Original Research Article

Evaluation of maternal care at different level of health care facilities and referral scenario in Northern Madhya Pradesh and its effect on fetomaternal outcome

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ABSTRACT

Background: Pregnancy and childbirth especially in high-risk women necessitate proper antenatal, intranasal and immediate post partum care. Lack of knowledge, ignorance and poor transport facilities are major contributors of poor pregnancy outcome. Early detection of complications and prompt referral to higher centre is crucial in improving maternal outcome.

Methods: This retrospective observational study was conducted in 700 consecutive patients who attended the department of obstetrics and gynecology Bundelkhand medical college, Sagar Madhya Pradesh. India from 1st January 2021 to 30th July 2022.

Results: Out of total patients included maximum referrals were from CHC (community health centre) i.e., 49%, followed by 25.5 and 14.6% referrals from DH (district hospital) and PHC (primary health centre) respectively. Majority of referrals from outside located CHC from Sagar district. Maximum referral reported during third trimester i.e., 58.4 and 79.2% from inside and outside Sagar respectively. Overall majority of patients referred belonged to the age group of 21 to 30 years (76.6%) and there was not significant (p=0.41) correlation between inside and outside referral.

Conclusions: Maximum referrals reported during third trimester i.e., 58.4% and 79.2% from inside and outside Sagar Districts respectively and there was statistically significant correlation (p=0.01). Antenatal care (ANC) outcome at tertiary health centre can be improved by up grading health care facilities at various peripheral health care centres.

Keywords: Emergency obstetric care, ANC, Tertiary care centre

INTRODUCTION

Pregnancy and childbirth are a universally celebrated event. Yet for many women this joyful event is associated with various complications which may end in death.[1] Various government and non-government organizations are working for creating awareness and providing facilities regarding ANC and safe delivery practices. Despite the provision of improved facilities, there is a public health concern about high maternal mortality and perinatal mortality.[2] ANC at ground level is provided by various frontline health workers through primary health centre to detect high risk cases as early as possible. The objective of ANC is to detect high risk cases and refer them to tertiary care centre and arrange for them skilled care. The referral system plays a very crucial role in pregnancy and childbirth for providing access to emergency obstetrics care (EOC). Appropriateness and timeliness of referral is important is an important factor in the ultimate outcome of patients.[3] Despite the provision of good antenatal services and attempt to increase awareness, services are poorly utilized and hence the patients present in late stage with complication which are difficult to manage. This increases the suffering and morbidities of the patients. Present study was conducted at Bundelkhand medical college, Sagar Madhya Pradesh. Being a tertiary care hospital, it caters the patients referred from different parts of Bundelkhand region. Also, it caters population of various nearby

districts referred from various private and government institution. This is important to address as it has cost implication in resource constrained situation and it may affect quality of care provided at higher level facility.

METHODS

This retrospective observational study was conducted in 700 consecutive patients who attended the department of obstetrics and gynecology, Bundelkhand medical college, and Sagar Madhya Pradesh. India from 1st January 2021 to 30th July 2022.

Inclusion criteria

All obstetrics patients referred from various health care facilities from inside and outside Sagar district to Bundelkhand medical college.

Exclusion criteria

All unbooked direct obstetrics patient seeking care at Bundelkhand medical college, Sagarwere included.

Methodology

From the admission register and in patient case files all the information regarding patients sociodemographic profile (age, parity, place of referral, time of referral, management at the referring facility including investigation and treatment at the referral facility including investigation and treatment, possible causes of referral and other information on the referral letter were noted in a proper formulated proforma were excluded.

Statistical analysis

Data was compiled using MS excel 2007 and analysis was done with the help of Epi-info 7 software. Frequency and percentages were calculated and statistical test (chi square) was applied wherever applicable<0.05 was taken as statistically significant.

RESULTS

This retrospective observational study was conducted in 700 consecutive patients who attended department of obstetrics and gynecology Bundelkhand medical college

Sagar, Madhya Pradesh, India. In study finding as follows:

Majority of patients were referred from outside Sagar district (62.6%), whereas only 37.4% referred from Sagar districts (Table 1), (Figure 1).

Maximum referrals are from CHC (community health centre) i.e., 49%, followed by 25.5% and 14.6% referrals from DH (district hospital) and PHC (primary health centre) respectively. Majority of referrals from outside located CHC from Sagar district (Table 2).

Ambulance facilities were utilized by both group (inside Sagar as well as outside Sagar) i.e., 86.6% and 79.5% respectively (Table 3).

