

Factors associated with high-risk birth in South Africa.

Background to the study

High-risk fertility poses various health risks for both the mother and child/infant, especially in developing countries. There are various definitions of high-risk fertility, and these are all important in the quest to fully understand the dangers of high-risk fertility. High-risk fertility behaviours include the birth of mothers under the age of 18, births to mothers over the age of 34, births to mothers whose preceding birth interval is less than 24 months, and births to mothers whose birth order is above three children (National Department of Health *et al.*, 2019:125). World population estimates found that over 50 years in the pre-modern era birth rates were estimated at above 4.5 to 7 children per woman (United Nations, 2020). This high rate increased the prevalence of high-risk birth across the world and highly in the parts of the world that are experiencing slowly declining birth rates, for example in Sub-Saharan Africa (SSA). Timarat and colleagues also noted that the high-risk pregnancy occurs in less economic countries than in more economic countries across the globe. High-risk birth is defined as a condition that is in relation to pregnancy where there is an actual or potential risk to both the mother and the foetus (Rajbanshi *et al.*, 2021:02).

In South Africa in 2020, more than one million births were registered and of these births, more than 33 thousand were conceived by mothers aged 17 years and less (Statssa, 2022). In South Africa, 7.4% high-risk fertility prevalence was estimated among mothers aged under 18 years, 33.2% for mothers aged more than 34 years, 9.9% of women whose birth interval is less than 24 months, and 21.8% for women with birth order that more than 3 children among all women in the country (National Department of Health *et al.*, 2019:125). In the past and present, South Africa is included among the countries that experienced high risk birth because of fertility rates and its development and economic situation. Such birth risks were surprising given that in Sub-Saharan Africa national family planning programmes were introduced during the mid-1970s (De Silva & Tenreyro, 2017:209).

After the realization of high-risk birth as one of the concerns in South African society, the country made efforts to address this issue. The Department of Health released the national maternity guidelines (National Department of Health, 2019: 114). Some of these guidelines include basic antenatal care, choice of contraception, clean and safe delivery, choice of

pregnancy permanency basic, and comprehensive emergency obstetric care. There are programmes and policies that were formed to reduce and address the issue of high-risk pregnancy namely Maternal and Child Health Programme (MCHP) and Perinatal Problem Identification Programme (PPIP). Since then, the risk of high-risk birth was regulated which also resulted in the decrease of maternal mortality (National Department of Health, 2019). This is evident from Statistics South Africa (2022) which shows that maternal mortality rates decreased from 2019-2020 (from 105 deaths per 100 000 population to 88 deaths).

Although there are studies that look on this issue among in the world (Schuurmans *et al.*, 2021), there is a dearth of information on socio-demographic factors associated with high-risk birth in South Africa. This study will fill this gap by providing the analysis about the association between high-risk pregnancy and socio demographic factors in South African country. It is hoped that the result and findings of this study will be of interest to the government of South Africa in formulating additional policies and programmes that might be relevant in addressing the issue of high-risk birth in South Africa.

Statement of the problem

Not much is known about factors associated with high-risk fertility in South Africa. According to Statssa (2021: 01) there were more than 100,000 births in the country and a total of 33 899 births occurred to mothers that are less than 18 years old and over 600 children aged from 10 to 13 years gave birth, of these, 499 gave birth in 2020. It is estimated that in the country 24% of live births were in a single high-risk category and 8% of births were in multiple high-risk categories between the period 2010 to 2016. (National Department of Health *et al.*, 2019:125). High-risk fertility is accompanied by an increase in maternal, infant and child mortality (National Department of Health *et al.*, 2019:125). Although South Africa has experienced a decline in MMR which was estimated at 88.0 per 100 000 births in 2020 a decline from 105.9 per 100 000 live births in 2018, it is still considered a concern (National Department of Health *et al.*, 2019:241). This affects the country economically because it causes complications of health among women and live births which might decrease future production of the country as a result of unhealthy females to participating in the labour force (Schuurmans *et al.*, 2021).

The pregnancy complications can lead to abnormal responses between the body of the mother and the baby to the pregnancy-induced changes that greatly affect the health of the baby as well as medical conditions that are associated with delivery and labour, including gestational diabetes, preterm labour, placental previa, and preeclampsia complicate a pregnancy (Isaacs & Andipatin,

2020:01). As an example, gestational diabetes mellitus (GDM) is said to affect about 14% of pregnancies, nevertheless rates between 1% and 28% are recorded in various locations and differ based on ethnicity and geographic location (urban vs. rural), and other factors, globally (Hedderson *et al.*, 2010:445). This are considered as the impacts of high-risk birth among both the pregnant woman and the baby.

Main objective of the study

The main objective of the study is to investigate the association between socio-demographic factors and high-risk birth in South Africa.

Specific objectives of the study

The study aims to answer the following specific objectives:

- To examine the prevalence of high-risk births in South Africa by background socio-demographic factors.
- To investigate the socio-demographic factors influencing high-risk births in South Africa.

Significance of the study

The prevalence of high-risk births effect the health outcomes of both the foetus and the mother, and it also hinders the economy of the country (Mabaso *et al.*, 2014:182). The findings of the study will contribute to increasing the knowledge of maternal health and high-risk pregnancies in the country. This study is related to Sustainable Development Goal 3 which is aimed at reducing the maternal mortality ratio by 70% in 2030 as high-risk fertility is in relation to maternal mortality. The study will also enlighten government officials in formulating additional policies and programmes for both less economic areas and more economic areas in the country that can be used to address the issue of high-risk pregnancies within the country. Researchers will find this study useful in making them aware of the correlations between the socio-demographic factors and high-risk births in South Africa country, to add to what the study has been missed.

