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Original Research Article

Knowledge, attitude and practices regarding immunization among parents with children in the age group 12 to 24 months

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ABSTRACT

Background: Immunization is one of the most indispensable community-based health interventions with unquestionable ability to improve a nation's health status. In spite of evidences about the effectiveness of vaccines, millions of children around the world are lagging behind exposing them and their community to a risk of epidemics. Despite efforts taken to improve vaccination coverage, India has only succeeded in achieving 65% coverage in childhood immunization. We aim to determine parental knowledge, attitudes and practices regarding childhood immunization.
Methods: It is a questionnaire-based observational study involving 95 parents with children aged 12 to 24 months, conducted in a tertiary care hospital in Tamil Nadu.
Results: Ninety children have been completely immunized according to age. Nearly 60% children did not receive vaccinations according to prescribed schedule. More than half parents believed that vaccines are efficient in preventing diseases, which was statistically associated with education of parents. Although there is a good immunization coverage in our locality, 17.89% parents still doubt the safety of vaccines and one-fifth of respondents had misapprehensions that vaccines may cause long-term consequences in children.
Conclusions: We found that multiple factors play a role in determining the immunization status of the population, including sociodemographic characteristics, level of knowledge and attitudes towards immunization. Therefore, improving knowledge, attitudes and practices regarding immunization among parents is one of the key initiatives towards building a disease-free nation.

Keywords: Immunization, Vaccine**,** Vaccine preventable diseases

INTRODUCTION

According to World Health Organization (WHO), "Immunization is a process whereby, a person is made immune or resistant to an infectious disease, typically by administration of vaccine".[1] The concept of immunization is not restricted to one person but concerns the entire community, whereby a vaccinated child is not only protecting himself/herself but also indirectly protecting others by preventing spread of vaccine-preventable diseases (VPDs). This is termed as herd immunity. Through this, immunization has become a proven strategy with conceivable potential of reducing 2 to 3 million deaths per annum worldwide.[2] Vaccinating a child with appropriate vaccines would significantly reduce costs of disease treatment and incidence of diseases and, therefore improve the child's quality of life.

In India, childhood immunization has been a chief contributor in the decline of under-5 mortalities from around 233 per 1000 to 63 per 1000 over the past five

decades.[3] Although India is a leading manufacturer and exporter of vaccines, around one-third of world's partially immunized children are part of the nation's population.[4] As a result, VPDs are still responsible for more than 5 lakh deaths annually in India.[3] Common issues delaying India's progress in this war for immunization includes poverty, low maternal literacy rates, prevalence of myths, lack of awareness and lack of access to adequate medical health facilities in rural areas. Therefore, it is important to spread awareness about the necessity of immunization, and ensure that parents have adequate information about immunization schedule.

Pandemics can have a significant impact on access to essential health services leading to higher rates of morbidity and mortality.[5] Not different from other pandemics, the ongoing Covid-19 pandemic has also interrupted immunization services globally, with a comparatively higher impact in the developing countries including India. Evidence from previous pandemics had clearly revealed that even a temporary disruption of routine immunization services can result in massive public health crises due to outbreaks of VPDs.[6]

The purpose of present study was to gain information on knowledge, attitude and practices regarding childhood immunization from parents of children aged 12 to 24 months. There are no recent studies in this part of India pertaining to awareness of parents on immunization. We intended to assess the shift in parents' perspective towards immunization owing to the improving literacy rates and employment status in Tamil Nadu. Essentially this study will help health professionals gain an understanding of the parents' awareness in order to provide them with further information to improve their adherence to immunization schedule and on a larger scale, to reduce the prevalence of VPDs.

Immunization is one of the cost-effective health investments, with scientifically proven strategies that make it accessible to even the most underprivileged and vulnerable populations to reduce global morbidity and mortality. Though there are many community-based programs in India to improve immunization coverage such as the Universal Immunization Program, the progress in vaccination coverage is slow throughout the nation. To fully address these issues, health-care professionals should work together in multidisciplinary teams in vaccination programs to disseminate evidence-based information about the effectiveness and safety of vaccinations, and about risks of VPDs.

In addition, it is essential to monitor the immunization coverage in periodic intervals and carry out necessary interventions to improve the nation's vaccination status.

METHODS

A questionnaire based cross-sectional study was conducted in an urban-based tertiary care hospital in Tamil Nadu. This study was conducted over a period of 2 months (August 2022 to September 2022). The sample size of 95 parents was calculated using single population proportion formula.

