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Original Research Article

A study on the pattern of non-communicable diseases and their effects on pregnancy outcomes in Kashmiri women

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ABSTRACT

Background: Non-communicable diseases (NCDs), such as chronic hypertension, diabetes, thyroid disorders and cardiovascular diseases, pose significant risks during pregnancy, contributing to adverse maternal and fetal outcomes. This study aims to examine the pattern of NCDs among pregnant women in Kashmir and evaluate their effects on pregnancy outcomes.

Methods: A prospective observational study was conducted over 12 months at Lalla Ded Hospital, Srinagar, involving 450 pregnant women diagnosed with NCDs either before or during pregnancy. Data were collected on maternal demographics, type of NCD and pregnancy outcomes. Maternal and fetal complications were assessed, including APGAR scores, NICU admissions, delivery modes and maternal morbidity and mortality.

Results: The most prevalent NCD was chronic hypertension (33.7%), followed by thyroid disorders (19.1%) and diabetes mellitus (15.1%). Of the 450 women, 250 (55.5%) had no complications, 176 (39.1%) had non-life-threatening complications, 20 (4.4%) experienced maternal near-miss events and 4 (0.8%) succumbed to their conditions. Regarding fetal outcomes, 84.8% were live births, 10.2% abortions, 3.1% intrauterine deaths and 1.7% stillbirths. APGAR scores were ≥8 in 73.2% of babies, while 31.2% required NICU admission.

Conclusions: NCDs during pregnancy are prevalent and significantly impact both maternal and fetal health. Chronic hypertension was the most common condition, associated with increased rates of complications, caesarean delivery and NICU admissions. Early diagnosis, multidisciplinary management and improved antenatal care are crucial for optimizing fetomaternal outcomes in pregnancies complicated by NCDs.

Keywords: APGAR score, Chronic hypertension, Caesarean delivery, Diabetes mellitus, Fetomaternal outcome, Maternal near miss, NICU admission, Non communicable diseases, Perinatal outcome, Thyroid disorders

INTRODUCTION

Non-communicable diseases (NCDs) refer to diseases that are non-infectious and non-transmittable and are commonly associated with genetic or lifestyle components. These diseases tend to be chronic due to their slow progression. NCDs that can complicate pregnancy include chronic hypertension, cardiovascular diseases, endocrine diseases (including thyroid disorders and pre-existing diabetes), renal diseases, liver diseases, respiratory diseases, hematological diseases, neurological diseases and autoimmune diseases.[1] The influence of NCDs on maternal health is emphasized in the global analysis of the causes of maternal death which was conducted in 2014.[1] According to the International Classification of Diseases (ICD), maternal death can occur from either direct (obstetric-related) causes or indirect causes and deaths from an NCD fall under the indirect causes. NCDs are responsible for about 36 million deaths each year and approximately 80% of them occur in low- and middle-income countries. Each year, 18 million reproductive age women die from an NCD and two out of

every three women die from an NCD. Lastly, approximately 810 women die each day mostly from preventable complications during pregnancy, delivery or after pregnancy.[2]

Screening for NCDs through preconception counselling and antenatal care can prevent or reduce the impact of the disease on maternal and fetal outcomes. Identifying and treating underlying cases during pregnancy will improve maternal and fetal outcome. Routine antenatal visits, monitoring and timely interventions when necessary are basic obstetrical care. If the woman has high-risk conditions related to NCDs, they can be referred for more specialized obstetric protocols.[3]

The sustainable development goals (SDGs) aim to reduce global maternal mortality to 70 deaths per 100,000 live births (SDG 3.1) and reduce one- third of premature mortality from NCDS globally (SDG 3.4). Given the Government of India has also established a target to reduce premature maternal mortality due to NCDs in the next decade to one-third, the goal of this study is to examine NCDs in a sample of pregnant women and its relationship to maternal and fetal outcomes in a tertiary care obstetric setting.