The global prevalence of high-risk birth

High-risk birth is widespread across the globe, and it is prevalent in all countries of the world. A study by WHO (2016) found that approximately 15% of all pregnancies worldwide can develop complications that are lifetime threatening. WHO (2016) reported that more than 800 women die daily due to complications that occurs during childbirth and antenatal period. The study conducted across the world found that 10%–30% of pregnancies are estimated to be high-

risk across the globe (Jaideep *et al.*, 2017:1258). The same study discovered that In India, between 20%–30% of pregnancies are identified to be high-risk. Looking at the differences in terms of high-risk birth prevalence among different countries, studies in various countries revealed that high-risk pregnancies differs across different countries, both developed and developing (WHO, 2016). The study done in a developed country seconded this by making an example of United States where most pregnancies occurring are not high-risk pregnancies (Backes *et al.*, 2020:86). Referring to the WHO, 2.3% of high-risk pregnancies was found in the United States (WHO, 2016).

In addition, high-risk fertility in New Zealand was estimated at less than 20% in 1993 showing a decrease from 37% during 1990 (Rajbanshi *et al.*, 2021:06). In high-income countries negative pregnancy outcomes are reduced due factors such as maternal health and antenatal education provided for both men and women which advance their knowledge on how to deals with pregnancy, childbirth, and parenthood (Backes *et al.*, 2020:86). In contrast, a study in China revealed that the high-risk pregnancies increase in 2015 since Chinese citizens were allowed to have 2 children because of shrinking population and ageing workforce (Zhu *et al.*, 2019:02). Zhu and colleagues also noted that there has been an increase in older age pregnancies (older than 35 years) after one child policy was banned.

Developing regions have a high prevalence of high-risk pregnancies compared to developed regions. Sub-Saharan Africa is also counted among the highest in terms of high-risk pregnancies. The study in SSA argues that the region remains the hard region in reducing maternal and child mortality which in 2015 was estimated at 546 per 1000 live births although global leaders implemented the Sustainable Development Goals (SDGs) to reduce MMR to 70 deaths per 1000 live births (Seidu *et al.*, 2023:22). The same study also reported that high-risk pregnancies behaviour in SSA is leading to this numerous adverse child and maternal outcomes in this region. The same study compared single high-risk fertility and multiple high-risk fertility in Sub-Saharan Africa and found that Chad had the first highest prevalence of both single (82.86%) and multiple (36.58%) high-risk fertility behaviours. Southern Africa has high prevalence of high-risk fertility as compared to another regions across the world (Seidu *et al.*, 2023:22).

Prevalence of high-risk birth in South Africa.

Like other African countries, South Africa has the prevalence of high-risk births. In South Africa, teenage mothers accumulate a certain amount in the number of births in the country. According to Statssa (2021: 01) there were more than 100 000 births in the country and a total of 33 899

births occurred to mothers that are less than 18 years old and over 600 children aged from 10 to 13 years gave birth, of these, 499 gave birth in 2020. It is estimated that in South Africa 24% of live births were in a single high-risk category (mother's age less than 18 years, mother's age more than 34 years, birth interval less than 24 months, and birth order greater than three), and 8% of births were in multiple high-risk categories. (National Department of Health *et al.*, 2019:125). The study in Sub-Saharan Africa revealed the prevalence of single high-risk fertility and multiple high-risk fertility behaviour South Africa and proven that the country had the prevalence of single high-risk fertility behaviours of 45.42% and multiple high-risk fertility behaviours of 17.85% (Seidu *et al.*, 2023:22).

Factors associated with high-risk birth prevalence in South Africa.

Age group

Age group contribute to the prevalence of high-risk births in South Africa as a country. The age group of the pregnant woman is reported as a factor towards the prevalence of high-risk birth in the society, because late age and early age at delivery to women results in adverse child health and maternal outcome (Seidu *et al.*, 2023:24). A study conducted in Bangladesh also found age as a contributing determinant to the occurrence of high-risk fertility in the country(Howlader *et al.*, 2022:03). Age group of less than 18 and 34+ are found to be at risk. This is because women who are aged less than 18 years are still not fit to conceive and those who are aged above 34 years have high chances of miscarriages.

A study by (Seidu *et al.*, 2023:24)also revealed that high-risk fertility is predominant in women who are aged less 18 years and more than 34 years. However, this study included high-risk birth to be occurring among women with birth interval of less than 24 months. In contrast, a study by (Tamirat *et al.*, 2021:05)found different results because they revealed that high-risk fertility problem mainly occurs among women are 25-34 years which was estimated at 53% person among 11 022 of women.

Type of place of residence.

Type of place of residence is included among factors that contribute to high-risk birth not only in South Africa but among other countries across the globe. It is believed that high-risk fertility prevalence differs based on the type of place of residences whereby in rural type of place of residence it is believed to be high in occurrence compared to urban type of place of residence. A study conducted in Ethiopia found high-risk birth to occur mostly in rural dwellings compared

to urban dwellings (Tamirat *et al.*, 2021:04). In addition, another study conducted in Bangladesh also found rural areas to have more prevalence of high-risk birth which accumulated more than 60% women with high-risk fertility problem (Howlader *et al.*, 2022:03). The reason behind this is that fertility is high in rural areas among young and older women in rural areas due to poverty and economic crisis.

