

RISKS OF PRETERM LABOUR AMONG WOMEN WHO ATTEND PUBLIC ANTENATAL CARE CLINICS

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ABSTRACT

Preterm births are the leading cause of perinatal morbidity and mortality worldwide. Complications of prematurity are the single largest cause of neonatal death and the second leading cause of deaths among children under the age of five years. The study aimed to identify the possible causes for preterm labour among women who attend antenatal care clinics in the East London area of the Buffalo City Metropolitan Health District in South Africa. A quantitative, explorative, descriptive, and retrospective design was used. The target population was women who delivered preterm infants in the year 2014. Patient files were used to collect the data and simple random sampling was used to select patient files. The sample only included women who delivered preterm infants and who received antenatal care at primary healthcare clinics. An audit tool was developed and used to collect data. The findings suggest that many of the women did not receive quality antenatal care with certain tests and procedures being omitted and underreported by nurses, leading to some conditions being poorly monitored or even undiagnosed. In conclusion, many preterm births could be prevented among women who attend antenatal care clinics, provided that they attend early, adhere to return dates and experience quality basic antenatal care services.

Keywords: antenatal care; perinatal mortality; pregnancy; preterm birth

INTRODUCTION AND BACKGROUND

Globally, preterm birth is a major challenge to healthcare services. Indeed, preterm birth is the world's leading cause of newborn deaths, meaning that if prematurity can be averted, many newborn deaths could be prevented (Lawn and Kinney 2014, 1). According to the World Health Organization (WHO), approximately 15 million babies are born preterm every year, making it the leading cause of death among children under five with preterm births causing almost one million deaths each year (WHO 2015a, para. 1).

Of all the preterm births in the world, 85 per cent occur in central and sub-Saharan Africa. The following seven countries top the list: Malawi, Comoros, Congo, Zimbabwe, Equatorial Guinea, Mozambique and Gabon (WHO 2012). In South Africa more than eight out of 100 babies are born prematurely and South Africa is ranked 24th out of 184 African countries for the number of newborn deaths due to complications from being born preterm (SANGONeT 2012, para. 1). The National Perinatal Morbidity and Mortality Committee (NaPeMMCo) states that most baby deaths in South Africa fall in the category of unexplained intrauterine deaths (22%) with the second most common cause of infant deaths being preterm birth (21%) (Bradshaw, Nannan, and Nicol 2011, 8). In 2012/2013, the perinatal mortality rate in the Eastern Cape was 35.5 per 1 000 live births with spontaneous preterm births accounting for 23 per cent of all deaths (Pattinson and Rhoda 2014, 30). In addition, the primary obstetric cause of neonatal deaths was spontaneous preterm births, accounting for 38.4 per cent of all neonatal deaths (Pattinson and Rhoda 2014, 11).

The Buffalo City Metropolitan Health District in the Eastern Cape recorded 6 064 early neonatal deaths which are equivalent to 12.8 per 1 000 live births for the period between 1 April 2013 and 31 March 2014 (Massyn et al. 2014, 96). These statistics exclude the number of perinatal deaths from the tertiary and regional hospitals within the district. With the 2015 deadline for the Millennium Development Goals (MDGs) having passed, most countries in Africa have not been able to meet the fourth MDG – to reduce perinatal and child mortality. No progress will be made in achieving this goal if the issue of preterm births is not dealt with (WHO 2015a, 1).

Factors that place a pregnancy at risk are a woman's age group, existing health conditions, lifestyle factors and conditions of pregnancy (National Institute of Child Health and Human Development 2010). These factors are identified during the history taking and assessment process at antenatal care clinics. Specific risk factors include multiple pregnancies, vaginal infections, high blood pressure, teenage pregnancies, smoking, alcohol, substance abuse and obesity (Lockwood and Kuczynski 1999). Cronje, Cilliers and Grobler (2011, 56) state that antenatal care forms the basis for risk identification and treatment or appropriate referral of high risk conditions in pregnancy.

