Maternal and Child Health in Urban Slums – A Cross-Sectional Study at Madurai, Tamil Nadu

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KEYWORDS	ABSTRACT
Maternal and child health, urban slums area and health seeking behaviour	**Background:** Maternal and child health is a crucial dimension of healthcare quality and overall health conditions in a society. Maternal Mortality Rate (MMR) is influenced by factors such as limited healthcare access, poor living conditions, and social challenges, especially among high-risk populations like those in slums, migrants, and tribes. This study aims to assess the maternal and child health profile in urban slums of Madurai, Tamil Nadu and also to assess their healthcare seeking behaviour. **Methods:** A cross-sectional study was conducted among the mother and child dyad residing at slums of Aruldhaspuram, ManjalMedu and Gomaspalayam around Arapalayam, Madurai district, Tamil Nadu which were included as slum areas in the gazette of Madurai Corporation. The estimated sample size was 99. Data was collected door-to-door by personal interview method. Descriptive statistics such as frequency, percentages, mean, standard deviation were used to summarize the data collected. **Results:** 71% had consanguineous marriage; 13% of women had more than 3 children. 96% of mothers had complete Ante Natal Care (ANC) including Tetanus Toxoid (TT) immunization and Iron and Folic Acid (IFA) supplementation. 98% of the mothers had institutional delivery among whom 23 had caesarean delivery; 2% had home delivery. 56% of children had normal birth weight. 94% of mothers have practised exclusive breastfeeding for first 6 months .94% children had had been immunized for age. 71% of them had permanent sterilization and 25% of the mothers are not using any family planning method among whom only 14% had not completed their family, whereas the remaining 11 did not opt for any family planning method which is the Unmet need for family planning. **Conclusion:** Majority are availing complete ANC, institutional delivery and immunization services. But there are still home deliveries and unmet need for family planning.

1. Introduction

Maternal Mortality Rate (MMR) refers to the number of maternal deaths per 100,000 live births. It is a key indicator of the quality of healthcare and overall health conditions for pregnant women. Even with 73% decrease in Maternal Mortality Rate (MMR) between 2000 and 2020, India's MMR of 103 is still a matter of concern, particularly for urban poor population. Understanding a pregnant woman as a dyad requires a holistic approach that integrates biological, epidemiological, social, and operational perspectives. Each dimension provides valuable insights into the complexities of pregnancy and highlights the importance of comprehensive care for both the mother and the foetus. [1] While mothers and children make up a large portion of the population and are the main users of health care services, there remain significant challenges in ensuring their health and well-being, particularly in vulnerable groups such as those who are living in urban slums. [2] A slum is a residential area with substandard housing that is poorly serviced and/ or overcrowded, and therefore unhealthy, unsafe and socially undesirable. Worldwide, nearly billion people live in slums and the number is predicted to grow further.[3]

The Factors that influence the Maternal and Child Health (MCH) indicators in a slum area are deeply interconnected with poor living conditions and sanitation leading to diarrhea, malaria etc. Inadequate access to Antenatal and postnatal practices, lack of healthcare facilities, low immunization coverage,

unplanned pregnancies, skilled birth attendance and not but the least education barriers. Addressing these challenges requires a multifaceted approach that includes improving access to care, enhancing education and awareness, and implementing effective policies and programs. [4]

Worldwide, nearly billion people live in slums and the number is predicted to grow further. The living conditions of these people are characterized by overcrowding, insecure tenure and poor access to infrastructure. All these have a considerable impact on the health of the inhabitants.[3] Indian government is making efforts to upgrade infrastructure and improve the health situation of the inhabitants of the urban slums. Promotion of maternal and child health has been one of the most important objectives of the family welfare programme in India.[5] Maternal health is the key barometer of functional health system. Maternal mortality and morbidity continue to be high despite the existence of national programmes for improving maternal and child health in India. Maternal health care services aim to monitor signs of complications, detect and treat pre-existing and concurrent problems during pregnancy and provide advice and counselling on preventive care, delivery care, postnatal care and related issues.[6]

Urban slum children face a number of health and sanitation problems. While the average infant mortality rate in urban India is 41.7, it is 54.6 among the urban slum. [7] Further attention to understanding and addressing child health in slum settings is an important priority of health department. Thus an integrated survey and monitoring on the maternal and child health care in the urban slums are very essential. With this backdrop, this study aims to assess the Maternal and child health profile in urban slums of Aruldhaspuram, Majal Medu and Gomaspalayam in Madurai district, Tamil Nadu and also their healthcare seeking behaviour.

