Original Article

Pattern of Noncommunicable Diseases in Pregnancy and Effect on Fetal Outcome

Jagun Olusoji Edward[1], Ikhile Monday[2], Oritogun Kola[3]

[1]Department of Obstetrics and Gynaecology, Olabisi Onabanjo University Teaching Hospital / Olabisi Onabanjo University Sagamu, Nigeria, [2]Department of Obstetrics and Gynaecology, Olabisi Onabanjo University Teaching Hospital Sagamu, Nigeria, [3]Department of Community Medicine and Primary care, Biostatistics unit, Olabisi Onabanjo University Sagamu, Nigeria

Correspondence: *Jagun Olusoji Edward*
Department of Obstetrics and Gynaecology,
Olabisi Onabanjo University Teaching Hospital / Olabisi Onabanjo University Sagamu, Ogun state. Nigeria
Email: jocorban@yahoo.com

Abstract

Objective: To determine the prevalence of NCDs among parturients, identify the common NCDs in the population and associated risk factors and compare the fetal outcome to the population without a NCD.

Methodology: This is a retrospective case control study of patients admitted into the labour room of Olabisi Onabanjo University Teaching Hospital between 2010 and 2015. The data was collected from the antenatal clinic records and the obstetric emergency room. A total of 149 cases of NCDs were recruited into the study.

Results: A total of 3639 were admitted into the labour room in that period with 293 cases of NCD and this represents 8.05%. There was no positive history of use of alcohol or smoking of cigarette or substance abuse, however, there was family history of NCD in 20.8% (31/149) of the respondents. Hypertension in pregnancy (preeclampsia) was the most common NCD (69.8%). The majority of the deliveries were by Spontaneous vaginal delivery (52.7% {78/148}) and the APGAR score at 5 minutes showed the control population having more asphyxiated babies than the NCD (p=0.000) but the NCD parturients have prolonged hospital stay.
The stillbirth rate was 7.4% (11/149) in the NCD and 1(0.7%) in the control group with a p=0.000.

Conclusions: NCDs are associated with a high prevalence of caesarean and instrumental deliveries. The duration of labour is shorter because of high incidence of induction of labour and shortening of the second stage. Early diagnoses, intensive care in pregnancy and labour will improve the feto-maternal outcome

Keywords: Congenital anomaly, Fetal outcome, Hypertension in Pregnancy, Noncommunicable disease, Risk factors.

Cite this article as: Edward JO, Monday I, Kola O. Pattern of Noncommunicable Diseases in Pregnancy and Effect on Fetal Outcome.J Soc Obstet Gynaecol Pak. 2019; Vol 9(3):115-120.

Introduction

The incidence of Non Communicable diseases (NCDs) are said to be increasing in the developing countries despite the fact that the wherewithal for managing the after effect are not readily available. This, therefore, create a socioeconomic burden and will further worsen the health indices. NCDs are responsible for close to 36 million deaths every year, of this, nearly eighty percent of this occur in low- and middle-income countries(LMICs).[1,2,3] The leading NCDs of the African Region are: Hypertension, Diabetes mellitus, Cardiovascular diseases, Cancer, Chronic obstructive lung disease like Asthma, and which were once linked to affluent societies but

Authorship Contribution: [1-3]Conception and design, Collection and assembly of data, Critical revision of the article for important intellectual content, Final approval and guarantor of the article

Funding Source: none

Conflict of Interest: none

Received: Aug 15, 2019

Accepted: Nov 08, 2019

the adoption of western lifestyle and diet has made them be prevalent. The four key risk factors for these NCDs are: Tobacco use, excessive use of alcohol, unhealthy diet and physical inactivity and identified four intermediate risk factors are: obesity, high blood pressure, raised blood sugar and high cholesterol.[3]

The NCDs generally tend to get worse in pregnancy and presumed to affect the fetal outcome adversely when not properly managed. They contribute significantly to maternal mortality as an indirect cause. In the United Kingdom, 2011-2013 records show that over two-third (68%) of all maternal deaths were due to indirect causes, with cardiac disease being the single largest cause.[4] There is also evidence of a shift in incidence from direct to indirect maternal deaths in many LMICs due to an increase in Noncommunicable diseases among women in the reproductive age.[4] The positive aspect, however, is that the NCDs can be screened for if preconception counseling and care was done and reasonable precaution can be taken to prevent feto-maternal fatal outcomes.[5]

