

Factors determining place of delivery of pregnant woman: A cross-sectional study conducted in Western part of Gujarat

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ABSTRACT


Background: Institutional delivery with appropriate delivery care is one of the key paths toward achieving maternal mortality ratio target of sustainable developmental goals-3. Delay in receiving timely and adequate care at health facility is deciding factor in reducing maternal mortality. Importance of closeness of health facility, cost at private hospitals, spiritual factors, social factors, etc., play a crucial role in deciding place of delivery. Important indicator of Reproductive, Maternal, Newborn Child plus Adolescent Health programme for antenatal care (ANC) is early registration of pregnancy, minimum three (upgraded to four) antenatal checkups, proportion of delivery conducted by skilled birth attendant, etc. Various demographic factors and ANC factors play a crucial role in selection of place of delivery. **Objectives:** The objectives of this study were to examine the demographic factors and ANC in determining place of delivery. **Materials and Methods:** This community-based cross-sectional retrospective study was conducted in eight Primary Health Centre areas of Jamnagar district of Gujarat during September 2015–August 2016. Multistage sampling was used and convenient samples of a total of 400 mothers who delivered during the past 6 months were taken as study participants. Chi-square test and Fisher's exact test were used for analysis. **Results:** Among the study participant mothers, 384 (96%) had institutional delivery while 16 (4%) mothers were delivered at home. Statistically significant difference in place of deliveries was found among caste ($P < 0.05$), among different socioeconomic classes ($P < 0.01$), and among different education level of mothers ($P < 0.01$). Among 16 home deliveries, 10 (62.5%) were neither registered during antenatal period nor received Mamta Card. **Conclusion:** Increasing education level of females, 100% ANC registration, and minimum four ANC checkups are the key steps toward 100% institutional deliveries.

KEY WORDS: Institutional Delivery; Education of Females; Antenatal Registration; Sustainable Developmental Goals

INTRODUCTION

Sustainable Development Goals (SDGs) aim to reduce the global maternal mortality to $<70/100,000$ live births by 2030.^[1] The current maternal mortality of India is $130/100,000$ live birth which

is almost near double than the target of SDG.^[2] It is important that appropriate delivery care is provided to mother which is necessary for both maternal and perinatal health. Settings where mothers deliver are important where hygienic care is provided in addition to professional attention during delivery. Availability of equipment for proper antenatal care (ANC), intranatal care, and postnatal care is the key to meet the target of SDG. Institutional deliveries also play an important role in decreasing maternal mortality by providing immediate routine and emergency care. Despite this known fact, home deliveries still take place in India, particularly in rural area. Hence, it is necessary to examine factors related to place of delivery. In this context, this study was carried out in rural area of Jamnagar district of Gujarat.

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Among classical three delay model, delay in receiving timely and adequate care at health facility is deciding factor in reducing maternal mortality. Importance of closeness of health facility, cost at private hospitals, spiritual factors, social factors, etc., play a crucial role in deciding place of delivery. A sizable proportion of maternal deaths in developing countries occurs on the way to hospital; other women are almost beyond help by the time they arrive.^[3] Studies found that geographical access has a greater effect on utilization than socioeconomic factors, particularly in rural areas with limited service provision.^[4]

Reproductive, Maternal, Newborn Child plus Adolescent Health (RMNCH+A) programme includes training of medical officers, auxiliary nurse midwife (ANM), staff nurses, and traditional birth attendants (TBAs) for conducting safe delivery.^[5] It also provides aseptic delivery kits and includes expansion of existing rural health services to include facilities for institutional delivery, i.e., supplying essential equipment to district, subdistrict, and first-level referral facilities to deal with high-risk obstetric emergencies.^[5] Important indicator of RMNCH+A programme for ANC is early registration of pregnancy, minimum three (upgraded to four) antenatal checkups, proportion of delivery conducted by skilled birth attendant, etc.^[5]

We believe that demographic factors and ANC are important and decisive factors for place of delivery in rural India. In this context, this study was conducted in Jamnagar district of Gujarat to examine determinant of the place of delivery.

