Research Article

Utilization of 108 EMRI obstetric care services for institutional delivery in Jamnagar district of Gujarat, India

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ABSTRACT

Background: Robust emergency transport system is vital in the reduction of maternal mortality ratio (MMR) by curtailing delay and thus, it helps in reaching the sustainable development goals of MMR. The emergency management and referral institute (EMRI) model has shown good results in various states of India including Gujarat. There are some demographic and other reasons which may affect the choice of transport service for institutional delivery. **Objective:** The objective of this study was to assess the factors for utilization of 108 EMRI obstetric care services for institutional delivery in Jamnagar district of Gujarat. **Materials and Methods:** It was conducted in eight Primary Health Centre areas of different four talukas of Jamnagar district with a sample size of 384. Pregnant women whose institutional delivery occurred during past 6 months from the study date were included as the study population. The sampling frame consisted of a list of such woman recorded in E-Mamta from which samples were selected by systematic random sampling. **Results:** Among 384 institutional deliveries, 150 (39.1%) mothers used 108 EMRI for transport from their place to a health facility. Statistically significant higher utilization of 108 EMRI services was observed among scheduled caste (49.2%), scheduled tribe (42.8%), and among socioeconomic Class V (55.3%) followed by Class IV (45.2%). Absence of felt need was the major reason for not utilizing 108 EMRI. Among user, 78.7% were satisfied with the services of 108 EMRI. **Conclusion:** A total of 108 GVK EMRI has been the lifeline for transport of institutional deliveries for the socially disadvantaged and economically challenged community.

KEY WORDS: 108 GVK Emergency Management and Referral Institute; Utilization; Institutional Delivery; Obstetric Care

INTRODUCTION

National health policy 2017 envisages to decrease maternal mortality ratio (MMR) to 100/100,000 live births by 2020.[1] The target for MMR in sustainable developmental goal (SDG) is 70/100,000 live births by 2030.[2] Although India has performed well to bring down MMR to 130/100,000 live births,[3] we may not be able to achieve the target of MMR mentioned under national health policy, and there is a long path ahead to meet MMR target of SDG. Promotion of maternal nutrition and health education, with greater attention to emergency obstetrical care at the district sub-center and primary health-care center levels, must be prioritized. These changes of focus are vital to make prenatal, delivery, and postnatal care safer.[4]

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Establishing referral linkages between the community and first referral units is an essential component for the utilization of services, particularly during emergencies including obstetric emergencies.[5] In many countries with high maternal mortality, including in the Asia-Pacific regions; long distances, geographical barriers, lack of transport, poor communication infrastructure and associated high costs, and lead to often fatal delays in reaching life-saving care once a complication occurs.[6] Prompt referral and immediate transport of pregnant women during obstetric emergency curtail delay in reaching a health-care

delivery system. Robust emergency transport system plays a crucial role in the reduction of MMR and helps in reaching the SDG of <70/100,000 live birth for MMR.[7] The emergency management and referral institute (EMRI) model have shown good results in various states of India including Gujarat.[5]

GVK EMRI was established as a nonprofit organization. GVK EMRI is a society, registered under the provisions of Andhra Pradesh societies registration act, 2001, in February 2005 and provides services free of cost through a toll-free number "108" to every citizen of our country under public-private partnership (PPP) framework.[8] GVK EMRI, under the PPP, has made substantial progress over the past 10 years in providing emergency response services across the country and presently operate over 10,000 state-of-the-art ambulances in 22 States and two union territories. This largest service provides en route basic life support and obstetric care through trained emergency medical technicians EMT.[9] Every day, GVK EMRI is serving on an average 24,000 emergencies (41 million emergencies attended since inception) and saving over 750 lives every day and cumulatively have saved >15 lakh lives since the launch of the services.[8] Since inception, 2,143,827 calls were answered with 97% call efficiency.[6] About 2.9 crore beneficiaries have availed this service, and 3.16 lakh deliveries were assisted.[6] GVK EMRI operates ambulance under this scheme in partnership with Andhra Pradesh, Assam (Adarani), Uttarakhand (Khushion Ki Sawari), Gujarat (Khilkhilat), Chhattisgarh (Mahtari express), and Uttar Pradesh (national ambulance services). Governments to ensure wholesome support for the mother and child which provides for a home to hospital and drop back facility for mother and child to curtail infant mortality rate and MMR.[10]

In some remote areas, long distances, geographical and seasonal barriers, will mean that pregnant women experiencing a complication will not be able to reach care in time despite efforts to strengthen referral systems.[6] Moreover, we believe that there may be some sociodemographic factors, medical reasons such as lack of emergency in case of uncomplicated labor, previous experience, and client satisfaction which all may be affecting the choice of transport in obstetric emergencies.

