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Original Research Article

Managing dyspnea in pregnancy-an errand uphill: an experience from the critical care obstetric unit of a tertiary care facility in India

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ABSTRACT

Background: The occurrence of dyspnea in a gravid woman induces the query in the treating obstetrician regarding its root cause being either underlying or new cardiac or pulmonary disease, or due to the pregnancy itself. Attainment to this conclusion requires grasp of the cardiopulmonary changes befalling during normal pregnancy, as well as detection of the ailment of dyspnea during antenatal period. Objective of present study was to find out the incidence and feto-maternal outcome of patients presenting with dyspnea in pregnancy and puerperium.
Methods: This study was conducted in Department of Obstetrics and Gynaecology in Vardhaman Mahavir Medical College and Safdarjung hospital over a period of one year, wherein review of all women who had presented with a diagnosis of dyspnea in pregnancy and puerperium, and admitted and treated in the Critical care obstetric unit of the department was done. Thorough evaluation was done and case files were exhaustively reviewed, data was anonymously extracted, and outcomes analyzed. All causes of mortality were also recorded. The primary outcome was incidence of dyspnea in pregnancy. Secondary outcomes measured were socio-demographic variables, timing of presentation-antepartum=first trimester, second trimester, third trimester/postpartum<48 hours, 3-7 days,>7 days, causative factors for dyspnea, any other obstetric complications, mode of delivery, fetal outcome (fetus weight, Apgar score, need for NICU admission), need for ICU/HDU admission, duration and course in the hospital, mortality, and cause of death in case of mortality. Data recording was done on a predesigned proforma and deciphered at the end of study and analyzed.
Results: Incidence of dyspnea was 1.97% of all admissions. Pulmonary edema following hypertensive disorders of pregnancy, was the leading cause. 28.5 % women succumbed to their illness. Majority were preterm births (88/112), requiring NICU admission.
Conclusions: The clinician should be able to determine the underlying cause of dyspnea, differentiating it from physiologic progesterone-induced hyperventilation. Strategy of expeditious delivery during the third trimester is often warranted after weighing fetal outcome and maternal risk in such women.

Keywords: Dyspnea, Causes, Feto-maternal outcome, Pregnancy

INTRODUCTION

Dyspnea or shortness of breath or difficult, labored, consciousness about taking breath is a common symptom during pregnancy that makes even simple everyday activities a major challenge.[1] Around 50% of gravidas, even without history of cardiac or pulmonary disease, experience it sometime during their gestation.[1] These symptoms may be related to physiological changes in cardio-pulmonary, hematopoietic system, increase in

weight etc. that occur during pregnancy.[2-4] Also, pregnancy has been identified as a stressor to the cardiovascular and the respiratory systems.[5] Any amount of breathing difficulties during gestation may indicate a decompensation.

Assessment, resuscitation and management of the critically ill obstetric patient with respiratory compromise presents a unique clinical challenge to the obstetricians.[1,5] This is chiefly attributed to maternal physiological adaptations, some pregnancy specific conditions requiring critical care management, and presence of a fetus whose well-being is linked to the mother.[5] Successful feto-maternal outcomes in such patients contemplate a multidisciplinary approach in liaison with a pulmonologist, cardiologist, intensivist, and neonatologist ,besides the obstetrician.[6]

Due to varied etiology and lack of sufficient research on such patients, especially in LMIC countries, optimal management of women presenting with dyspnea in pregnancy remains elusive.[1-11]

Keeping this in mind, the present research is conceived to find out the etiology and outcome of patients presenting with dyspnea in obstetric emergency. This would be in turn instrumental in formulating institutional guidelines for management of such women, which could be widely applied across nation.

METHODS

The present study was conducted in Department of Obstetrics and Gynaecology in Vardhaman Mahavir Medical College and Safdarjung hospital over a period of one year from March 2016 to February 2017, wherein review of all patients who had presented with a diagnosis of dyspnea in pregnancy and puerperium, and admitted and treated in the Critical care obstetric unit of the department was done.

Their case files were thoroughly reviewed, and data was anonymously extracted and outcomes analyzed.