Non-communicable diseases (NCDs) such as gestational diabetes mellitus (GDM) and cardiovascular disease (CVD) pose significant risks during pregnancy. GDM, a glucose intolerance first detected in pregnancy, can lead to complications like preeclampsia, macrosomia and increased cesarean delivery rates. It also raises the mother's lifetime risk of type 2 diabetes and cardiovascular disorders. Pre-existing or pregnancy-induced CVD can result in heart failure, arrhythmias and adverse fetal outcomes. Both conditions share risk factors such as obesity, hypertension and advanced maternal age. Early identification, regular monitoring and multidisciplinary care are essential for optimizing maternal and fetal outcomes in pregnancies affected by NCDs.[4-6]

Review of literature

Hamid et al, (plored the morbidity profiles of women diagnosed with NCDs during pregnancy at a tertiary care hospital in Kashmir. They established anemia as the most common disorder (70% prevalence), together with 26% hypertensives, 55% hypothyroids and 25% diagnosed with diabetes.[7]

Edward et al carried out a retrospective case- control study to examine NCDs in pregnancy and on fetal outcomes. The study determined that NCDs were very common and hypertensive disorders were the most prevalent. This was linked to higher rates of caesarean and instrumental deliveries, shorter timing in labor due to higher induction rates and second stage time, longer hospital stays after delivery and higher APGAR scores for babies compared to the control group.[8]

Barnes et al indicated that NCDs are responsible for approximately 18 million deaths of reproductive-age women annually or about two of three female deaths. For three decades, NCDs have been the leading cause of death for women worldwide.[9]

Malhame et al completed a prospective cohort study at a community hospital in Haiti to investigate the prevalence of non- communicable diseases (NCDs) in pregnancy and the effects on perinatal outcomes from these diseases. They found adverse consequences for both maternal and perinatal outcome from NCDs.[10]

Jung et al performed a systematic scoping review of clinical practice guidelines regarding non-communicable diseases (NCDs) within maternal health services from 2011 onwards. The review assessed 405 clinical practice guidelines, ultimately providing an extensive evaluation of the present recommendations. This research underscored the necessity of establishing guidelines that have a comprehensive approach to NCDs within antenatal, intrapartum and postnatal care-especially in resource-limited contexts.[11]

Akhtar et al conducted a descriptive study on maternal mortality as a result of NCDs for the purpose of exploring maternal mortality due to NCDs. 72 cases of maternal death were evaluated. It was determined that 59.72% were classified as direct maternal deaths and 40.27% were classified as indirect.[12]

Yadav et al conducted a descriptive cross-sectional study on the prevalence of NCDs among Indian women of reproductive age and reported an overall prevalence of 39.02%. The most prevalent NCDs were hypertension (33.55%), chronic respiratory disease (32.89%) and diabetes (25.34%).[13]

Aims and objectives

To study the pattern of non-communicable diseases in pregnancy in Kashmiri women. To study the spectrum of different maternal outcomes in pregnancy due to medical disorders in terms of no complications, complications not life-threatening, life-threatening complications including maternal near miss or death. To study the fetal outcome in terms of time of delivery, mode of delivery, birth weight, APGAR score, NICU admissions, fetal death.

METHODS

Study type

This was a prospective observational study.

Study place

The study period was for 12 months from January 2024-December 2024.

Study duration

The study period was from 12 Months (January 2024-December 2024).

Study group

It included 450 pregnant women with NCDs.

The study, entitled as pattern of non-communicable diseases during pregnancy in Kashmiri women and their effect on fetomaternal outcome.

A tertiary care centre study, was a Prospective Observational study, conducted in Postgraduate Department of Obstetrics and Gynaecology, Lalla Ded Hospital, an associated hospital of Government Medical College, Srinagar over a period of 12 months after obtaining the ethical clearance from the Institutional Ethical Committee.