In the present study maximum referral reported during third trimester i.e., 58.4% and 79.2% from inside and outside Sagar respectively. This was followed by referral during postpartum period in 23.3% from inside Sagar and 13.2% from outside Sagar. There statistically significant (p=0.01) correlation between inside and outside referred patients (Table 4).

Recording of vitals such as pulse, BP, respiration and temperature are essential part of examination. Pulse, blood pressure, respiratory rate and temperature were recorded at 66.6%, 74%, 78.9% and 78.9% referring facility respectively. Pulse and blood pressure were recorded in significantly higher no. of referring facility from outside Sagar as compare to inside Sagar (p<0.05) (Table 5).

It was observed that less than half referring units had the patient investigated before being referred. Hemoglobin estimation was conducted at only 27.1% and 46.1% referring centre from inside and outside Sagar respectively. Blood grouping and CBC was done at only 28.7% and 0.3% referring facility. Hemoglobin estimation, blood grouping, BTCT, CBC, and VDRL testing done insignificantly higher number of referring structure outside Sagar as compare to inside Sagar (p<0.5) (Table 6).

Table 1: Distribution of cases according to referral, (n=700).

Referral	N	Percentages (%)
Outside Sagar district	438	62.6
Inside Sagar district	262	37.4

Table 2: Distribution according to the place of referral, (n=700).

Place of referral	Total		Inside Sagar district, (n=262)		Outside Sagar district, (n=438)	
	N	%	N	%	N	%
PHC	102	14.6	58	22.1	44	10
District hospital	180	25.7	79	30.2	101	23.1
CHC	344	49	55	21	288	65.8
SC	46	6.6	46	100	0	0
Civil hospital	20	2.9	20	100	0	0
Private hospitals	8	1.1	8	100	0	0

Table 3: Distribution according to the mode of transport, (n=700).

Mode	Total		Inside Sagar district, (n=262)		Outside Sagar district, (n=438)	
	N	%	N	%	N	%
Ambulance	575	82.1	227	86.6	348	79.5
Private vehicle	125	17.9	35	13.4	100	20.5
Total	700	100	262	100	438	100
Chi sq-5.46, p=0.02						

Table 4: Distribution according to gestational age at referral, (n=700).

Period of referral	Total		Inside Sagar district, (n=262)		Outside Sagar district, (n=438)	
	N	%	N	%	N	%
1st trimester	58	8.3	39	14.9	19	4.3
2nd trimester	23	3.3	9	3.4	14	3.2
3rd trimester	500	71.4	153	58.4	347	79.2
Postpartum	119	17	61	23.3	58	13.2
Total	700	100	262	100	438	100

Table 5: Recording of vitals at referring centre, (n=700).

Vitals at previous institution		Total		Inside Sagar district, (n=262)		Outside Sagar district, (n=438)		Chi sq	P value
		N	%	N	%	N	%		
Pulse	Yes	466	66.6	146	55.7	320	73.1	22.13	0.001
	No	234	33.4	116	44.3	118	26.9		
Blood pressure	Yes	518	74	168	64.1	350	79.9	21.13	0.001
	No	182	26	94	35.9	88	20.1		
Respiration	Yes	552	78.9	206	78.6	346	79	0.01	0.91
	No	148	21.1	56	21.4	92	21		
Temperature	Yes	552	78.9	206	78.6	346	79	0.01	0.91
	No	148	21.1	56	21.4	92	21		
Total		700	100	262	100	438	100		

Table 6: Investigation conducting at referral facility.

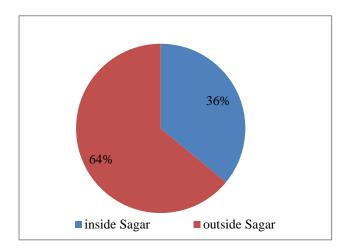| Investigation at previous institution		Total		Inside Sagar district		Outside Sagar district		Chi sq	P value
		N	%	N	%	N	%		
HB	Yes	273	39	71	27.1	202	46.1	24.93	0.001
	No	427	61	191	72.9	236	53.9		
Blood group	Yes	201	28.7	59	22.5	142	32.4	7.85	0.005
	No	499	71.3	203	77.5	296	67.6		
BTCT	Yes	3	0.4	3	1.1	0	0	6.29	0.05
	No	607	99.6	259	98.9	438	100		
CBC	Yes	2	0.3	0	0	2	0.5	6.29	0.05
	No	698	99.7	262	100	436	99.5		
HIV	Yes	55	7.9	14	5.3	41	9.4	3.65	0.06
	No	645	92.1	248	94.7	397	90.6		
HBSAg	Yes	60	8.6	17	6.5	43	9.8	2.1	0,13
	No	640	91.4	245	93.5	395	90.2		
VDRL	Yes	57	8.1	14	5.3	43	9.8	4.31	0.04
	No	643	91.9	248	94.7	395	90.2		
RBS	Yes	9	1.3	5	1.9	4	0.9	1.27	0.25
	No	691	98.7	257	98.1	434	99.1		
Urine albumin	Yes	19	2.7	7	2.7	12	2.7	0.13	0.96
	No	681	97.3	255	97.3	426	97.3		

