

Obstetric critical care requirements felt by the obstetricians: An experience-based study

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Abstract

Background and Aims: Pregnancy is a state of physiological stress to a woman's health. Concomitant complications and infections during pregnancy may necessitate intensive monitoring and management of such patients in critical care settings. This study aims to determine the perceptions about the requirement of obstetric critical care based on the experience of obstetricians.

Material and Methods: An observational, questionnaire-based study was conducted in 200 obstetricians working in various settings, who were approached during obstetric conferences. The questionnaire consisted of twenty items and was designed to determine the views of obstetricians, based on their clinical experience, regarding problems at the time of medical or surgical crisis in obstetric patients due to nonavailability of the intensive care services.

Results: Seventeen percent of the participating obstetricians had a facility of dedicated obstetric Intensive Care Unit (ICU) at their institution. In the opinion of 62% of the respondents, ICU bed was made available in cases of crisis. Forty-two percent of the obstetricians reported that it took <10 min for the intensivist to reach the critically ill parturient. According to 32% of respondents, the intensivist could not reach within 20 min. There was a delay of more than 30 min in providing critical care services according to almost half (49%) of the respondents. Postpartum hemorrhage (24%) was the leading cause of ICU admission, followed by pregnancy-induced hypertension (14%) and acute respiratory distress syndrome (12%). A majority (87%) of the obstetricians were strongly in favor of a dedicated obstetric ICU.

Conclusions: Need for a dedicated obstetric ICU is felt by most of the obstetricians to improve patient care.

Keywords: Dedicated obstetric Intensive Care Unit, multidisciplinary team approach, physiological changes

Introduction

Dedicated obstetric critical care is lacking in most of the obstetric centers of developing countries. Obstetric patients are often young and mostly healthy. Pregnancy is a stressful physiological state for the woman. It unmasks or at times worsens the underlying comorbidities. There may be certain superimposed issues such as concomitant obstetric complications and infections. These clinical situations necessitate the requirement of intensive monitoring and management of such patients in critical care settings. In developed countries, the incidence of Intensive Care Unit (ICU) admission of an obstetric patient

is 2–4/1000 deliveries as compared to developing countries where it is as high as 2–13.5/1000 deliveries.^[1] The incidence of maternal deaths due to critical illness varies from 1% to up to 25% in different developing countries.^[2] The majority of these deaths are caused by postpartum hemorrhage (PPH).^[3-5]

This study aims to determine the requirement of critical care based on the experience of the obstetricians and the problems experienced by them due to complete lack or delay in accessing these facilities.

Material and Methods

After getting approval from the Institutional Ethical Committee, we conducted an observational questionnaire-based study. The

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questionnaire consisted of twenty questions [Appendix 1]. Two hundred obstetricians working in various settings such as government hospitals, corporate medical centers, or individual nursing homes in different cities were interviewed during obstetric conferences. The questionnaire was designed to determine the views of obstetricians based on their clinical experience, the kind of set up in which the obstetricians participating in this study were working, as well as to describe various problems faced by the patients at the time of medical crisis due to nonavailability or delayed availability of intensive care services.

The study was completed over a period of 1 year in which the authors collected data from delegates attending obstetric conferences held in different cities including the capital New Delhi, after seeking appropriate permission/s from the organizers. We tried to collect maximum data points in each conference and were able to complete the data collection in three conferences.

Statistics

Data comprised 200 questionnaires filled by 200 obstetricians. The data were compiled in Microsoft Excel and analyzed using SPSS version 20 (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) The percentages were calculated for most of the data. Association between various factors and experience of obstetricians was found using Chi-square test, and *P* value was calculated.

Results

Baseline data of the participants are presented in Table 1. Experience with obstetric complications requiring critical care has been presented in Table 2. Seventeen percent of the participating obstetricians had a dedicated obstetric ICU facility at their workplace. ICU bed was made available in case of a medical crisis for 62% of the respondents while the patients of the remaining 38% of respondents did not receive ICU care due to the lack or shortage of facilities. Forty-two percent of the obstetricians reported that it took < 10 min for the intensivist or the anesthesiologist to reach the site of the critically ill parturient. In rest of the 58% cases, there was a delay of more than 10 min.