However, a study with different findings was conducted in India. The study found that high-risk birth in rural primary health centre in India was less than 35% (Ka *et al.*, 2023:16). This is because this health centre was involved in utilizing the antenatal services and this results in the decreasing high-risk birth. Ka and colleagues also show high-risk pregnant women in this study, 88.2% had a single high-risk factor, and the remaining 11.8% which is likely to decline had more than one high-risk factor. Rural dwelling who are not receiving maternal and antenatal care contribute to more high-risk birth compared to those who receive maternal and antenatal care.

Educational attainment.

Women's education is associated with high-risk birth. Women with lower educational level are believed to experience pregnancy problems compared to women with higher educational level. A study by (Howlader *et al.*, 2022:05) revealed that, compared to women with primary education, those with secondary and higher education reduced high-risk fertility behaviour. Howlader and colleagues continued to argue that the reason behind this could be due to primary barriers to employment, resulting in a lack of autonomy and low income, which has an impact on self-care during pregnancy and purchasing power and visiting antenatal care (ANC). Women with secondary and higher education have a better understanding of self-health consciousness, eating food that are favourable to pregnancy, and proper diet and thus lead to reduced odds of high-risk fertility behaviour (Howlader *et al.*, 2022). However, a study conducted in the East African region found that women with no formal education are at high-risk of the prevalence of high-risk birth, although they are not at much risk as those with primary education (Tamirat *et al.*, 2021:04). Tamirat and colleagues found that women with no formal education accumulates 32.2%, women with primary education accumulates 47.8%, women with secondary education accumulates 18.6%, and women with diploma and higher education accumulates 2.5%.

Sex of Child.

Sex of child is realized as a factor that is associated with high-risk birth. Some families and cultures in South Africa are likely to encourage more children to meet their desires of the preference of sons (Tamirat *et al.*, 2021:05). Tamirat and others stated that this situation of son

preferences comes because of culture and tradition. Even in modern years, tradition still exists and there are traditionalised places and families that still consider only sons as heirs. The study conducted in Ethiopia found sex of child as one of the determinants of high-risk fertility (Tamirat *et al.*, 2021: 05). The same study revealed that high-risk birth is high in prevalence among male child household compared to female child household. Several Studies revealed the same results. In addition, a study conducted in Bangladesh also found that high-risk fertility occurs mainly on households with male child compared to households with female child (Howlader *et al.*, 2021: 05). The same study found the 41.2% of the prevalence of high-risk fertility in male child households and 40% in female child households.

Wealth index.

Wealth index is identified as one of the factors associated with high-risk birth. Women with rich wealth status have fewer chances of being victims of high-risk birth, as compared to those with poor and middle wealth status. A study in Bangladesh revealed that women with rich wealth status accumulates 49.3% of high-risk birth, those with middle wealth index accumulates 61.2%, and those with poor wealth status accumulates more than 69% (Howlader *et al.*, 2022:05). Women with poor wealth status are more likely to experience high risk birth compared to those who are rich. Additionally, in India rich women had fewer chances of experiencing multiple high-risk birth as compared to those who are poor (Pal & Shekhar, 2021:04). The study shows that women who are rich accumulates 2.19% of multiple high-risk fertility, those who are middle quantile accumulates 5.5%, and those who are in the poor quantile accumulates 28.3 multiple high-risk fertility. The reason behind this could be that poor women cannot meet all the requirements for a healthy pregnancy because they cannot afford relevant food for pregnancy, healthy life, and proper diet(Howlader *et al.*, 2022).

Marital Status.

Marital status is one of the factors behind high-risk births among women. A study conducted in Ethiopia found the same feature to be the reason for the prevalence of high-risk birth behaviours. In Ethiopia revealed that high-risk fertility behaviour occurs mostly among married women and those living with their partners, less occurring among women who were currently single (Woldeamanuel *et al.*, 2023:03). The study reported 50.3% of high-risk fertility among women who are currently married or living with their partners. In addition, another the study conducted in Ethiopia reproductive-age women found that women who are married are in danger of high-

risk fertility compared to those who are single, and the reason behind this finding might be that married women are likely to engage get pregnant more in comparison with single women (Tamirat *et al.*, 2021:07). This study revealed that 93.3% of married women experiences high-risk births. The findings in the studies are different from one, however they present that married women are at risk of high-risk births as compared to single women.

Sex of the household head.

Sex of the household head is another background feature that contributes to the experience of high-risk birth, and it has been recognized as the feature that influence the prevalence of high-risk birth. As per study conducted in the DRC (Democratic Republic of Congo), it is proven that sex of household head contributes to high-risk birth (Tsala Dimbuene *et al.*, 2023:07). The same study in terms of the sex of the household head, focused on females as they are the ones that conceive and give birth to children. Tsala Bimbuene and colleagues found that female household head accumulates more that 15% on the prevalence of high-risk birth among reproductive women in the Democratic Republic of Congo. Another study conducted in the East African region also identified sex of household head as the feature that influence high-risk birth (Tamirat *et al.*, 2021). In contrast to the study conducted in the DRC, Tamirat and colleagues focused on both males and female's household head and found that females accumulated 15.6% in terms of influencing high-risk birth in the East African region. However, these studies are different and conducted in different places, high second one another in highlighting that sex of household head contributes to high-risk birth.

