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Oligohydraminos associated factors among pregnant women: a cross-sectional study from Bharatpur, Nepal

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Abstract

Background

Oligohydramnios refers to a situation where the amniotic fluid volume is less than expected for gestational age. Decrease in amniotic fluid volume considered as pathology termed as polyhydramnios and oligohydramnios. Severely depleted amniotic fluid volume cause fetal anomalies; poor development of the lung and leads to death. Current study was undertaken to determine Oligohydramnios and associated sociodemographic factors, labour status, perinatal outcomes among pregnant women in Bharatpur district, Tarai region of Nepal

Methods

The present research work was carried out in the maternity unit of Bharatpur Hospital Chitwan. A total number of 148 pregnant women, gestational age ≥28 week were considered for this research. Questionnaire was created, filled by the participants; obstetrical information, perinatal outcomes was also obtained.

Results

56.4% of the respondents were primigravida. Oligohydramnios was more in respondents who had rupture of membrane and meconium stained liquor primigravida respondents whose duration of labour was >12. Perinatal outcomes of oligohydramnios were more with cesarean section 63.6%, asphyxia (56.2%). Low birth weight was more (54.5%) amongst severe cases. Resuscitation of newborn was needed in severe Oligohydramnios (49%) mothers.

Conclusion

Oligohydramnios patients require intensive fetal surveillance and proper antepartum and intrapartum care. Correct decision should be taken timely to reduce perinatal morbidity and mortality. Newborn asphyxia, low birth weight, resuscitation were important perinatal outcomes to reduce mortality.

Key words

Amniotic fluid, foetus, Oligohydramnios, Nepal, pregnancy.

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Background

Oligohydramnios refers to a situation where the amniotic fluid volume is less than expected for gestational age. Often these fetuses have <500 mL of amniotic fluid.

Amniotic fluid is one of the most important factors during gestation, which bathes the fetus and required for its proper growth and development. It also helps to avert compression of the umbilical cord. Crucial functions like cushioning the foetus from physical trauma, helps in the growth in the respiratory system, strong protection against infections served by amniotic fluid [1].

Normally the fluid varies with in a physiological range, with a gradual increase as pregnancy proceeds; peaking at 800-1000 mL, at 36-37 weeks' gestation. Increase or decrease in volume considered as pathology termed as polyhydramnios and oligohydramnios. Severely depleted amniotic fluid volume cause fetal anomalies; poor development of the lung and leads to death. Oligohydramnios are mostly common comparing Polyhydramnios 1% and 11% respectively [2, 3].

A number of factors are responsible for oligohydraminos like Uteroplacental insufficiency (e.g., due to preeclampsia, chronic hypertension, abruptio placenta, a thrombotic disorder, or another maternal disorder), drugs [e.g., angiotensin-converting-enzyme inhibitor (ACE inhibitors), Nonsteroidal anti-inflammatory drug (NSAIDs)], post term pregnancy, fetal malformations, particularly those that decrease urine production, fetal growth restriction, fetal demise, fetal chromosomal abnormalities (e.g., aneuploidy), premature rupture of membranes, idiopathic *etc*. [4].

Relatively less research works are conducted in Nepal. So the current study was undertaken to determine Oligohydramnios and associated sociodemographic factors, labour status, perinatal outcomes among pregnant women in Bharatpur district, Tarai region of Nepal.

Material and Methods

Study Period

The present was done in the year 2016 (January –July) six months period.

Study design, participants and data collection

The present research work was carried out in the maternity unit of Bharatpur Hospital Chitwan. This hospital is a tertiary care hospital where several oligohydramnios cases diagnosed, and referred from other hospitals for expertise consultation and management. A total number of 148 pregnant women, gestational age ≥28 week were considered for this research.

Response Rate

Initially 152 participants were registered, but 148 met the criteria to participate in this research, with response rate of 97.36%.

Questionnaire design

Multigraded semi-structured questionnaire was created which was revised by subject experts from OBG department. The questionnaire was scrutinized further for minor revision; language editing was done by experts for simplicity. Factors associated with Oligohydramnios directly or indirectly were considered during framing of the questionnaire e.g. literacy, occupation, family income obstetrical information (number of pregnancy, history of abortion, still birth, pre-term, post term, week of gestation). Some other factors like labour status (membrane status, colour of amniotic fluid, duration of labour), perinatal outcomes (mode of delivery, apgar score) were also included. Record review guide of OBG was used. Unique study identification number was used for this study for confidentiality and avoiding biasness.