PPH (24%) was found to be the leading cause of ICU admission. This was followed by pregnancy-induced hypertension (14%) and acute respiratory distress syndrome (12%). Other important but rarer causes included pulmonary embolism, sepsis, disseminated intravascular coagulation, antepartum hemorrhage, and shock as well as medical conditions which mainly include cardiac diseases

Table 1: Baseline data of participants

Variables	Percentage
Years of experience after postgraduation (years)	
<5	40
5-10	25
>10	35
Working in institution	
Yes	95.5
No	4.5
Type of institution	
Government	74
Private	22
Other	4
Total number of beds	
<500	20.5
500-1500	64.5
>1500	15
Number of obstetric beds	
<40	45
40-100	26.5
>100	28.5
Total ICU beds	
0-10	61.5
11-20	30.5
>20	7.5
Tertiary care center	
Yes	87.5
No	12.5
Approximate delivery rate in your institute	
<250	33
250-500	17.5
>500	49.5
Approximate incidence of operative delivery (%)	
<10	18
10-20	46
>20	36

ICU=Intensive Care Unit

and severe anemia. Operative complications, postoperative injury, poor antenatal care, and delayed help and referral system at their centers were among the other causes mentioned by the obstetricians for the deterioration of the condition of their patients and requirement of intensive care services [Table 3].

Suggestions for improvement and better management of critically ill obstetric patients and lacunae in the management have been summarized in Table 4. Association between the number of complications and the years of experience of the participants has been shown in Table 5. No significant difference was found between the number of complications observed over last 2 years and the number of years of experience of the obstetrician ($P = 0.190$). Association of the time of delay of arrival of the intensivist and years of experience of attending obstetricians has been shown in Table 5. Data were

Table 2: Experience with obstetric complications requiring critical care

Experience with obstetric complications requiring critical care	Percentage
Obstetric complications including deaths experienced in last 2 years	
<5	37
5-20	58
>20	5
Dedicated ICU/ICU beds available only for obstetric cases in your hospital	
Yes	17
No	83
Immediate ICU bed availability at the time of crisis/need	
Yes	61.5
No	38.5
Average duration of delay in availability of intensivist/ anesthesiologist (min)	
<10	42
10-20	26.5
>20	31
Average duration of delay in availability of ICU bed (min)	
<30	51
30-60	31
>60	18

ICU=Intensive Care Unit

Table 3: Causes of Intensive Care Unit admission

Causes of ICU admission	Frequency	Percentage
Hemorrhage	172	29.5
Shock	17	2.9
Sepsis	50	8.6
DIC/HELLP	22	3.8
PIH	80	13.7
ARDS	72	12.3
Pulmonary embolism	69	11.8
Cardiac arrest	14	2.4
Medical conditions	70	12.0
Operative complications	5	0.8
Postoperative injury	6	1.0
Poor antenatal care	3	0.5
Delayed help and referrals	3	0.5

ICU=Intensive Care Unit, DIC=Disseminated intravascular coagulation, HELLP=Hemolysis, elevated liver enzymes, low platelet count, PIH=Pregnancy-induced hypertension, ARDS=Acute respiratory distress syndrome

suggestive of an association between these two factors, but it failed to achieve a statistical significance ($P = 0.065$).

A few of the participants suggested that strengthening of antenatal services should be done at grass root level. This can be done by creating awareness among women of childbearing age and training of midwives. A few others focused on a multidisciplinary approach and a more coordinated teamwork within various departments while giving suggestions to improve obstetric critical care.

Discussion

Obstetric patients are a special group of patients as their care requires caring for two lives. In addition, these women have altered physiology. During pregnancy, they develop physiological anemia, hypercoagulability, generalized edema, and blood vessel fragility. The gravid uterus compresses the inferior vena cava. Due to these factors, these women are prone to decompensate in the presence of medical insults such as hypoxemia, hypotension, and anemia. Furthermore, their airway may be difficult to manage due to estrogen and weight gain-mediated airway edema. Critically ill obstetric patients pose a challenging situation for the intensivist, obstetrician, and the pediatrician. A multidisciplinary team approach is required for their management. However, the role of the obstetrician is of utmost importance whose supervision, vigilance, skill, and knowledge of critical events of obstetric patients can decrease maternal morbidity and mortality to a great extent.^[6]

Maternal safety has always been given priority. However, as far as possible fetal well-being should also be kept in mind and interventions which are safe for both mother and child should be considered. Acquisition of special procedural skills and knowledge of the pathophysiological changes of the underlying disease is essential for providing high-quality intensive care. The prime requirement for this is the supervision and cooperation of the obstetrician in addition to continuous vigilance and care by the intensivist. Therefore, the round-the-clock availability of dedicated obstetric critical care services is the need of the hour.