Region.

Regions is found to be one of factors associated with high-risk fertility. Various study conducted revealed that high-risk fertility occurs different according to regions and provinces, in other terms, different regions have different occurs with regard the phenomena. A study conducted in Ethiopian found different regions namely Large Centrals, Small Peripherals, and Metropolis with different rates of high-risk fertility. This study also found that the prevalence of high-risk fertility behaviour occurs the most in large centrals compare to small peripherals and metropolis regions (Aragaw *et al.*, 2023:06). In addition, another study focusing on women's education, contraceptive use, and high-risk fertility among reproductive women in Ethiopia found that high-risk fertility behaviour occurs differently in different regions (Woldeamanuel *et al.*, 2023:04).

Both studies found the same result and outcomes when it comes to region difference on the occurrence of high-risk fertility, although they are different.

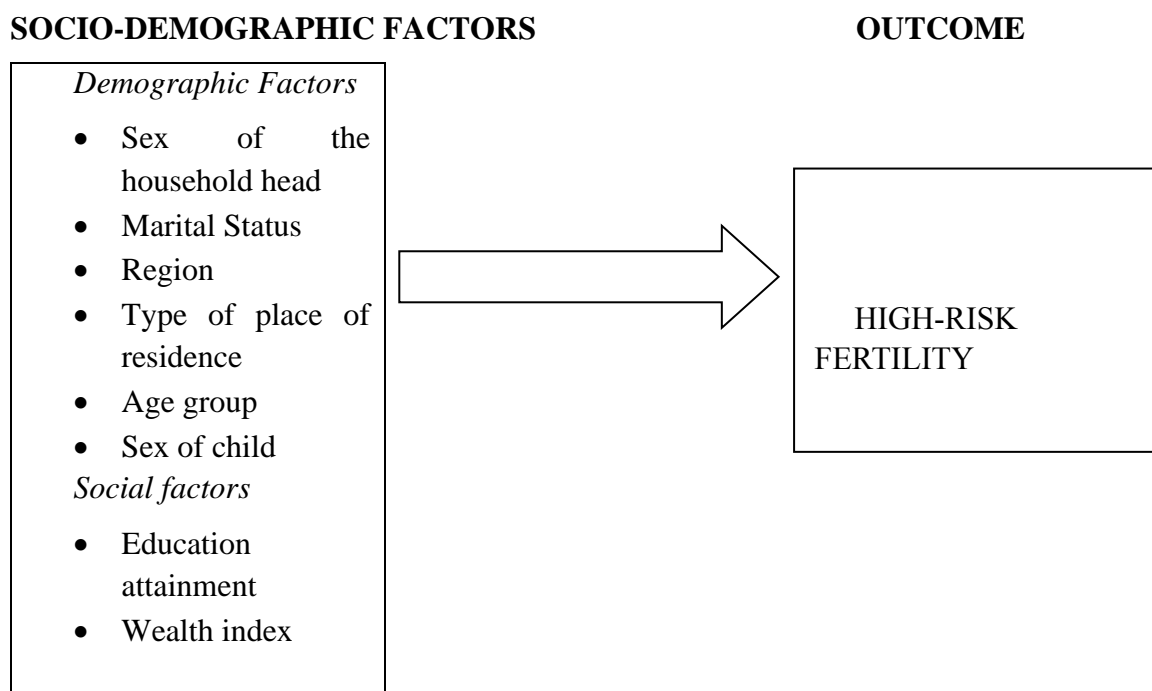
Theoretical framework.

This study will be guided by the Social-Ecological Model that was developed by Bronfenbrenner in the 1970s and has been used in social science studies on violence or abuse (Rakovec-Felser, 2014), nutrition, and age at first birth (Amoateng & Kalule-Sabiti, 2016). Age at first birth is one of the parameters that are used to compute the outcome variable of the study namely high-risk birth. In this study, the model will be used to understand the factors that are related to high-risk birth, divided in social and demographic factors. This study will identify the background characteristics that are in association with high-risk birth in South Africa.

Conceptual framework.

The theoretical framework fits in the conceptual framework because they both deal with the factors influencing high-risk birth. The above theoretical framework shows one characteristic that was used to create high-risk fertility as the outcome characteristic. This framework shows the relationship and connection between high-risk birth and background characteristics. The background characteristics of the study are age group, sex of the household head, sex of child, education attainment, wealth index, type of place of residence, marital status, and region. The outcome characteristic of the study is high-risk fertility.

Figure 2.1: Conceptual framework depicting the relationship between socio-demographic factors and high-risk birth.



METHODOLOGY.

Study setting

In this study, the data that the study used was collected in South Africa, an African country located in the Southern coasts of Africa. South Africa (SA) is one of the most southern nations on African continent. It has nine (9) provinces divided into 52 districts, 226 local municipalities and 8 metropolitan areas. Figure 1 shows the map of South Africa and its provinces. As per National Department of Health *et al* (2019). South Africa has estimated population of 58.78 million people in 2019. The study used the data that was collected from Statistics South Africa. In addition, the Demographic and health Survey was used to collect the data of birth ratio of 2016. South African Demographic and Health Survey (SADHS) provide important information to be used as secondary data for the research purpose.