Noncommunicable diseases (NCDs), have been hitherto perceived as diseases of little significance to global health, but in reality, represent the greatest threat to economic development and human health.[6] The effect is linked to the next generation as they can cause chronic diseases in the offspring hence the need for proper identification, evaluation, and care.[7,8,9] The aim of the study is to determine the prevalence of NCDs among parturients and to identify the common NCDs in the population and associated risk factors and compare the fetal outcome to the population without a NCDs

Methodology

This is a retrospective case control study of patients admitted into the labour room of Olabisi Onabanjo University Teaching Hospital between 2010 and 2015. A total of 149 cases of NCDs were recruited into the study. The case notes were thereafter retrieved from the health information management office and the labour ward records. Some of the clients were previously diagnosed with noncommunicable diseases and were on treatment, the details were retrieved from the past medical records and medication history. Hypertension in pregnancy was defined as a blood pressure elevation of greater or equal to 140/90mmHg on 2 or more occasions using the aneroid sphygmomanometer and were said to be preeclamptic if there is associated significant proteinuria. Previously diagnosed Diabetics had a corroborating Fasting Blood sugar and HBAIc while new diagnoses were made with OGTT. All other NCDs were diagnosed and managed as per departmental protocols. Patients were admitted from the clinic, antenatal wards and from referrals which were from peripheral centers and secondary care centers from other parts of the state and adjourning states. The 151 controls were the parturients without identifiable medical conditions who attended the clinic in the same period and had similar socio-demographic characteristics. The data collected includes; the biodata of the patients, the type of NCDs, management in labour and the fetal outcome including APGAR scores, perinatal deaths, and congenital anomalies. These are compared with the fetal outcome in women who do not have NCDS.

The data was analyzed using the Statistical Software Package (SPSS version 20). The descriptive statistics such as frequencies, percentages, and graphs were used for categorical variables while the associations of some categorical variables and the groups were considered using Chi-square test, $\chi 2$. Statistical significance was set at $P<0.05$.

Results

A total of 3639 were admitted into the labour room in that period with 293 cases of NCD and this represents 8.05%. The control group was found to be comparable with no statistical significance in terms of socio-demographic and occupational characteristics. About three quarters of the NCD population were between the age range 26-40 years and 2/3 of them were para 0-1 with the uncorrected BMI with pregnancy at delivery

showing 69.6% were between overweight and obese (Table I). The majority of the deliveries occurred at term between the gestational age of 37-0weeks and39-6weeks. None of the respondents with NCD gave a positive history of use of alcohol or smoking of cigarette or substance abuse, however there was family history of NCD in 20.8% (31/149) of the respondents. Eighty-four (56.4%) were on treatment prior to labour and 60(40.3%) were commenced on treatment only when they came for admission for delivery and 5(3.4%) were not on any form of treatment.

Table I: Bio-Characteristics of the Parturients.

Variable	Frequency	Percentage
Age (Years)		
<20	7	4.7
20-25	17	11.4
26-30	35	23.5
31-35	44	29.5
36-40	35	23.5
41-45	11	7.4
Total	149	100
Parity		
0	53	35.6
1	38	25.4
2	32	21.5
3	14	9.4
4	7	4.7
5	3	2.0
6	1	.7
7	1	.7
Total	149	100
BMI		
<19.9	1	0.7
20-24.9	34	24.6
25-29.5	48	34.8
30-34.5	48	34.8
35-39.5	6	4.4
>40	1	0.7
Total	138	100
Gestational Age (Weeks)		
28-0 - 33-6	13	8.8
34-0 - 36-6	29	19.7
37-0 - 39-6	99	67.4
40-0 - 42	6	4.1
Total	147	100

Hypertension in pregnancy (preeclampsia) was the most common NCD (69.8%), Sickle cell disease, peptic ulcer disease, Diabetic Mellitus and Asthma all contribute less than 10% each to the prevalence of NCD in pregnancy. (Table II). The majority of the deliveries were by Spontaneous vaginal delivery (52.7% {78/148}) while 39.9% (59/148) were by caesarean section. Induction of labour accounted for 20.9% of the NCDs as against 4.1% in the control group, the most common mode of delivery for the 2 populations is spontaneous vaginal deliveries and instrumental vaginal deliveries accounted for 8.1% in the NCDs, and there was a significant difference in the mode of delivery. Table (III). The duration of labour was comparable with about three quarters delivering between 3-12 hours of labour.

