

# Utilisation of Emergency Transport Services by Pregnant Women-A Hospital Based Cross Sectional Study

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**Abstract- Background:** One of the achievements of National Health Mission is in improving the basic transport and ambulances for pregnant women which are operating under dial 108/102 emergency transport system (EMS) in the form of ambulances. Although, 108 is predominantly designed to attend patients of critical care, trauma and accident victims, state governments consider 108 services to be the mainstay of transport for pregnant women in both normal labour and emergency whereas 102 services exclusively cater the needs of pregnant women and sick newborn. Government of India has launched Janani Shishu Suraksha Karyakaram (JSSK) on 1st June, 2011, which entitles all pregnant women free of cost hospital services including transport, who delivers in public health institutions. Present research work aimed to study free transport component entitled under JSSK scheme.

**Methods:** Utilization of EMS services was studied in post natal mothers (n =293) who delivered at government medical college and hospital Aurangabad Maharashtra. Pretested and predesigned questionnaire is used to collect the data which includes details of transportation used to arrive at the facility, time taken, travel expenses and their awareness about the EMS was asked

**Results:** Out of 293 pregnant women in labour ,38.22% pregnant women used EMS services, 38% belonged to middle class while 66.21 % females were aware about EMS.39.59% were Inter facility referral. Average money spent for opting private transport 124.72 rupees Mean waiting period for ambulance is 19.44min median is 15 min with IQR 10-60min

**Conclusions:** Use of EMS by pregnant women in labour was 38.22% indicating need for creating more awareness about EMS use in labour.

**Index Terms-** Emergency medical transport services (EMS), Inter facility transfer (IFT)

## I. INTRODUCTION

Emergency Response Service (ERS) is generally associated with medical services, Police emergency and fire service. Historically, Emergency Response Services (ERS) are in practice since 18th century (during the Napoleonic times) when a pre-hospital system was designed to triage and transport the injured from the field to aid stations. An emergency *call* service was first

launched in 1937 in the UK known as the 999 emergency services. In the Indian context, model for ERS is the *108 and 102 Emergency Service* being managed and operationalized by EMRI (Emergency Management and Research Institute).<sup>(1,2)</sup>

Maharashtra Emergency Medical Services (MEMS) is a project of Government of Maharashtra under National Rural Health Mission (NRHM) and implemented and operated by BVG India Ltd. Citizens across Maharashtra can avail free ambulance in case of any medical emergency by dialling toll free number '108'. BVG has implemented a network of around 1000 ambulances across the state of Maharashtra<sup>(3)</sup>

The National Health Mission envisages achievement of universal access to equitable, affordable & quality health care services that are accountable and responsive to people's needs. One of the achievements of NHM is in improving the basic transport and ambulances for pregnant women which are operating under dial 108/102 emergency transport system (EMS) in the form of ambulances. Although, 108 is predominantly designed to attend patients of critical care, trauma and accident victims, state governments consider 108 services to be the mainstay of transport for pregnant women in both normal labour and emergency whereas 102 services exclusively cater the needs of pregnant women and sick newborn<sup>(4)</sup>

Government of India has launched Janani Shishu Suraksha Karyakaram (JSSK) on 1st June, 2011, which entitles all pregnant women free of cost hospital services including transport, who delivers in public health institutions. Janani Shishu Suraksha Karyakaram has been launched from 7th Oct. 2011 in all districts of Maharashtra. Under this scheme services are provided to pregnant & delivered mothers (up to 42 days after delivery) and sick infants up to the age of 1 year are getting free services in all government health facilities irrespective of poverty level, caste and parity. Each of the village, district or city is connected to one of the 1811 PHCs, 446 RH-SDH, 23 DH, 13 WH, 4 GH, 14 Government medical college hospitals and 26 Municipal Corporation Maternity Homes and hospitals under public health department, Mothers and infants are being referred to nearest facility with availability of services needed. 24 X 7 Centralized call centre is established at Pune. 108 & 102 Toll free numbers are available.<sup>(5)</sup>

Present research work aims to study free transport component entitled under JSSK scheme with objectives to study proportion of pregnant women using EMS, the characteristics of

pregnant women who used EMS and to estimate proportion of inter facility referral.

## II. METHODS

Study is conducted at Govt. medical college and hospital Aurangabad which is one of the tertiary care centre in Marathwada region of Maharashtra India. Pregnant women who delivered in the institution in last 7 days from the date of interview and were admitted in Post natal ward after their delivery were included in the study. Informed consent was obtained from all respondents prior to participating in the study.