MATERIALS AND METHODS

This community-based cross-sectional retrospective study was carried out during the period of September 2015–August 2016 in Jamnagar district of Gujarat after obtaining ethical approval from the institutional ethical committee. Jamnagar district is spread over the area of 14,184 sq. km, with the population of 2,160,119 (Census 2011).

Study Design

Sampling was done by multistage sampling [Figure 1] in the study district. Four talukas were selected by random sampling and from each taluka, two Primary Health Centres (PHCs) were selected by random sampling. Hence, a total of eight PHCs were taken. From each PHC area, 55 mothers were included in the study (including non-response). List of mothers who delivered during the past 6 months was obtained from e-Mamta. Mothers were selected systematic random sampling. Household visits of mothers were carried out with prior telephonic intimation. In case of locked house or non-response, we excluded that mother from the study. After taking the informed consent, detailed interview of mother was conducted and answers were recorded in predesigned prevalidated structured questionnaire.

Inclusion Criteria

- The following criteria were included in the study:
- The mothers who delivered during the past 6 months at the time of interview.
 - The mothers who gave valid consent.

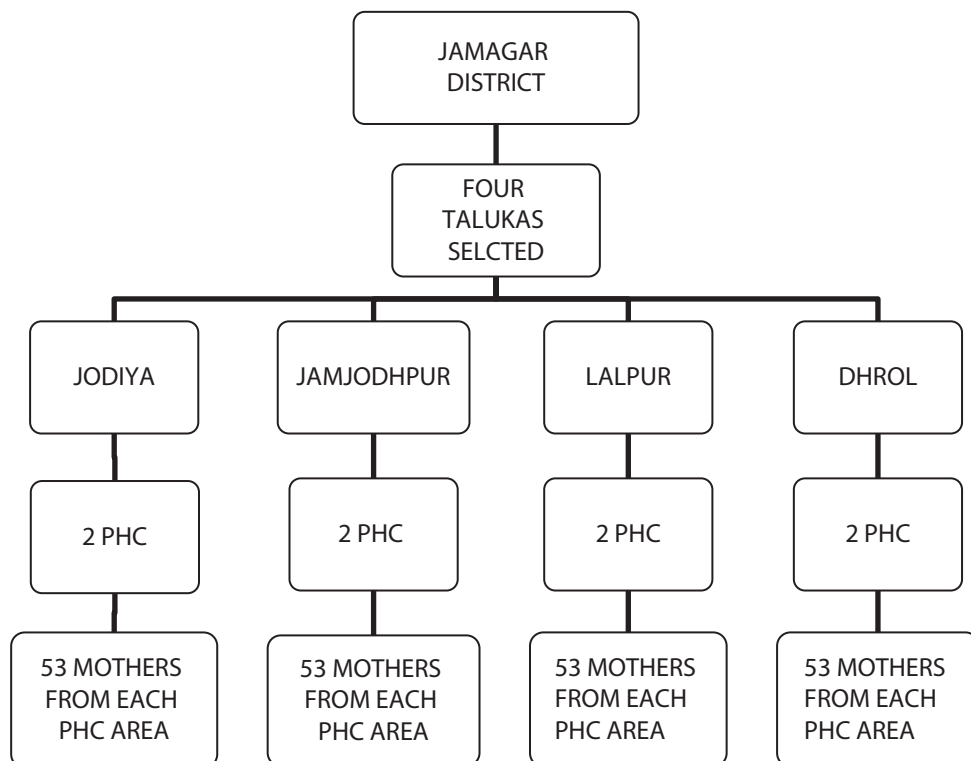


Figure 1: Study design- Multistage sampling

Exclusion Criteria

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

Sample Size

Sample size was decided by convenient sampling technique. It was decided to take 50 mothers from each eight PHC areas who delivered during the past 6 months. Considering 10% non-response rate, total sample size turned out to be 440. Among them, we could get full response of 400 mothers.

Statistical Methods

Data were analyzed using Microsoft Excel and Epi info. Chi-square test and Fisher's exact test were used for analysis.

