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Original Research Article

# Knowledge, Attitudes, and Practices of Mothers towards Vaccination of Children in Urban and Rural Setup

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**Abstract**

**Introduction:** Mothers play a pivotal role in vaccinating their children. In India, in spite of the improvement of rate of vaccination, still some barriers to immunization persists, in both urban and rural areas.

**Aim:** To evaluate, knowledge, attitudes, and practices of mothers towards vaccination of their Children in urban and rural mothers.

**Material and Methods:** A prospective study including 600 urban mothers and 400 rural mothers was conducted rural and urban set up. A structured interview proforma was prepared and applied to evaluate, knowledge, attitude and practices of mothers towards vaccination in their children.

**Result:** Rural mothers were more Illiterate (50% rural, 11.50% urban) and Younger (35% rural, 15.83% urban) in this study. Common cold (60% rural, 28.5% urban) and fever (rural 35%, urban 83.3%), in children was considered as significant reasons for preventing vaccinating in child as compared to diarrhea (12.5% rural, 26.6% urban). Majority of urban mothers (88.5%) knew, when to administer first vaccine to their children as compared to rural mothers (50%). Father was the main decision maker about vaccinating the child in rural group (49.5% rural, 17%urban). Doctors, Nurses, Health workers (71.25% rural, 66.67% urban) were the main source of information about vaccination in both groups.

**Conclusion:** Illiteracy, myth and paternal dominance play as deciding factors for immunization in rural mothers, whereas, lack of awareness of vaccine schedule in both rural and urban groups played an important role for partial immunization of children.

**Keywords**: Vaccination, Rural, Urban, Attitude, Knowledge.



## Introduction

All individuals and communities must enjoy lives free from vaccine-preventable diseases [1]. It is a fruitful, cost-effective health intervention to prevent significant illnesses that contribute to child mortality in developing countries. In India, a large chunk of the population lives in rural areas, where mothers are illiterate and have numerous myths about vaccination, resulting in children being unimmunized and susceptible and hence causing a serious policy concern [2].

Child immunization coverage remains suboptimal despite on-going public health efforts [3]. Data from the National Family Health Survey (NFHS-5) for the period 2019–21 indicate that only 76.4% of children aged 12–23 months were fully immunized [4]. A complete review of epidemiological data and existing literature underscores the persistent difference in vaccination coverage between urban and rural populations. This difference occurs due to the complex relationship between maternal knowledge, attitudes and healthcare-seeking behaviours. Caregivers in rural areas face a variety of barriers that prevent optimal vaccine uptake. These challenges include geographic inaccessibility, prolonged travel distances to healthcare facilities, limited awareness regarding immunization benefits, and misconceptions regarding vaccine safety and efficacy. [5,6]

The success of national immunization program is depends upon the knowledge, attitudes, and practices of caregivers, particularly mothers, who play a pivotal role in ensuring timely and complete vaccination of their children. To address these challenges, the present study was conducted.

## Material and Methods

The aim and objective of this study was to determine the knowledge, attitudes, and practices of Mothers, towards vaccination of their Children, as well as, to compare these factors between urban and rural mothers. This is a prospective cross-sectional study, conducted at Immunisation Clinics in District Hospital Anand (Gujarat) and Tertiary care teaching hospital, S.M.I.M.E.R. Surat during. The study was conducted over a span of 15 months

(2024-25) and was approved by Institutional ethical committee. Four hundred mothers with their children from rural areas and six hundred mothers from urban areas, who voluntarily consented, were included in the study. Strict confidentiality of personal information was maintained. Mothers were selected using a convenience sampling method, as all eligible individuals presenting during the study period were enrolled consecutively Prior to their participation, each mother was provided with a detailed explanation regarding the objectives, methodology, and significance of the study. The information provided by the mothers was systematically documented using a validated, pre-designed structured proforma, to evaluate mothers' knowledge, attitudes, and perceptions regarding childhood vaccination which included questions in vernacular languages (Hindi and Gujarati) to facilitate ease of understanding and accurate responses. Subsequently, the collected data were subjected statistical analysis.

**Statistical Analysis:** The data were analysed using SPSS version 22. Categorical variables were assessed using the chi-square test. A p-value of < 0.05 was considered statistically significant. The study included all mothers who had brought their children for vaccination to the district hospital from rural areas over a three-month period, as well as those who had visited the tertiary (urban) hospital for the same purpose over a separate three-month period.