Data source

The study used the secondary data collected by South Africa Demographic and Health Survey (SADHS) of 2016. The Demographic and Health Survey collects and distributes data of the country on health and the population (National Department of Health, *et al.*, 2019: 357). SADHS includes different variables known as factors that are used in the study. Additionally, SADHS 2016 includes socio-economic and demographic variables (Factors) that are used in the study. The SADHS used a two-stage cluster sample design and produce a sample that is representative to the country for mothers under the age of 18 years, mothers aged older than 34 years, mothers whose birth order is equal and more than 3, and mother with birth interval of less than 3 years (National Department of Health *et al.*, 2019). The data collected by the SADHS 2016 used a two-stage stratified sample design including the probability that is equals to the size sampling of PSUs, which was identified as the initial stage (National Department of Health *et al.*, 2019). The next stage was the systematic sampling of DUs. This analysis used individual recode (IR) file. The sampling frame that is used for the SADHS 2016 is the Statistics South Africa (STATSSA) Master Sample Frame (MSF), which was created by using the 2011 Census enumeration areas (EAs).

Study design and study population.

Study design.

The study used a cross-sectional study design. In the individual recode file, the total of 8514 women aged 15-49 years were successfully interviewed (National Department of Health *et al.*, 2019: 125). However, the study focused on 6124 women who gave birth in the past five years preceding the survey. The study excluded women above the age of 49 years, those who do not yet have a child, and those who are not yet reproductively stable to conceive a child.

Study population.

The population that the study was interested in are women aged 15-49 years who were to conceive a child at the time of the survey. The SADHS obtained information from 6124 women aged 15-49 years, however, if they were to conceive a child 5 years before the survey.

Description of study variables

Dependent variable

The outcome variable of the study is high-risk birth among all women aged 15-49 years. This variable is computed using four parameters namely women under the age of 18 years, women above the age of 34 years, women whose birth order is three and more children, and women whose last birth was less than 1 year. Given the four parameters, four dummy variables were created from the four parameters namely high-risk 1, high-risk 2, high-risk 3, and high-risk 4. Each of these dummy variables were code 0 “no risk” and 1 “risk”. The dependent variable of the study was created with a combination of these four dummy variables and was at the end also code 0 “No” no risk and 1 “Yes” risk.

Independent variables

Table 1: Definition and description of variables

Variables	Definition	Code
High risk births		0 = no risk 1= risk
Age group	Age group of the mother	1=15-24 2=25-34 3=35+
Sex of household headed	Sex of the head of the household categorised in to two categories	1= Male 2= Female
Sex of child	Sex of child in to two categories.	1= Male 2= Female
Education attainment	Education attainment of women in to three categories.	1= Primary 2= Secondary 3=Higher
Wealth Index	Women’ wealth status	1= Poor 2=Middle 3=Rich
Region	Nine provinces of South Africa	1=Western Cape 2=Eastern Cape 3=Northern Cape 4=Free State 5=KwaZulu-Natal

		6=Northwest 7=Gauteng 8=Mpumalanga 9=Limpopo
Type of place of residence	Type of place of residence categorised in to two residences	1=Urban 2=Rural
Marital Status	Women's current marital status	1=Not married 2= Married
Ethnicity	Women's population group categorised in to four categories	0=Black/Africa 1=White 2=Coloured 3=Indian/Asian

Method of analysis.

This study used the SPSS (Statistical Package for the Social Sciences) version 20 to analyse of the data. The study included the univariate analysis to present the frequencies distributions of the background characteristics and the bivariate analysis which presents the association of the background characteristics and the outcome characteristic of the study. The bivariate analysis included the chi-square test to show the association between the outcome (independent) variable and selected background (independent) variables. Binary logistic regression analysis was used to measure the relationship between the background characteristics and the outcome characteristic. The significance of the associations was be revealed by using the confidence interval of 95 percent and the level of significance of 5%. All data in the study was based on a p-value of less than 0.05 for the different measures of association.

Ethical considerations.

The study used the South African Demographic and Health Survey (SADHS) to obtain the secondary data. The researcher must first register and be granted the ability and rights to use the data from this survey to be able to access data in the system. The data can be obtained only if the project is registered in the DHS Program system. The DHS program make sure that all the respondents and data are anonymous before the results of the study are released so that no one

can be able to identify who the respondents participated in the study was. The data can be obtained only if the project is registered in the DHS Program. The researcher applied for ethics training giving by the Basic and Social Sciences Research Committee (BaSSREC) and the study will not continue to data analysis until the researcher get ethics approval.

Results

Descriptive findings

Figure 4.1 shows the distribution of percentages of high-risk birth. In terms of the experience of high-risk birth, 34.3% did not experience high-risk birth and 65.7% experienced high-risk birth.