There are a limited number of studies and probably none in Jamnagar district for evaluation of factors determining the utilization of 108 EMRI for obstetric care services as well as on client satisfaction of those who used 108 EMRI. Hence, this study was carried out in this district to evaluate the utilization of 108 EMRI services among pregnant women for intrapartum transport.

MATERIALS AND METHODS

Study Design

This was a community-based cross-sectional retrospective study.

Study Period

The study duration was September 2015–August 2016.

Study Area

This study was conducted in Jamnagar district which has six talukas named Jamnagar, Kalavad, Jodiya, Lalpur, Jamjodhpur, and Dhrol. Among them, first four talukas were selected randomly as a study area.

Sample Size

Considering the prevalence of 108 EMRI service utilization for pregnancy-related cases was 33.7% as reported by "Study of emergency response service – EMRI model 2009-2010,"[7] 5% allowable error and 10% nonresponse rate, the sample size calculated was 352. However, we were able to take more samples in our study, and we could do an analysis of 384 institutional deliveries.

Inclusion Criteria

The following criteria were included in the study:

- The mothers who had institutional delivery during last 6 months at the time of interview
- The mothers who gave valid consent.

Exclusion Criteria

- Mothers who did not gave valid consent were excluded from the study.

Ethical Permission

Prior ethical approval of the institute ethical committee was obtained.

Data Collection

Sampling was done by multistage sampling in the study district. Four talukas were selected by random sampling and from each taluka two Primary Health Centre (PHC) were selected by random sampling. Hence, a total of 8 PHC were taken. From each PHC area, it was decided to enroll at least 45 mothers in study (including nonresponse); however, we were able to enroll more than our sample size totaling to 384. List of mothers who delivered during the past 6 months was obtained from e-Mamta which consisted of a sampling frame from which mothers were selected by systematic random sampling. Household visits of mothers were carried out with prior telephonic intimation. In the case of locked house or nonresponse, we excluded that mother from the study. After taking the informed consent, detailed interview of the mother was conducted, and answers were recorded in the predesigned pre-validated structured questioner.

Data Analysis

The analysis was done using Microsoft Excel and Epi info software. Chi-square test was used for statistical analysis.

RESULTS

Among 384 institutional deliveries, 150 (39.1%) mothers used 108 EMRI for transport from their place to a health facility. Hired vehicle and personal vehicle were used by 132 (34.4%) and 102 (26.6%) families for the transport of pregnant woman for delivery [Table 1].

Age group wise analysis showed that 53.7% of pregnant women in the age group of 15–19 years utilized 108 EMRI during delivery transport, which is the highest across all age groups. It is followed by 30–34 year age group women, among whom 47.9% utilized 108 services for the same purpose. These findings are statistically significant ($P < 0.05$). Hired vehicle utilization was highest among 25–29 year age group (39%) followed by 35–39 years age group (37.5%). Personal vehicle was utilized by 37.5% pregnant women of the age group of 35–39 years followed by 35.6% women in the age group of 25–29 years. There was also a statistically significant difference in the utilization of 108 EMRI among different castes of pregnant women. Higher utilization was observed among scheduled caste (SC) and scheduled tribe (ST) which was 49.2–42.8%, respectively. Simultaneously personal vehicle use for delivery was least among these castes, i.e., 10.2–14.4%, respectively. Analysis of utilization of transport among different socioeconomic classed revealed that there was highest usage of 108 EMRI among Class V (55.3%) followed by Class IV (45.2%) which is also statistically significant ($P < 0.01$). Use of personal vehicle for delivery was highest among Class I (45.9%). There was no statistically significant difference in 108 EMRI use among different religions. Similarly, parity and distance from a health facility were also not significant determinants of selecting the mode of transport for delivery. Occupation wise farmers (56.9) and laborers (47.8%) used 108 EMRI services most ($P < 0.05$) while employed women were leading in the usage of hired (39.1%) or personal (32.2%) vehicle for delivery [Table 2].

Major source of information about 108 EMRI services was various health staff and health worker (54.7%) including medical officer, female health worker, and Accredited Social Health Activist (ASHA) followed by neighbors (29.2%) [Figure 1].