Table II: Type of NCD in Pregnancy.

NCD	Frequency	Percentage
Preeclampsia	104	69.8
SCD	12	8.1
Peptic ulcer	10	6.7
DM	9	6.0
Asthma	6	4.0
Thyroid	4	2.7
Kidney disease	2	1.3
Heart failure	1	0.7
Severe anaemia	1	0.7
Total	149	100

Table III: Delivery Mode and Duration of Labour.

Variable	NCD Frequency (Percentage)	NON-NCD Frequency (Percentage)	
Mode of Delivery			P-Value
SVD	78(52.7)	107(70.9)	
Instrumental Delivery	11 (7.4)	5 (3.3)	0.004
CS	59(39.9)	39(25.8)	
TOTAL	148	151	
Duration of Labour			
<3HRS	0(0.0%)	2(1.4)	
3-12HRS	76(51.4)	77(54.6)	
12-24	12(8.1)	27(19.1)	0.006
>24	1(0.7)	1(0.7)	
CS	59(39.9)	34(24.1)	
Total	148	141	

Congenital malformations were found in 0.7% of each of the 2 populations and the stillbirth rate was 7.4% (11/149) in the NCD and 1(0.7%) in the control group with a p=0. 000. The APGAR scores at 5 minutes showed the control population having

Table IV: Length of Stay in the Hospital.		
Days Spent in Hospital	NCD n (%)	NON-NCD n(%)
<48HOURS	2(1.3)	4(2.6)
2-4	17(11.4)	104(68.9)
5-7	52(34.9)	37(24.5)
8-10	44(29.5)	4(2.6)
>10	34(22.8)	2(1.3)
TOTAL	149	151
P value	0.000	

more asphyxiated babies than the NCD (p=0.000) Figure 1 but the NCD parturients have prolonged hospital stay. (Table IV)

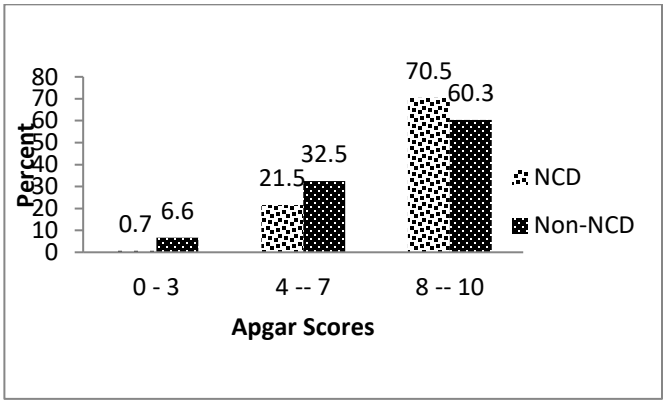

Figure 1. Percentage Distribution of Apgar Scores by Group.

