percentage of Women according to their Knowledge about Polio (N=400)

Sl. No.	Categories	Range of Marks	Frequency	Percentage
1.	Good	8-11	22	5.5
2.	Fair	4-7	100	25
3.	Poor	0-3	278	69.5

Knowledge about Infant Polio Immunization: Polio Only 5.5% of the 400 women surveyed showed good knowledge about polio, getting 8–11 scores. About 25% of the people who took the test knew a decent amount (scoring 4–7), whereas 69.5% knew very little (scores 0–3). This shows that the

participants don't know much about polio and don't grasp it very well.

Conclusion

The most vulnerable age for polio is between 6 months and 3 years (Park, 2011; WHO, 2016). Despite decades of immunization campaigns, the findings of the present study revealed that the majority of respondents still had poor knowledge about polio and its prevention, which is consistent with earlier studies highlighting gaps in awareness among parents and caregivers (Ahmad et al., 2015; Angadi et al., 2013; Al-Moukhtar & Al-O, 2011). This underscores the need for continued health education, awareness drives, and targeted interventions to achieve sustainable eradication goals (Kew, 2012; UNICEF & UN IGME, 2023).

Suggestions

1. Public gatherings as a way to raise awareness about vaccinations: Public gatherings can be utilized to teach people how important it is to get vaccinated. In the past, mass communication tactics have helped more people become vaccinated (Orthodoxy defeats immunization, 2015; WHO, 1985).
2. Students' role in spreading the word: Schools and colleges should encourage students to share what they know about preventative health care. Getting young people involved has been a successful strategy to boost awareness about immunization, especially in rural and underserved communities (Angadi et al., 2013).
3. Resource distribution for at-risk groups: It is still important to make sure that enough resources are available to help the most vulnerable members of society, such as infants, young children, and women of childbearing age. Evidence indicates that enhancing maternal and child health (MCH) outcomes necessitates not only immunization but also nutritional support and maternal health interventions (Christian et al., 2023; MoHFW, 2023; UNICEF & UN IGME, 2023).
4. Strengthening the Expanded Program on Immunization (EPI):
    - Training village leaders in EPI to get more people involved (Ahmad et al., 2015; Al-Moukhtar & Al-O, 2011).
    - Getting more people to get their vaccinations every year through integrated outreach (MoHFW, 2003; Park, 2011).
    - Campaigns to raise awareness and targeted information drives to fill in knowledge gaps (Orthodoxy defeats immunization, 2015).
    - Improving monitoring and accountability by making the EPI information system stronger at the state and district levels (WHO, 2023; MoHFW, 2023).

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