PROBLEM STATEMENT

An article in the *Daily Dispatch* entitled: *Dead on Arrival*, stated that many baby deaths in the Frere Hospital in the Buffalo City Metropolitan Health District are caused by preterm labour (Mfengu 2011), which highlighted the significance of the problem of preterm labour. One of the researchers is an experienced midwife who works in a primary healthcare facility where antenatal care services and the referral of patients with preterm labour are conducted. At the time of the research she was employed to facilitate basic antenatal care (BANC) training in primary healthcare clinics in the health district and she was responsible for the monitoring of maternal and child health services in the district. She noted an increase in the number of women seeking antenatal care services in an attempt to avoid negative pregnancy outcomes. She also observed an increase in perinatal deaths due to preterm birth at one of the main tertiary facilities during the perinatal audits, and these statistics were a cause for concern. The above-mentioned issues prompted the researchers to investigate the causes of preterm birth among women who attended antenatal care clinics so that an attempt could be made to make recommendations on how to reduce the occurrence of preterm labour.

RESEARCH QUESTIONS

The study sought to find answers to the following questions:

- What are the causes of the preterm births among women who attend antenatal care clinics in the East London area of the Buffalo City Metropolitan Health District in the Eastern Cape?
- What recommendations can be made to prevent preterm labour among women who attend antenatal care clinics?

RESEARCH OBJECTIVE

The objective of the study was to determine the causes of preterm labour among women who attend antenatal care clinics in the East London area of the Buffalo City Metropolitan Health District in the Eastern Cape, South Africa.

DEFINITIONS OF CONCEPTS

Antenatal care is the foundation of efficient primary care in obstetrics. Its main objective is the prevention or early identification of risk factors, with a subsequent significant decrease in the maternal and perinatal mortality rate (Cronje, Cilliers, and Grobler 2011, 55). Antenatal care in this study refers to care provided to pregnant women at primary healthcare facilities in the Buffalo City Metropolitan Health District.

Perinatal mortality is defined as the death that occurs in a child's life including the four to five months before birth and the first month after birth (Pattinson 2010, 7). In this study, perinatal mortality refers to the death of a child due to complications related to preterm birth.

Preterm labour occurs when regular contractions lead to the opening of the cervix earlier than 37 weeks of pregnancy, bearing in mind that a full-term pregnancy is 40 weeks (Mayo Clinic 2017). Preterm labour in this study refers to early labour in pregnant women who attended primary healthcare facilities in the Buffalo City Metropolitan Health District.

RESEARCH DESIGN AND METHOD

A quantitative design was followed, with an exploratory, retrospective and descriptive approach adopted to determine the causes of preterm labour among women who attend public antenatal care clinics in the East London area, Buffalo City Metropolitan Health District, Eastern Cape. This method was chosen because the objective was to determine whether these preterm labours were avoidable.

Population and Sampling

The target population for this study consisted of women who delivered preterm infants and who attended antenatal care clinics in the East London area. The delivery register was accessed and all preterm deliveries by women who attended antenatal care clinics in East London area were identified. Hence, the population consisted of 205 women. Simple random sampling was used to obtain the sample. The file numbers of all the identified preterm deliveries which occurred between 1 January 2014 and 31 December 2014 were captured on a spreadsheet. A number was allocated to each file numbered from 1 to 205. These numbers were written on separate slips of paper and placed in a box from which random numbers were drawn. The file number matching the number on the slip was obtained from the spreadsheet and the slip was replaced after each selection. The same process was followed until 50 file numbers were drawn. The file numbers were then submitted to the filing department for the files to be drawn. Women who attended only one antenatal visit at the clinic were excluded from the sample as the study sought to identify and describe the causes of preterm labour from the first antenatal visit until the women deliver.

Data Collection

Data were obtained from the patient files of women who delivered preterm infants. The patient files are called maternity case records and contain all the information regarding the antenatal care, labour and delivery as well as the outcome of the delivery. A maternity case record is opened by the healthcare provider that renders the antenatal care services

and is given to the woman to bring with her on each antenatal care visit to the clinic. The maternity case record remains with the woman until she goes into labour. However, the maternity case record remains the property of the hospital after delivery.

Data were collected using the risk assessment tool which was developed using literature (Cronje, Cilliers, and Grobler 2011; Goldenberg et al. 2008; Kazemier et al. 2014; WHO 2015b), as well as the maternity case record. A pilot study was conducted on five women and their files were analysed using the tool. The tool was used to audit the files in order to explore the causes of preterm labour. The tool comprised the following sections:

- a. section 1: socio-economic status of the patient;
- b. section 2: obstetric history of the patient;
- c. section 3: social habits of the patient; and
- d. section 4: the current pregnancy of the patient.