Inclusion criteria

Parents of children belonging to the age group 12 to 24 months attending out-patient department or admitted in this center were participants of this study.

Exclusion criteria

Parents who did not give consent to participate and parents of children with severe co-morbidities like leukemia, lymphoma, receiving immunosuppressants were excluded from the study.

Data collection

Predesigned and pretested questionnaires were used to collect data on socio-demographic profile (age, residence, educational qualification, occupation and income), and the knowledge, attitudes and practices regarding childhood immunization. Questionnaire has been validated by three expert pediatricians. Questionnaire was translated into the regional language which was reviewed and back translated by pediatrician to check the accuracy of the terms used. Any discrepancies in the translated version were resolved. Final version was prepared after a pilot study with 10 participants. In this study, a simple random sampling technique was used to select the participants. Written informed consent form was obtained from parents who gave consent to participate after explaining to them the objectives of this study in the participant's own language.

Statistical analysis

Data entry and statistical analysis were carried out using SPSS software version 26 and Microsoft Excel. The analysis of the collected data was done on the basis of scalar-scoring method. All correct responses were given one point and wrong or uncertain responses were awarded zero point. The widely-adopted bloom's cutoff scores were used to categorize the KAP scores into good (80%-100%), moderate (60%-79%) and poor (<59%).[7] All results are expressed as percentages and numbers.

RESULTS

General characteristics of the study population

A total of 95 parents of children in the age group 12 to 24 months were included in the study. The mean age of child, mother and father were 17 months, 27 years and 33 years, respectively. Among the study population, 44 (46.32%) were females and 51 (53.68%) were males. Majority (67.37%) were from urban localities. More than

half, 63 (66.32%) mothers and 61 (64.21%) fathers involved in the study were well-educated (Table 1).

Table 1: Socio-demographic characteristics of participants of the study (n=95).

Variables	Frequency (n=95)	Percentage (%)
Age of child (mean±SD)	17.821±3.063	
Gender of child		
Female	44	46.32
Male	51	53.68
Place		
Urban	64	67.37
Rural	31	32.63
Age of mother (mean±SD)	27.88421±4.187	
Maternal education		
Primary	5	5.26
Secondary	27	28.42
Graduate	63	66.32
Maternal occupation		
Housewife	82	86.32
Employed	13	13.68
Age of father (mean±SD)	33.094±4.976	
Paternal education		
Primary	13	13.68
Secondary	21	22.11
Graduate	61	64.21
Paternal occupation		
Unskilled	5	5.26
Skilled	26	27.37
Professional	64	67.37
Type of family		
Nuclear	49	51.58
Joint	46	48.42
Socio-economic class		
Upper	18	18.95
Upper-middle	46	48.42
Lower-middle	22	23.16
Upper-lower	9	9.47
Lower-lower	0	0

Of the study population, 36.84% and 32.63% utilized doctors and other health-care workers as their primary source of information, respectively. Other sources of information were antenatal clinics, media, friends and family members (Figure 1).

Using the calculated KAP score, it was found that around one-third of our study population had good knowledge and positive attitudes regarding childhood immunization (Figure 2).

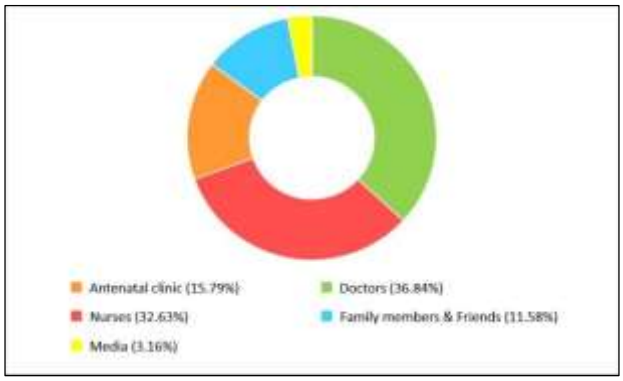

Figure 1: Source of vaccine information (n=95).