We analyzed causes of not using 108 EMRI among 234 pregnant women who were transported either by hired vehicle or by personal vehicle at health facility for delivery. Among them, 45.3% did not feel need to call 108 EMRI ambulance. It may be due to lack of emergency in obstetric care during intrapartum period or availability of personal vehicle or affordability for hired vehicle. Prior bad experience of using 108 EMRI suspended its use among 23.5% women while 15% of women said that the call center did not receive their call. Surprisingly, 9.4% of women did not know about ambulance service of 108 EMRI for delivery [Figure 2].

Client satisfaction analysis showed that 118 (78.7%) women were satisfied with the services of 108 EMRI out of 150 women who used it for the transport of delivery purpose. Out of 32 women who were not satisfied with 108 EMRI service said that "ambulance reached late to pick up them" as major reason (65.6%) for dissatisfaction. At the end of the interaction, with all 384 women who delivered at a health facility, we elicited their response to utilize 108 EMRI in future or to suggest to others. Out of 384 women, 318 (82.8%) positively affirmed for same [Table 3].

Table 1: Type of transport facility used for reaching health facility (n=384)

Transport facility	No. (%)
108 EMRI	150 (39.1)
Hired vehicle	132 (34.4)
Personal vehicle	102 (26.6)

EMRI: Emergency management and referral institute

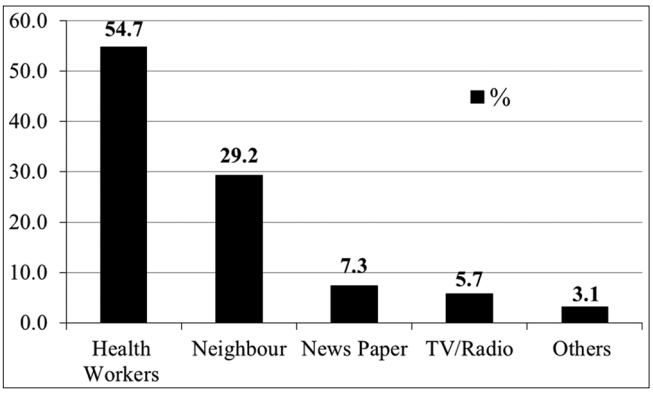

Figure 1: Source of information about 108 emergency management and referral institute services (n = 384)

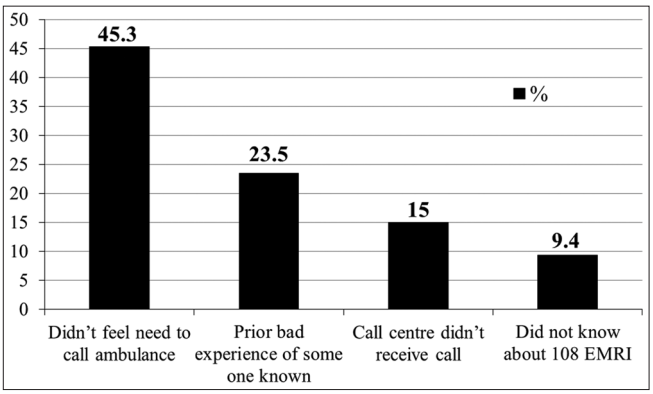

Figure 2: Reasons for not utilizing 108 emergency management and referral institute for transportation during delivery (n = 234)

Table 2: Relation of use of different transport facilities with demographic characteristics (*n*=384)