Each section of the tool was developed to record all the information or circumstances important to the case in order to provide a comprehensive picture of additional risk factors.

Data Analysis

The data obtained from the audit tool were analysed using MSEXcel. Descriptive statistical analyses by means of frequency distributions were used to analyse the data. The results are presented in the form of tables.

Reliability and Validity

A pilot study was conducted to test the tool for reliability and to promote consistency throughout the study. The validity of the audit tool was enhanced by utilising a peer review. It was carried out by a professional nurse, a district obstetric specialist and the departmental research committee before data collection.

ETHICAL CONSIDERATIONS

All ethical principles were adhered to with ethical approval being granted by the Nelson Mandela University. Permission to conduct the study was obtained from the Eastern Cape Department of Health and the hospital manager. Privacy and confidentiality were maintained as the patients' names were not used to identify their files, but only the file numbers. The researchers were the only ones to audit the files.

RESULTS

The data were collected by means of a risk assessment tool for preterm labour. Four main categories or causes of preterm labour were identified in the results, namely the socio-economic status, the obstetric history, the social history, and current pregnancy risks.

Socio-Economic Status

Data regarding the socio-economic status of the patient included the age of the patient below 20 years and above 40 years, whether the patient is a single parent, whether the patient is employed or unemployed, and if the patient had two or more children at home (Table 1). The items in this section attempted to determine whether the patient was at risk of preterm labour based on her age, type of work, marital status and the number of children at home.

Table 1: Socio-economic status

	>2 children		Employed		<20 yrs		>40 yrs		Single parent	
	n	%	n	%	n	%	n	%	n	%
No	39	78	31	62	40	80	50	100	5	10
Yes	10	20	8	16	10	20	0	0	40	80
N/A	1	2	0	0	0	0	0	0	0	0
No info	0	0	11	22	0	0	0	0	5	10

The majority of women in the sample were unemployed, 62 per cent (n = 31). In addition, the majority of the women, 80 per cent (n = 40), indicated that their marital status was “single”. A very small percentage (20%, n = 10) of women had additional children. A high percentage of the women, 80 per cent (n = 40), were between the ages of 20 and 40 years, with only a small percentage being younger than 20 (n = 10, 20%).

Obstetric History

This section was concerned with the history-taking process during antenatal care. Ascertaining the obstetric history of the pregnant woman assists the midwife to determine specific problems that occurred in past pregnancies that might pose a risk to the current pregnancy. Historical factors identified risks of preterm labour as: first

pregnancy, previous abortions including second trimester abortions, previous low birth weight infants, conditions such as pyelonephritis and pre-eclampsia, previous preterm labours, and previous twin pregnancies (Tables 2a and 2b).

Table 2a: Obstetric History

	Primigravida	Primigravida	Pyelonephritis	Pyelonephritis	Abortion	Abortion	>3 abortions	>3 abortions	T2 abortion	T2 abortion
N	n	%	n	%	n	%	n	%	n	%
Yes	15	30	0	0	8	16	1	2	2	4
No	35	70	2	4	26	52	32	64	32	64
N/A	0	0	15	30	16	32	16	32	16	32
No info	0	0	33	66	0	0	1	2	0	0

Of all the women in the sample, 30 per cent (n = 15) were primigravidae. There was no information regarding the history of pyelonephritis among 66 per cent (n = 33) of the women where there was a previous pregnancy. Of all the 35 multiparous women, 23 per cent (n = 8) had an abortion in the past (16% of the total). One woman in this study had more than three abortions in the past. The percentage of multiparous women (n = 35) who had pre-eclampsia in their previous pregnancy was 14 per cent (n = 5), and no information was available regarding pre-eclampsia in the previous pregnancy of 31 per cent (n = 11) of the multiparous women.

Table 2b: Obstetric History

	Prev. GPH*	Prev. GPH*	Prev. PTL**	Prev. PTL**	Prev. twin	Prev. twin	Prev. LBW***	Prev. LBW***
N	n	%	N	%	n	%	n	%
Yes	5	10	8	16	1	2	7	14
No	18	36	24	48	33	66	11	22
N/A	16	32	16	32	16	32	16	32
No info	11	22	2	4	0	0	16	32

*GPH: Gestational proteinuric hypertension

**PTL: Preterm labour

***LBW: Low birth weight

Only 23 per cent ($n = 8$) of the women had previously delivered preterm infants, while 4 per cent ($n = 2$) of the cases could not be identified owing to a lack of information. Records showed that only one of the women delivered twins in a previous pregnancy. Of all the multiparous women 20 per cent ($n = 7$) had infants with low birth weight in their previous delivery, although there was no information for 46 per cent ($n = 16$) of the multiparous women.