2. Materials and methods

Study Design: The present study is a community based cross sectional study. Study **setting and period:** The study was conducted at urban slums of Aruldhaspuram, ManjalMedu and Gomaspalayam in Madurai, Tamil Nadu. The slums in Madurai are in cluster groups either on the banks of the Vaigai or Kiruthumal river. ManjalMedu, Gomaspalayam and Aruldhaspuram are found on the banks of the river Vaigai nestling around Arapalayam area. ManjalMedu hosts 5000 people who are mainly corporation sanitary workers. It consists of mixed types of houses and the street lines are very narrow and uneven. An underground drainage system is maintained by the Corporation of Madurai. Gomaspalayam is facilitated by houses constructed by the slum clearance board. Dumping of domestic articles, tricycles and goat sheds are commonly seen here. Aruldhaspuram is hosted by sanitary workers and some of them are self-employed in making baskets and brooms with bamboo. Corporation Maternity and childcare hospital at Karimedu in New Jail Road was utilized in common by the people of these slums. The study was conducted from January to March 2024 among the mothers of reproductive age group (15-49) living in the slum area.**Sample size calculation**: The sample size was calculated using the formula $4pq/d^2$ to be 99 based on NFHS 5 data of Tamil Nadu where 46.3% of the mothers had complete antenatal care in urban area and with an absolute precision of 10%. The sample size was approximated to 100.**Sampling method:** There are totally 200 slum areas in the city of Madurai and a list of them was collected from city municipal corporation of Madurai from which 3 slums Aruldhaspuram, ManjalMedu and Gomaspalayamwere selected by simple random sampling technique. **Study population:** Inclusion criteria: Mother-child dyad where mothers are in the reproductive age group (15-49 years) and residing in the select urban slum areas for a minimum of three years and have at least two living children with the youngest child aged 3 years or less on the day of survey were included as study population. Exclusion Criteria: Mothers who were not willing to participate and who were ill on the day of survey were excluded.

2.1 Study tool:

After getting informed written consent from the study participants, a pretested semi-structured questionnaire consisting of following details was administered to the mothers by personal interview

method- socio-demographic information, utilization of maternal, reproductive and child health services.

2.2 Statistical Analysis:

The data collected were entered in Microsoft Excel spreadsheet and analysed using Statistical Package for Social Sciences version 25. Descriptive statistics such as frequencies, Percentages, mean and standard deviation (SD) were calculated to summarize the findings.

2.3 Ethical Considerations:

Ethical clearance was obtained from the Institutional Ethics Committee of Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Chengalpattu district, Tamil Nadu.

3. Results

The study includes 100 mother-child dyad. The mean age of mothers was 34.68 ± 6.7. Among the 100 participants, 93% were Hindus. Maximum number of participants (60%) were sanitary workers and all of them belong to either lower or lower middle class in the socio-economic ladder. 16% of them had no school education and 14% had primary education. 30 % had studied up to 8th standard, 18% had completed 10th standard 14% had Higher secondary education and only 8% of them had completed a degree which is shown in Table 1.

Table1: Sociodemographic profile of the study participants (N= 100)

S. No	Study Parameter	N	%
1	**Age in Years**		
	21-30	31	31
	31-40	49	49
	41-49	20	20
2	**Religion**		
	Hindus	93	93
	Christians	7	7
3	**Education Details**		
	No school education	16	16
	Primary	14	14
	Middle	30	30
	High school	18	18
	Higher secondary	14	14
	Degree	8	8
4	**Occupation**		
	Homemaker	26	26
	Sanitary worker	60	60
	Others	14	14

42% of the participants had attained menarche at the age of 12. The mean age of menarche was 12.65±1.0 years. The mean age at marriage was 19.8±2.8 years. 71% of the marriages were consanguineous which is very high. 14% of the mothers had their first childbirth at an age less than 18 years and 50% between 18 to21 years, only 46% had their first child above 21 years of age. 47%

had spacing less than 3 years between each childbirth. The number of children was 3 and more than 3 for 34 %and 13% mothers respectively. 96 % of mothers had complete Antenatal care (ANC) including Tetanus toxoid (TT) immunization and Iron and folic acid (IFA) supplementation. 98% of the mothers had institutional delivery whereas 2% had home delivery. 23% of mothers had caesarean delivery as mentioned in Table 2.