Discussion

Non-communicable diseases increase the burden of pregnancy physically and financially and can also increase the risk of maternal mortality[10] with a greater impact on a developing or depressed economy due to poor response to the challenges of management. The incidence of NCD has been increasing and worrisome which necessitated it to be made one of the targets of Sustainable Development Goals (SDG 3 target 4).[11] About 80% of all NCD-related deaths in 2008 occurred in LMICs, and In 2004, there were more NCD-related deaths among women aged 15 to 44 years in Africa than in high-income countries,10 in this study however there were no cases of maternal mortality in the group which could be a reflection of the high level of care in the hospital. Hypertensive disorders in pregnancy (HDP) is the leading causes of maternal and perinatal morbidity and mortality12 and it occurs in less than 10% of pregnancies.[13] In this study, HDP constituted about 70% of the NCD. Studies have shown that efficient antenatal care will help to make early diagnosis and reduce maternal mortality. Of the 5 major causes of maternal mortality, HDP is the only one that efficient ANC can prevent. HDP accounts for as much as 30,000 maternal mortality in a year.[14] strengthening and making more effective ANC services and Preconception care will, therefore, reduce the burden of NCDs. Congenital malformations are a consequence of the disease or a consequence of therapy. Congenital malformations occur in 2-3% of the population globally[15,16] and an incidence of 1.07% in Ogun state, Nigeria[17].they are associated with 20-25% perinatal mortality.[18] In this study there was no difference in the incidence of congenital anomalies in the NCD and non NCD 0.7% incidence which is less than what was obtained about a decade ago in the same hospital however the stillbirth rate was significantly higher in the NCD population.

Obesity is an important risk factor for hypertension and cardiovascular disease and mortality. A large study in United states found increasing maternal mortality with cardiovascular diseases being an important factor,[19] in this population, however, obesity was not a problem in this study because sixty percent of them were not obese and class 1 obesity was 34.8% as at the time of delivery. The prevalence of obesity-related NCD and its associated mortality is therefore expected to be low compared to what is obtained in developing countries where haemorrhage, contributes between 25% to 34% of maternal mortalities.[20,21,22] There was however no associated mortality in this study which does not support the concept of obstetric transition which propounds that there is an increasing maternal mortality due to increasing NCDs.[23]

Caesarean and instrumental deliveries were significant among the NCD groups. Shortening of the second stage of labour accounts for the higher percentage of the instrumental deliveries in the NCD group to reduce the stress of the second stage of labour and attendant effect on the

cardiovascular system. Induction of labour and caesarean deliveries are found to be commoner in NCDs.[24,25]

The APGAR score is a measure and a predictor of the neonatal outcome though may not be a predictor of the level of asphyxia as a sole entity but has been found to have a relative risk of cerebral palsy, and the degree of abnormality correlates with the risk of cerebral palsy. APGAR scores of less than 5 at 5 minutes and 10 minutes clearly confer an increased relative risk.[26] The study showed that the NCDS had a significantly better APGAR score than the control group. The determinants of APGAR scores are gestational age and maternal medications and non-significant risk factors were maternal medical or obstetric complications and oxytocin use.[26,27,28] Lai et al however found lower APGAR scores with instrumental vaginal deliveries and emergency caesarean sections.[28]

Conclusion

Non-communicable diseases are common with hypertensive diseases being the most common and it is associated with a high prevalence of caesarean and instrumental deliveries. The duration of labour is shorter because of high incidence of induction of labour and shortening of the second stage. They stay longer in the hospital after delivery and the APGAR scores in them was found to be better than in the controlled population and no higher risk of congenital abnormality. NCDs are common in our practice and recognizing them early and given appropriate treatment will prevent morbidity and mortality.