Government and corporate hospitals have got critical care setups though not dedicated obstetric critical care. It is only the obstetricians working in the nursing homes that represent the true segment of obstetric practice devoid of critical care arrangements. Provision of ICU attachments is mandatory for these nursing homes to have complete obstetric care facility. Hence, this segment of obstetricians was also included in the study.

We did not fix specific numbers for interviewing obstetricians working in different hospital settings such as government, corporate, or nursing homes, so our results do not point to any specific health care setting.

For best delivery of obstetric critical care, a closed ICU is preferable over an open ICU. Open ICU implies that the physician-in-charge of the patient is responsible for the patient's admission to the ICU as well as her treatment. The intensivist does not have the primary responsibility of the patient whereas in a "closed" ICU the patient is admitted to

the ICU directly under the intensivist. Closed ICUs of various specialties have been associated with a lower ICU mortality as compared to open ICUs.^[7]

In developed countries, only 0.2–0.9% of parturients require critical care.^[8] However, in developing countries like India, empirically speaking, this figure seems high and has not actually been calculated. The incidence of maternal deaths due to critical illness varies from 1% to as high as 25% in different developing countries.^[2] PPH is one of the leading causes of maternal mortality in developing countries.^[3] It was found in a systematic review conducted by the World Health Organization that PPH is the leading cause of maternal mortality in Africa and Asia, accounting for approximately

50% of the total number of maternal deaths in this region.^[4,5] Overall PPH accounts for an estimated 25% of maternal mortality worldwide. Tang *et al.* in their series of patients also reported PPH to be consistently the most common indication for ICU admission.^[9] The obstetricians who participated in this study also observed that PPH was the leading cause of ICU admission in 23.6% cases. Early detection and timely and appropriate intervention can avoid or reduce the effects of PPH. Due to the lack of dedicated obstetric ICUs and nonavailability of ICU beds in general ICUs, the patient may clinically deteriorate as there is a delay in delivery of intensive care. Massive transfusion of blood products may be required which has its inherent complications. Hence, this should best be done under intensive monitoring in the intensive care settings. Another area of concern in managing these patients is the availability of a blood bank. Dedicated obstetric hospitals, nursing homes, and clinics are mostly equipped with their own blood banks. Smaller setups/nursing homes get approval by the government for obstetric practice only after ensuring the availability of essential requirements, one of which is a liaison with a dedicated blood bank in its vicinity. However, prior availability of specific blood and emergency blood bank facility should be ensured in elective cases. For emergencies, blood bank facility should be available round the clock.

Lack of proper and uniform ICU scoring systems has also led to poor management of critically ill obstetric patients. The criteria used in scoring systems which are routinely used such as Acute Physiology and Chronic Health Evaluation, Mortality Probability Models II, and Simplified Acute Physiology Score II do not differentiate the physiological changes of pregnancy from the pathological changes in this group of patients. This leads to an overestimation of mortality in critically ill parturients.^[1,3] A uniform scoring system needs to be designed for obstetric patients, taking into consideration the altered physiology during pregnancy. Such a system will work best if there is a dedicated ICU that deals only with obstetric patients.