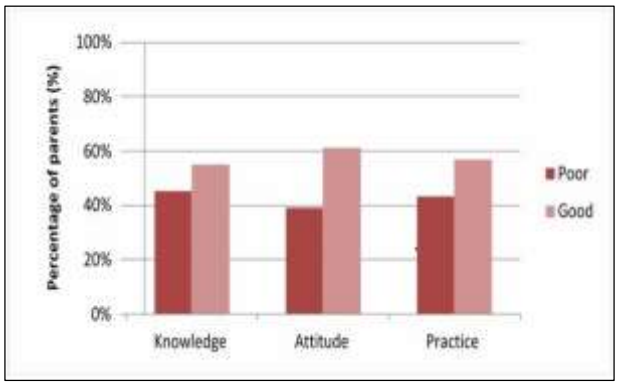

Figure 2: Overall immunization knowledge, attitude and practices among parents (n=95).

Knowledge of parents about childhood immunization

Majority of respondents (95.79%) understood that vaccination coverage is necessary to avoid epidemics. Eighty-two respondents (86.32%) were aware that it is necessary to vaccinate against uncommon diseases and eighty-six respondents (90.53%) rightly pointed that it was necessary for a child to be completely immunized. Only around twenty-four percent of responders were aware that common cold, low-grade fever, ear infection and diarrhea are not contraindications for vaccination. A satisfying number of respondents (61.05%) were aware that local herbs cannot be a substitute for immunization. A small fraction of respondents (16.84%) had misconceptions that vaccines might cause diseases like autism in children. Fifteen (15.79%) had misinterpretations that a healthy child need not be vaccinated and ten (10.53%) responders had a misbelief that well-breastfed babies need not be immunized. Nearly half (47.37%) had a false opinion that multiple vaccines at once can overload the child's immune system (Table 2).

In our population, a very meagre number (3.16%) of respondents had a false opinion that vaccination was meant only for male children. Around 30% of respondents had the misconception that one dose of a vaccine is sufficient to protect the child against the

disease. None of the parents could name all the VPDs. The highest number (60%) of parents named polio and 48 parents (50.53%) named tuberculosis when asked about VPDs.

Table 2: Immunization knowledge assessment of parents (n=95).

Knowledge questions	Participant's response	
	True (%)	False (%)
Vaccine coverage is necessary avoids epidemics	91 (95.79)	4 (4.21)
It is necessary to vaccinate against uncommon diseases	82 (86.32)	13 (13.68)
Vaccines are safe	80 (84.21)	15 (15.79)
There is a relationship between vaccines and chronic illnesses	79 (83.16)	16 (16.84)
Vaccines are efficient in preventing diseases	62 (65.26)	33 (34.74)
Multiple vaccinations at once can overload the immune system	50 (52.63)	45 (47.37)
A child with minor illnesses should not be vaccinated	22 (23.16)	73 (76.84)
A child can become infected with the disease for which he/she was vaccinated	66 (69.47)	29 (30.53)
Local herbs are good substitutes for immunization	58 (61.05)	37 (38.95)
Immunization is necessary for a healthy baby as well	80 (84.21)	15 (15.79)
Immunization is necessary for a breastfed baby	85 (89.47)	10 (10.53)
Not only a male but also a female child should be immunized	92 (96.84)	3 (3.16)
One dose is sufficient for the child to be protected against the disease	65 (68.42)	30 (31.58)
It is essential for a child to be completely immunized	86 (90.53)	9 (9.47)

Attitudes of parents about childhood immunization

Based on attitude assessment, majority (98.95%) of the responders suggested that educating parents about benefits of immunization is necessary. Seventy-nine responders (83.16%) thought that it was the duty of healthcare professionals to educate parents about immunization. Ninety-one (95.79%) responders believed that immunization is crucial for protecting children from infectious diseases. On the other hand, seventeen (17.89%) parents still doubt the safety of vaccines. Nearly fifty percent of responders believed that the incidence of diseases had decreased only because of immunization, rather than better hygiene and sanitation. About one-third responders (29.47%) had an opinion that pharmaceutical companies promote vaccines for their profit. More than 90% of parents would recommend others to vaccinate their children according to national immunization schedule. About thirty percent of the responders felt that long distance immunization centers would be a barrier for immunization. More than half (64.21%) of the parents had an opinion that vaccines should be made more affordable to improve vaccination coverage (Table 3).

Table 3: Attitude assessment of parents (n=95).