**Result**

**Table 1: Comparison of mother's age in the Socio-demographic context of Urban and Rural areas.**

| Age ( years) | Urban (600) | | Rural (400) | | Mean ± SD | Chi-square, P-value |
|---|---|---|---|---|---|---|
| | No. of case | % | No. of case | % | | |
| ≤25 | 95 | 15.83% | 140 | 35.00% | 28.02 ± 8.5 | $\chi2$ = 101.7583 and P = <0.0001 |
| 26-30 | 249 | 41.50% | 95 | 23.75% | | |
| 31-35 | 145 | 24.17% | 47 | 11.75% | | |
| 36-40 | 79 | 13.17% | 60 | 15.00% | | |
| >40 | 32 | 5.33% | 58 | 14.50% | | |
| Total | 600 | 100.00% | 400 | 100.00% | | |

**Table 2: Comparison of Educational Status of Urban and Rural Mothers**

| Education | Urban (600) | | Rural (400) | | Total (1000) | | Chi-square, P-value |
|---|---|---|---|---|---|---|---|
| | No. of case | Percentage | No. of case | Percentage | No. of case | Percentage | |
| Illiterate | 69 | 11.50% | 200 | 50% | 269 | 26.90% | $\chi2$ = 241.9455 P = <0.0001 |
| Primary school | 102 | 17.00% | 90 | 22.50% | 192 | 19.20% | |
| Secondary school | 90 | 15.00% | 50 | 12.50% | 140 | 14.00% | |
| Pre-degree | 149 | 24.83% | 20 | 5.00% | 169 | 16.90% | |
| graduate | 190 | 31.67% | 40 | 10% | 230 | 23.00% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |

**Table 3: Comparison of Perception of Common cold, Fever & Diarrhoea with vaccination in Rural & Urban mothers**

| Can child with common cold be vaccinated? | Urban (600) | | Rural (400) | | Total | | Chi-square and P-value |
|---|---|---|---|---|---|---|---|
| | No. of case | Percentage | No. of case | Percentage | No. of case | No. of case | |
| Yes | 390 | 65% | 82 | 20.50% | 472 | 47.20% | $\chi2$=193.2990 & P=<0.0001 |
| No | 171 | 28.50% | 240 | 60% | 411 | 41.10% | |
| Don't know | 39 | 6.50% | 78 | 19.50% | 117 | 11.70% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |
| **Can child with Fever be vaccinated?** | **Urban (600)** | | **Rural (400)** | | **Total** | | |
| | **No. of case** | **Percentage** | **No. of case** | **Percentage** | **No. of case** | **No. of case** | |
| Yes | 50 | 8.33% | 60 | 15% | 110 | 11% | |
| No | 500 | 83.33% | 140 | 35% | 640 | 64% | $\chi2$=263.9678 & P=<0.0001 |
| Don't know | 50 | 8.33% | 200 | 50% | 250 | 25% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |
| **Can child with Diarrhoea be vaccinated?** | **Urban (600)** | | **Rural (400)** | | **Total** | | |
| | **No. of case** | **Percentage** | **No. of case** | **Percentage** | **No. of case** | **No. of case** | |
| Yes | 360 | 60% | 190 | 47.50% | 550 | 55% | |
| No | 160 | 26.67% | 50 | 12.50% | 210 | 21% | $\chi2$=100.8658 & P=<0.0001 |
| Don't know | 80 | 13.33% | 160 | 40% | 240 | 24% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |

In urban mothers, 65.00% had a perception that, vaccination was safe, in common cold as compared to only 20.50% in rural mothers. As regards vaccination with fever in children, 83.33% of urban mothers correctly responded "No," while only 35.00% of rural respondents did so. Majority of urban mothers (60%) believed vaccination was possible in diarrhoea, compared to 47.5% in rural mothers. Regarding all the three perceptions, Common cold, Fever and Diarrhoea with vaccination, difference between urban & rural mothers was statistically significant (p< 0.0001).

A large proportion of rural mothers (50.00%) in Fever category & (40%) in Diarrhoea category, responded with they "Don't know".