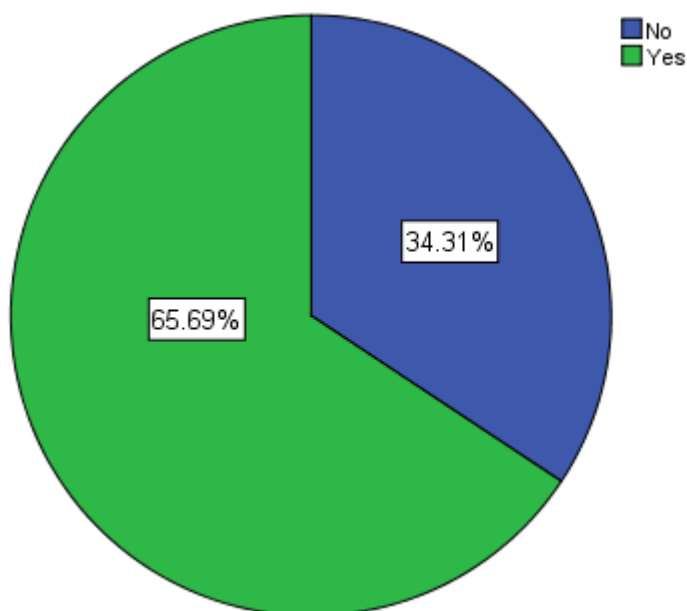


Table 4.2: Descriptive analysis of the study population

High-risk birth		Frequency	Percent
	No	2101	34.3
	Yes	4023	65.7
Age group			
	15-24	205	3.3
	25-34	2017	32.9

	35+	3902	63.7
Marital Status			
	Not married	3312	54.1
	Ever Married	2812	45.9
Educational attainment			
	Primary	865	14.1
	Secondary	4608	75.2
	Higher	651	10.6
Region			
	Western Cape	458	7.5
	Eastern Cape	753	12.3
	Northern Cape	523	8.5
	Free State	595	9.7
	Kwazulu-Natal	930	15.2
	Northwest	662	10.8
	Gauteng	633	10.3
	Mpumalanga	783	12.8
	Limpopo	787	12.9
Sex of child			
	Male	3180	51.9
	Female	2944	48.1
Sex of household head			
	Male	2662	43.5
	Female	3462	56.5
Type of place of residence			
	Urban	3419	55.8
	Rural	2705	44.2
Wealth index			
	Poor	2693	44.0
	Middle	1435	23.4
	Rich	1996	32.6
Ethnicity			
	African/Black	5339	87.2
	White	131	2.1

	Coloured	601	9.8
	Indian	53	0.9
	Total	6124	100

Table 4.2 shows the frequency distribution of the independent variables of the study. More women in the study were those age 35+ (63.7%) followed by those aged 25-34 (32.9%). Least women were those who were aged 15-25 (3.3%). In terms of marital status, many of the women in the study were not married (54.1%) and only 45.9% of those who were married. Regarding education attainment, majority of women completed secondary education (75.2%). Least of women completed primary education (14.6%) and higher education (10.6%). More women are from KwaZulu Natal (15.2%) followed by Limpopo (12.9%), Mpumalanga (12.8%), Eastern Cape (12.3%), Northwest (10.8%), Gauteng (10.3%), Free State (9.7%), Northern Cape (8.5%), and Western Cape (7.5%). In terms of sex of the child, more women in the study are those with a male child (51.9%) and 48.8% are those with a female child. Majority of women in the study were from female headed households (56.5%) and those from male headed household accumulated only 43.5%. Just 55.8% of women were from urban type of place of residence and 44.2% were from rural type of place of residence. Regarding wealth index, more women were poor (44.0%) followed by rich women (32.6%). Least women are those in the middle wealth status (23.4%). Regarding ethnicity, more women were black (87.2%). Least women were coloured (2.1%), White (2.1%), and Indian (0.9%).

Association between high risk births and background variavles

Table 4.3. present the prevalence of high-risk birth by background (independent) characteristic. The results shows that age group, marital status, education, region, wealth index, and ethnicity were statistically in association with high-risk birth.

Table 4.3: Bivariate association between main-outcome and selected background factors

Characteristics	High-risk birth					Chi-square	

		No	%	Yes	%	Value	P-value
Age group						6.200a	.045
	15-24	86	42.0	199	58.0		
	25-34	584	34.9	1091	65.1		
	35+	1431	33.7	2813	66.3		
Marital Status						239.868a	.000
	Not married	1423	43.0	1889	57.0		
	Married	678	24.1	2134	75.9		
Education attainment						178.872a	.000
	Primary	124	14.3	741	85.9		
	Secondary	1741	37.8	2867	62.2		
	Higher	236	36.3	415	63.7		
Region						29.594a	.000
	Western Cape	128	27.9	330	72.1		
	Eastern Cape	240	31.9	513	68.1		
	Northern Cape	164	31.4	359	68.6		
	Free State	207	34.8	388	65.2		
	Kwazulu-Natal	358	38.5	572	61.5		
	Northwest	235	35.5	427	64.5		
	Gauteng	221	34.9	412	65.1		
	Mpumalanga	302	38.6	481	61.4		
	Limpopo	246	31.1	541	68.7		
Sex of child						.492a	.483
	Male	1104	34.7	2076	65.3		
	Female	997	33.9	1947	66.1		
Sex of household head						.032a	.859
	Male	910	34.2	1752	65.8		
	Female	1191	34.4	2271	65.6		
Type of place of residence						.032a	.859
	Urban	1156	33.8	2263	66.2		

	Rural	945	34.9	1760	65.1		
Wealth index						17.207a	.000
	Poor	964	35.8	1729	64.2		
	Middle	524	36.5	911	63.5		
	Rich	613	30.7	1383	69.3		
Ethnicity						49.620	.000
	Black/African	1914	35.8	3425	64.2		
	White	20	15.3	111	84.7		
	Coloured	156	26.0	445	74.0		
	Indian	11	20.8	42	79.2		
Total		2101		4023			

The results presented a high prevalence of high-risk birth among women aged 35+ (66.3%) followed by women aged 25-34 (65.1%). Married women (75.9%) had a higher prevalence of high-risk birth. In terms of education attainment, women with primary education (85.9%) had a high prevalence of high-risk birth. There is also a significant prevalence of high-risk birth among women with higher education (63.7%). Western cape had a high prevalence of high-risk birth (72.1%) followed by Limpopo (68.7%), Northern cape (68.6%), and Eastern cape (68.1%). Regarding wealth index, there is a high prevalence of high-risk birth among women from rich households (69.3%). In terms of ethnicity, white women had high prevalence of high-risk birth (84.7%).