Family health care is woman oriented in developing countries. Greater morbidity and mortality of obstetric patients becomes a

Table 4: Suggestions for improvement and better management of critically ill obstetric patients and lacunae in the management

Suggestions for improvement and lacunae in management	Percentage
Suggestions - Dedicated ICU with intensivist for obstetric cases	
Yes	70
No	30
Suggestions - Training of obstetrics and gynecology residents in handling obstetric critical care	
Yes	84
No	16
Lacunae - Lack of training in curriculum	
Yes	74.5
No	25.5
Lacunae - Lack of immediate help from intensivist	
Yes	66
No	34
Percentage decrease mortality/morbidity if obstetric ICU services available in hand	
<50	22
50-80	59.5
>80	18.5
Favor of obstetric ICU as separate specialty in obstetrics and gynecology	
Yes	87
No	13

ICU=Intensive Care Unit

Table 5: Association of number of obstetric complications and delay in time of intensivist with years of experience of obstetrician

Parameter	<5 years' experience (%)	5-10 years' experience (%)	>10 years' experience (%)	P
Number of obstetric complications				
<5	31.2	36	44.3	0.190
5-20	60	60	54.3	
>20	8.8	4	1.4	
Delay in time of intensivist (min)				
<10	45	36	42.9	0.065
10-20	16.2	38	30	
>20	38.8	26	27.1	

liability for the family as well as the society. Hence, availability of ICU for obstetric patients will lead to a reduction in their morbidity and mortality and improve the family care and resources.

Similar studies if done in different parts of the country may help determine the incidence of various problems in those regions and may also point out to the problems analyzed our study in a wider perspective.

Limitations of the study

There are two major limitations of this study. First, it is a questionnaire-based study. The results tell us about what the obstetricians remember about the complications and not the facts regarding the incidence of obstetric complications or ICU admissions. Second, the obstetricians attending the conferences were interviewed. Therefore, the participants are not the true representatives of all the obstetricians leading to selection bias of the participants.

Conclusions

In spite of the limitations, some conclusions can be drawn from the present study. The majority of the obstetricians feel a need of dedicated obstetric ICU at their institution and the earliest possible help from the intensivist to manage critically ill patients. It also needs to be focused that the training and curriculum of obstetricians need to be modified so that they can themselves carry out intensive care procedures by the time specialist help is reached.

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Conflicts of interest

There are no conflicts of interest.

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Appendix 1: Questionnaire

1. How many years of experience do you have after postgraduation?
 - a) <5 years
 - b) 5-10 years
 - c) >10 years
2. Are you working in an institution?
 - a) Yes
 - b) No
3. If yes, your institution is a
 - a) Government institution
 - b) Private
 - c) Other
4. How many total number of beds it has?
5. How many number of obstetric beds it has?
6. How many total ICU beds it has?
7. Is it a tertiary care center or attached to some tertiary care center?
 - a) Yes
 - b) No
8. What is approximate delivery rate in your institute?
 - a) <250/month
 - b) 250-500/month
 - c) >500/month
9. What is the approximate incidence of operative delivery?
 - a) <10%
 - b) 10-20%
 - c) >20%
10. How many obstetric complications including deaths were experienced by you in the last 2 years?
11. Is there a dedicated ICU/ICU beds available only for obstetric cases in your hospital?
 - a) Yes
 - b) No
12. Was the bed immediately available in ICU at the time of crisis/need?
 - a) Yes
 - b) No

Contd...

Appendix 1: Contd...

13. What is average duration of delay in need and availability of intensivist/anesthesiologist?
 - a) <10 min
 - b) 10-20 min
 - c) >20 min
14. What is average duration of delay in need and availability of bed?
 - a) <30 min
 - b) 30-60 min
 - c) >60 min
15. According to you what are top three causes of ICU admission of obstetric patient?
 - a). _____
 - b) _____
 - c) _____
16. What best can be done to handle obstetric critical care? (can choose multiple options)
 - a) Dedicated ICU with intensivist for obstetric cases
 - b) Training of obstetrics and gynecology residents in handling obstetric critical care
 - c) If other please specify
17. What are the lacunae in your training/institutional practices to manage critically ill obstetric patients? (can choose multiple options)
 - a) Lack of training in curriculum
 - b) Lack of immediate help from intensivist
 - c) If other, please specify
18. How much you can decrease mortality/morbidity if obstetric ICU services available in hand?
 - a) <50%
 - b) >50-80%
 - c) >80%
19. Are you in a favor of obstetric ICU as separate specialty in obstetrics and gynecology?
 - a) Yes
 - b) No
20. Any other suggestion to improve obstetric critical care

ICU=Intensive Care Unit