All causes of mortality were also recorded. The primary outcome was incidence of dyspnea in pregnancy. Secondary outcomes measured were socio-demographic variables, timing of presentation-antepartum=first trimester, second trimester, third trimester/postpartum<48 hours, 3-7 days,>7 days, causative factors for dyspnea, any other obstetric complications, mode of delivery, fetal outcome (fetus weight, Apgar score, need for NICU admission), need for ICU/HDU admission, duration and course in the hospital, mortality, and cause of death in case of mortality.

Data recording was done on a predesigned proforma and deciphered at the end of study, and analyzed.

RESULTS

During the study period, total number of obstetric admissions were 8501, and 27222 deliveries. Amongst these, 168 number of cases presented with dyspnea in pregnancy or puerperium, the incidence being 1.97% of all admissions. However out of the 825 admissions during the same period in the obstetric ICU (CCOB), these cases constituted 20.36%.

Table 1: Demographic and maternal characteristics.

Baseline characteristics	Cases n=168 (%)	Percentage	P value
Age (years)			
<20	0	0	<.0001
20-25	96	57.14	
25-30	48	28.57	
>30	24	14.29	
Parity			
Primigravida	72	42.86	<.0001
G2-G4	72	42.86	
>G5	24	14.29	
Religion			
Hindu	120	71.43	<0.0001
Muslim	44	26.19	
Sikh	4	2.38	
Christian	0	0	
Others	0	0	
SE status (Modified Kuppuswami)			
Upper	0	0	<0.0001
Upper middle	0	0	
Lower middle	24	14.29	
Upper Lower	24	14.29	
Lower	72	42.86	
Residence			
Urban Rural	168	100	-
Booking status			
Referred	159	94.64	<0.0001
Booked	9	5.36	
BMI			
<18	24	14.29	<0.0001
18-24.9	96	57.14	
25-29.9	36	21.43	
>30	12	7.14	

Preponderance of women was seen between 20-30 years (significantly higher than other age group), with mean age being 24.09±5.1 years. Maximum women were multigravidas. All of the patients were un-booked, having no or inadequate antenatal supervision, being referred from peripheral hospitals (Table 1).

Ninety six women presented during antenatal period, whereas in the remaining 72 women, 60 presented within first 24 hours, whilst rest within 7 days of delivery or miscarriage.

Table 2: Distribution of subjects according to timing of presentation in pregnancy, and delivery details of the women.

	Cases (n=168)	%	P value	P value
Postpartum	72	42.86	<0.0001	0.064
<48hrs	60	35.71		
3-7days	12	7.14		
2nd -6th week	0	0		
Antepartum	96	57.14		
1st trimester	7	4.17	<0.0001	
2nd Trimester	40	23.81		
Third trimester	49	29.17		
Delivery status				
Undelivered	4	2.38	<0.0001	
Delivered	164	97.62		
Mode of delivery				
D/C	16	9.52	<0.0001	
Vaginal	33	19.64		
Operative vaginal delivery	7	4.17		
Caesarean section	112	66.67		
Place of delivery				
Present Facility	92	54.76	<0.0001	
Home	24	14.29		
Other hospital	48	28.57		

Out of the 96 women, only four pts remained undelivered, the difference being statistically significant. However, there was no significant difference in distribution of timing of presentation i.e. antepartum and postpartum. Amongst those presenting prenatally, second and third trimester patients were significantly higher than first trimester (Table 2).

Analyzing the causes, pulmonary edema following hypertensive disorders of pregnancy, emerged as the leading cause.

Congestive heart failure in the setting of severe anemia was a close second (21.43%). Cardiac diseases and Infectious etiology were seen in 16.67 % of women each (Table 3).

Majority (80%) women were admitted in critical condition. Despite best efforts, 28.5 % women succumbed to their illness, most common cause of death being cardiac disease (41.67%), p value <0.001, followed by pulmonary edema. Apart from the four women who died undelivered, live born babies were delivered by 112 women. Out of these, majority were preterm (88/112), requiring NICU admission. Fifty six infants had an early neonatal death (Table 4).

Table 3: Causes of dyspnea.