Demographic characteristics	Transport facility			Total	Statistical test
	108 EMRI	Hired vehicle	Personal vehicle		
	No. (%)	No. (%)	No. (%)	No.	
Age group					
15–19	29 (53.7)	17 (31.5)	08 (14.8)	54	χ^2=21.06, df=8, *P*<0.01
20–24	52 (42.3)	43 (35.0)	28 (22.8)	123	
25–29	30 (25.4)	46 (39.0)	42 (35.6)	118	
30–34	35 (47.9)	20 (27.4)	18 (24.7)	73	
35–39	04 (25.0)	06 (37.5)	06 (37.5)	16	
Caste					
General	61 (36.5)	54 (32.3)	52 (31.1)	167	χ^2=13.44, df=6, *P*<0.05
SEBC	48 (36.9)	42 (32.3)	40 (30.8)	130	
SC	29 (49.2)	24 (40.7)	6 (10.2)	59	
ST	12 (42.8)	12 (42.8)	04 (14.4)	28	
Socioeconomic class					
Class-I	20 (32.8)	13 (21.3)	28 (45.9)	61	χ^2=43.68, df=8, *P*<0.01
Class-II	44 (38.6)	28 (24.6)	42 (36.8)	114	
Class-III	32 (32.0)	49 (49.0)	19 (19.0)	100	
Class-IV	28 (45.2)	24 (38.7)	10 (16.1)	62	
Class-V	26 (55.3)	18 (38.3)	3 (06.4)	47	
Religion					
Hindu	133 (40.4)	114 (34.7)	82 (24.9)	329	χ^2=0.51, df=2, *P*=0.77
Muslim	17 (36.2)	18 (38.3)	02 (25.5)	47	
Christian	00 (00)	00 (00)	08 (100)	08	
Education of mother up to					
Graduate	10 (28.6)	13 (37.1)	12 (34.3)	35	χ^2=67.96, df=10, *P*<0.01
Higher Secondary	15 (28.8)	24 (46.2)	13 (25.0)	52	
Secondary	25 (21.4)	49 (41.9)	43 (36.8)	117	
Primary	22 (34.4)	23 (35.9)	19 (29.7)	64	
Illiterate	35 (83.3)	4 (9.5)	3 (7.1)	42	
Just literate	43 (58.1)	19 (25.7)	12 (16.2)	74	
Occupation					
House wife	60 (36.6)	58 (35.4)	46 (28.0)	164	χ^2=18.62, df=8, *P*<0.05
Employed	25 (28.7)	34 (39.1)	28 (32.2)	87	
Farmer	29 (56.9)	18 (35.3)	04 (07.8)	51	
Laborer	22 (47.8)	10 (21.7)	14 (30.4)	46	
Student	14 (38.9)	12 (33.3)	10 (27.8)	36	
Parity					
≤2	97 (37.0)	93 (35.5)	72 (27.5)	262	χ^2=1.44, df=2, *P*=1.44
>2	53 (43.4)	39 (32.0)	30 (24.6)	122	
Distance from health facility (km)					
<10	84 (36.5)	78 (33.9)	68 (29.6)	230	χ^2=2.93, df=2, *P*=0.23
>10	66 (42.9)	54 (35.1)	34 (22.1)	154	

EMRI: Emergency management and referral institute, SC: Scheduled caste, ST: Scheduled tribe

DISCUSSION

Among "three delay model" for getting health-care services including obstetric services, delay in reaching health facility is taken care of by 108 GVK EMRI. Increasing availability and relative affordability of mobile phones hold much promise to overcome communication barriers that contribute to delays in reaching care. There are examples of a number of innovative PPP to increase access in rural and underserved areas.[6]

There was a statistically significant difference in the use of transport facility among different age groups, among various castes, and among different socioeconomic classes ($P < 0.05$). Various education level and occupation of pregnant woman were also significant determinants of a different mode of transport for the delivery purpose ($P < 0.05$). However, religion and parity of mother and distance from health facility did not significantly influence the mode of transport. A major source of information about 108 EMRI services was various health staff and health worker (54.7%) including medical officer, female health worker, and ASHA.

Our study showed that 39.1% of mothers used 108 EMRI for transport from their place to a health facility. In Gujarat, 108 GVK EMRI has attended 2568,434 pregnancy-related emergencies since its inception to February 2017.[11] This figure is highest among all the emergencies attended by 108 ambulance services. Health and family welfare department of Assam also reported that highest calls for 108 Mritunjoy were pregnancy related[12] while Priyanka Chaman in her study conducted in Goa showed that 7.5% of emergency cases transported by 108 EMRI were pregnancy related.[13] Singh *et al*. in their study conducted in five states of India, including Gujarat reported that ambulances were assigned for >98% of the pregnancy-related calls overall.[14] They also reported an estimated proportion of pregnant women transported by 108 among all mode of transport. It ranged from 9% for Chhattisgarh to 20.5% for Himachal Pradesh, for Gujarat is 19.5%.[15]

Table 3: Satisfaction perception of clients who used 108 EMRI

Satisfaction perception	No. (%)
Satisfied with service of 108 EMRI (*n*=150)	
Yes	118 (78.7)
No	32 (21.3)
Reasons for non-satisfaction (*n*=32)	
Reached very late	21 (65.6)
Not taken to the hospital which we preferred	07 (21.9)
EMRI staff was not cooperative	03 (9.4)
None availability of emergency drugs and equipment in the ambulance	01 (3.1)
Will you use 108 EMRI next time or advice others to use it? (*n*=384)	
Yes	318 (82.8)
No	66 (17.2)