References

1. Facing the noncommunicable disease (NCD)global epidemic-the battle of prevention starts in utero-the FIGO challenge. Roura LC, Arulkumaran SS. Best Pract Res ClinObstetGynaecol. 2015 ;29(1):32-42.
2. Shannon LM, David EB, Eli YA. Noncommunicable Diseases, A Global Health Crisis in a New World Order. JAMA. 2012;307(19):2037-2038
3. Report on the status of major health risk factors for noncommunicable diseases: WHO African Region, 2015. http://www.afro.who.int/en/noncommunicable-diseases/npc-publications/2540-publications-non-communicable-disease-prevention-a-control.html.
4. Nair M, Nelson-Piercy C, Knight M. Indirectmaternal deaths: UK and global perspectives. Obstet Med. 2017 ;10(1):10-15
5. Hadar E, Ashwal E, Hod M. the preconceptional period as an opportunity for prediction and prevention of noncommunicable disease. Best Pract Res ClinObstetGynaecol. 2015;29(1):54-62.
6. Marrero S, Adashi EY. Non communicable diseases. SeminReprod Med. 2015;33(1):35-40
7. Liat S, Gabero L, Hod M, Yogev Y. Obesity in Obstetrics. Best Pract Res Clin ObstetGynaecol.2015;29(1):79-90
8. Kapur A. links between maternal health and NCDs. Best Pract Res ClinObstetGynaecol. 2015 ;29(1):32-42.
9. Hussein J. Non-communicable diseases during pregnancy in low and middle income countries. Obstet Med. 2017;10(1):26-29
10. Schutte JM, de Jonge L, Schuitemaker NW, Santema JG, Steegers EA, van Roosmalen J Indirect maternal mortality increases in the Netherlands. ActaObstetGynecolScand.2010 ;89(6); 762-768.
11. Sustainable Development Goals -United nations http://www.un.org/sustainabledevelopment/sustainable-development-goals
12. vonDadelszen P, Magee L.A.Preventing deaths due to the hypertensive disorders of pregnancy. Best Pract Res ClinObstetGynecol. 2016; 36: 83–102
13. Steegers E.A., von Dadelszen P., Duvekot J.J. Pre-eclampsia. Lancet. 2010 21;376(9741):631–644
14. Kassebaum NJ, Bertozzi-Villa A, Coggeshall MS, Shackelford KA, Steiner C, Heuton KR, et al. Global, regional, and national levels and causes of maternal mortality during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet. 2014;384(9947):980-1004.
15. Dolk H., Loane M., Garne E. The prevalence of congenital abnormalities in Europe. In: Posada de la Paz M., Groft S. (eds) Rare diseases epidemiology. Advances in Experimental Medicine and Biology, vol 686: 349-364. Publishers Springer
16. Corsello G, Giuffre M. Congenital malformations. J Matern Fetal Neonatal Med. 2012;25 (Suppl 1):25-9.
17. Oloyede O.A.O, Fetuga B. M, Iyaniwura C. A, JagunO.E. Profile of congenital malformations in Sagamu, Nigeria. Nigerian Medical Practitioner. 2006; 49(4): 65-67.
18. Teresa Marino. Prenatal Diagnosis for Congenital Malformations and Genetic Disorders https://emedicine.medscape.com.
19. Lisonkova S, Muraca GM, Potts J, Liauw J, Chan WS, Skoll A, Lim KI. Association BetweenPrepregnancy Body Mass Index and Severe Maternal Morbidity. JAMA. 2017 14;318(18):1777-1786.
20. The World health report 2005: make every mother and child count. 2005, Geneva: World Health Organization
21. Bates I, Chapotera GK, McKew S, Van Den Broek N. Maternal mortality in sub-Saharan Africa: the contribution of ineffective blood transfusion services. BJOG. 2008; 115:1331-1339.
22. Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van Look PFA. WHO analysis of causes of maternal death: a systematic review. Lancet. 2006;367(9516):1066-1074.

23. Souza JP, Tunçalp Ö, Vogel JP, Bohren M, Widmer M, Oladapo OT, et al. Obstetric transition: The pathway towards ending preventable maternal deaths. BJOG. 2014; 121: 1–4.
24. Sebire NJ, Jolly M, Harris JP, Wadsworth J, Joffe M, Beard RW, Regan L. Maternal obesity and pregnancy outcome: a study of 287 213 pregnancies in London. International Journal of Obesity. 2001; 25:1175-1182.
25. Robertson JE, Silversides CK, Ling Mah M, Kulikowski J, Maxwell C, Wald RM, Colman JM, Siu SC, Sermer M. A contemporary approach to the obstetric management of women with heart disease. J ObstetGynaecol Can. 2012;34(9):812-819.
26. The Apgar score. Committee Opinion No. 644. American College of Obstetricians and Gynecologists. ObstetGynecol 2015;126: e52–5. Accessed from www.acog.org on 01/03/2018
27. Kovavisarach E, Juntasom C. The non-significant risk factors were maternal medical or obstetric complications and oxytocin use. Med Assoc Thai. 1999;82(7):660-665.
28. Lai S, Flatley C, Kumar S. Perinatal risk factors for low and moderate five-minute Apgar scores at term. European Journal of Obstetrics &Gynaecology and Reproductive Biology. 2017;210: 251-256.