Attitude questions	Participant's response	
	Yes (%)	No (%)
Do you doubt the safety of vaccines	17 (17.89)	78 (82.11)
Educating parents about immunization is important	94 (98.95)	1 (1.05)
Health practitioners play a vital role in educating parents about immunization	79 (83.16)	16 (16.84)
It is safer than idle to vaccinate children against infectious diseases	91 (95.79)	4 (4.21)
The incidence of diseases begun to decrease, before mandatory vaccinations, as a result of better hygiene and sanitation	48 (50.53)	47 (49.47)
Pharmaceutical companies promote vaccinations for their profit	28 (29.47)	67 (70.53)
I would advise others to vaccinate their children according to the national immunization schedule	87 (91.58)	8 (8.42)
Long distance immunization centers would be a barrier for immunization	32 (33.68)	63 (66.32)
The father should also be involved in immunization of the children	89 (93.68)	6 (6.32)
Vaccines should be made more affordable	61 (64.21)	34 (35.79)

Practices and other related factors regarding childhood immunization

A large proportion of children (94.74%) were fully immunized and the remaining (5.26%) were partially immunized. Common reasons for child being partially immunized were ongoing pandemic and lack of faith on the benefits of immunization. Among fully immunized children, only 40% completed the vaccination schedule on time. The common reason for the delay in vaccination was the ongoing Covid-19 pandemic, translating to around 90%. All mothers (100%) were vaccinating their children using the immunization card.

More than ninety-five percent (95.79%) of the parents were ready to immunize their children according to the national immunization schedule. Around ten parents (10.53%) had difficulty accessing hospital for vaccination. Among the study participants, 69.47% of the parents were informed about the dates for subsequent vaccination by the healthcare worker and 21% of parents reported that the child developed mild side-effects after vaccination (Table 4).

Table 4: Immunization practices assessment of parents (n=95).

Immunization practices	Participant's response	
	Yes (%)	No (%)
I will vaccinate my child according to the national immunization schedule	91 (95.79)	4 (4.21)
My child has been immunized according to the national immunization schedule	90 (94.74)	5 (5.26)
I regularly use the immunization card	100 (100)	0 (0)
I have difficulty in accessing the hospital for vaccination	10 (10.53)	85 (89.47)
The healthcare worker has informed me about my child's next vaccination date	66 (69.47)	29 (30.53)

DISCUSSION

Immunization coverage is an important indicator to assess the effectiveness of immunization services. It provides information on the proportion of children who are up-to-date with the recommended immunization schedule. In the present study, the immunization coverage was determined as 94.74% which is much higher than the national immunization coverage of 62%. The vaccine coverage in our population was consistently higher compared to 70% in Tamil Nadu.[8] Our finding was in accordance to 90.85% determined by Singh et al.[9] In contrast to other countries such as Europe, and United States[11] the vaccination coverage in our population did not decline as a result of Covid pandemic.[10]

Globally, the Covid-19 pandemic is a chief reason for delaying scheduled vaccinations. The UNICEF reported at least 23 million children around the globe missed out on basic childhood vaccines in 2020 due to Covid-19 related disruptions of routine vaccination.[12] Although the immunization coverage did not decline in our population, almost 60% of children had delay in receiving their vaccines. The prevalence of vaccination delay in our study population was higher compared to studies from Saudi Arabia and Pakistan.[13,14] Efforts should be taken to communicate the benefits of timely immunization through counselling and health education, along with appropriate immunization delivery approaches under safe circumstances for the children, parents, health workers and the community.

In the present study, all mothers (100%) used immunization card to vaccinate their children. This was higher compared to 90% reported by Fad et al in Sudan. In our study, majority of parents (69.47%) utilized the health-care workers as their main source of information regarding childhood immunization.[15] Similar findings were reported in previous studies from Ethiopia and Saudi Arabia.[16,17] This might be attributed to the increasing institutional deliveries and the indispensable role of better communication between health-care providers and parents over the recent years. This finding was significantly higher compared to 43.6% and 49.5% reported by Dativah et al and Verulava et al, respectively.[18,19] On the other hand, studies conducted in Libya and Nigeria reported paramedical workers, television, and antenatal clinics as the main source of information, respectively.[20,21]

