Original

Illness pattern and Pregnancy Outcomes among Women with Chronic Medical Conditions in a Hospital in Ibadan

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Abstract

Background: Pregnancy associated with an underlying chronic/medical disorder has a huge impact on both maternal and fetal well-being. This study examined the pattern of illness and pregnancy outcomes among women with chronic illnesses in pregnancy.

Method: Using a retrospective survey design, 216 case notes of women with at least one chronic condition, delivered in a secondary health care facility in Ibadan city were examined. Data on maternal characteristics, obstetric and social history and birth outcomes were collected. Statistical Package for Social Sciences (SPSS 20.0) was used for data analysis. Frequencies, mean and percentages were used in descriptive data analysis while Pearson's chi-square statistics was used in testing the hypotheses.

Result: Mean age was 30.10 (±5.8) years, with 70.1% being married. About half (49.5%) had a family history of chronic illness and over a third (36.1%) took alcohol. The most prevalent chronic illness was hypertension (23.1%), followed by co-morbid diabetes and hypertension (19.9%). Adverse maternal outcomes included mortality (4.2%), postpartum haemorrhage (17%) and extended length of hospital stay (48.6%). Adverse fetal outcomes included neonatal mortality (3.2%), stillbirth (3.2%); Neonatal Intensive Care Unit admission (24.5%). There was a significant relationship between multiple chronic conditions and extended hospital stay ($p<0.01$) maternal mortality ($p<0.01$) and birth outcomes ($p<0.05$).

Conclusion: Significant adverse outcomes including maternal and neonatal death, were associated with chronic disease (s) in pregnancy. These outcomes were worse in women with multiple chronic conditions. Policies and programmes directed at preventing and managing chronic diseases in pregnancy should be intensified at secondary healthcare facilities.

Keywords: Birth outcomes; Diabetes; Hypertension, Maternal mortality, Neonatal mortality, Pregnancy.

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Introduction

Currently, chronic or Non-Communicable Diseases (NCDs), such as cardiovascular diseases (CVD) and diabetes mellitus are major factors threatening women's health globally; becoming more fatal when they exist with pregnancy.[1] Over the years, maternal mortality has increased worldwide, with a higher prevalence in developing countries like Nigeria and having an impact on the socioeconomic development of the country.[2] A 2020 publication by the World Health Organisation (WHO) reported that about 287,000 women lost their lives either during or after pregnancy and childbirth; of which 95% occurred in low- and middle-income countries.[3]

Data from the United States reported an annual increase of 8.8% % in the incidence of CVD and 11.3% for all chronic conditions among pregnant women. [4] Similarly, evidence from the United Kingdom shows that many women have more than one medical condition at the time of getting pregnant.[5] Among pregnant women in Saudi Arabia who suffered from hypertensive disorders of pregnancy, there was a 1.3% prevalence of maternal mortality while 9.4% of the women developed various complications.[6] Similarly, hypertensive disorders in pregnancy are the second leading cause of maternal mortality in sub-Saharan Africa after perinatal haemorrhage.[7] Further, up to 27% of maternal deaths were due to hypertensive disorders of pregnancy in a tertiary hospital in Nigeria while sickle cell anaemia accounted for 2.4%.[8] Hence, a reduction in NCDs among women of reproductive age as a measure to reduce maternal mortality is listed as number three of the sustainable development goals.[9]

A myriad of adverse maternal and neonatal events accompanies chronic illnesses in pregnancy leading to maternal and fetal complications. For example, the risk of low birth weight with all its attendant sequelae is more common among women with hypertensive disorders in pregnancy, besides a reduced survival rate.[10] Pregestational diabetes mellitus is known to cause many adverse neonatal outcomes including stillbirth and perinatal death, respiratory morbidity, cardiomyopathy, and perinatal asphyxia.[11] Hypertensive women had a higher rate of caesarian section and mortality than normotensive women.[12]

A 2018 study carried out in a teaching hospital in a cosmopolitan city in Nigeria reported a 24.5% prevalence of chronic conditions including hypertension, HIV, sickle cell anaemia, diabetes mellitus and hepatitis. [13] The authors further reported that up to 21.4% of the neonates had an Apgar score less than 7 at one minute after birth. Moreover, the outcome has been reported worse in women with co-morbidities, in which higher maternal mortality and morbidity tend to occur.[14] Co-morbidities in pregnancy are related to Neonatal Intensive Care Unit (NICU) admission, earlier delivery, and respiratory distress syndrome among others. [15] Data on maternal and neonatal outcomes among pregnant women with single or chronic medical conditions is sparse in Nigeria, especially in secondary health facilities which do not have as many resources as tertiary facilities. This study therefore sought to determine the prevalent medical conditions among women with chronic medical conditions in pregnancy and ascertain the outcomes of these pregnancies.