Causes of dyspnea	Cases	%	P value	P value
CHF due to severe anemia with	36	21.43		
Incomplete abortion	9	5.36		
APH	12	7.14	0.472	
PPH	15	8.93		
Pulmonary edema with hypertensive disorder of pregnancy	64	38.10		
Severe preeclampsia	47	27.98		
Antepartum eclampsia	7	4.17	<0.0001	
Chronic hypertension with superimposed preeclampsia	6	3.57		
HELLP	4	2.38		
Failure due to cardiac disease	28	16.67		
RHD without PAH	12	7.14		<0.0001
RHD with PAH	6	3.57	0.368	
CHD	10	5.95		
~ASD	7	4.17	0.206	
~Situs inversus + dextrocardia	3	1.79		
Infectious etiology	28	16.67		
Tuberculosis	10	5.95		
Asthma	6	3.57	0.099	
Pneumothorax	2	1.19		
H1N1	10	5.95		
ARDS in setting of MODS	12	7.14	-	

All the women were admitted in obstetric HDU for management. Maximum women required intensive resuscitative procedures including intubation (152) and use of vasopressors (112). Eight women required

evacuation for incomplete abortion, while 16 were taken up for urgent laparotomy and further procedure (Table 5).

Table 4: Hospital course.

Hospital course	Cases, N=168	%	P value
Condition on admission			
Critical	136	80.95	<0.0001
Sick but not critical	28	16.67	
Stable	4	2.38	
Maternal outcome			
Died	48	28.57	<0.0001
Recovered	120	71.43	
LAMA	0	0	
Underlying cause of death, n=48			
MODS	7	14.58	0.020
Severe anemia in failure	7	14.58	
HDP	14	29.17	
Cardiac disease	20	41.66	
Hospital Stay			
<6hrs	24	14.29	<0.0001
6-24 hrs	9	5.36	
24-48 hrs	9	5.36	
2-7 days	78	46.43	
>7 days	48	28.57	
Fetal outcome (n=164)			
D/C	16	9.76	<0.0001
Still born	40	24.39	<0.0001
Live born	112	68.29	<0.0001
Preterm	88	53.66	<0.0001
Term	24	14.63	<0.0001
NICU	88	53.66	<0.0001
NND	56	34.15	1.00

Table 5: Interventions done.

Intervention	Cases	%
HDU admission requiring resuscitative (CAB) or cardio respiratory support	168	100
Resuscitative procedures/intubation mechanical ventilation	152	90.48
Use of cardiotonics/ vasopressors/ digitalization	112	66.67
Evacuation	8	4.76
Laparotomy with procedures	16	9.52
Anticoagulant therapy	48	28.57

Amongst the preventable modifiable factors, considerable delay in women seeking help (39%), delay in diagnosis and lack of recognition of gravity of ailment (36%) and in deferment in referral of patient to tertiary care hospital (33%) were the principal amendable causative aspects that were divulged during the analysis that were associated with dyspnea in pregnancy (Table 6).

Table 6: Modifiable factors/ delays.

Delays	Cases	%	P value
Personal/family	148	88.09	<0.0001
Delay in woman seeking help	128		<0.0001
If yes, why –			
Lack of awareness	109		<0.0001
Lack of resources	10		
Past adverse experience	0		
Refusal of treatment/admission	9		
Logistics			
Lack of adequate transport from home to health care facility	20		<0.0001
Lack of transport between health facilities	64		0.005
Lack of communication network	48		<0.0001
Referral facilities			
Infrastructural issues	40		<0.0001
Lack of medications/instruments/ Equipment/consumables	28		<0.0001
Non utilization of available medications/instruments/ equipments/consumables	0		-
Lack of blood /blood products	24		<0.0001
Lack of expertise	24		<0.0001
Present facility/facilities			
Infrastructural issues (lack of available ICU bed)	4		<0.0001
Lack of medications/instruments, equipments/consumables	0		-
Non utilization of available medications, instruments, equipments/consumables	0		-
Lack of blood /blood products	0		-

DISCUSSION

Dyspnea is a highly threatening experience of breathlessness experienced by around 60-70% pregnant patients due to diverse pathologies, including respiratory, cardiovascular disorder. Despite optimization of disease-specific treatments, it is often insufficiently treated.[1,7]The enormous burden met by such women, their families and the healthcare system, makes improving management of dyspnea a priority in developing countries like India. Though a few studies are available depicting outcome of ARDS in pregnancy, the paucity of research articles scrutinizing the causes, and outcome of dyspnea in pregnancy remains the strongest forte of this study.[7-13]

In the course of the study period of one year, 1.9% of the total admissions (17002) in obstetrics and gynecology department presented with dyspnea. This was quite a high incidence.