RESULTS

Among 400 mothers, majority (31.2%) were in the age group of 20–24 years followed by 25–29 years age group (30.3%). Mean age of mothers was 25.59 years and SD 5.41 years. Caste wise 42.2% of mothers belonged to open category and 57.8 % were from socially and economically backward classes, scheduled castes, and scheduled tribes category. Among mothers, 49%

had education level up to primary and 51% of mothers were educated secondary and above level. Housewives were 42.5% while 48.3% were working. Parity-wise distribution shows that 88.5% of mothers had parity level up to 3 [Table 1].

Examination of demographic factors related to place of deliveries showed that 9 of 16, i.e., 56.25% deliveries in the age group of 20–29 years were home deliveries as compared to 7 in the age group of > 29 years which is not statistically significant ($P = 0.07$). This is naturally due to more number of pregnancies occurring in 20–29 years of age group. Statistically significant difference in place of deliveries was found among caste ($P < 0.05$), among different socioeconomic classes ($P < 0.01$), and among different education level of mothers ($P < 0.01$). Higher proportion of home deliveries was found among castes other than general (87.5%). All 16 home deliveries were found among socioeconomic Class 3–5 with Class 5 being the highest (50%) and among mothers having with education level primary and below level. Religion and parity were not found to be statistically significant demographic factors for determining place of delivery [Table 1].

Analysis of ANC factors demonstrated that among 384 institutional deliveries, 376 (97.9%) were registered and

Table 1: Relation of the place of delivery with demographic details of pregnant women ($n=400$)

Demographic characteristics		Place of delivery n (%)		Total n (%)	Statistical results
		Institutional	Home		
Age group	15–19	54 (14.1)	4 (25)	58 (14.5)	$P=0.07$ (Fisher's exact test between age group 15–29 years and 30–39 years)
	20–24	123 (32.0)	2 (12.5)	125 (31.2)	
	25–29	118 (30.7)	3 (18.7)	121 (30.3)	
	30–34	73 (19.0)	4 (25)	77 (19.2)	
	35–39	16 (04.2)	3 (18.8)	19 (4.8)	
Caste	General	167 (43.5)	2 (12.5)	169 (42.2)	$\chi^2=6.046, P<0.05$
	Others	217 (56.5)	14 (87.5)	231 (57.8)	
Socioeconomic class	Class-I	61 (15.9)	0 (0)	61 (15.2)	$\chi^2=12.963, P<0.01, df=1$, (between Class 1, 2 and Class 3, 4, 5)
	Class-II	114 (29.7)	0 (0)	114 (28.5)	
	Class-III	100 (26.0)	2 (12.5)	102 (25.5)	
	Class-IV	62 (16.1)	6 (37.5)	68 (17)	
	Class-V	47 (12.2)	8 (50)	55 (13.8)	
Religion	Hindu	329 (85.7)	15 (93.8)	344 (86)	Yates' corrected $\chi^2=0.831, df=1$ $P=0.36$ (between Hindu and other castes)
	Muslim	47 (12.2)	01 (6.2)	48 (12)	
	Christian	08 (02.1)	0 (0)	8 (2)	
Education of mother	Primary and below	180 (46.9)	16 (100)	196 (49)	$\chi^2=17.34, P<0.01, df=1$
	Secondary and above	204 (53.1)	0 (0)	204 (51)	
Occupation	Housewife	164 (42.7)	06 (37.5)	170 (42.5)	Not applicable
	Employed	87 (22.7)	0 (0)	87 (21.8)	
	Farmer	51 (13.3)	6 (37.5)	57 (14.2)	
	Laborers	46 (12.0)	3 (18.7)	49 (12.2)	
	Student	36 (09.4)	1 (6.3)	37 (9.3)	
Parity	≤ 3	340 (88.5)	14 (87.5)	354 (88.5)	Yates' corrected $\chi^2=0.074, df=1 P=0.78$
	> 3	44 (11.5)	02 (12.5)	46 (11.5)	