Social History

The social history of the pregnant women is also obtained during history taking and this information allows the healthcare provider to determine whether the pregnancy is at risk of negative outcomes due to bad social habits such as smoking or abuse of substances (Bickley and Szilagyí 2012). It also creates an opportunity for health education to take place and for the healthcare provider to communicate the effect of bad social habits to the patient (Table 3).

Table 3: Social history

	Smoking	Smoking	Alcohol	Alcohol	Drugs	Drugs
	N	%	n	%	n	%
Yes	7	14	13	26	0	0
No	43	86	37	74	50	100
N/A	0	0	0	0	0	0
No info	0	0	0	0	0	0

Most of the women (86%, $n = 43$) were found to be non-smokers and 14 per cent ($n = 7$) of them were found to be smokers. Of all the women, 26 per cent ($n = 13$) reported that they were using alcohol, and 74 per cent ($n = 37$) of them did not use alcohol. None of the women reported using drugs. However, some of the women may have provided histories that were inaccurate, because some of the women were intoxicated by alcohol at the time of delivery, and evidence of smoking among some of the women was documented at the hospital where the deliveries took place.

Current Pregnancy

Data of the current pregnancy concerned the physical assessment and screening of the pregnant women. Accurate screening and examination of pregnant women enable the midwife to identify risks in the current pregnancy. If risks are identified, the midwife can

provide education, advice, management or immediate referral, depending on the type of risks detected in order to ensure a positive pregnancy outcome (RCOG 2008). Risk factors assessed were weight gain, anaemia, hypertension, abdominal scars, maternal infections, and foetal-growth monitoring.

Table 4a: Current pregnancy

	Weight gain	Weight gain	GPH *	GPH *	Abdominal scars	Abdominal scars	Growth monitoring	Growth monitoring	GDM**	GDM**
	n	%	n	%	n	%	n	%	n	%
Yes	1	2	12	24	11	22	26	52	3	6
No	18	36	37	74	24	48	13	26	44	88
N/A	9	18	0	0	0	0	2	4	1	2
No info	22	44	1	2	14	28	8	16	2	4

*GPH: Gestational proteinuric hypertension

**GDM: Gestational diabetes mellitus

Weight gain was monitored in only one woman in this sample. In 44 per cent (n = 22) of the women there was no information available. Weight gain or loss was not identified in 36 per cent (n = 18) of the cases. The blood pressure of 24 per cent (n = 12) of the women was found to be raised, and 30 per cent of these were appropriately managed and referred. The records reported that 37 of the women had no blood pressure problems, however, later it was reported that seven of these 37 women had gestational proteinuric hypertension (GPH), which had been overlooked at the initial contact. Almost half of the women (n = 24) had no abdominal scars. A moderate percentage, 22 per cent (n = 11), of the women had abdominal scars from previous caesarean sections. However, no information was obtained regarding abdominal scars in 30 per cent (n = 15) of the cases. Foetal-growth monitoring was done on 54 per cent (n = 27) of the women, while for 26 per cent (n = 13) the records indicated that no foetal-growth monitoring took place. There was no information for 18 per cent (n = 9) of the women and one woman underwent foetal-growth monitoring but it was inaccurate. A small number of women (n = 3, 6%) were found to have gestational diabetes mellitus (GDM). (See Table 4a.)

Table 4b: Current pregnancy

	Anaemia	Anaemia	Syphilis	Syphilis	Syphilis retest	Syphilis retest	HIV test	HIV test	HIV repeat	HIV repeat
	n	%	n	%	n	%	n	%	n	%
Yes	5	10	44	88	176	352	43	86	10	20
No	27	54	3	6	12	24	1	2	0	0
N/A	0	0	0	0	0	0	6	12	32	64
No info	18	36	3	6	12	24	0	0	5	10

Only 10 per cent of the women (n = 5) were tested for anaemia during their initial visit to the clinic. While there was no information available in 36 per cent (n = 18) of the cases, more than half of the women, 54 per cent (n = 27), were not tested for anaemia. Regarding maternal infections, syphilis screening by means of a blood test was conducted on 88 per cent (n = 44) of the women. In this sample, the HIV testing rate was 86 per cent (n = 43) on the first antenatal visit, with 12 per cent (n = 6) women already on antiretroviral therapy. The records also indicated that the nurses missed that 34 per cent (n = 17) women had urinary tract infections and thus these women were not treated. (See Table 4b.)