**Table 4: Comparison of urban and rural Mothers' knowledge about appropriate time for the first vaccination in their child, about the next vaccination date of their child, source of information about vaccination.**

| **When should the first Vaccination be administered** | **Urban (600)** | | **Rural (400)** | | **Total (1000)** | | **Chi-square and P-value** |
|---|---|---|---|---|---|---|---|
| | **No. of case** | **Percentage** | **No. of case** | **Percentage** | **No. of case** | **Percentage** | |
| From 6 month onwards | 55 | 9.17% | 161 | 40.25% | 216 | 21.60% | $\chi$2=180.9263 & P=<0.0001 |
| At birth | 531 | 88.50% | 200 | 50% | 731 | 73.10% | |
| From 1 year onwards | 14 | 2.33% | 39 | 9.75% | 53 | 5.30% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |
| **Do you know the next vaccination date of your child?** | **Urban (600)** | | **Rural (400)** | | **Total (1000)** | | $\chi$2=64.6755 & P=<0.0001 |
| | **No. of case** | **Percentage** | **No. of case** | **Percentage** | **No. of case** | **Percentage** | |
| yes | 405 | 67.50% | 168 | 42% | 573 | 57.30% | |
| No | 150 | 25% | 187 | 46.75% | 337 | 33.70% | |
| don't know | 45 | 7.50% | 45 | 11.25% | 90 | 9% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |
| **Where did you get to know about vaccination?** | **Urban (600)** | | **Rural (400)** | | **Total (1000)** | | $\chi$2=26.1499 & P=<0.0001 |
| | **No. of case** | **Percentage** | **No. of case** | **Percentage** | **No. of case** | **Percentage** | |
| Lack of awareness of mass media | 42 | 7.00% | 55 | 13.75% | 97 | 9.70% | |
| Through doctor/ Nurse/ health worker | 400 | 66.67% | 285 | 71.25% | 685 | 68.50% | |
| Family/Friends | 158 | 26.33% | 60 | 15.00% | 218 | 21.80% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |

The above table shows that there is significant difference in knowledge about the correct time to administer the first vaccination between urban and rural mothers. In urban mothers, 88.50% correctly stated that, it should be given at birth, while only 50.00% of rural mothers said the same. A higher percentage of rural mothers (40.25%) believed, it should start from 6 months or 1 year compared to urban mothers (9.75%). In urban areas, 67.50% of respondents knew the date of next vaccination, compared to only 42.00% in rural areas. Majority of urban (66.67% and rural (71.25%) received information about vaccination from doctors, nurses and health workers. The difference between the urban and rural mothers was statistically significant in all three groups (p<0.0001)

**Table 5: Comparison of attitudes of mothers towards awareness of Govt. vaccination centre near them, awareness of possession of National Immunization Card/ Mamta Card and who is decision maker in matter of vaccination**

| Are you aware of Govt. Vaccination centres near you? | Urban (600) | | Rural (400) | | Total (1000) | | Chi-square and P-value |
|---|---|---|---|---|---|---|---|
| | No. of case | Percent age | No. of case | Percent age | No. of case | Percent age | |
| Yes | 450 | 75.00% | 200 | 50.00% | 650 | 65.00% | |
| No | 50 | 8.33% | 90 | 22.50% | 140 | 14.00% | $\chi 2$=70.8944 & P<0.0001 |
| Don't know | 100 | 16.67% | 110 | 27.50% | 210 | 21.00% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |
| **Do you have Immunisation card / Mamta card?** | **Urban (600)** | | **Rural (400)** | | **Total (1000)** | | |
| | **No. of case** | **Percent age** | **No. of case** | **Percent age** | **No. of case** | **Percent age** | $\chi^2$ = 19.0138, P < 0.0001 |
| Yes | 490 | 81.67% | 294 | 73.50% | 784 | 78.40% | |
| No | 36 | 6.00% | 16 | 4.00% | 52 | 5.20% | |
| Don't know | 74 | 12.33% | 90 | 22.50% | 164 | 16.40% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |
| **Who is the decision Maker in matters of Vaccination?** | **Urban (600)** | | **Rural (400)** | | **Total (1000)** | | |
| | **No. of And case** | **Percent age** | **No. of case** | **Percent age** | **No. of case** | **Percent age** | $\chi 2$=89.1751 & p<0.0001 |
| Mother | 112 | 18.67% | 72 | 18% | 184 | 18.40% | |
| Father | 102 | 17% | 198 | 49.50% | 300 | 30% | |
| Both | 386 | 64.33% | 190 | 47.50% | 576 | 57.60% | |
| **Total** | 600 | 100% | 400 | 100% | 1000 | 100% | |

Above table depicts, the awareness of government vaccination centres, possession of National Immunization Card/ Mamta Card and decision maker in the matters of vaccination.