Figure 1: Distribution of cases according to referral.

DISCUSSION

This study was conducted with the aim to evaluate the status of maternal care at different facility. The constitution of referral in present study was community health care in 49% patients, followed by 25.7%f from district hospital and 14.6% from primary health centre. Singh et al in their study observed practice for screening and managing high risk complications in only 35% staff at PHC and 51% staff at CHC. Also, they observed low confidence amongst staff of CHC and PHC for managing complicated pregnancy.[4] Inadequate health staff and inadequate resources might be responsible for high number of referral from periphery. However more complicated cases are referred from district hospitals. Sabale et al observed 17.3% referral rate in their study and majority i.e., 42.4% referral were made from district hospital revealing lacunae in the EOC given the district level hospitals.[5] In present study majority of patients referred belonged to the age group of 21 to 30 years (76.6%) followed by less than20 year of age (15.4%). Maximum referral was reported during third trimester i.e., 58.4% from inside and 79.2% from outside Sagar, followed by referral during postpartum period i.e., 23.3% from inside Sagar and 13.2% from outside Sagar. Gupta et al also enrolled maximum number of referred cases in the age range of 20-30 years comprising 86.9% of total case similar to present study.[6] Government of India and Madhya Pradesh are running various scheme to promote institutional deliveries which include free transport facilities with the aid of Janani express. For effectively reducing maternal morbidity and mortality, utilization of services is necessary. Ambulance facility were utilized by both group (inside Sagar as well as outside Sagar) i.e., 86.6% and 79.5% respectively. Gupta et al in their study documented unavailability of ambulance in 69.34% cases for transport.[6] Kujur et al in their study reported 15.37% proportion of referral cases and documented unavailability of ambulance in 69.34% of cases for transport.[7] In other study conducted by Akaba et al reported transport by ambulance in only 9 (7.3%) patients.[8] Recording of vitals such as pulse, BP, respiration and temperature are essential part of examination. The present study observed recording of pulse in 66.6%, blood pressure in 74%, respiratory rate in 78.9% and temperature in 78.9% referring facilities before referring the patients. Pulse and blood pressure were recorded in significantly higher number of referring facility from outside of Sagar district as compare to inside Sagar (p<0.05%). Whereas recordings of temperature and respiratory rate were statistically similar in referring facility of inside as well as outside of Sagar (p>0.05%). Investigation before referral were conducted at less than half referring facility. Hemoglobin estimation, blood pressure, BTCT, CBC and VDRL testing were done in significantly higher number of referring facility from of outside Sagar district as compare to inside Sagar (p<0.05%). Also, the treatment given at referring facility before referring a patient was also poor i.e., 10.5% and 9.9% patient referred from outside Sagar and inside Sagar district respectively were referred following antibiotic dose.

Singh et al observed sub optimal knowledge and practice of screening common high risk conditions and assessing complication in pregnancy amongst staff of PHC and CHC. Also they observed large gap in knowledge of emergency treatment for obstetric complication in pregnancy and pre referral first-aid.[4] Goswami Pet al also reported hypertensive disorder (25.4%) were the leading cause of maternal death amongst the referral cases. The delay in referral of complicated cases from peripheral health centre which could be due to lack of adequate transport facilities or trained personnel in PHC/CHC was the contributing factor for adverse maternal outcome.[9] Tiwari at al observed weight measurement in 74.9%, abdominal examination in 76.4% and hemoglobin estimation in only 69.6% patients, height and blood pressure examination in only 60.8% and 66.2% patients respectively at PHC and CHC. Urine examination was done in only 50.2% patients and education regarding complication and danger sign during pregnancy was given in only half of patients. They documented poor quality of antenatal services at primary and community health centre.[10]