It was hypothesized that both fetal and maternal adverse outcomes would be worse in women with more than one chronic condition in pregnancy.

Method

Study design

The study adopted a retrospective cross-sectional design aimed at identifying birth and maternal outcomes among mothers with chronic diseases in Ibadan, Oyo state, Nigeria.

Study setting

Oyo state is an inland state in South-western Nigeria with its capital at Ibadan. Ibadan is an urban city with a population of over four (4) million people. It is divided into 11 local governments areas. The study setting, which is Adeoyo maternity hospital, is a specialized hospital located at Yemetu, Adeoyo, in Ibadan North local government. The hospital was established in 1928. It is a secondary healthcare facility; majorly offering Maternal and Child Health Care (MCH) services. It consists of an antenatal clinic, antenatal ward, labor ward, gynecological ward, lying in ward, post-caesarian section ward, children's ward, immunization clinic, gynecological and family planning clinics. It also serves as a referral centre for primary healthcare centres and private health facilities within and outside Ibadan city. It is highly patronized by Ibadan residents, especially those of low and middle socioeconomic status because of its affordability. It records a high influx of patients. The bed capacity of the hospital is 255, and the labour ward holds 16 beds.

Study population and eligibility

The study population consisted of the health records of pregnant women who delivered in the hospital irrespective of the age of booking; with at least one chronic illness within three years – January 2017 to December 2019. However, health records with blurred

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information were excluded. Hence, all 216 health records of women with chronic illness within the study period were examined.

Sampling methodology

Since this was a three (3) year retrospective study, a total sampling of all eligible cases was selected.

Sample size estimation

Since all cases of chronic illness in pregnancy were to be included, there was no need to estimate a sample size.

Study variables and outcomes

Study variables were sociodemographic characteristics of the women; and clinical and obstetric history such as parity and gravida. Others were the average number of days spent in the hospital (length of hospital stay) post-delivery; maternal mortality (Yes or No); and fetal outcome: live birth, stillbirth, NICU admission or neonatal death. Chronic conditions in pregnancy were classified into single or two/more.

Study instrument

A quantitative method of data collection using researcher-designed data sheets was adopted. Items in the datasheet included the presence of chronic disease (s) before and/or during pregnancy and pregnancy outcomes, in line with the literature review. Other components of the data sheet included: socio-demographic information, obstetric and social history, type (s) of chronic illness, birth outcome for mother and birth outcome/complications for neonates. The validity of the questionnaire was established through the face and content validity criteria. The datasheet was given to an expert – A registered midwife with a PhD in nursing

Data collection

Permission was obtained from the Chairman of the Medical Advisory Committee of Adeoyo Maternity Hospital, Ibadan. Data were then obtained from the health records office of the same hospital and entered into the datasheet by one of the researchers – a Registered Nurse - while ensuring confidentiality and anonymity. Data were collected in a noise-free office space to avoid distractions that could cause errors. The data collected included the socio-demographic data of the patient, parity, gestational age at birth, and any chronic illness. Also, the pregnancy outcomes, such as the type of delivery, gender, and weight of the neonates, were documented. The data collection spanned three (3) weeks.

Data analysis

Data were entered into the Statistical Package for Social Sciences (SPSS) - version 20. Using descriptive statistics, the means and standard deviations of the responses were determined, and frequencies and percentages were used to present summary tables for relevant variables. Disease conditions were summarized using a bar chart. Infants < 2.5kg were classified as being small for age. Those weighing ≥ 4kg were classified as macrosomic. Fetal/birth outcomes were classified as live birth, stillbirth, Neonatal Intensive Care Unit (NICU) admission and neonatal death. Presence of birth asphyxia was classified as 'Yes' (Apgar score < 7 in 1 minute) and 'No' (Apgar score ≥ 7 in 1 minute).[16] The average maternal age was determined, and age was further classified into ≤ 30 and > 30. The average length of stay in the hospital after delivery was also calculated. The independent t-test and chi-square test were used to investigate the association number of chronic illnesses and specific pregnancy outcomes. A p-value <0.05 was considered statistically significant.

Ethics

Ethical approval was obtained from the University of Ibadan/University College Hospital (UI/UCH) ethical review committee with approval number UI/EC/19/0520. Besides, researchers adhered to the ethical principles that guide research which are the principle of informed consent, respect for persons, beneficence, non-maleficence, and justice which are in line with the ethical standards of the UI/UCH ethical review committee and those of the Helsinki Declaration of 1975 (year 2000 revision).