A higher proportion of urban mothers (75%) were aware of vaccination centre near them as compared to rural mothers (50%) and (81.67%) of urban mothers had an Immunisation or Mamta card compared to rural mothers (73.50%). (22.50%) of rural mothers were unaware, of Immunisation card, as compared to urban mothers (12.33%).

Majority of Fathers in rural area (49.50%) were decision makers about vaccination in children. P<0.0001 indicated that this difference was statistically significant in urban and rural mothers in all three above groups.

**Table 6: Comparison of Urban and Rural Mothers on Reasons for Partial Immunization (Including Missed Single Dose or Schedule)**

| What is the reason for Partial Immunization (Even if single dose/ time missing) | Urban | | Rural | | Total | | chi-square test | p- value |
|---|---|---|---|---|---|---|---|---|
| | No. of case | Percent age | No. of case | Percent age | No. of case | Percent age | | |
| Mother was busy / Domestic work | 4 | 10.53% | 82 | 36.44% | 86 | 32.70% | 70.7442 | P<0.0001 |
| Can't travel to Vaccination centre | 0 | 0.00% | 30 | 13.33% | 30 | 11.41% | 30.0000 | P<0.0001 |
| Unaware of Vaccination Schedule | 12 | 31.58% | 56 | 24.89% | 68 | 25.86% | 28.4706 | P<0.0001 |
| Child was unwell at the time of Vaccination | 6 | 15.79% | 10 | 4.44% | 16 | 6.08% | 1.0000 | P=0.3173 |
| Long waiting time for Immunization | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | - | - |
| Mother was afraid of side effects | 2 | 5.26% | 16 | 7.11% | 18 | 6.84% | 12.8000 | P=0.0003 |
| Mother was unaware of age-related vaccination | 14 | 36.84% | 12 | 5.33% | 26 | 9.89% | 0.1538 | P=0.6949 |
| Vaccine was not available at the centre | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | - | - |
| Did not know the place and time for immunization | 0 | 0.00% | 19 | 8.44% | 19 | 7.22% | 19.0000 | P<0.0001 |
| **Total** | 38 | 100% | 225 | 100% | 263 | 100% | - | - |

The above table shows that the reasons for partial immunization differed significantly ($p<0.0001$) in mothers of urban and rural areas. In rural mothers, busy with domestic work, unable to travel to vaccination centre, lack of awareness of vaccination schedule, time and place vaccination and fear of side effects were the predominant reasons observed, whereas, unwell child and lack of awareness regarding age related vaccination were the predominant reasons for partial immunization in urban mothers, but the difference was not significant ($p>0.05$).

**Discussion**

In the present study, a total of 1,000 mothers were enrolled, with 400 participants from rural areas and 600 from urban settings. As in Table-1, the overall age distribution revealed that the largest proportion of mothers (n = 249; 41.50%) belonged to the 26–30 years age group, followed by those aged 31–35 years (n = 145; 24.17%). Among urban participants, (15.83%) mothers were aged ≤25 years, whereas in rural mothers (35%) were aged ≤25 years, (5.33%) of urban mothers were > 40 years (14.50%) of rural mothers were > 40 years. More number of rural mothers, in less than 25 years of age group, could be early marriage in rural areas as compared to urban area. Ndaki. et al [7]. (2024) and Tiwari A, et al [8]. in their study also had predominantly mothers of younger age group (21-30 years).