In the present study, 95.79% of the parents were cognizant of the importance of vaccination in preventing epidemics. This finding was comparable to results reported by Almutairi et al, while it was much higher compared to 72.9% reported by Mohammed et al and 55% reported by Fad et al.[22.23,15] Among our study population, 65.26% of the parents believed that immunization prevents the occurrence of infectious diseases in children. Our study finding was significantly lower compared to 95% reported by Herath NC et al.[24] This highlights the need for implementation of community-based health programs to promote awareness regarding benefits of immunization. Around 70% of the parents believed that multiple doses of the same vaccine were necessary to protect the child from certain VPDs. This finding was in line with the study performed by Thirumalai Kumar et al, while it was higher compared to Dativah et al.[25,18] In this study, 86.32% of the parents were aware that it is necessary to vaccinate children against uncommon diseases. It is crucial to understand that the low incidence and prevalence of these uncommon VPDs is masking the tenacious threat which could emerge if adherence to the schedule declines. Most parents (76.84%) had misconceptions that minor illnesses were contraindications for vaccination. This result was much higher in relation to findings from studies performed by Dativah et al and Verulava et al.[18,19] Around two-thirds of responders were aware that complementary and alternative medicines are not good substitutes for immunization. However, the remaining one-third who believed that local herbs can be a replacement for immunization did not refuse vaccination for their children, unlike the study performed by Zuzak et al, where 12.7% of responders refused basic vaccination.[26] A small proportion of the study population (16.84%) believed that there is a relationship between childhood immunization and autism spectrum disorder, similar to findings from other published studies.[25,26]

Studies performed to determine the relationship between vaccines and autism were not able to establish any causal association.[27,28] Around 50% of the parents believed that multiple vaccinations at once can have negative impacts on the child's immune system. This finding was congruent with the results drawn from the study performed by Thirumalai Kumar et al.[25] Nearly 10% of the parents had a misconception that immunization was not necessary for healthy and well-breastfed babies, of which majority of respondents were rural-dwellers. This finding may be attributed to the fact that parents residing in urban localities were more likely to be educated and have better access to health services compared to their counterparts, which may increase their knowledge about childhood immunization. Efforts towards ensuring adequate immunization education among parents are needed in order to eliminate such misconceptions and misbeliefs prevalent in the community.

Parents' attitudes towards immunization have a great impact on the vaccination status of their children. Eighty-two percent of parents believed that it was safe to administer vaccines for their children. This finding was in alignment with Almutairi et al, where 83% of the respondents believed the safety of vaccination.[22] Although immunization coverage in India is reasonably high, concerns about safety of vaccines may adversely impact parents' decisions to vaccinate their children. This has potential to decrease the vaccine coverage, putting the population under threat of deadly disease outbreaks. In the current study, more than 83% of parents presume that healthcare workers play a vital role in educating parents about immunization. A good patient-physician communication had proved to evoke a positive attitude regarding childhood vaccination among parents.[29] Among our study population, there was mixed opinion regarding the relationship between hygiene, sanitation and incidence of infectious diseases. Previous systematic reviews and meta-analysis found the protective role of improved hygiene and sanitation against several infections.[30] However, the studies included in these reviews were mainly observational or small-scale trials. Since there are inconclusive evidences regarding the relationship between improved hygiene and sanitation, and incidence of infectious diseases, it is important to maintain optimum rates of immunization to prevent the rise in the incidence of vaccine-preventable infectious diseases. In our study population, around 90% of the parents stated that they would recommend others to vaccinate their children. Studies by GebreEyesus et al and Almutairi et al reported similar findings. High fidelity and adherence towards the recommended schedule have potential to develop herd immunity, thereby creating a disease-free nation.[16,22] A considerate number of respondents from urban localities, and with better education status had the opinion to make vaccines more affordable. This could be attributed to the better awareness about optional vaccines among this group of respondents.

Good parental practice of immunization is crucial in reducing incidence of VPDs. In the present study, more than 95% of the parents asserted that they will vaccinate their children according to the national immunization schedule, which means that parents among our study population have adequate information and good immunization practice. In addition, this is a reflection of the trust that our population has on the national immunization program.

The main limitation of our study is the small sample size compared to previous reports. Another limitation concerns selection bias, because the sampling technique may have been inaccurate as the sample under investigation may not be representative of the entire community. Finally, a social desirability bias is also possible since parents tend to respond to questions in a manner that will be favorably viewed by others.

CONCLUSION

In conclusion, it is paramount to streamline efforts towards improving knowledge among parents with lower levels of education, increasing access to those in rural localities and eliminating the widely prevalent misconceptions regarding immunization. During the times of pandemic, it is of greatest importance to strengthen the vaccine production and supply chain to establish catch-up immunization campaigns and promote innovative approaches like mobile vaccination centres. The findings of our study would give a clear understanding about the factors affecting the parental decision to immunize, and implement fruitful measures to improve childhood immunization practices and adherence, especially in developing countries.

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