Results

Socio-demographic data of respondents

The socio-demographic information obtained from the medical records of 216 participants is displayed in Table 1. The mean age of the women was 30.10 years ((±5.8). The majority of the women (61.1%) were of the Yoruba tribe. Although a good number of the women were married (70.1%), some were widowed (4.6%); single (19.9%) and divorced (4.6%). The mean weight was 66kg (±13.0) with more than half (54.6%) weighing below this average. Just over half of them (55.5%) were well employed with the government, private organisations and as big-scale business owners, while the rest were low-income earners.

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Table 1: Socio-demographic data of respondents

Variable	Freq (f)	Percent (%) n=216
Age:		
≤ 30	109	50.5
> 30	107	49.5
$\bar{x}$: 30.10(±5.8)		
Tribe:		
Yoruba	132	61.1
Igbo	55	25.5
Hausa	28	13.0
Others	1	0.5
Religion:		
Christianity	127	58.8
Islam	82	38.0
No religion	7	3.2
Weight:		
≤ 66kg	118	54.6
> 66kg	98	45.4
$\bar{x}$: 65.8 (±13.0)		
Height:		
≤1.6m	95	44.0
>1.6m	121	56.0
$\bar{x}$: 1.61(±0.82)		
Marital status:		
Single	43	19.9
Married	153	70.8
Widowed	10	4.6
Divorced	10	4.6
Occupation:		
Government employee	57	26.4
Private employee	35	16.2
Big scale trading	28	13.0
Small-scale Trading	68	31.5
Student	20	9.3
Unemployed/ Housewife	8	3.7

Obstetric and Social history

Table 2 shows that the median number of pregnancies was three (3). Almost half (47.2%) had only one child alive while just over a third (34.3%) had two children alive. Further, only a quatre of the participants had a normal/ spontaneous vaginal delivery. Others were complicated by prolonged labour (25.9%), caesarean section (44.4%) and forceps delivery (4.6%).

Results also show that half of the women (49.5%) had a family history of at least one chronic illness; 36.1% had a history of alcohol intake while 11.1% had a history of cigarette smoking. The majority of the participants (58.3%) started antenatal care before 21 weeks gestational age. The average length of hospital stay after delivery was 5 days.

Table 2: Obstetric and Social history

Variable	Freq (f)	Percent (%)
Gravida		
0-3	124	62.0
>3	76	38.0
(median 3)		
Parity:		
1-2	160	74.1
>2	56	25.9
($\bar{x}$ = 2)		
Children alive:		
0	3	1.4
1-3	200	92.6
4-5	13	6.0
$\bar{x}$ = 2		
Delivery type:		
SVD/normal labour	54	25.0
SVD/prolonged labour	56	25.9
Cesarean Section	96	44.4
Vacuum/Forceps	10	4.6
Perinatal Complications:		
Prolonged labour	24	11.1
Use of oxytocic agent	18	8.3
Breech presentation	14	6.5
Malaria in pregnancy	9	4.2
STI	9	4.2
PROM	4	1.9
APH	1	0.5
False labour	1	0.5
Previous CS	2	0.9
OPP	4	1.8
URTI	1	0.5
Not Applicable	124	57.4
Family history of chronic illness		
Yes	107	49.5
No	109	50.5
History of alcohol intake		
Yes	78	36.1
No	136	63.8
Smoking history:		
Yes	24	11.1
No	192	88.8
Gestational age at first ANC		
=< 21 weeks	126	58.3
> 21 weeks	90	41.7
$\bar{x}$ = 20.7(±5.8)		

*SVD: Spontaneous Vaginal Delivery; STI: Sexually Transmitted Illness; PROM: Premature Rupture of membrane; APH: Antepartum haemorrhage; OPP: Occipito-Posterior Position; URTI: Urinary Tract Infection.

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As shown in Figure 1, the most prevalent medical conditions were hypertension (23%); followed by co-morbid hypertension and diabetes (19.9%).

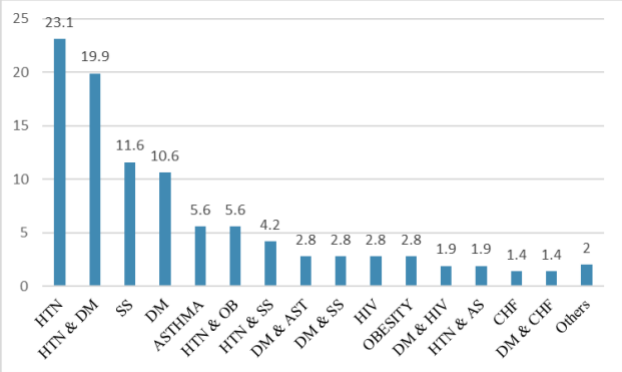

Figure 1: Distribution of chronic medical conditions in pregnancy

HTN: Hypertension; DM: Diabetes; SS: Sickle cell disease; OB: Obesity; AST: Asthma; HIV: Human Immuno-deficiency Virus; CHF: Congestive Heart Failure (CHF); Others (DM & OB: 0.5%; HTN & CHF: 0.5%; HTN & HIV: 0.5%; OB & SS: 0.5%).