Table 2: Maternal and reproductive health profile of the study participants

S.No	Outcome Parameter	N	%
1	**Age in years at menarche**		
	10	2	2
	11	6	6
	12	42	42
	13	31	31
	14	13	13
	15	6	6
2	**Age at marriage (In Years)**		
	< 18	34	34
	19 - 21	40	40
	> 21	26	26
3	**Consanguinity of marriage**		
	Yes	71	71
	No	29	29
4	**Number of child births**		
	1	14	14
	2	39	39
	3	34	34
	>3	13	13
5	**Age at first birth**		
	< 18	4	4
	18-21	50	50
	>21	46	46
6	**Spacing of child births**		
	< 3	47	47
	≥ 3	53	53
7	**Antenatal care (Minimum 4 ANC visits, TT, Iron Folic Acid Tablets)**		
	Yes	96	96
	No	4	4
8	**Place of delivery**		
	Institutional	98	98
	Home	2	2

S.No	Outcome Parameter	N	%
9	**Mode of delivery**		
	Normal	77	77
	Cesarean	23	23

71% of them had permanent sterilization and 25% of the mothers are not using any family planning method among whom only 14% had not completed their family, whereas the remaining 11% did not opt for any family planning method (Unmet need for family planning) as shown in the Figure 1.
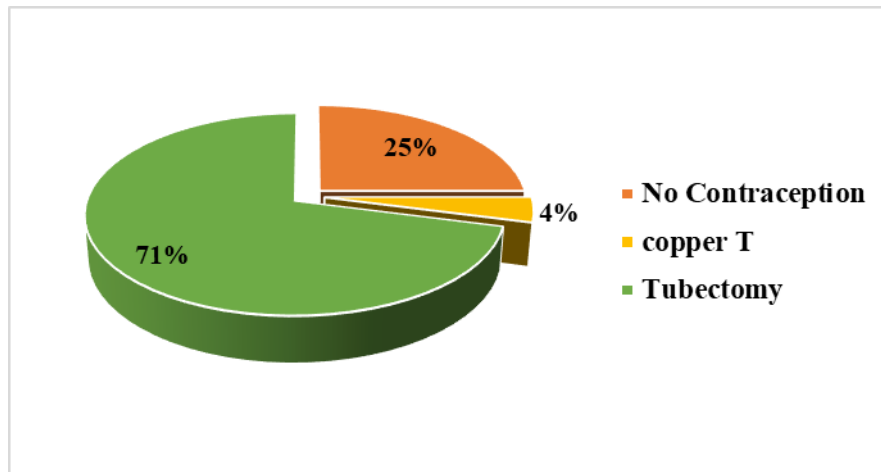

Figure 1: Distribution of family planning methods of the study participants

88% were term deliveries and the mean birth weight was 2.7500±0.47 kg. 94% of mothers had practised exclusive breastfeeding for 6 months whereas 6 % gave supplementary feeding due to inadequate breast milk. 94% of children had received immunization appropriate for age.

42% opted for private hospitals whereas 54% sought treatment from Government hospital and 4 opted for Primary Health Centre .as shown in the figure 2.

Table 3: Child health profile

S. No	Study Parameter	N	%
1	**Term/preterm**		
	Term	88	88
	Preterm	12	12
2	**Exclusive breast feeding till 6 months**		
	Yes	94	94
	No	6	6
3	**Timely initiation of complementary feeding**		
	Yes	6	6
	No	94	94
4	**Immunization**		
	Adequate for age	96	96
	In- adequate for age	4	4
5	**Birth weight (Kg)**		