In contrast with previous literary work, a relatively younger woman in the present study emulates an early age at marriage and childbearing in India.[1-12]On further analysis, most of them were un-booked with no prior antenatal supervision, belonging to lower socioeconomic background. Maximum females thus came as referral cases from peripheral centers drained by our hospital, following lack of awareness about the entity or unsatisfactory and inadequate treatment practices by less skilled practitioners available there.

In under-resourced backdrops like in rural India, it becomes an imperative requisite to segregate the un-booked / referred cases presenting to a health facility from those acquiring the clinical entity in the hospital setting itself; since the former is symbolic of a deficient infrastructure, or failure in access to the available health amenities in the peripheral units and/or to the referral chain. It also emphasizes that such first referral units should be made armed with plenteous capital and resources, besides sufficient health workers proficient in handling such emergencies.

These aforementioned observations were in consonance with the available reviews in literature across the world, again reiterating that this cohort of women bears most of the predisposing co-morbidities.[7-13] It may be further ascribed to poverty, illiteracy, malnutrition, early age at marriage and subsequently initial conception. This legion of women is often oblivious of the essential and emergent obstetric services, need for prenatal care, symptoms and concept of high risk pregnancy. Besides, per se, they are clinically underfed, with concomitant comorbidities like tuberculosis and anemia, as was found in the present study.

Analogous to the biochemical and mechanical changes during gestation, usually, the symptom of dyspnea starts during the first or second trimester; the frequency then rises during the second trimester, and becomes reasonably stable during the third trimester.[14-16] But in the extant study, maximum women (49/96) presenting in antenatal period were term/ near term. This could be attributed to the underlying causes, mostly hypertensive disorders and cardiac causes, where women decompensated after end of second trimester, simulating the physiology of pregnancy.

In parallel to previous reviews available, pulmonary edema following hypertensive disorders of pregnancy, appeared as the foremost cause in study population.[7-11] Literature says that rise in hydrostatic pressure from hypertension and alterations in capillary membrane permeability results in pulmonary edema in around 3% of women with preeclampsia/ eclampsia, typically after delivery, when plasma oncotic pressure is at its lowest.[7,14-16] Similar to this, maximum women (70%) presented post-partum with shortness of breath in the present study too, majority within first 24 hours. Older and multiparous women are at the greatest risk for pulmonary edema. Since full blown pulmonary edema is often accompanied by dysfunction of another organ system, like disseminated intravascular coagulation, acute renal failure, hypertensive crisis, cardiopulmonary arrest, or cerebral edema, it becomes imperative on the part of the obstetrician to have a high index of suspicion and prompt diagnosis and adept management strategies in their clinical armamentarium. Earliest hunch for development of this symptom should prompt speedy referral to a tertiary care infirmary with dedicated obstetric ICU for multidisciplinary management.

Anemia leading to congestive failure continues to be a main causative factor for dyspnea in Indian setting. This sadly reflects poor maternal health services in the borough, including dearth of cognizance, accessibility, availability and ignorance on the part of the patients. Alas, it also indicates the failure of the health system to decrease anemia in reproductive population, till date, despite best efforts and national policies. It also provides the health care providers with an opportunity to re-look into the prevalence, causes of anemia in Indian females, and to rectify and formulate novel strategies to combat this comorbidity at an early stage, to thwart its devastating complications during pregnancy, depriving mother of a safe motherhood and healthy baby.

The extant study also witnessed high incidence of cardiac etiology as the plausible causative factors instrumental in dyspnea in women. This was equivalent to conclusions of former canvassers from developing countries, who have shown a rise in cardiac diseases in pregnancy over the time owing to better diagnosis and newfangled treatments.[17-18]

Around ~ 7.14% of women had dyspnea following multi-organ failure; this signifies the need of a prompt and thorough evaluation for impending sepsis in pregnant women at the slightest of suspicion, which would be a constructive step in averting end organ damage and curtailing sepsis related morbidity and mortality in the country. It also supports maintenance of hygiene and asepsis by doctors and midwifery, besides upgrading of their knowledge up-to-date with new-fangled protocols in infection control in pregnant population.[19]

Unlike the western literature, very few women had asthma exacerbations during their pregnancy.[20-23] This can be ascribed to the largely rural population coming to the hospital for their antenatal care. However, this cohort of women was largely predisposed to acquiring pneumonia and infectious diseases including tuberculosis.

