

# Association of Maternal and Foetal Outcomes with Selected Non-Communicable Diseases in Pregnant Women

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## ABSTRACT

Non-communicable diseases (NCDs) during pregnancy can have detrimental outcomes for the mother-child pair. An analytical cross-sectional study was conducted in Union Council 69, District Lahore, Pakistan, using a sample of 220 pregnant women to determine the prevalence of selected NCDs. Approximately one-quarter of the sample (23%) had a chronic disease, with pregnancy-induced hypertension being the most frequently occurring condition (19%). NCDs were significantly associated with postpartum complications in both mothers and neonates. The results provide essential baseline data to improve NCD care during this critical phase.

**Key Words:** Non-communicable diseases, Maternal outcomes, Birth complications, Diabetes mellitus, Gestational diabetes.

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Non-communicable diseases (NCDs) during pregnancy are one of the major risk factors for adverse maternal and foetal outcomes. NCDs account for approximately two-thirds of maternal deaths globally, and the majority of these deaths occur in low- and middle-income countries,<sup>1</sup> which already have burdened economies. Some of the most common NCDs relevant to mother-child health include diabetes (pre-gestational and gestational), hypertension, obesity, anaemia, cardiovascular diseases, and endocrine disorders. These conditions not only impede foetal growth and development and contribute to birth complications but also have long-lasting effects on both the mother and child through delivery and beyond. The problems associated with NCDs include maternal conditions such as pre-eclampsia and eclampsia, polyhydramnios, preterm labour, and the risk of chronic diabetes or hypertension, as well as foetal complications such as macrosomia, congenital anomalies, preterm birth, low birth weight, neonatal mortality, and growth retardation, among others.<sup>2</sup> This study aimed to provide pre-requisite data on the link between selected NCDs and maternal and foetal outcomes.

This study employed an analytical cross-sectional study design conducted among residents of Union Council 69, District Lahore, Pakistan. The sample size was calculated using the formula  $N = z^2 \cdot P(1-P)/d^2$ , based on the local prevalence of one of the common NCDs in pregnant females, *i.e.*, gestational diabetes mellitus (GDM), estimated at 17%,<sup>3</sup> with a 95% CI and an absolute precision of 0.05. The sample was selected using the following inclusion criteria: women in the third trimester of pregnancy who presented for hospital delivery during the data collection period (September to December 2022).

The results show that pregnancy-induced hypertension (PIH), along with pre-eclampsia, was the most common NCD found in 19.5% of the sample, followed by GDM found in 5.5% of the sample (Figure 1). Table I shows a significantly greater number of neonates who were admitted to the Neonatal Intensive Care Unit (NICU) after birth (25.4%) among mothers with an NCD compared to neonates born to mothers without an NCD (8.1%). A significantly larger number of women with NCDs gave birth by Lower Segment Caesarean Section (LSCS) than women without NCDs. It has been noted that women with NCDs, such as GDM, are at high risk of a low APGAR score <7 at 5 minutes.<sup>4</sup> The cross-tabulation of neonatal APGAR scores with maternal NCDs revealed a significant association between the two variables. A significantly greater number of neonates scored low on APGAR (35.6%) whose mothers had an NCD compared to neonates whose mothers did not have an NCD (17.4%). NCDs such as PIH put the life and health of the mother at risk. The foetus can develop intrauterine growth retardation (IUGR) or be born prematurely. These conditions can even lead to maternal and foetal mortality.<sup>5</sup> Table I supports this, as 95.7% of mothers who did not suffer from NCDs developed no complications after delivery.

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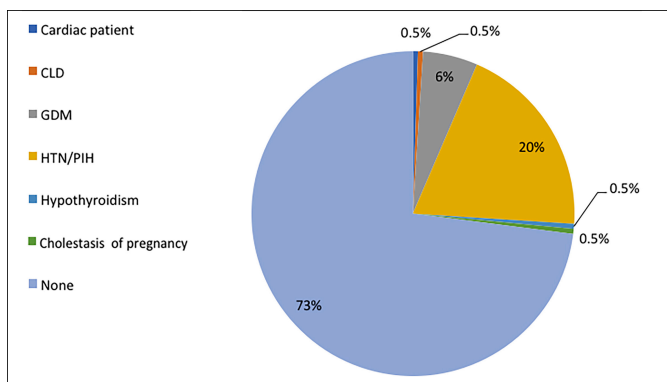
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**Table I: Cross-tabulation of maternal and neonatal outcomes with maternal NCDs.**

Variables		Complications developed after delivery		Chi-square (df)	p-values	Remarks
		No	Yes			
<b>NCDs</b>	Present	20 (33.9%)	39 (66.1%)	99.568 (1)	0.000	Significant
	Absent	154 (95.7%)	7 (4.3%)			
<b>Neonatal outcome</b>						
<b>NCDs</b>	Present	15 (25.4%)	44 (74.6%)	11.700 (1)	0.001	Significant
	Absent	13 (8.1%)	148 (91.9%)			
<b>Type of delivery</b>						
<b>NCDs</b>	Present	LSCS 92 (57.1%)	SVD 69 (42.9%)	10.939 (1)	0.001	Significant
	Absent	48 (81.4%)	11 (18.6%)			
<b>APGAR Score*</b>						
<b>NCDs</b>	Present	Good 38 (64.4%)	Not good 21 (35.6%)	8.263 (1)	0.006	Significant
	Absent	133 (82.6%)	28 (17.4%)			

\*Good > = 8; not good < = 7.



**Figure 1: Frequency of NCDs in pregnant women (n = 220).**

The findings call for action towards reducing the prevalence of, and creating awareness about, NCDs during pregnancy. The results of this study will be valuable in designing and implementing interventions aimed at reducing NCDs during this pivotal stage of women's lives and for future generations.

**ETHICAL APPROVAL:**

The Ethical Committee approval was sought from the Institute of Public Health (ECA No. 98/ERC/IPH).

**COMPETING INTEREST:**

The authors declared no conflict of interest.

**AUTHORS' CONTRIBUTION:**

NS: Proposed and conducted the survey.

HS: Supervised the project and reviewed the manuscript.



AT: Data entry in SPSS and drafting.

All authors approved the final version of the manuscript to be published.

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