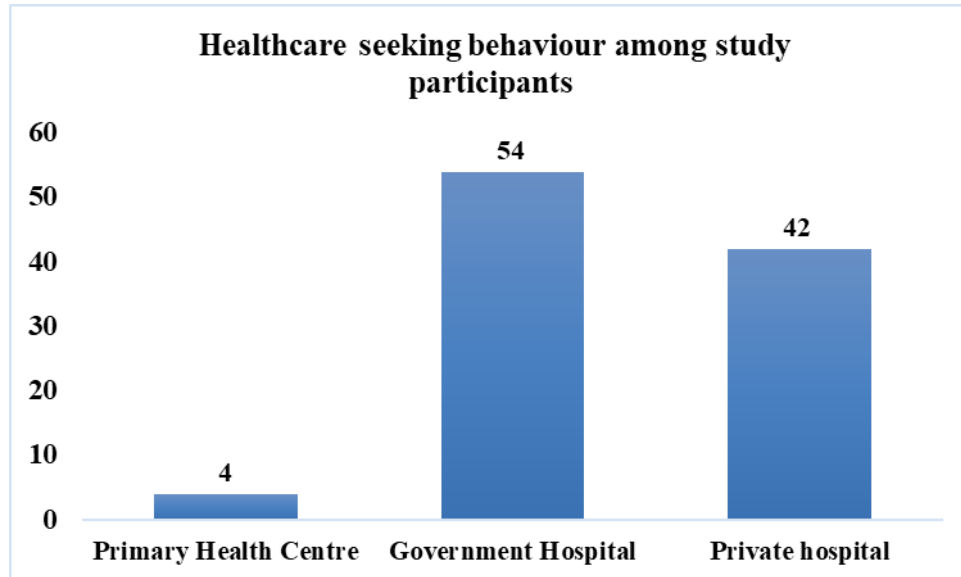| S. No	Study Parameter		N	%
	2		7	7
	2.5		28	28
	2.5 -3		28	28
	>3		12	12

Figure 2: Healthcare Seeking Behavior of the study participants

4. Discussion

The present study includes 100 mother-child dyads. 40% of the women were married at the age of 19-21 years whereas the percentage was greater (56%) according to the study done by Pai D V et al8 among a slum area of Udupi district of Karnataka and 50% in the study done by Sivapragasam et al9. In our study 41.84% of teenage pregnancy (< 18 years) was seen, which is similar in a slum at Raiganj, West Bengal according to a study done by Mandal G et al.10 But double the percentage (81.9%) was found in the study done by Pai D V et al8. Whereas in a study done by Nilesh Patel et al11 the common age at the 1st pregnancy was 21 years.

According to NFHS 5 data (2019-2021)7, 88.8% of urban mothers had atleast 4 ANC visits and 88% had in the study done by Pinjari V12 among Mumbai slums, but in the present study the percentage was greater and it was found to be 96%.7

The NFHS 5 data7 shows 99.2% institutional delivery in TamilNadu whereas it was only 98% in the present study. In the present study 77% were normal deliveries and 23 % were caesarean deliveries which were more or less equal in the study done by Sivapragasam et al9 in which 75% were normal and 25% were caesarean deliveries. Birth delivered by caesarean section was 36.1% according to NFHS 5 data7 whereas it was only 23% in our study.

The number of living children was found to be >3 in 46.3% of the mothers in the case of the study done by Pinjari V et al 12 among Mumbai slum whereas it was only 34% in the present study. In a study done by Patel NG et al11, the spacing between two children was found to be only 26.6% but according to our study it was comparatively higher (53%) .In the study by Dr Sivapragasam et al9 24.6% were preterm babies, whereas in the present study the rate of preterm babies is only 12%.And the mean birthweight of the babies was found to be normal (i.e>2.5 kg)in 56% of the participants which was greater (41.5 %)compared to the study done by Pai DV et al [8]

According to NFHS 5 data[7] only 47.8% mothers practised exclusive breastfeeding whereas in our

study it was 94%. Children aged 12 to23 months fully immunized were 86.4% in NFHS 5 data[7] and 85.3% in a study done by Pai DV et al[8] whereas in our study it was appreciably 96%.

In our study 71% underwent tubectomy which was better compared to 55.6% who have underwent tubectomy according to NFHS 5 datasheet of Tamilnadu7. The unmet pregnancy was 11% in our study which is higher compared to the figure reported by NFHS 5 (8.1%)7.

The findings of our study reveal that most of the deliveries are institutional due to the easy access of healthcare facilities. 54% of people were guided towards Government Rajaji hospital, a tertiary care hospital. The maternity centre also guided them in infant care.

5. Conclusion

The majority are availing complete ANC, institutional delivery and immunization services. But there are still home deliveries and unmet need for family planning. Consanguinity was at the maximum level. One third of marriages were done below the age of 18 which might affect child rearing practices. Though there was an adequate spacing in childbirth, most of them did not limit giving birth to 2 children and they opted for 3 or more. Due to their desire to have children more than 2, they avoided permanent sterilization. Strict measures should be enforced in following minimum marriage ages. Couples should be educated on the genetic risks of consanguineous marriages and be motivated towards permanent sterilization.

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