received Mamta Card while among 16 home deliveries, 10 (62.5%) were neither registered during antenatal period nor received Mamta Card. It means that higher home deliveries were found among pregnancies which were not registered and this result is also statistically significant ($P < 0.01$). Same number of pregnant mothers, i.e., 10 who were not registered did not have any contact with health-care provider and thereby did not get ANC. Among 382 mothers who received ANC at PHC and below level, 6 (100%) were delivered at home as compared to no home deliveries among mothers who received ANC at CHC and above level ($P < 0.01$). Statistically significant difference in results was also found between place of deliveries among mothers who received up to three ANC checkups and who received more than three ANC checkups ($P < 0.05$). All 16 (100%) home deliveries were reported among mothers receiving ≤ 3 ANC checkups [Table 2].

Among the study participant mothers, 384 (96%) had institutional delivery while 16 (4%) mothers were delivered at home. Among institutional deliveries, 22.8% were conducted in district hospital while 15% in PHC and Community Health Centre (CHC) each. Trust and private hospitals also contributed 21% each in institutional deliveries [Table 3].

In institutional deliveries, 74.3% were assisted by doctor while 25.7% were by ANM or staff nurse. While among home deliveries, 37.5% deliveries by conducted by TBA and 62.5% were conducted by untrained Dais [Table 4].

Major reason for home delivery was found to be cost (37.5%) for delivery including medical expense, travel expense and loss of wages. Other reasons were non availability of male member during labour pains (25%) and distance (25%). Interestingly, lacks of trust on health facility and previous bad experience in health facility were mentioned as reasons for home delivery by one woman each [Table 5].

DISCUSSION

Our findings showed that 96% of deliveries were institutional in Jamnagar district of Gujarat. Mean age of mothers is 25.59 ± 5.41 years in the present study. Socioeconomic class and mother's education were significant demographic determinant of place of delivery. There is no statistically significant difference in place of delivery according to age group, religion and parity of mother. Place of delivery was also determined by registration of pregnancy, ANC received during pregnancy, and number of antenatal visits.

National Family Health Survey (NFHS) 4 (2015–2016) showed increase in the prevalence of institutional births in rural India from 25% in 1998 to 78.9% as compared to 96% in our study.^[6] This variation from NFHS 4 national finding is explained by variation among different states. Gujarat being more developed state showed 88.5% of institutional deliveries in district wise report of NFHS 4.^[7] These significant increases in institutional deliveries are due to National Rural Health Mission launched in 2005, RMNCH+A (2013), JSK and various conditional cash transfer schemes such as Janani Suraksha Yojana and Kasturba Poshan Sahay Yojana. NFHS 4 also mentioned that 52.1% of deliveries among all institutional deliveries are in public health facilities.^[6] Similar to our study, hospital-based study conducted in Madhya Pradesh reported mean age 23.9 ± 4.0 years^[8] and a study on obstetric care in a PHC of South Assam district reported mean maternal age 24.1 years (± 4.09).^[4] Women below the age of 20 years and >35 years were 14.5% and 4.75%, respectively, in our study while hospital-based study conducted in Madhya Pradesh reported 17.5% and 5.1%, respectively,^[8] and still higher 37.6% and 3.1%, reported, from Andhra Pradesh.^[9] Caste wise statistically significant higher home deliveries (87.5%) were found among castes other than general. Similar findings were found in a study conducted in Nepal that upper caste (Brahmin/Chhetri) was more likely to deliver at institution ($P = 0.011$).^[10] Similarly, in the study of factors affecting the place of delivery in Nepal

Table 2: Relation of place of delivery with ANC received by pregnant women ($n=400$)