Inclusion criteria

Women ≥ 28 weeks of gestation who had equal or less than 8cm AFI (ultrasound report) and delivered baby within 1day period of data collection in maternity ward and willing to participate voluntarily were considered for this study.

Exclusion criteria

Gestational age < 28 weeks and multipara woman were excluded from this research.

Outcome variable

Factors like obstetrical information, labour Status, perinatal outcomes were considered as outcome variable.

Explanatory variables

Explanatory variables were age, Education, occupation and economic status ethnicity, religion etc.

Ethical committee approval

Thesis Committee of Nursing Program, Chitwan Medical College (P) Ltd. permitted this research. Ethical clearance was obtained from CMC-IRC Bharatpur, Chitwan. The purpose of the study was explained to the participants, who signed a consent form prior to the data collection. Study participants were clearly informed that, at any level of the research, they can withdraw their names. Confidentiality was maintained throughout the project. This research study will be conducted in accordance to latest version of the Declaration of Helsinki.

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Data management and statistical analysis

The data collected was analyzed using Statistical Package for the Social Sciences (SPSS) for Windows Version 20.0 (SPSS Inc; Chicago, IL, USA) and EPI Info 3.5.1 Windows Version. Association between different variables were tested by Chi square. Logistic regression analysis was done to identify the strength between the variables. An adjusted odds ratio with 95% confidence interval was calculated.

Results

45.9% of the respondents were in the age group of 21-25 years and 6.8% were above 30 years. Ethnically 43.2% belongs to Janajati followed by Brahmins and Dalits; A vast majority (87.2%) of participants were from Tarai region.

Table – 1 Education, occupation and economic status of the respondents n(%)

Education(n=148)	
Illiterate	2 (1.4)
Literate	146 (98.6)
Literacy (n=146)	
General literate	37 (25.3)
Basic education	46 (31.5)
Secondary education	34 (23.3)
Higher secondary	20 (13.7)
Bachelor and above	9 (6.2)
Occupation (n=148)	
Household work	60 (40.5)
Agriculture work	42 (28.4)
Service	23 (15.5)
Business	19 (12.8)
Wage labour	4 (2.7)
Family income per month in NRs. (n=148)	
<20000	80 (54.1)
20000-40000	47 (31.8)
>40000	21 (14.2)

Table 1 shows that 98.6% of respondents were literate and 31.5% had completed basic education level whereas 6.2% of them had completed bachelor and above. 40.7% of the participants were involved in household work and 2.7% were wage labour. 54.1% of respondents had <20000 and 14.2% had >40000 family income per month.

Table 2 expedites 56.4% of the respondents were primigravida and remaining multigravida. Among 64 multigravida respondents, 32.8% had history of abortion. Likewise, 3.1% of respondents had history of still birth, 3.1% had the history of preterm, pregnancy and 1.6% had post term pregnancy. Regarding number of previous live birth, 67.18% had one and 32.82% had more than one previous live birth. 89.9% participants were from 37-42 week of gestation. 97.5% of the respondents had visited antenatal clinic during pregnancy.

Table – 2 obstetrical information of the respondents n(%)

Number of pregnancy (n=148)	
Primigravida	84 (56.4)
Multigravida	64 (43.2)
History of abortion(n=64)	
Yes	21 (32.8)
No	43 (67.2)
History of still birth(n=64)	
Yes	2 (3.1)
No	62 (96.9)
History of pre-term (n=64)	
Yes	2 (3.1)
No	62 (98.6)
History of post term (n=64)	
Yes	1 (1.6)
No	63 (98.4)
Number of previous live birth (n=64)	
One	43 (67.18)
More than one	21 (32.82)
Week of gestation of present pregnancy (n=148)	
<37 weeks	6 (4.1)
37-42 weeks	133 (89.9)
>42 weeks	9 (6.0)
ANC visit(n=148)	
Yes	144 (97.3)
No	4 (2.7)

Table –3 association between Oligohydramnios and labour status of the respondents