Inclusion criteria

Pregnant women visiting antenatal clinic of Lalla Ded Hospital with any Non-Communicable disease, diagnosed before pregnancy or during antenatal check-up was included in the study.

Exclusion criteria

Exclusion criteria comprised pregnant women who declined to provide consent, those who were lost to follow-up during the study period and those diagnosed with pregnancy-induced medical conditions such as gestational diabetes mellitus or pregnancy-induced hypertension, as these conditions could independently influence pregnancy outcomes and confound the study findings.

A proper written and informed consent was taken from pregnant women visiting the antenatal clinic willing to participate in the study. NCDs included were Chronic hypertension, cardiac diseases, endocrine disorders including pre-existing diabetes mellitus and Thyroid disorders, neurological disorders, chronic kidney disease, chronic liver disease, chronic respiratory disease, hematological disorders and autoimmune disorders.

Data was collected relating to biodata of women (age, parity, demographic profile), type of NCD, age at diagnosis of NCD, whether diagnosed during pregnancy, the period of gestation at which it was identified, menstrual history, personal and past history. A Proforma was used for collecting data. Different tests were carried for diagnosis of different medical disorders. Baseline investigations were done in every patient. Bp measurements were taken in sitting position 15 min apart. Patient was labelled with chronic hypertension if the person had BP of >/=140/90 before 20 weeks of pregnancy or treated before 20 weeks. For diagnosis of pre-existing diabetes mellitus, fasting blood glucose levels were measured and 2h plasma glucose levels were measured by glucometer or by withdrawing 2 ml of blood in syringe and sent for testing.

Thyroid disorders were diagnosed by performing TSH/T3/T4 levels. Liver disorders were diagnosed by performing LFT and USG. Renal disorders can be diagnosed by performing KFT and USG. Autoimmune profile was sent for different autoimmune disorders. ECG and ECHO was done to detect any cardiovascular disease. CBC and peripheral blood film was used to diagnose Hematological disorders. History, Examination and EEG was done for Neurological disorders.

Pregnant women that were taken in the study were followed up to delivery and discharge. Outcomes of pregnancy and delivery were recorded as: No complication, complications which were not life threatening and life- threatening complications leading to maternal near miss or mortality.

Fetal outcomes were reported in terms of APGAR Score, live births, still births, preterm deliveries, abortions, NICU admissions, birth asphyxia and congenital anomalies. Mode of delivery was noted whether the deliveries were conducted by caesarean section or spontaneous vaginal delivery.

Statistical analysis

Data was entered in Microsoft Excel spreadsheet and was analyzed using SPSS V20.0. All the data was summarized and entered in Microsoft excel sheet and then transferred to statistical software for analysis. Results on continuous measurements were presented as mean ± SD and results on categorical measurements were presented in number (%). Results were summarized in tables and graphs.

RESULTS

In our study, majority of patients were in the age group of 36-40 years. 144 patients were in the age group of 31-35 years, 62 patients in 25-30 years and 52 patients in 41-45 years. The most prevalent NCD in our study was chronic hypertension followed by thyroid disorder and then Diabetes Mellitus. There were 52 Hematological cases, 48 cardiovascular cases, 18 patients had Neurologic disorder and 10 patients had autoimmune disease. Only 6 patients had chronic kidney disease, 6 had chronic respiratory disease and 4 patients had chronic liver disease.

Out of total 450 patients, 46 had Abortion and there were 14 IUDs. 382 patients had livebirths while 8 patients had stillbirth. In our study, 250 patients remained stable throughout pregnancy. 176 patients developed minor complications which were treated in hospital. Among Life threatening Complications, 20 patients had maternal near miss, where prompt intervention by doctors saved lives. However, 4 ICU admissions eventually died despite treatment. Out of 404 patients, 86 had asphyxiated babies.