DISCUSSION OF RESULTS

Socio-Economic Status

The results suggest that being unemployed increases the risk of premature birth as the majority of the women were unemployed. For instance, in a UK study, Snelgrove and Murphy (2015) found that unemployment and reduced social support were associated with a higher risk of preterm birth. Furthermore, the majority of the women in the study were single. In a systematic review, according to Shah, Zao and Ali (2011, 1107), there are significantly increased risks of preterm, low birth weight and small for gestational age birth associated with women who are unmarried, namely single or cohabitating. Unemployment and single marital status are therefore important risk factors for preterm birth and nurses need to monitor such women carefully.

Obstetric History

Almost a third of the women in this sample were primigravidae. Watson, Rayner and Forster (2013, 434) cite a number of sources that support the argument that primigravidae have a much greater chance of a very preterm birth compared with women who have given birth before. A third of the primigravidae gave birth at less than 32 weeks gestation. In addition, a number of women in the sample had previously had an abortion, which has been identified as a risk factor for preterm birth (Heaman et al. 2013, 54). In 32 per cent of the women who had a previous pregnancy no information was available regarding pre-eclampsia. This is problematic as there is a strong association between previous preterm birth and pre-eclampsia (Watson, Rayner, and Forster 2013, 438) and the lack of information regarding a patient's history of pre-eclampsia adds to the risk of preterm birth. A small number of women had previously delivered preterm infants, and according to Blencowe et al. (2013), preterm birth is a risk factor in over 50 per cent of all neonatal deaths.

Records showed that only one of the women delivered twins in a previous pregnancy. A twin pregnancy is more likely to result in a preterm birth than singletons (Dolgun et al. 2016, 925). A number of multiparous women had infants with low birth weight in their previous pregnancy, but their second or third pregnancies have been shown to have increased birth weights (Johnson et al. 2016, 792).

Social History

A small number of women in the study admitted that they were smokers at their first antenatal care visit. However, the maternal records indicated that the number was higher as patients often only confessed about smoking on delivery at the referral hospital. Smoking throughout pregnancy is associated with an increased risk of preterm birth (Silveira et al. 2016, 1). In addition, a relatively high percentage (26%, n = 13) of women acknowledged that they consumed alcohol. Alcohol consumption during pregnancy is also a risk factor for preterm birth and pregnant women are encouraged to reduce their alcohol intake before and during their pregnancy (Nykjaer et al. 2014, 7). Smoking and alcohol intake among pregnant women are also more strongly associated with populations in poorer communities with high unemployment, which place mothers and their infants at a higher risk (Onah et al. 2016, 1). Hence, determining whether pregnant women smoke cigarettes or consume alcohol can alert the nurse or midwife to a candidate for preterm labour.

CURRENT PREGNANCY

In this study, the results indicate that weight gain was poorly monitored in most of the women. The importance of monitoring weight gain was highlighted in a Norwegian study, where it was found that there was a significant relationship between pre-

pregnancy obesity and preterm labour (Nohr et al. 2007, 13). On the other hand, a low pre-pregnancy body mass index (BMI) is significantly related to high risk preterm labour (Goldenberg et al. 2008, 77). Hence, it is possible that this oversight or even negligence regarding the monitoring of the BMI of the women in this study contributed to the premature labour of some of the women in the sample.

A fifth of the women in this study were tested for anaemia. Studies indicate that anaemia in pregnancy is associated with preterm births (Rahman et al. 2016, 495). Hence, the concern in this study is the fact that there was no information available in over a third of the patients with regard to anaemia. In other words, the patients were either not tested for anaemia or their results were not recorded by the healthcare provider.