Characteristics	Oligohydramnios		p-value
	Severe (n=61)	Mild (n=87)	
Membrane status			
Intact	8(25.5)	26(76.5)	
Ruptured	53(46.5)	61(53.5)	0.017*
Colour of amniotic fluid			
Clear	16(29.1)	39(70.9)	0.011*
Meconium stained	31(52.5)	28(47.5)	
Duration of labour in primigravida			
≤12 hours	2(5.4)	35(94.6)	0.001†
>12 hours	18(54.5)	15(45.5)	
Duration of labour in multigravida			
≤8 hours	8(34.8)	15(65.2)	0.919x
>8 hours	7(33.3)	14(14)	

xP>0.05 statistically not significant
*P<0.05 statistically significant
†P<0.01 statistically significant

Table 3 shows that outcomes of oligohydramnios was more in respondents who had rupture of membrane and meconium stained liquor primigravida respondents whose duration of labour was >12.

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Table – 4 Association between perinatal outcomes and Oligohydramnios of the respondents

Characteristics	Oligohydramnios		p-value
	Severe (n=61)	Mild (n=87)	
Mode of delivery			
Vaginal	26(28.0)	67(72.0)	0.001†
Cesarean section	35(63.6)	20(36.4)	
Apgar test at 1 minute			
No asphyxia	25(29.8)	59(70.2)	0.001†
Asphyxia	36(56.2)	28(43.8)	
Birth weight			
Normal weight	22(19.1)	93(80.9)	0.001†
Low weight	18(54.5)	15(45.5)	
Need for resuscitation			
Yes	28(45.9)	33(37.9)	0.162x
No	33(54.1)	54(62.9)	
Methods of resuscitation			
Stimulation	35(57.4)	26(42.6)	0.001†
Suction	35(57.4)	26(42.6)	0.001†
Oxygen therapy	26(57.8)	19(42.2)	0.007†
Need for NICU admission			
Yes	7(70)	3(30)	0.055x
No	54(39.1)	84(60.9)	

xP>0.05 statistically not significant
†P<0.01 statistically significant

Table 4 explains perinatal outcomes of oligohydramnios were more with cesarean section 63.6%, asphyxia (56.2%), low birth weight. Low birth weight was more (54.5%) amongst severe cases. Resuscitation of newborn was needed in severe Oligohydramnios (49%) mothers.

Table – 5 Bivariate analysis of pregnancy related illness and labour status of the respondents

Characteristics	Oligohydramnios		95% CI
	Severe (n=61) No. (%)	Mild (n=87) No. (%)	
Duration of leaking			
≤7days	25(47.2)	28(52.8)	5.655 (1.493, 21.418)†
>7days	3(13.6)	19(86.4)	
History of high blood pressure			
Yes	20(66.7)	13(33.3)	3.756 (1.608, 8.774)†
No	41(34.7)	77(65.3)	
Membrane status			
Intact	8(25.5)	26(76.5)	3.111 (1.247, 7.759)†
Ruptured	53(46.5)	61(53.5)	
Colour of amniotic fluid			
Meconium stained	31(52.5)	28(47.5)	
Clear	16(29.1)	39(70.9)	2.699(1.244, 5.854)†
Duration of labour in primigravida			
≤12 hours	2(5.4)	35(94.6)	21.0 (4.321, 102.02)
>12 hours	18(54.5)	15(45.5)	

†P<0.01 statistically significant

Table 5 shows logistic regression analysis. Respondents who had history of leaking with duration ≤7 days was 5.65 times more likely to have severe oligohydramnios as compared to the respondents who had history of leaking with duration >7 days. History of high BP was 3.75 times more likely to have severe oligohydramnios as compared to the normotensives. Likewise, respondents who had rupture membrane 3.11 times more likely to have severe oligohydramnios as compared to the respondents who had intact membrane. It was found that respondents with severe oligohydramnios had 2.69 times more likely to have meconium stained liquor as compared to mild oligohydramnios. Primigravida respondents with severe oligohydramnios had 21.0 times more likely ≤12 hours duration of labour as compared to respondents of >12 hours.

