STELLENBOSCH UNIVERSITY

Faculty of Medicine and Health Sciences

Division of Family Medicine and Primary Care

RESEARCH ASSIGNMENT

Title

Modifiable pre-natal risk factors for stillbirth in pregnant women of the Omusati Region, Namibia
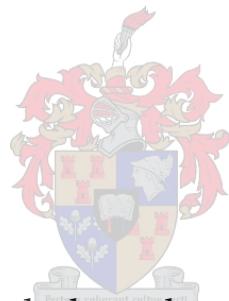
Declaration

I, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree.

Signature: ....……... Date: 7 July 2015

Full author details

Dr Desire Dinzela Tshibumbu

Student MMED FAMMED number 15428117

Contact details:

Dr Desire Dinzela Tshibumbu

Abstract

Background

Reduction of stillbirth rates is one of the major concerns of the government of Namibia because of the social and economic implications of stillbirth. Access to quality antenatal care, especially at primary health care settings, is important in preventing the risk factors associated with stillbirth. This study assessed the prevalence of some of the modifiable risk factors to reveal potential gaps in their prevention.

Aim

To determine the prevalence of modifiable antenatal risk factors associated with stillbirth in order to determine possible gaps in their prevention.

Setting

The study was conducted at four district hospitals in the Omusati Region, Namibia.

Methods

A descriptive study using recorded antenatal data was used. Data was collected from the records of 82 women at the time that they had a stillbirth, during the period October 2013 to December 2014. The assessed risk factors included maternal characteristics, antenatal care received, medical conditions and obstetric complications.

Results

The study found that 95.1% of women who had a stillbirth had at least one modifiable risk factor. The average prevalence of each of the four categories of risk factors was as follows: quality of antenatal care (19.8%), maternal characteristics (11.4%), medical conditions (8.9%) and obstetric complications (6.5%). The most

prevalent individual risk factors included the following: no folate supplementation (30.5%), positive HIV status (25.6%), advanced maternal age (20.7%), grand multigravidity (17.1%), late booking (16.7%), intrauterine foetal growth retardation (13.4%) and alcohol use (12.5%).

Conclusion

A total of 82.4% of the studied modifiable risk factors were prevalent among women who had a stillbirth. Risk factors associated with quality of antenatal care were the most prevalent. While further investigation is needed to determine the causes behind the most prevalent risk factors, health education on the availability and benefits of antenatal care, pregnancy timing and pregnancy spacing may contribute to the reduction of the prevalence of these risk factors.

1   Introduction

The occurrence of stillbirth is usually associated with social and cultural concerns both at a family and country level. At family level, the death of any child is always associated with grief and negative emotions, and at country level, high stillbirth rates impact negatively on the perinatal mortality rates for the country.[1] Countries from the developing world are particularly affected and still have high stillbirth rates compared to those of the developed world where a decline has been observed over the last decades. It is estimated that stillbirth rates for developing countries are as high as 25.5 per 1 000 deliveries, compared to only 5.3 per 1 000 deliveries for developed countries.[1] These rates are a direct reflection of the quality of obstetrical and perinatal care provided in each setting.[1,2]

The quality of care in developing countries is also related to the limited availability of diagnostic resources such as ultrasound, and this has an influence on how stillbirths are classified.[3] In contrast with developed countries where technological advances have led to many classifications being proposed,[4] stillbirths in developing countries are commonly categorised based on the dead foetus' physical appearance as either fresh or macerated.[5] Fresh stillbirths are recent stillbirths, and the foetus has no decaying skin changes. Macerated stillbirths are deaths that occurred at least 12–24 hours before delivery and the baby has skin changes.[6] Since this study was conducted in a developing country, the same classification was adopted for the sake of comparison.

It is assumed that risk factors related to both categories of stillbirth are similar in the antenatal period, in contrast with perinatal risk factors, which are often influenced by provider- and resource-related factors.[7,8] This assumption was considered for this study, and only antenatal risk factors were assessed on whether they were similar in prevalence for either fresh or macerated stillbirths.

The risk factors that were selected for this study were considered to be potentially modifiable through antenatal programmatic interventions. They included factors related to certain maternal characteristics, to the quality of antenatal care received, to medical conditions, including infections, and to antenatal obstetric complications (Table 1).

These risk factors, and many others, have already been extensively explored in previous studies, and the relationship between the risk factors and stillbirth has been established. However, these studies were conducted mostly in developed settings.[5,6] The reality in developing countries, especially in Africa, is different. Studies on the topic are inadequate and have often been conducted either in urban areas or in tertiary hospitals,[2,7–9] leaving the rural primary health care settings almost unexplored. Yet, these are the settings where most women in Africa, and in Namibia in particular, access antenatal care services.[10] It is towards this literature gap that this study intended to make a contribution.