**Sample size-** considering the prevalence of use of EMS 21%<sup>(6)</sup> sample size was calculated  $n=293$ . With 5% allowable error and 95% confidence interval. Systematic random sampling is used and every 10<sup>th</sup> mother is interviewed till the sample size is reached. **Period of study:** Data collection is spanned over a period of three months, with effect from 1<sup>st</sup> December 2017 to 28 February 2018. **Study tool-** Data is collected by face to face interview with study participant with the help of pretested and predesigned questionnaire. Questionnaire included details of transportation used to arrive at the facility, time taken, travel expenses and their awareness about the availability of EMS and its use in labour. Questions were asked about whether she came on her own to hospital or was referred from other government or private hospital (Inter facility transfer -IFT). Distance travelled is calculated with the help of google map application. For time, it was obtained from study participant, that how much time she travelled on road and how much time she waited for EMS vehicle to arrive after the toll free call was done to 108/102 number. Inter facility transfer (IFT), for this study, was defined as any transfer of a pregnant woman in labour from one health facility to tertiary care health institute for delivery on the advice of a healthcare provider irrespective of their use of EMS

**Statistics** -Master chart is prepared by entering data using Microsoft excel. Data is analyzed using SPSS software latest version (24) and appropriate statistical tests are applied for qualitative and quantitative data. Median & Interquartile range is calculated for distance and time travelled.

## III. RESULTS

Total 293 pregnant women who delivered in tertiary care hospital 38.22% used EMS to reach the tertiary care centre. Table 1 explains the baseline characteristics of pregnant women, 74.41% were in age group of 20-25yrs. 51.52% pregnant mothers were primipara, 55.29% mothers were from rural residence and 44.71% were from urban residence. 40.27% were educated up to high school. 39.59% were total interfacility transfer (IFT) (Table 1).

EMS awareness about the availability and its use in labour was asked to all pregnant women included in study. Amongst 293, 66.21% pregnant women were found aware about the availability of the EMS and its use (Figure 1).

Use of EMS according to residential place of study participants-. Out of 293, 162 were from rural residence and 131 from urban residence. Amongst rural residence 53.70% used EMS and 19.08% from urban residence used EMS. Use of EMS found

significantly associated with study participant's residential place (Table 2).

Pregnant women who has completed their education up to high school have utilized EMS facility highest. Pregnant women belonging to middle class used EMS 38% whereas low utilization is seen in both lower and upper class 13% & 3% respectively (Figure 2,3)

**Interfacility transfer(IFT)-** Out of 293 mothers 39.59% were transferred from some other health facility to tertiary care centre (Inter facility transfer -IFT). Amongst 39.59% of total IFT 60.82% used EMS, whereas 17.51% used EMS who got admitted on their own without any referral to tertiary care centre. (Figure 4)

Median distance travelled in urban area from home to tertiary care health centre is 6.80 km with the inter quartile range of 3.90 to 13.0 km Q1, Q4 respectively. In rural area median distance travelled from home to tertiary care health centre is 42.1km with the range of 27.75 to 64.00 km Q1, Q4 respectively. Average money spent for opting private transport 124.72 rupees. Mean waiting period for ambulance is 19.44min median is 15 min with IQR 10min to 60min. Actual time travelled by pregnant women to reach to tertiary care centre after the call to toll free centre is 60 minutes (median time). Required time to travel same distance according to google map application is 30 min (Median time) was statistically significant  $t=9.867$  with 95% CI

## IV. DISCUSSION

Providing free ambulance services to the pregnant women is the norm of JSSK. This service is provided free of cost to all targeted beneficiaries under JSSK regardless of their sex, creed, caste, age, disability or medical conditions (AIDS, TB etc), block/district boundary. Average response time is 35 minutes once the call is received. Present study was planned to find out proportion of pregnant mothers who used EMS, their characteristics and proportion of interfacility transfer IFT

### Awareness of EMS

In present study 66.21% women were aware about emergency transport services 38.22% used EMS. Awareness study about jssk and its various entitlements was carried out in same institute<sup>(7)</sup> in 2015-16 found awareness 21.20% for Free transport to mother from home to health facility, 17.90% Free transport to mother between health facilities 9.90% Free drop back from health facility to home after delivery. we did not evaluate awareness for separately but calculated it for the availability of service to be used while in labour. Present study found awareness level about the availability of EMS is more than previous study.