ANC		Place of delivery n (%)		Total n (%)	Statistical results
		Institutional	Home		
Pregnancy registered	Yes	376 (97.90)	06 (37.5)	382 (95.5)	Fisher exact test $P < 0.001$
	No	08 (02.1)	10 (62.5)		
ANC received	Yes	376 (97.9)	06 (37.5)	382 (95.5)	Yates' corrected $\chi^2=116.78$, $df=1$, $P < 0.01$
	No	08 (02.1)	10 (62.5)		
Place of ANC received ($n=376$)	In Mamta session at village level, subcenter, or PHC	353 (93.9)	06 (100)	359 (89.75)	Fisher's exact test $P=1$
	CHC, UHC, district hospital, trust hospital	23 (06.1)	00 (0)		
Number of ANC checkup received	≤ 3	241 (62.8)	16 (100)	257 (64.25)	$\chi^2=9.274$, $df=1$ $P < 0.01$
	> 3	143 (37.2)	0 (0)		

ANC: Antenatal care, PHC: Primary Health Centre, CHC: Community Health Centre

Table 3: Health facility-wise distribution of deliveries among mothers (n=384)

Health Facility	n (%)
District hospital	91 (22.8)
CHC	60 (15.0)
PHC	61 (15.3)
Trust hospital	85 (21.30)
Private hospital	87 (21.8)
Total	384 (100.00)

PHC: Primary Health Centre, CHC: Community Health Centre

Table 4: Assistance of delivery (n=400)

Person who assisted delivery	Place of delivery (%)	
	Institutional	Home
Doctor	285 (74.3)	-
ANM/staff nurse	99 (25.7)	-
Trained birth attendant (TBA)	-	06 (37.5)
Untrained Dai	-	10 (62.5)
Total	384	16

ANM: Auxiliary nurse midwife

Table 5: Reasons for home delivery (n=16)

Reason	n (%)
Non-availability of male family member	4 (25.00)
Distance	4 (25.00)
Cost	6 (37.50)
Do not trust health facility	1 (6.3)
Previous bad experience of health facility	1 (6.3)

also did not found any difference in place of delivery among different age group and across different religion.^[10] However, in contrast to our findings, that study found more prevalence of institutional delivery among primiparous mother than multiparous ones ($P = 0.007$).^[10] Mother's education is an important determinant of place of delivery in our study. All the mothers (100%) with education primary and below level were delivered at home as compared to no home deliveries among mothers with education level at secondary and above level ($P < 0.01$). This finding is in line with the study conducted in Nepal in which 79% of home deliveries were among illiterate women.^[10] Similar studies of factors affecting place of delivery in Meghalaya and Maharashtra also found that illiteracy is an important contributing factor to home delivery.^[11,12] Past president of the USA Mr. Barak Obama also emphasized on education of woman in SDG summit held at the United Nations Headquarters. He stated that education of woman is an important indicator of health of family and ultimately health of nation because women are primary health care provider in family. All 16 (100%) home deliveries occurred among socioeconomic Class 3, 4, and 5 as compared to Class 1 and 2 mothers had institutional deliveries. The study in Nepal showed that 97.43% of home deliveries were among mother with per capita income <1.25

US\$.^[10] Among home deliveries, 62.5% of mothers did not get contact with health worker and hence were neither registered nor issued Mamta Card. It resulted in non-receipt of ANC among mothers who were not registered during pregnancy and resulted in home deliveries. ANC is the period where mothers can be prepared for institutional deliveries by ANM/staff nurse. <4 ANC visits also turned out to be a determining factors for home deliveries ($P < 0.01$) which are similar to findings of the study conducted in Nepal.^[10] Main reasons for home deliveries were overall cost of deliveries (37.5%), distance of health facility (25%), and non-availability of male member at home during labor pains (25%). Many other studies also found financial constraint to be the culprit for home deliveries in other studies.^[13,14] Lack of trust in health facility and previous bad experiences were also reason among one home delivery each. Similarly, the study in Meghalaya found that unnecessary referrals and improper management led to loss of trust of the pregnant women and her family over health facility.^[11] Zuhaeni et al. in their study conducted in Indonesia showed that attitude, family support, the support of health workers, and perception of health need showed a significant relationship with the utilization of home delivery helped by midwives.^[15]

Strength and Limitations of Study

The strength of this study is that it was a community based and we could include four out of total six talukas of district which could make better representation of the district. However, we did not consider outcome of the deliveries according to place of delivery which is limitation of this study, and simultaneously, it is a scope for further study.