EMRI: Emergency management and referral institute

Mean age of pregnant women in our study was 25.5 years and standard deviation of 5.29 years. In a similar study conducted by Singh *et al*. in two states, the mean age of pregnant women was 23.6 years in Andhra Pradesh and 24.9 years in Himachal Pradesh.[15] They also found that 90% of women in their survey had age between 20 and 34 years, and the majority were Hindus and from a rural area.[15] While in our study, 314 out 384 women (81.7%) were aged between 20 and 34 years, 85.7% were Hindus, and all were from a rural area. Our study showed socially backward class utilized 108 services more than general class. Similar findings were obtained in a study conducted in Gujarat stating that utilization was 52.5–42.2% in ST and SC class, respectively.[16] In Andhra Pradesh, higher access of 108 services was sought by socially disadvantaged class while in Himachal Pradesh, these were mostly from general caste.[15] Along with its lower socioeconomic Class V and IV used 108 EMRI 55.3% and 45.2%, respectively, higher than upper socioeconomic classes ($P < 0.01$) in our study. Similarly, Singh *et al*. demonstrated that usage of 108 for below poverty line families for pregnancy-related transport was 55.7% in Gujarat, but higher in other states such as 98.5% in Andhra Pradesh, 98.3% in Telangana, and 85% in Assam.[14] The higher socioeconomic class has the facility of a personal vehicle as well as affordability for a hired vehicle for medical emergency related transport. While the socially disadvantaged community as well as middle and lower income class people have 108 services, as the mainstay of transport for medical emergencies including obstetric ones. Many other studies about women using publically financed transportation schemes ("108"/"102"/Janani Express Yojana) for pregnancy-related emergencies, also showed that, overall, most "108" users belonged to the disadvantaged social castes, below-the-poverty-line strata, and rural areas.[17-19] Our study demonstrated more proportion of illiterate users of 108 as compared to other education levels of pregnant women. Prinja *et al*. in their study demonstrated higher usage of emergency referral service among families whose head of the family was educated up to metric level.[16] Distance wise higher proportion (42.9%) of 108 services was utilized among women with health facility >10 km away from her place. This finding is in line with a study conducted by Prinja *et al*. in Haryana[18] and Bhabhor *et al*. in Gujarat[16] who showed 62.2–50.9% usage of 108 EMRI, respectively, for similar distance criteria.

Analyzing reasons for non-utilization of 108 EMRI demonstrated "absence of felt need" as the most common reason found in 45.3% among nonusers. This may be due to planned delivery, absence of emergency during labor pain, less distance or availability of hired or personal vehicle. However, other reasons such as prior bad experience (23.5%), no reply from the call center (15%), and lack of knowledge of 108 services (9.4%) are of utmost importance for programmatic point of view to further improve quality of 108 EMRI

service and to spread more awareness. However, the majority (78.7%) felt satisfied with 108 ambulance services which is similar to results of a study conducted in Andhra Pradesh by Surendra *et al*.[19] Most common reason for non-satisfaction as answered by unsatisfied mothers was ambulance reaching late at their place. This proportion is 65% among unsatisfied but only 14% of all users. Similarly, in a study by Surendra *et al*. showed that 80% of users gave opinion that service was very quick.[19] Finally, 82.8% of our overall study participants were ready to use 108 EMRI for any emergency as well as to suggest others about it also.

Strength and Limitation of Study

This study was community-based one which was conducted in four out of six talukas of the district including mothers who delivered in recent 6 months. Hence, the inclusion of study samples from different areas of district with all socioeconomic groups and minimization of recall bias is major strength of this study. However, we could not include the type of obstetric emergency attended by 108 EMRI and its outcome in this study, which was a limitation of our study and simultaneously scope for further studies.

CONCLUSION

A total of 108 GVK EMRI have been the lifeline for transport of institutional deliveries for the socially disadvantaged and economically challenged community. Heath workers are a major source of information for pregnant women about delivery plans including transport plan in case of emergencies. Although 108 EMRI service could satisfy the majority of expectant mothers, there is always scope of improvement for making service faster and meeting the expectation of clients to increase its utilization.

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