In addition, the study also intended to assess the prevalence of antenatal risk factors with a view to identifying possible shortcomings that still exist in the implementation of prevention strategies in the four rural districts of the Omusati Region, Namibia. This region's stillbirth rates have been around 15 per 1 000 deliveries in recent years,[11] with the proportion of macerated stillbirths reaching up to 71% at times. These rates are still a source of concern, and health authorities' aim at reducing them even further. Highlighting the shortcomings and making recommendations about them were one way for this study to make a contribution to the reduction efforts.

The aim of the study was to determine the prevalence of modifiable antepartum risk factors associated with stillbirths in the Omusati Region, Namibia, in order to determine possible missed opportunities for their prevention.

The study objectives were as follows:

1. To determine the prevalence of modifiable antepartum risk factors associated with stillbirth in women of the Omusati Region, Namibia.

2. To make recommendations based on these findings for possible interventions aimed at reducing the prevalence of these risk factors.

2   Methods

2.1   Study design

A descriptive, cross-sectional study using recorded data was conducted.

2.2   Study setting

The study was conducted in the four health districts of the Omusati Region, one of the 13 regions of Namibia. The districts are Okahao, Oshikuku, Outapi and Tsandi, and they are generally rural with a combined estimated population of 243 166 people.[12] The population consists of peasant farmers who that access health care services through clinics, health centres and district hospitals in the region. Antenatal care services are offered at all levels of health care, but most of the deliveries are conducted at district hospitals and health centres.

2.3   Study population and sampling strategy

The study population consisted of all mothers who gave birth to stillborn babies at the four district hospitals of the Omusati Region during the study period.

Using the total number of deliveries in the Omusati Region in 2013 (5 239), a stillbirth rate of 17 per 1 000 and 95% confidence level, a minimum required sample

size of 26 was determined using Epi-info StatCalc. Since this sample size was small, a decision was made to include all cases of stillbirth during the study period, as long as they met the inclusion criteria.

The inclusion criteria were as follows:

- Delivery at one of the four district hospital of the Omusati Region during the study period.
- Gestational age at time of birth of at least 28 completed weeks as recommended by the World Health Organization for comparison's sake[13] and baby weight of at least 700 g more as recommended in Namibia.

The exclusion criteria were as follows:

- Twin gestation to avoid confounding due to its strong association with stillbirth.[13]
- Stillbirths occurring in the community.
- Severely incomplete baseline antenatal records.

2.4   Data collection

A record review was conducted from October 2013 to December 2014 on all women who had stillbirths at district hospitals in the region. Data was collected on 16 risk factors (Table 1) from the records of women who had either a fresh or a macerated stillbirth.

A collection tool was developed specifically for this study. It included items to collect data on selected antenatal risk factors routinely assessed during antenatal care in Namibia. The selected risk factors were considered modifiable and previously associated with stillbirth in the literature.[3,9,14–18] The tool was piloted on 10 women at Tsandi Hospital, and identified shortcomings were corrected.

2.5   Risk factors of interest

The risk factors included are described in Table 1 below:

Table 1: List and definitions of modifiable risk factors included in the study

	Risk factor	Definition
Maternal characteristics	Advanced maternal age	Mother's age of 35 years or more
	Overweight	Body mass index (BMI) at booking of 25.0 kg/m^2 or more[19]
	Underweight	BMI at booking of 18.5 kg/m^2 or less[19]
	Grand multigravidity	Had six or more previous pregnancies[20]
	Alcohol use	The use of alcoholic beverages prior/during this pregnancy
	Tobacco use	The use of tobacco products prior/during this pregnancy
Received antenatal care	Unbooked	Nonattendance of antenatal services prior to delivery
	Late booking	Start of antenatal visits in the third trimester (gestational age of 28 weeks or more at booking)
	Nonsupplementation with folate	Evidence of nonsupplementation during current pregnancy
Medical conditions	Positive baseline syphilis	Positive rapid plasma reagin at booking
	Positive HIV status	Positive HIV test at booking
	Malaria	Positive malaria test during this pregnancy
	Uncontrolled preexisting chronic condition	Pre pregnancy chronic medical conditions such as hypertension, diabetes and epilepsy, classified according to ICD-10[13]
Obstetric complications	Pregnancy-induced hypertensive disorders	Either eclampsia or preeclampsia, classified according to ICD-10[13]
	Antepartum haemorrhage	Painless or painful bleeding during this pregnancy
	Suspected intrauterine foetal growth retardation (IUFGR)*	Birth weight below the 10th percentile for gestational age and gender using Williams' charts[21]

* Suspected IUFGR was assessed using a California-based chart because there is no agreement on standards for developing countries and because evidence from these countries has shown little difference due to race or ethnicity when these charts were applied in South Africa and Malawi.[22,23]

2.6   Ethical considerations

Approval to conduct the study was obtained from the Health Research Ethical Committee of Stellenbosch University (reference number S13/08/153) and from the

Office of the Permanent Secretary, Ministry of Health and Social Services, Namibia (reference number 17/3/3).