A cross sectional study was conducted at a tertiary care Hospital Solapur in Maharashtra, with sample size of 250, among post-natal mothers admitted after delivery (normal delivery / caesarean section) and also mothers of neonates age less than 30 days admitted in paediatrics ward. Socio-demographic profile of study participants (mothers) revealed that maximum (75.2%) belonged to age group of 19-25 years. There were 55.2% participants from rural area and 44.8% from urban area. In same study 45.6% of study participants were aware free transport service and 84 (33.6%) used free transport service available under JSSK. It was observed that awareness of free transport service was significantly higher among rural (71.4%) participants as compared

to urban (24.6%).<sup>(8)</sup>, findings observed in present are similarly observed

Awareness about EMS was studied in Mumbai with age more than 15 year and both male and female were included. It was observed that 76.2% correctly responded that '108' is the number to call in case of a medical emergency. Awareness is found more than present study as both male and females were the part of study and that might be the reason for more awareness<sup>(9)</sup>

Study conducted at kolkatta showed awareness of free transport services 35.5%. About one-third (35.42%) respondents had awareness on free transport for mother from home to health facility and free drop back home after delivery<sup>(10)</sup>

### Use of EMS

In our study 38.22% pregnant women used emergency transport services and 61.77% used private transport to reach to tertiary care hospital for delivery. It was observed that many pregnant women came to tertiary care hospital at their own. As the tertiary care hospital is situated at district head quarter and it is the only government tertiary care hospital available in district many women utilized it for routine ante natal care services starting from registration to delivery and post natal care

In nrhm policy rept 2012 EMS is used 21% for normal deliveries and 28% for obstretic emergencies<sup>(6)</sup> study of emergency response service (emri model) in selected states in india Pregnancy related cases as percentage of emergencies transported by EMRS is 21%, 33.7%, 20.13 % in Andrapradesh, Gujrat, Rajsthan respectively

Analysis of 108 ambulance by pregnant women in 5 states estimated that between 9.0 % and 20.5 % of pregnant women in the population in 2013–2014 were transported by '108'.<sup>(11)</sup>

### Inter facility transfer

A cohort study conducted in rural Maharashtra<sup>(12)</sup> of the 34,319 women, 9.4% had an inter-institutional maternal referral, 68% of whom were referred to another facility on the day of delivery. Almost all mothers (99.7%) who were referred were transported to the referral facility. Present study 69.82% used EMS who were referred from other health facility.

Study about interfacility transfer by 108 ambulance done 5 states showed that the pregnant women transferred by '108' ambulances, 34 993 (5.8%) had an IFT The proportion of IFTs among women transported by '108' was highest in Himachal Pradesh (11.3%) followed by Andhra Pradesh (9.9%), Telangana (8.7%), Chhattisgarh (3.2%) and Gujarat (2.4%).<sup>(13)</sup>

it was found that a high proportion (two-thirds) of all the interfacility referrals in a study from Madhya Pradesh used Janani Express service (EMS used in Gujrat) while others used personal transport, taxis, autorikshaws or public transport.<sup>(14)</sup>

### Distance and time travelled

In present study mean distance travelled by women in urban area is 6.80km(IQR3.90-13.00km), in rural area 42.01km(25.75-64.00km). Average duration travelled is 30min (IQR15-60min) and in rural area 60 min (IQR60-120min) with the use of EMS and median waiting period of 19.4 min

On an average, the EMRI ambulances took 33 minutes to reach the pick-up point and 21 minutes to reach the hospital from the site in Publicly Financed Emergency Response and Patient

Transport Systems Under NRHM National Health Systems Resource Centre Policy Support Report May 2012<sup>(6)</sup>

Ambulances travelled less than 4 km to reach half of the pregnant women for IFTs across four states but up to 10 km in Andhra Pradesh. For non-IFTs, ambulances travelled farther (between 9 and 12 km) to reach half of the pregnant women. Among IFTs, median distances from pick-up site to destination facility were between 16 km in Chhattisgarh to 32 km in Himachal Pradesh, but nearer in non-IFTs (between 8 and 32 km). The median time taken for the ambulance to travel to the pick-up site for IFTs was between 10 and 15 min<sup>(13)</sup>