Around eighty percent women were already critical when admitted highlights the significance of early diagnosis

and referral. The high rate of mortality (28.5%), when contrasted with previous researchers, could be accredited to considerable delay in diagnosis of same by index physician, non-recognition of severity of disease by the primary caregiver and tardy referral to tertiary care hospital.[7-12] Besides, Safdarjung hospital, being one of the largest tertiary care hospitals of India, serves to a substantial amount of gravely sick referred cases from adjacent states of North India. Typical hitches associated with dearth of skilled experts, incorrect prescriptions, non/hardly operational laboratory facilities at the smaller peripheral hospices were also influential in the same.

Early multidisciplinary consultation is essential to optimize maternal and fetal outcomes. Maternal–fetal medicine, neonatology, anesthesiology, and intensivist clinicians should all be engaged in proposing appropriate timing, location, and mode of delivery. Also required surgical provisions and neonatal resuscitation facilities should also be readily available with minimal delay.

Apart from the four women who died undelivered, all remaining were delivered, either by abdominal/vaginal delivery, mostly preterm, as per the hospital protocol after meticulously weighing gestational age of the fetus, fetal status, maternal risk, and the gestational age at which the treating institution can support a preterm infant.

The alleged clarification behind this is relief of aorto-caval compression and improvement in maternal cardiac output following evacuation of the gravid uterus.[18,19] This was in consonance of the findings of few past pollsters who have suggested that delivery may improve maternal status in ventilated women, and some authors have suggested elective delivery for women in late pregnancy who have ARDS but are clinically stable (5, 94). However, others have stated that given the risks of inducing labor or performing a cesarean, the indications for delivery in such women should be obstetric.[1,7-11]

Little literature exists to guide the decisions on the mode of delivery. The final choice should again be based on standard obstetric indications for cesarean delivery, and attempts should be made to optimize maternal oxygenation and pain control during vaginal deliveries [7,8,11]. Also, in the event of maternal cardiopulmonary arrest, perimortem cesearean cesarean delivery is recommended within 4 mins for the benefit of both the mother and the fetus, without documentation of fetal status

All the women were admitted in obstetric HDU for management. Maximum women required intensive resuscitative procedures including intubation (152) and use of vasopressors (112). The decision about whether to intubate a patient should be taken considering the fact that these women have hypocapnia due to hyperventilation at baseline. Intubation was often difficult during pregnancy and the peripartum period due to upper airway edema and diminished airway caliber, especially late in pregnancy. Once the patient had been stabilized and the cause of the acute respiratory failure was determined, ongoing management included supportive care and treatment of the etiology, as per the reviews.[1]

The conclusions drawn stressed that most of the women in the study were unaware of the gravity of symptoms of dyspnea and its associated causes, seeking help late, often when the entity had been fully established or worsened with complications. This reiterates that heath education, promotion and mass communication becomes the need of the hour, especially for obstetric population. Besides clinicians at the local peripheral hospitals, including midwives must be made versed with the concept of high risk pregnancy, enlightened about early identification and diagnosis of common problems like preeclampsia, heart disease, in order to refer women in time after initial resuscitation.

Our corollaries, having been elicited from a relatively smaller study population, cannot be an accurate representation of respiratory distress at the national level. Also, this being a single centered hospital based study, it cannot reverberate data countrywide, and as morbidity and mortality occurring in community due to same would still be missing.

CONCLUSION

Dyspnea is a common symptom in pregnancy. An early diagnosis along-with intensive care resourcing influences the efficacy of goal-directed therapy. Strategy of expeditious delivery during the third trimester often warranted after weighing fetal outcome, maternal risk. Multidisciplinary approach and dedicated CCOB-long way in preventing morbidity and mortality. However, Under-reporting of cases leads to underestimation of its contribution to maternal death.

On the whole, most of the serious snags of this otherwise common symptom in pregnancy can be circumvented by enhancing health education, disseminating consciousness among antenatal females and equipping the trivial health units also with best amenities to tackle obstetric emergencies care, above and beyond, boosting the manpower at the first referral units.

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