Nearly a quarter of the women in this study were shown to have hypertension. Bramham, Seed and Chappell (2014, 3) conducted a systematic review of 55 studies from 25 countries and were able to confirm that chronic hypertension is associated with adverse pregnancy outcomes including a greater chance of a preterm birth. Of some concern is the fact that seven out of the 12 women in the current study who were diagnosed with hypertension were incorrectly managed, and seven with hypertension were diagnosed to have no hypertension.

The majority of women were tested for HIV on their first antenatal visit. Testing for HIV is critical considering that a major outcome of maternal HIV infection is the possibility of mother-to-child transmission as well as other adverse effects, particularly for the foetus (Dos Reis et al. 2015, 111). Furthermore, over a third of the women in this study had urinary tract infections which were missed or poorly treated. In an Italian study, intrauterine infection was shown to be a cause of premature labour in 38 per cent of the cases in the study (Lettieri et al. 1993, 1485). Hence, quality genital screening can reduce the chances of premature labour (Swadpanich et al. 2008, 7). It is possible that had these women been suitably treated they may not have had a preterm birth. Foetal-growth monitoring took place in the majority of the women, however, a quarter of the women underwent no growth monitoring. If babies who are small for their gestational age are identified early, approximately 185 to 225 of every 1 000 perinatal deaths could be prevented (RCOG 2008).

CONCLUSION

Identification of women whose pregnancies are at risk of preterm birth increases the possibility of providing the women with higher levels of antenatal care with the aim of preventing or at least preparing for a preterm birth. However, it appears that, based on the documented records used in this study, many of the women did not receive quality antenatal care with certain procedures being omitted and underreported by nurses, leading to some conditions being poorly monitored or even undiagnosed. Indeed, many preterm births can be prevented among women who attend antenatal care clinics, provided that they attend early, adhere to return dates and experience quality BANC services.

RECOMMENDATIONS

Recommendations based on the findings of this study are made to assist the district health managers in reducing the number of preterm births in the East London area. The recommendations regarding nursing practice, education and research are presented below.

Regarding nursing practice, it is critical that nurses are able to compile a comprehensive case history of the pregnant women who come to the clinic. Owing to their social and economic vulnerability, clinics should consider home visits for unemployed, single women (who are at a higher risk of preterm birth), possibly involving community health workers. Such home visits could help to deal with issues raised in the social history, especially if the pregnant woman is engaging in unhealthy social habits, and is a perfect opportunity for conducting healthcare education. However, healthcare education should be carried out at every point of contact between the nurse and the pregnant woman.

Collecting obstetric history such as pre-eclampsia or pyelonephritis from multiparous women appears to be a challenge for the nurses. It may require the nurses to determine at which facility the woman delivered her previous baby, in order to accurately complete the pregnant woman's case history, by communicating with the facility.

Regarding the current pregnancy, many of the tests were not conducted or if the tests were carried out, the risk factors were not identified. Weight gain, blood pressure, abdominal scars, foetal-growth monitoring, anaemia and urinary tract infections were either not tested or poorly monitored in many of the women despite the association of these conditions with preterm birth. Hence, basic health checks as required by the BANC approach are not happening. There is also a need for accurate recording of findings in patient records by clinicians rendering antenatal care services at primary healthcare clinics.

Regarding nursing education, there is an urgent need to train nurses to identify risk factors of preterm labour and the appropriate responses to such risk factors. Many of the women displayed risk factors before delivery and it is possible that the nurse on duty may have been guilty of neglecting to refer or deal with the risk factor and thus avert the resultant preterm birth. Furthermore, it appears that many of the women were not managed correctly, emphasising that nurses need in-service training regarding the risk factors of preterm labour.

Regarding nursing research, as this was a pilot study, it is essential that a larger study be conducted in order to determine if the trends identified above are occurring throughout the Eastern Cape. Furthermore, observational studies are necessary to determine what nurses are doing in practice regarding antenatal care in the light of preterm labour. Intervention studies are necessary in order to improve the knowledge and practices of nurses regarding antenatal care.

LIMITATIONS OF THE STUDY

One of the limitations of this study was that many maternity case records were not filled in. However, this was an enlightening result in itself as it reflected either poor record-keeping or that the nurses had omitted certain tests and procedures. An additional limitation was that only one institution in the Buffalo City Metropolitan Health District was used to gather the data. Furthermore, as this was a pilot study, the small research sample prevented the results from being generalised to the larger population.

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