22 patients had either IUD or babies with very low APGAR Score of 0-3. 296 patients had babies with 8-10 APGAR Score. Out of 404 patients, 14 had IUD. Therefore, among 390 babies, almost 31.2% required NICU admission while 68.7% babies were discharged. 64 patients that had no complications were discharged within 2 days. Patients that developed complications had to stay longer. 144 patients stayed for 2-4 days, 136 patients stayed for 5-7 days, 44 patients had to stay for 8- 10 days while 42 patients stayed for more than 10 days.

Table 1: Age distribution of patients.

Age (in years)	Frequency (N)	%
25-30	62	13.7
31-35	144	32
36-40	192	42.6
41-45	52	11.5
Total	450	100

Table 2: Type of NCD in pregnancy.

NCD	Frequency (N)	%
Chronic hypertension	152	33.7
Thyroid disorders	86	19.1
Diabetes mellitus	68	15.1
Hematological	52	11.5
Cardiovascular disease	48	10.6
Neurological	18	4
Autoimmune	10	2.2
Chronic kidney disease	6	1.3
Chronic respiratory disease	6	1.3
Chronic liver disease	4	0.8
Total	450	100

Table 3: Pregnancy outcome of study group.

Outcome	Frequency (N)	%
Abortion	46	10.2
IUD	14	3.1
Stillbirth	8	1.7
Livebirth	382	84.8
Total	450	100

Table 4: Maternal complications of study group.

Complications	Frequency (N)	%
No Complications	250	55.5
Complications not life threatening	176	39.1
Maternal near miss	20	4.4
Death	4	0.8
Total	450	100

Table 5: APGAR score of babies born.

APGAR score	Frequency (N)	%
0-3	22	5.4
4-7	86	21.2
8-10	296	73.2
Total	404	100

Table 6: Babies admitted to NICU.

NICU Admission	Frequency (N)	%
Yes	122	31.2
No	268	68.7
Total	390	100

Table 7: Duration of stay in hospital.

Duration in Hospital	Frequency (N)	%
<48 hours	64	14.2
2-4 days	144	32
5-7 days	136	30.2
8-10 days	44	9.7
>10 days	42	9.3
Total	450	100

DISCUSSION

The present study aimed a study on the pattern of non-communicable diseases and their effects on pregnancy outcomes in Kashmiri women was a prospective analytical study done in the Department of Obstetrics and Gynaecology, Lalla Ded, associated Hospital of GMC, Srinagar. A total of 450 pregnant women were enrolled in our study. Maximum no. of patients (42.6%) were in the age group of 36-40 and 31-35 years (32%). The results were consistent with Neelam Rajput (2018) where most of the cases belonged to 35-39 years.[14] Similarly, UM Zahan (2013) found mean maternal age to be more than 35 years.[15]

Chronic hypertension was the most common NCD (33.7%) found in these patients followed by Thyroid Disorder (19.1%) and Diabetes Mellitus (15.1%). 11.5% had Haematological and 10.6% patients had CVS disease. Only a few patients had Neurological, Chronic Respiratory Disease, Chronic Kidney Disease, Chronic Liver Disease and Auto Immune diseases. Our study results were consistent with the study conducted by Tabassum Firoz (2022) and J.O. Edward (2019).[8,16] A study conducted by Neha Kumari (2022) found that chronic hypertension was the common disease (30.8%), followed by cardiovascular (15.9%), neurological (14.2%), endocrine (11.5%), autoimmune (7.6%), chronic kidney disease (4.8%), chronic respiratory disease (4.3%), chronic liver disease (1.8%) which is more or less similar to our study findings.[17] In the study, 44.8% patients had no complication, 36% had some minor complication that were not life threatening. 19% patients had life threatening complication which included maternal near miss (18.2%) and death (0.8%). Kumari et al found that the prevalence of maternal death was 0.7% and near miss was 2.1% which is in contrast to our study where maternal near miss rate was 18.2%.[17] 73.2% babies born to mothers with NCD had good APGAR Score (7-10). 21.2% babies had low APGAR score (4-7). 5.4% had very low APGAR score of 0-3. Out of 404 patients, 86 had asphyxiated babies. 22 patients had either IUD or babies with very low APGAR Score of 0-3. 296 patients had babies with 8-10 APGAR Score. In a study conducted by J O Edward (2019), the APGAR score at 5 min was 8-10 in 70.5% babies, 4-7 in 21.5% babies and 0-3 in 0.7% babies.[8] The APGAR score of 0-3 at 5 min is in contrast to our study. Our study had more percentage of low APGAR score babies in comparison to J O Edward study. In the study, the pregnancy outcome was Abortion (10.2%), IUD (3.1%), stillbirth (1.7%) and livebirth (84.8%). 31.2% babies born required NICU admission. Only 1.3% babies born had congenital anomalies. In the study carried out by J O Edward (2019) it was found that 0.7% babies born had congenital malformations and the prevalence of stillbirth was 7.4% which is more compared to our study.[8]