Frequency and percentage distribution of birth outcome for mother

Table 3 shows the birth outcome for mothers and only 17.6% of the participants had post-partum haemorrhage out of which the majority had mild haemorrhage (13.0%) and 0.9% had a severe haemorrhage. Maternal mortality was 4.2% and 48.6% had extended length of stay in the hospital (> 2 days), after delivery.

Table 3: Birth outcome for mothers

Variable	Freq (f)	Percent (%)
Postpartum haemorrhage		
Yes	38	17.6
No	178	82.4
If yes		
Mild (500-1000ml)	28	13.0
Moderate (>1000ml)	8	3.7
Severe (> 2000ml)	2	0.9
NA *	178	82.4
Maternal mortality		
Yes	9	4.2
No	207	95.8
Extended length of stay (> 2 days)		
Yes	105	48.6
No	111	51.4

NA: Not applicable

Frequency and distribution of birth outcomes of neonates

The birth outcomes and complications among the neonates are presented in Tables 4 and 5 respectively. Close to a third of the neonates (29.2%) had a low birth weight, i.e. <2.5kg; most (48.6%) had a normal weight while 22.2% of the newborns were macrosomic.

For Apgar score, about a fifth (21.8%) had an Apgar score of less than 7 in one minute, indicating a potential for birth asphyxia. Moreover, while a majority of the neonates (69%) were alive and well after birth, a quarter (24.5%) were admitted into the neonatal intensive care unit; 3.2% died after delivery while 3.2% died in-utero.

Table 4: Birth outcome for neonates

Variable	Freq (f)	Percent (%)
Size at birth:		
Smaller than average(<2.5kg)	63	29.2
Average (2.5-4kg)	105	48.6
More than average(>4kg)	48	22.2
Apgar score(1minute)		
< 7	47	21.8
≥ 7	169	78.2
Apgar score(5minutes)		
0	3	1.4
4	1	0.5
6	5	2.3
7	5	2.3
8	90	41.7
9	112	51.9
Asphyxia:**		
Yes	82	38.0
No	134	62.0
If yes, type:		
Mild	62	28.7
Moderate	15	6.9
Severe	5	2.3
NA	134	62.0
Birth status:		
Live birth	149	69.0
Stillbirth	7	3.2
NICU admission	53	24.5
Neonatal death	7	3.2
Complications in newborns:		
Yes	70	32.5
No	146	67.6
If yes, type		
Dull and inactive	25	11.6
Ulcer in mouth	5	2.3
Neonatal infection	17	7.9
Breathing problem	23	10.6
NA	146	67.6

****Asphyxia = Apgar score < 7 at I minute (Njie et al 2023)[16]

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Table 5: Association between the number of chronic morbidities and pregnancy outcomes

	Single	Multiple	Chi-square/t-test value	p-value
Birth outcomes:				
Live birth	98	51		
Stillbirth	3	4		
NICU admission	23	30		
Neonatal death	1	6	14.471	0.001*
Maternal mortality:				
Yes	2	7		
No	123	84	4.895	0.038*
Mean length of stay	3.99 (±3.22)	6.2 (±4.06)	-4.45	0.000**

* chi-square test; *** t-test

Discussion

In this study, the maternal and fetal outcomes using the health records of women with chronic conditions in pregnancy was examined. Findings revealed that hypertension was the most prevailing chronic illness among pregnant women followed by co-morbid hypertension and diabetes mellitus. Other chronic conditions found among the women were sickle cell anaemia, diabetes mellitus, asthma and HIV. Our findings are in line with those carried out in a large cosmopolitan city in Southwest Nigeria where hypertensive disorders, HIV, sickle cell anaemia and diabetes mellitus were the prevailing conditions among pregnant women.[13] Similarly, authors from other parts of the world have reported that hypertension in pregnancy is the most common medical problem during pregnancy and is associated with adverse risks across the globe. [17,18] Most times, lack of illness symptoms implies that the woman is unlikely to have had her blood pressure measured before pregnancy and is only diagnosed when she is pregnant.