Table – 6 Bivariate analysis of perinatal outcomes of the respondents

Characteristics	Oligohydramnios		95% CI
	Severe (n=61) No. (%)	Mild (n=87) No. (%)	
Mode of delivery			
Vaginal	26(42.6)	67(77.0)	4.510 (2.213, 9.191)*
Cesarean section	35(57.4)	20(23.0)	
Apgar test at 1 minute			
No asphyxia	25(41.0)	59(67.8)	3.034 (1.537, 5.990)*
Asphyxia	36(59.0)	28(32.2)	
Birth weight			
Normal	22(19.1)	93(80.9)	5.073 (2.217, 11.609)†
Low	18(54.5)	15(45.5)	
Need for resuscitation			
Yes	28(45.9)	33(37.9)	1.609 (0.762, 3.395)
No	33(54.1)	54(62.1)	
Methods of resuscitation			
Stimulation			
Yes	35(57.4)	26(29.9)	4.520 (2.080, 9.825)
No	26(42.6)	61(70.1)	
Suction			
Yes	35(57.4)	26(29.9)	4.520 (2.080, 9.825)
No	26(42.6)	61(70.1)	
Oxygen therapy	26(57.8)	19(42.2)	
Yes	26(42.6)	19(21.8)	5.289 (2.418, 11.566)
No	35(57.4)	68(78.2)	

*P<0.05 statistically significant
†P<0.01 statistically significant

Respondents who had severe oligohydramnios had 4.51 times more likely to have cesarean section comparing mild oligohydramnios. Amongst severe Oligohydramnios, newborn with mild asphyxia had 3.0 times more likely to have as compared to mild Oligohydramnios mothers. Likewise, it was found that severe oligohydramnios had 5.07 times more likely to have newborn with low birth weight as compared to mild oligohydramnios. Newborns from severe oligohydramnios needed 3.15 times resuscitation like

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stimulation and suction and 4.52 times oxygen therapy as compared to mild oligohydramnios. Need for resuscitation was not significantly associated with severe Oligohydramnios [Table 6].

Discussion

Hayward *et al*. reported oligohydramnios (7%), was associated with Low socio economic status which supports our current findings [5]. In the present study, we observed Meconium stained amniotic fluid correlated with the oligohydraminos; but contradictory reports are available. A research by Blackwell *et al*. showed that Meconium stained amniotic fluid does not have any relation in term pregnancies [6].

We have observed severe oligohydramnios had 3.0 times more likely to have newborn with mild asphyxia as compared to those respondents who had mild Oligohydramnios. This findings are in accordance with Lindner *et al*., where neonates exposed to oligohydramnios experienced short-term respiratory morbidity and high ventilator settings, hypoxemia and hypercapnia was evident, and pulmonary hypertension was observed) than healthy neonates [7].

In current research we found severe oligohydramnios women had 4.51 times more likely to have cesarean section to deliver the baby than those who had mild oligohydramnios. Similar findings were observed by Liu Y A; who mentioned in a descriptive analysis that oligohydaminos is a condition when CS was the choice for delivery in Mainland China [8].

High blood pressure during pregnancy is a well known cause of oligohydraminos. We observed that women with a history of high BP was 3.75 times more likely to have severe oligohydramnios as compared to the normotensives. Findings by Mammarao *et al*. showed that high blood pressure can be dangerous for both the mother and the fetus. Women with pre-existing, or chronic, high blood pressure are vulnarable to have certain complications during pregnancy comparing normotensives. Jagatia, *et al*. also reported the same [9, 10].

We found primigravida 6.80 times more likely to have severe oligohydramnios, supported by the study of Kahkhaie *et al*. where respondents 51.5% were primigravida, similarly by Gurung *et al*. 57% of the oligohydramnios patient were primigravida [11, 12].

Conclusion

Oligohydramnios patients require intensive fetal surveillance and proper antepartum and intrapartum care. Due to intrapartum complication and high rate of perinatal morbidity and mortality, clinicians prefer caesarean section. Correct decision should be taken timely to reduce perinatal morbidity and mortality. Newborn asphyxia, low birth weight, resuscitation were important perinatal outcomes to reduce mortality.

Limitations & future scope of the study

Limited number of subjects is one of the major drawbacks for this research. A multi centric study comprising data from all the medical colleges of and the Universities in Nepal is strongly recommended for future researchers.

Abbreviations

Angiotensin-converting-enzyme inhibitor (ACE inhibitors), nonsteroidal anti-inflammatory drug (NSAIDs)

Competing interests

The authors do not have any conflict of interest arising from the study.

Authors' contribution

RDD designed the study, deduced the data, drafted the manuscript, and revised it. DP helped RDD in collecting the data. DP participated in the language editing along with RDD. RDD and DP participated in statistical analysis, data interpretation, critical revision of the manuscript. All the authors approved the final manuscript.

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