Predictors of high risk births

Table 4.4: Logistic regression findings for the relationship between main-outcome and selected background factors

Variables	Odds ratio	S.E.	Wald	Sig.	95% C. I	
					Lower	Upper
<i>Marital Status</i>						
Never married	0.36	0.07	223.37	0.000	0.31	0.41
Ever married®	1.00					
<i>Wealth Index</i>			21.89	0.000		

Poor	0.68	0.08	21.67	0.000	0.58	0.80
Middle	0.77	0.08	9.77	0.002	0.66	.91
Rich®	1.00					
<i>Age group</i>			2.28	0.320		
15-24	1.06	.152	0.16	0.691	0.79	1.43
25-34	0.91	.064	1.94	0.164	0.81	1.04
35+®	1.00					
<i>Ethnicity</i>			20.29	0.000		
African	0.60	.358	2.10	0.147	0.30	1.20
White	1.50	.431	0.87	0.350	0.64	3.49
Coloured	0.83	.375	0.24	0.628	0.40	1.40
Indian®	1.00					
<i>Education Attainment</i>			159.67	0.000		
Primary	4.31	.137	113.14	0.000	3.29	5.64
Secondary	1.17	.094	2.63	0.105	0.97	1.40
Higher®	1.00					
<i>Sex of child</i>						
Male	0.98	.056	0.09	0.762	0.88	1.10
Female®	1.00					
<i>Sex of household head</i>						
Male	0.59	.067	63.62	0.000	0.51	0.67
Female®	1.00					
<i>Region</i>			17.54	0.025		
Western cape	0.83	.157	1.38	0.241	0.61	1.132
Eastern cape	0.86	.117	1.63	0.201	0.68	1.083
Northern cape	0.75	.140	4.03	0.045	0.57	0.99
Free state	0.76	.131	4.21	0.040	0.59	0.99
KwaZulu-Natal	0.72	.110	8.79	0.003	0.58	0.90
Northwest	0.74	.120	6.19	0.013	0.59	0.94
Gauteng	0.77	.129	4.22	0.040	0.60	0.99
Mpumalanga	0.66	.113	13.93	0.000	0.53	0.82
Limpopo®	1.00					
<i>Type of place of residence</i>						
Urban	.873	.074	3.38	0.066	0.75	1.01

Rural®	1.000					
Cons	9.478	.379	35.285	.00		

Note: S.E= Standard ratio; Sig=Significance level; ®= Reference; Cons= Constant.

Table 4.4. shows multivariate logistic regression results for the association between high-risk birth and the background characteristics. The result shows that never married women were 0.36 [95% CI: 0.31-0.41] times less likely to experience high-risk birth compared to ever married women. The study found wealth index as one of the factors associated with high-risk birth. Women from poor households were 0.68 [95% CI: 0.58-0.80] times less likely to experience high-risk birth compared to women from rich households. Those from middle wealth status households were 0.77 [95% CI: 0.66-0.91] times less likely to experience high-risk birth compared to women from rich households. Education attainment was also found as a factor associated with high-risk birth. Women with primary education were 1.50 [95% CI: 3.29-5.64] times more likely to experience high-risk birth compared to women with higher education.

In addition, sex of household head was also found to be a factor associated with high-risk birth. Women from male headed households were 0.59 [95% CI: 0.51-0.67] times less likely to experience high-risk birth compared to women from female headed households. Region is also found to be one of the factors that are associated with high-risk birth. Women from Northern cape was 0.75 [95% CI: 0.57-0.99] times less likely to experience high-risk birth than women in Limpopo. Those who were from Free State were 0.76 [95% CI: 0.59-0.99] times less likely to experience high-risk birth compared to those from Limpopo. Women from Kwazulu-Natal were 0.72 [95% CI: 0.58-0.90] times less likely to experience high-risk fertility compared to women from Limpopo. Those who were from Northwest were 0.74 [95% CI: 0.59-0.94] times less likely to experience high-risk birth compared to women from Limpopo. Women from Gauteng were 0.77 [95% CI: 0.60-0.90] times less likely to experience high-risk birth compared to women from Limpopo. Also, women from Mpumalanga were 0.66 [95% CI: 0.53-0.82] times less likely to experience high-risk birth compared to women from Limpopo.

Major Findings

The study sought at examining the prevalence of high-risk birth in South Africa by the background characteristics. In the process, the study found a 65.7% prevalence of high-risk birth among reproductive women in South Africa. The study shows a higher prevalence of high-risk birth compared to other several studies (Kuppusamy *et al.*, 2023; Tamirat *et al.*, 2021; Harries & Khan, 2021,2,3). The study conducted in India found 49.4% prevalence of high-risk birth among Indian women (Kuppusamy *et al.*,2023). Study conducted in the East African region found 57.6% of women with high-risk fertility behaviour (Tamirat *et al.*, 2021), and the one that was conducted in Bangladesh found a 46% of all births were high-risk (Harries & Khan, 2023). The findings of the study were lower than that of the study conducted in Ethiopia where 72.8% of women experienced high-risk birth (Woldeamanuel *et al.*,2023). The study also sought at investigating factors influencing high-risk birth in South Africa. In this regard, several factors such as age group, marital status, education, region, and wealth index were statistically associated with high-risk birth.