The study further showed that close to half of the women in this study underwent a caesarian section. This must be associated with the high-risk nature of pregnancy complicated by medical disorders. Women who experience labour pains have a higher possibility of getting their medical condition exacerbated, hence caesarean section is often the best option for them. This is in keeping with reports among women in Ethiopia and Brazil where women with diabetes and hypertensive disorders of pregnancy had an increased risk of caesarean section, respectively. [9,19] A study among Irish women with hypertension in pregnancy further shows that many of them had to undergo caesarean section as a method of birth.[20]

There were high incidences of low birth weight (29.2%) and macrosomia (22.2%) among neonates of mothers with chronic conditions in this study. These rates are higher than those reported – 7.8% and 10.1% respectively - among neonates of mothers in a general population in the same region of Nigeria.[21] Our findings are in keeping with those of other authors from within and outside Africa in which low birth weight has been reported among pregnant women with hypertensive disorders of pregnancy[10,12] and fetal macrosomia among women with diabetes in pregnancy. [22,23] Further, neonates of mothers with multiple medical conditions had more adverse outcomes including mortality and NICU admission compared to neonates of mothers with single chronic conditions. This is in keeping with findings among pregnant women in India where infants of women with co-morbidities had a higher rate of NICU admission and neonatal deaths compared to infants of women with single condition.[24]

We also found adverse maternal outcomes among the women including mortality among 4.2% of the women with medical conditions in pregnancy. This rate is 100% higher than what was reported in a similar region of Nigeria in 2018, in which mortality was estimated at 0.4%. The large difference could be due to several factors. This includes the difference in the demography of the patients receiving care in the two hospitals. The patients in the study by Babah et al[13] were recruited at a teaching hospital in a cosmopolitan city of Nigeria while patients in the present study were recruited from a secondary health facility utilized by people of average to low socioeconomic status. Moreover, the difference could indicate a worsening of the health system and could sadly reflect the worsening state of maternal mortality in Nigeria. High maternal mortality has been reported in most parts of sub-Saharan Africa among women with medical conditions in pregnancy.[12]

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Our study showed a higher rate of mortality among women with multiple chronic conditions compared with their counterparts with a single chronic condition. This is in keeping with the findings of Admon et al [25] in a retrospective cross-sectional analysis of the health records of over a million US women. The finding also agrees with the results of a systematic study by Brown et al [14] where a higher mortality rate was reported among pregnant women with multiple chronic conditions. This implies the need for midwives and obstetricians to work better towards better obstetrics outcomes for this group of patients. Additionally, our findings revealed that women with multiple medical conditions had an increased healthcare utilization shown by a longer hospital stay after delivery. This finding agrees with that of another author [25] who reported a higher health utilization among a similar group of women in the US. The implication of a longer hospital stay in Nigeria is higher than usual hospital bills which may further stretch the meagre resources of Nigerian families who often earn little and mostly pay out of pocket for health expenditure.

Implications of the findings of this study

The findings from this study underscore the need for closer monitoring of pregnant women with hypertension, diabetes and other chronic conditions. Such women should be provided with closer follow-up and more frequent antenatal visits, if necessary. Moreover, during labour and the postnatal period, advanced practice midwives and obstetricians should attend the delivery and follow-up of such women and their neonates. Additionally, critical care unit equipment should be made available if serious life-threatening complications occur.

Limitations of the Study

The study was conducted in one location in Nigeria, so the results may not be generalizable to other populations.

Conclusion

This study examined maternal and fetal outcomes among women with chronic medical conditions in a secondary healthcare facility in South–Western Nigeria. Our findings revealed that hypertension existing alone or with diabetes was the most prevalent chronic condition. Close to half of the women were delivered by the caesarian section. Many of the babies delivered had low birth weight or were macrosomic. Besides, pregnant women with multiple chronic conditions had a higher mortality rate and increased length of hospital stay. Neonates of such women suffered from a higher mortality. It is recommended that midwives, obstetricians and other relevant stakeholders put policies in place to avert adverse maternal and neonatal outcomes for women with single or multiple chronic health conditions in pregnancy.

Declarations

Ethical Consideration: Ethical approval was obtained from the University of Ibadan/University College Hospital (UI/UCH) ethical review committee with approval number UI/EC/19/0520. Moreover, this research was carried out in line with the 1975 declaration of Helsinki, revised in 2000.

Authors' Contribution: LYO was involved in conceptualizing the topic, writing the initial and final draft of the manuscript, data analysis, and critical review of the manuscript. IOO was involved in writing the first and final draft of the manuscript, data acquisition and analysis. Both authors contributed to the design of the study. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript

Conflict of interest: The authors have no conflict of interest.

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