**Education status:** Mothers from urban area had higher education status as compared to rural mothers. Almost 50 percent of rural mothers were illiterate and only 10 percentage were graduate, whereas in urban mothers 11.50% were illiterate and 31.67% were graduates as depicted in Table -2. Other authors Ndaki P, et al [7], Tiwari A, et al [8], Mishra et al [9], Joseph J, et al [10]; Nassar O, et al [11] and Sarkees AN [12] also reported similar findings. As depicted in Table-3, Most of the urban mothers (65%) believed that vaccine can be administered in Common cold and diarrhea (60%). A larger proportion of rural mothers had no clear opinion about vaccination in common cold (19.50%), diarrhea (40%), and fever (50%). This may be due to, greater number of mothers from rural area falling under illiterate /less educated category. Fever was considered as a dreaded condition for not administering vaccination in both urban (83.33%) and rural mothers (35%). Thus improvement in literacy, education and correct information may further improve vaccination status. Mahalingam S, et al [13] who found that, more urban mothers (54%) said "no" to vaccinate a child with a cold, while more rural mothers (31.8%) said "yes"; notably, 34.9% of rural mothers responded "don't know" compared to 17.6% in urban areas. Furthermore, an Indian study conducted by Tiwari A, et al [8] in an urban slum area showed that 52% of participants believed a vaccine can be given during cough and cold, 35% said it cannot be given, and 13% were unsure. As per (Table-4), in this group, (88.50%) of urban mothers, whereas (50%) of rural mothers knew about first vaccination in their child. Majority of urban mothers (67.50%) and (42%) of rural mothers knew about the next date of vaccination. Majority of urban mothers (93%) and (86.25%) of rural mothers agreed that they received this information from doctors, nurses, health workers and family friends, as compared to media. This reflects that health personnel forms an important chain about information of vaccination in children of urban & rural mothers. Asmare G, et al [14] who observed higher vaccination coverage in urban populations relative to rural areas. Similarly, Albers A.N, et al [15] documented that, early childhood vaccination rates were notably lower in rural regions of the United States when compared with suburban and urban areas.

As depicted in (Table-5), Urban mothers (75%) were more aware of Govt. vaccination centre near them, as compared to rural mothers (50%). Both urban (81.67%) and rural mothers (73.50%) possessed immunization card /Mamta card. (22.50%) of mothers from rural area didn't know about this card, as compared to urban mothers (12.33%). Father played an important role in deciding about vaccination in rural area (49.50%). Mothers alone had little role in deciding about vaccinating their child in both urban (18.67%) & rural (18%) groups.

This implies that fathers should be preferably approached, communicated and counselled regarding vaccination of children in rural area. Mothers in both group should also be encouraged to play decision makers in vaccinating their children. Bardak F, et al [16] confirmed that, 85.8% of mothers possessed vaccination card. According Mishra B, et al [9] 97% of rural and 100% of urban mothers had immunisation cards. Regarding the decision of vaccinating their children in other studies ,a study conducted by Mahalingam S, et al [13] found that, mothers were the primary decision-makers regarding child vaccination in both urban and rural settings, while, Galagali et al P [17] reported that, mothers were the main decision-makers concerning their children's health. Nassar O, et al [11] reported that, fathers made decisions in 6.8% of case, mothers in 46.9%, and both parents jointly in 42.1% of case.

As per (Table-6), Partial immunization was observed in a total 263 mothers of which 225 were rural and 38 were urban mothers. Out of the 38 urban mothers 36.84% mothers were unaware of age related vaccination and 31.58% of vaccination of schedule. Thus a total of 68.42% of urban mothers, in spite of 81.67% of urban mothers

possessing immunization /Mamta card. Whereas in 26.32% urban mothers, unwell child and busy in domestic work, were the reasons for partial vaccination. In 225 rural mothers, majority busy in domestic or household work (32.70%), unaware of vaccination schedule (25.86%), unable to travel to vaccination center (11.40%) were reasons for partial immunization. Thus, lack of awareness of vaccination schedule, in both urban and rural mothers were one of the main reasons for partial immunization. Domestic work also played a major role in rural mothers for partial vaccination. Effective health education campaigns, better communication by frontline health workers, and targeted outreach in underserved areas are essential to bridge these knowledge gaps and improve immunization coverage. Nassar et al [11] reported that 60.8% of parents who missed vaccinations attributed this to child health-related issues such as fever (17.9%), runny nose (16.7%), and general sickness (11.9%). Parental factors included being busy (17.9%) and changing residence (6%). Mishra et al [9] revealed that, among rural mothers, the main barriers to seeking healthcare were financial constraints (30.5%) and distance from health centres (37.5%). Thomas S et al [17] observed that out of physical barriers responsible for partial immunisation, child illness (36%), reminder of cards not sent by workers (11%) vaccine pricks (11%) were the reasons for partial immunisation.

## Conclusion

There exists significant differences in reasons and beliefs regarding vaccination in children between urban and rural mothers. Awareness through mass media about vaccination, Improving literacy rate, communication, community participation and counseling with reinforcement or reminder of vaccination schedules will augment immunization coverage in both urban and rural population.

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