Limitations

Single-center study

The research was conducted at a single tertiary care hospital, which may limit the generalizability of the findings to other regions or healthcare settings.

Short study duration

A one-year study period may not capture seasonal or temporal variations in disease prevalence or outcomes.

Limited follow-up

The study followed patients only until delivery and immediate postpartum period. Long-term maternal or neonatal outcomes were not assessed.

Hospital-based sample

The study included only those pregnant women who sought antenatal care or were admitted to the hospital,

potentially missing cases managed in peripheral or private healthcare settings.

Exclusion of pregnancy-induced conditions

Common conditions like gestational diabetes and pregnancy-induced hypertension were excluded, which may underestimate the total NCD burden during pregnancy.

Potential reporting bias

Some data such as history of pre-existing conditions and personal medical history were self-reported and may be prone to recall bias.

Limited assessment of socioeconomic and lifestyle factors

Factors such as education, income, diet and physical activity which could significantly affect NCD outcomes were not analyzed.

No stratification by severity of NCDs

The study did not categorize outcomes based on the severity or control level of each NCD, which could influence maternal and fetal outcomes.

CONCLUSION

There is a broad spectrum of NCDs in pregnancy. If left undiagnosed and untreated NCDs can lead to adverse maternal and perinatal outcomes. A lot of studies have been conducted by many workers regarding NCDs in pregnancy.

NCDs are common with Hypertension being the most common and it is associated with a high prevalence of Caesarean section. NCDs are linked to preterm birth and Low birth weight babies. They are associated with adverse maternal complications necessitating prompt action. They stay longer in the hospital after delivery and the APGAR score in them are found to be low in a good no. of babies. NCDs are associated with significant no. of abortions. There is no significant risk of congenital abnormality in babies born to mothers with NCD. However, significant no. of babies born required NICU admission.

Given the potential severity of these conditions, affected pregnancies necessitate close surveillance. Early diagnosis, appropriate maternal and fetal monitoring and timely intervention are essential to prevent adverse outcomes. Establishing maternal care units with advanced antepartum and intrapartum fetal surveillance capabilities is crucial. Additionally, well- equipped neonatal intensive care units (NICUs) are necessary to manage complications related to preterm birth and perinatal asphyxia. A coordinated multidisciplinary approach involving primary care Physicians, Obstetricians, Cardiologist, Endocrinologist, Neurologist, Rheumatologist, Nephrologist, Gastro-enterologist and Hematologist is often required to ensure favourable outcomes for both mother and child. In conclusion, NCDs during pregnancy present a significant challenge, often leading to serious maternal and perinatal complications. The findings of our study emphasize the importance of early diagnosis, vigilant monitoring and timely intervention to mitigate the adverse outcomes associated with these conditions. By establishing advanced maternal care units and well-equipped neonatal intensive care facilities along with fostering a multidisciplinary team approach, we can improve feto-maternal outcomes and provide better care for pregnancies complicated by NCDs. Enhanced awareness and proactive management are essential to safeguarding the health and well- being of both mother and child.

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