Study done in Gujarat the median distance travelled by the mothers to reach a facility was 9.53 kilometres (km) (IQR 4.38 – 19.10 km). The JE users travelled median 10.33 km (IQR 5.92 – 19.48). JE non-users travelled median 7.42 km (IQR 2.05 – 18.35). The pregnant women who were referred from one facility to another facility also did not travel significantly longer distances than un referred mothers<sup>(14)</sup>

In Kashmir study 41.7% women had to travel a distance of 5-10 km, 20.9% between 10- 20 km. While more than 20% had to cover > 20 km to reach the institution and 13% a distance of <5kms. 51.7% of the mothers were provided free ambulance services from home to facility while 48.3% had to use either their own vehicle<sup>(15)</sup>

### Limitation

A main limitation of present study is that details for the time required to reach tertiary care hospital is based on the clients claim, as well history of interfacility transfer.

## V. CONCLUSION

The EMS was used by 38.22% pregnant women indicate the need of creating more awareness of EMS use in labour.. The EMS use was more prevalent among the rural than urban population. Large proportion of pregnant women who delivered by normal vaginal delivery came to tertiary care hospital to avail the services rather than inter facility transfer women This is hospital based study Further community-based studies are required to study the knowledge, and preferences of pregnant women in different sections of society and to assess the potential of increasing the use of EMS.

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## DECLARATIONS

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*Ethical approval: permission was taken from institutional ethics committee*

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Table 1: Baseline characteristics of pregnant women

Table no.1 –Baseline characteristics of pregnant women			
CHARACTER	SUBCATEGIRY	FREQUENCY	PERCENTAGE
AGE	>19	19	6.40
	20-25	221	74.41
	26-30	47	15.82
	31-35	7	2.36
	36-40	1	0.34
	41-45	2	0.67
	PARITY	PRIMIPARA	151
MULTIPARA		99	33.78
GRANDMUTIPARA		46	15.69
EDUCATION			

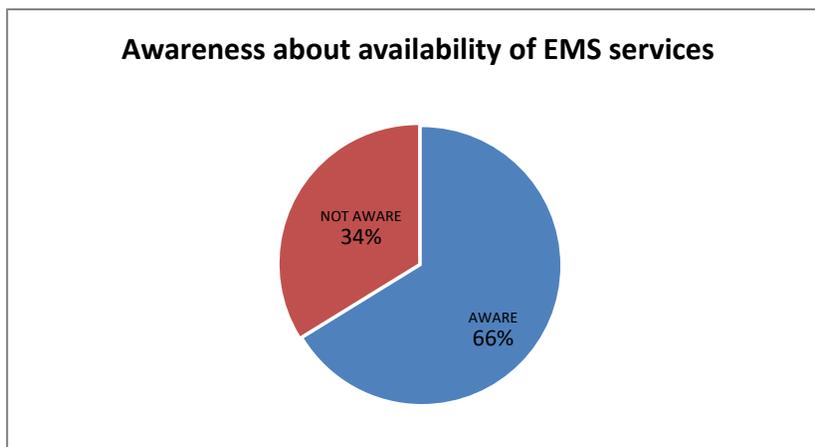
	<b>ILLITERATE</b>	<b>13</b>	<b>4.43</b>
	<b>PRIMARY SCHOOL</b>	<b>16</b>	<b>5.46</b>
	<b>MIDDLE SCHOOLING</b>	<b>60</b>	<b>20.47</b>
	<b>HIGH SCHOOL</b>	<b>118</b>	<b>40.27</b>
	<b>INTERMEDIATE/POST HIGH SCHOOL</b>	<b>61</b>	<b>20.81</b>
	<b>UG/PG</b>	<b>25</b>	<b>8.53</b>
	<b>PROFESION</b>	<b>0</b>	<b>0</b>
<b>RESIDENCE</b>			
	<b>RURAL</b>	<b>162</b>	<b>55.29</b>
	<b>URBAN</b>	<b>131</b>	<b>44.71</b>
<b>IFT</b>		<b>116</b>	<b>39.59</b>
<b>Ambulance USE</b>		<b>112</b>	<b>38.22</b>
<b>AWARENESS</b>		<b>194</b>	<b>66.21</b>