Appropriate ANC improves pregnancy outcomes. The primary care facilities include sub centres, PHC and CHC, in ascending order of level of obstetric care provided. The latter two should provide basic and comprehensive obstetric care, but they provide only partial services. In such scenario, the management and referrals during pregnancy are less understood. This study assessed rural providers' perspectives on management and referrals of antenatal women with high risk obstetric risk, or with complications. Asmathunnisa et al did their study on current scenario and challenges rural health in India.[4] Khanam et al studied quality of maternal and child health in different scenario among rural and urban Maharashtra. Singh did a knowledge, practice and attitude survey of providers in rural public healthcare in two states of India regarding management and referral of high risk conditions and complications during antenatal period.[11,12] Biswas et

al in their qualitative case study in Bangladesh concluded that timely referral saves the lives of mothers and new borns. Prompt and efficient indication, referral of pregnancy related complications and emergencies are key factors to the reduction of maternal and new born morbidity and mortality.

This study reveals that early detection of pregnancy complication by skilled professionals and timely referral to a facility is beneficial in saving the majority of baby's as well as mothers lives in resources poor teagardens with a considerable access barrier to health facilities.[13] Similar study by Roberts et al in Nigeria, Austin et al in Addis Ababa Ethiopia aimed from the perspective of healthcare providers by analyzing 3 factors: implememtation of national referral guidelines, staff training, and staff supervision. It was concluded that dedicated transportation and communication infrastructure, improvements in pre service and in service training, and supportive supervision are needed to maximize the effective use of existing human resources and infrastructure, thus increasing access to and the supervision of timely, high quality EOC.[14,15] In studies done by Singh et al on maternal outcome in referral obstetric cases in a tertiary care centre it was concluded that illiteracy and ignorance of female regarding healthcare requirements and poor infrastructure came out to be a major contributor of poor maternal outcome. Timely referral is crucial for a satisfactory maternal and fetal outcome. To reduce the number of unnecessary referrals and to reduce burden on tertiary care hospitals, health care workers should and trained in essentials and EOC which will help in reducing morbidity and mortality.[14] A study from southern Karnataka by Nagavarapu et al enumerated reasons for obstetric referrals from community facilities to a tertiary obstetric facility. It was seen that referrals frequently occurred after the onset of labor. Data implies that improving obstetric referral protocols will improve the birth experience and reduce the burden on tertiary care facilities and on the women themselves.[15,16] Mestre et al worked on organizing hospitals into networks and creating a hierarchical and multiservice model to define location, supply and referrals in planned hospital systems. Health care planners have to make decision on where to locate and how to organize hospital services, so as to improve the geographic equity of access in the delivery of care while accounting for efficiency and cost issues. What is needed is a model to inform decision on the location and supply of hospital services, and then the decision maker wants to maximize patient's geographical access to a hospital network. The model considers the multiservice structure of hospital production (with hospitals producing inpatient care, emergency care and external consultations) and costs associated with reorganizing the hospital network. Moreover, it considers the articulation between different hospital service and between hospital units, and the ascendants and descendent flows related to two way referrals of patients in the hospital hierarchy. The proposed approach differs from previous literature by accounting simultaneously for these issue and provides from previous literature by accounting simultaneously for these issue and provides crucial information for health care planners on referral networks, on hospital catchment areas , on location and structure of hospital supply as well as on costs required to improve access.[17] Darmstadt et al worked on evidence based, cost effective interventions and stressed on how many newborn babies can we save. Reduction in neonatal mortality that exceeds 50% can be achieved with an integrated, high coverage program of universal outreach and family community care. Early success in averting neonatal deaths is possible in setting with high mortality and weak health system to improve home care practices, to create demand for skilled care, and to improve care seeking. Simultaneous expansion of clinical care for babies and mothers is essential to achieve the reduction in neonatal death needed to meet the millennium development goal for child survival.[18] Bailey et al used a GIS to model interventions to strength the emergency referral system for maternal and new born health in Ethopia. GIS mapping and modeling enable spatial and temporal analyses critical to understanding the populations access to health services and the emergency referral system. The provision of vehicles and communication and upgrading of health centre's to first level referral hospitals are short and medium term strategies that can rapidly increase access to lifesaving services.[19]

CONCLUSION

ANC outcome at tertiary health centers can be improved by up grading health care facilities at various peripheral health care centres. General population awareness regarding utilization of government approved facilities can improve ANC.

The Indian health system should improve the provision of obstetric care by standardizing services at each level of health care and increasing the focus on emergency treatment of complications, appropriate decision making for referral, and improving referral communication and staff support.

ACKNOWLEDGEMENTS

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