CONCLUSION

We examined wide range of demographic and antenatal factors influencing place of delivery. Community mobilization toward 100% institutional delivery is possible with increasing education of mother, improving socioeconomic condition of family, or increasing financial assistance as motive for institutional deliveries. 100% ANC registration, minimum four ANC checkups, and improving quality of ANC checkups in Mamta sessions at Anganwadi, subcenter, and PHCs are also keys for achieving above goal of complete institutional deliveries, and thereby, it would be a big step toward approaching SDG of reduction of maternal mortality ratio in India.

REFERENCES

1. Rosa W, editor. Transforming Our World: The 2030 Agenda for Sustainable Development. In: A New Era in Global Health. New York: Springer Publishing Company; 2017. Available from: <http://www.connect.springerpub.com/lookup/doi/10.1891/9780826190123.ap02>. [Last accessed on 2019 May 09].
2. Office of Registrar General. Special Bulletin on Maternal Mortality in India 2014-16. Sample Registration System.

- New Delhi, India: Office of Registrar General; 2018.
3. Ronsmans C, Graham WJ, Lancet Maternal Survival Series steering group. Maternal mortality: Who, when, where, and why. *Lancet* 2006;368:1189-200.
 4. Dey AK, Chutia D. A study on obstetric care in a primary health center of South Assam district, India. *Int J Commun Med Public Health* 2018;5:3629.
 5. Department of Health and Family Welfare. Reproductive, Maternal, Neonatal, Child health and Adolescent Programme. Annual Report, 2013-14. India: Department of Health and Family Welfare; 2015.
 6. Kesterton AJ, Cleland J, Sloggett A, Ronsmans C. Institutional delivery in rural India: The relative importance of accessibility and economic status. *BMC Pregnancy Childbirth* 2010;10:30. Available from: <https://www.bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/1471-2393-10-30>. [Last accessed on 2019 May 08].
 7. National Family Health Survey, Ministry of Health and Family Welfare. Government of India. State Fact Sheet-Gujarat, 2015-16. India: National Family Health Survey; 2016.
 8. Noor N, Kural M, Joshi T, Pandit D, Patil A. Study of maternal determinants influencing birth weight of newborn. *Arch Med Health Sci* 2015;3:239.
 9. Dangoria D, Pampallona S, Lata SN, Bollini P. A retrospective observational study of obstetric care in rural Andhra Pradesh by Dangoria charitable trust (1979 to 2009). *Indian J Med Res* 2013;138:928-34.
 10. Dhakal P MS, Shrestha M MS, Baral D MS, Pathak S MD. Factors affecting the place of delivery among mothers residing in Jhorahat VDC, Morang, Nepal. *Int J Community Based Nurs Midwifery* 2018;6:2-11.
 11. Sarkar A, Kharmujai OM, Lynrah W, Suokhrie NU. Factors influencing the place of delivery in rural Meghalaya, India: A qualitative study. *J Family Med Prim Care* 2018;7:98-103.
 12. Mumbare SS, Rege R. Ante natal care services utilization, delivery practices and factors affecting them in tribal area of North Maharashtra. *Indian J Community Med* 2011;36:287-90.
 13. Esena RK, Sappor M-M. Factors associated with the utilization of skilled delivery services in the ga east municipality of Ghana. Part 1: Demographic characteristics. *Int J Sci Technol Res* 2013;2:11.
 14. Sarker BK, Rahman M, Rahman T, Hossain J, Reichenbach L, Mitra DK, *et al.* Reasons for preference of home delivery with traditional birth attendants (TBAs) in rural Bangladesh: A qualitative exploration. *PLoS One* 2016;11:e0146161.
 15. Zuhaeni R, Palutturi S, Russeng S, Pasi H. A study identifying factors related to the home delivery attended by the midwives in the health center of Mawasangka, Middle Buton Regency. *Int J Med Sci Public Health* 2016;5:1714.

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