**Table 2: Use of EMS according to residential place of pregnant women**

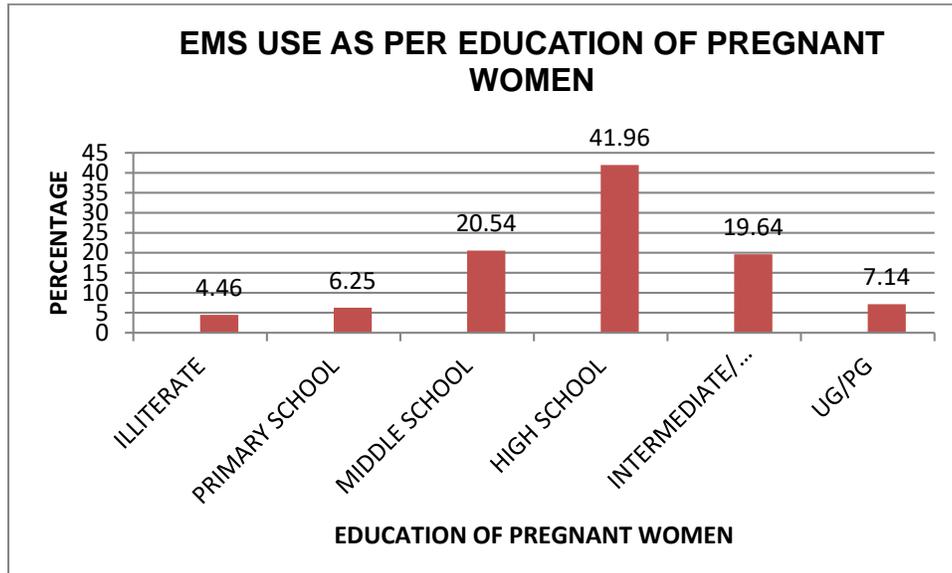
Table 2- Use of EMS according to residential place			
RESIDENCE	EMS USED	PRIVATE TRANSPORT USED	TOTAL
RURAL	87(53.70)*	75(49.30)	162(55.29)
URBAN	25(19.08)	106(80.91)	131(44.70)
TOTAL	112(38.22)	181(61.78)	293(100)

Figures in parenthesis are percentage  $\chi^2 = 36.76$   $df = 1$   $P \text{ value} < 0.000001$   
 Use of ambulance in rural population is significant

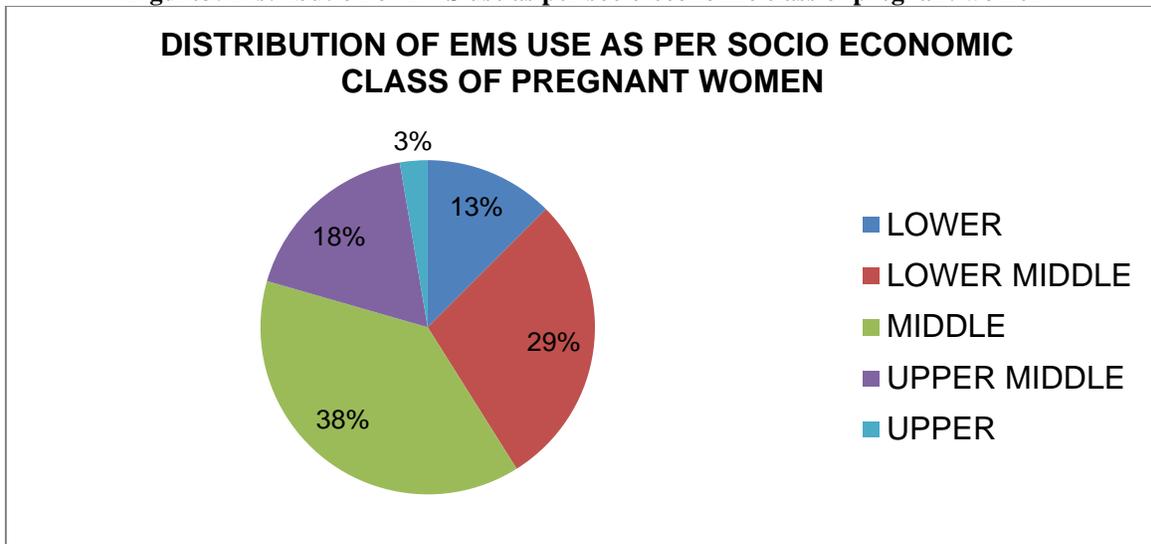
**Figure 1: Awareness about availability of EMS services amongst pregnant women**



**Figure2: Ems use as per education of pregnant women**



**Figure3: Distribution of EMS use as per socio-economic class of pregnant women**



**Figure4: Distribution of mode of admission to hospital and emergency transport service use**