5.3. Discussions.

High-risk birth is closely related to age-group. The study found that high-risk birth is statistically associated with age group. High-risk birth occurs differently per age group. The study found that high-risk birth is higher among women aged 35+ than women aged 15-24 and 25-34 years. A study conducted by Asresie and Dagnew (2022) agrees with what the study has found. The study suggests that women aged 35+ are older and physically tried to bear and give birth to children. Late motherhood (>34) is likely to be related to preterm births, stillbirths, and low-birth weight newborns (Howlader *et al.*, 2022). However, Tamirat *et al* (2021: 06) found that high-risk birth is higher among women aged 25-34 than other age groups.

Additionally, the study found marital status to be closely related to high-risk birth. It has been found that high-risk birth is higher among married women than never married women. Never married women were less likely to experience high-risk birth compared to ever married women. The explanation might be because married women are more likely to engage sexual intercourse compared to never married women. Marriage tends to perpetuate childbearing. The study finding was consistent to the previous study that was conducted in Ethiopia (Woldeamanuel *et al.*,2023). The same study revealed that high-risk birth is highly prevalence among married women than women who are not married (Woldeamanuel *et al.*, 2023).

Furthermore, education attainment is closely related to high-risk birth. There is a difference in terms of high-risk prevalence based on the levels of education attainment. The study found that high-risk birth is higher among women with primary education than women with secondary and higher education. The study found that women with primary education were four times more likely to experience high-risk birth than women with other education level (secondary and higher). The explanation might be due to lack of knowledge regarding the use of pregnancy prevention methods of women with primary. Women with primary education they lack knowledge on how to control their fertility (Tamirat *et al.*, 2021). Less educated women are believed to experience high fertility compared to more educated women (Tamirat *et al.*, 2021: 06). The same were found by the study conducted by Howlader *et al* (2022). Contrary, a study by Asresie and Dagne (2022) revealed that high-risk fertility is high among women with not education than women with primary, secondary, and higher education. Woldeamanuel *et al* (2023) agrees with Asresie and Dagne because the findings of the studies are similar. Tamirat *et al* (2021) also disagreed to what the study has found and proven that women with no formal education were likely to experience high-risk fertility compared to women with other levels of education.

The results of the study show that region is closely related to high-risk birth. The study shows that region is statistically associated with high-risk birth. There is a difference in terms of high-risk birth occurrence in different provinces across South African country. The study show that high-risk birth is high among women in Western cape than other provinces in the country. Another finding of the study show that wealth index is closely related to high-risk birth. The study also shows that women from poor and average households are less likely to experience high-risk birth compared to women from rich households. Several studies found similar results (Tamirat *et al.*, 2021; Asresie & Dagne, 2022). The explanation may be because women from rich households could decide to have more children because they are able to provide for them, which in turn contribute to high-risk birth (Tamirat *et al.*, 2021). The study suggest that rich households have access to food, shelter, asserts and other necessities and it not a burden to a greater number of children.

Ethnicity is closely related to high-risk birth. The results of the study have proven that ethnicity is statistically related to high-risk birth. It has been found that high-risk birth is high among white women compared to Indian women. The study suggests that this may be because of the political state and laws in South Africa. Indian people in South Africa came as migrants. Regardless of

South Africa passing their first citizenship Act No. 88 of 1995, it was discovered around a year 2010 that the Act made no provision of children born to foreign parents in South Africa.

Conclusion

The sought at examining the prevalence of high-risk birth in South Africa by background characteristics and at investigating the factors influencing high-risk birth in South Africa. The study proven that high-risk birth is a concern in South Africa. Study suggested several factors that are associated with high-risk birth and these factors included age group, marital status, education attainment, region, sex of child, sex of household head, type of place of residence, wealth index, and ethnicity. Among these factors, the study found that age group, marital status, education, region, wealth index, and ethnicity to be statistically associated with high-risk birth.

It is significant to reduce high-risk birth among reproductive women in South Africa. This will result in the reduced maternal mortality rates and infant mortality rates in the country. In addition, this will encourage women's health, which in turn promote women labour force participation and indirectly contribute to the economy of the country. This reflects the importance of addressing high-risk birth as it is a problem in South Africa.

5.4 Recommendations.

High-risk birth as a concerning problem that needs to be addressed, following are multiple recommendations that can be used in addressing this problem:

- High-risk birth was found to be high among married women as compared to never married. Married women must be encouraged to control their fertility using contraceptives. This can be done by empowering women so that they can be able to communicate and discuss their fertility desires with their husbands.
- Since high-risk birth occurs more among women with primary education than other level of education (secondary and higher), the government must create campaigns to assist in increasing knowledge of women with primary education. They can be provided with knowledge based on birth control and the taught about the importance of reducing their fertility to avoid high-risk birth. Women with primary education must also join the Adult Basic Education and Training (ABET).
- Government must invest more on family planning programmes in both rural and urban areas.

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