Other ethical considerations included the risk of arousing negative emotions in women shortly after a stillbirth experience, minimised by the use of records instead of face-to-face interviews, and the reduced need to obtain written consent from participants after obtaining authorisation to use records.

2.7   Data analysis

Data was analysed using SPSS version 16 and Microsoft Excel 2013. Frequency distributions were calculated for predictor variables (risk factors) and outcome variables (fresh or macerated stillbirth). Comparison of differences in the prevalence of risk factors between fresh and macerated stillbirth was made to rule out significant differences possibly due to the influence of perinatal risk factors on fresh stillbirth. Pearson's chi-squared test or Fisher's exact test was used as appropriate to determine the significance of these differences at $p < 0.05$. In addition, the relationship between the number of risk factors per woman and some of the most prevalent risk factors was also analysed using one-way independent analysis of variance at $p < 0.05$.

3   Results

3.1   Stillbirth rates

During the data collection period of October 2013 to December 2014, there were 8 405 deliveries in the Omusati Region. Among these, 101 were stillbirths (65 macerated and 36 fresh). This yielded an overall stillbirth rate of 12 per 1 000 births, which is lower than the previous years.

From these 101 stillbirths, 82 cases (48 macerated stillbirths and 34 fresh stillbirths) were included in this study because they met the inclusion criteria. The rest were excluded because they met the exclusion criteria.

3.2 Prevalence of modifiable risk factors

The average prevalence of each group of risk factors shows that risk factors related to the quality of received antenatal care were the highest at 19.8% (Figure 1).
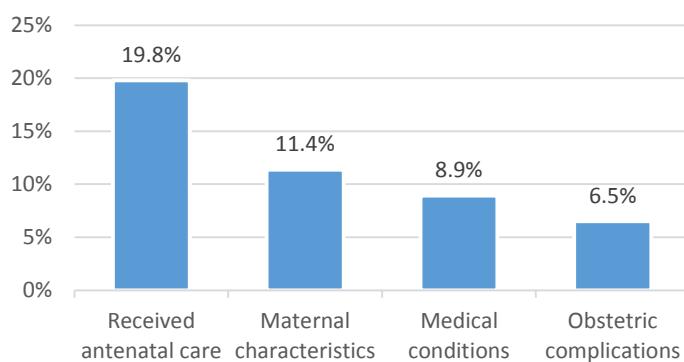

Figure 1: Average prevalence of each group of risk factors

Further assessment of the prevalence of individual risk factors related to the quality of received antenatal care shows that some women did not receive folate supplements (the most prevalent risk factor with 30.5%), some women started antenatal visits late (16.7%) and some women did not receive any antenatal care because they were unbooked (12.2%) (Figure 2, Table 2). The unbooked mothers were not necessarily those who did not receive folate as as98.2% of those who did not receive folate attended antenatal care services at least once. The prevalence of nonsupplementation with folate among women who had macerated stillbirths was 23.2%, and 7.3% amongst those who had fresh stillbirths. However, this difference was not statistically significant ($p = 0.051$) (Table 2).

Following risk factors related to the quality of antenatal care, factors related to maternal characteristics were second highest with an average prevalence of 11.4% (Figure 1). Further examination of the group results reveals that among women who had a stillbirth, 20.7% were advanced in age, 17.1% were grand multigravidas, 12.5% used alcohol and 11.1% were overweight. In addition, grand multigravidas constituted 52.9% of women who were advanced in age, and there was no significant difference in prevalence between fresh and macerated stillbirths, with the exception of alcohol use, which was higher in fresh stillbirth cases.(p = 0.013; odds ratio: 0.013).

Risk factors related to medical conditions, including infections were in third position with an average prevalence of 8.9% (Figure 1). Individual prevalence of risk factors in this group was generally low with the exception of HIV at 25.6% (Figure 2). The apparent difference in HIV prevalence between cases of macerated stillbirths (15.9%) and fresh stillbirths (9.8%) (Table 2) was, however, not statistically significant (p = 0.801).

Risk factors related to obstetric complications during the antenatal period were the lowest with an average prevalence of 6.5% (Figure 1). The most notable in this group was noted IUFGR at (13.4%. It is) worth noting that 54.5% of women with IUFGR did not receive folate supplements. Similarly, 54.5% of them were HIV positive and 9.1% used alcohol.
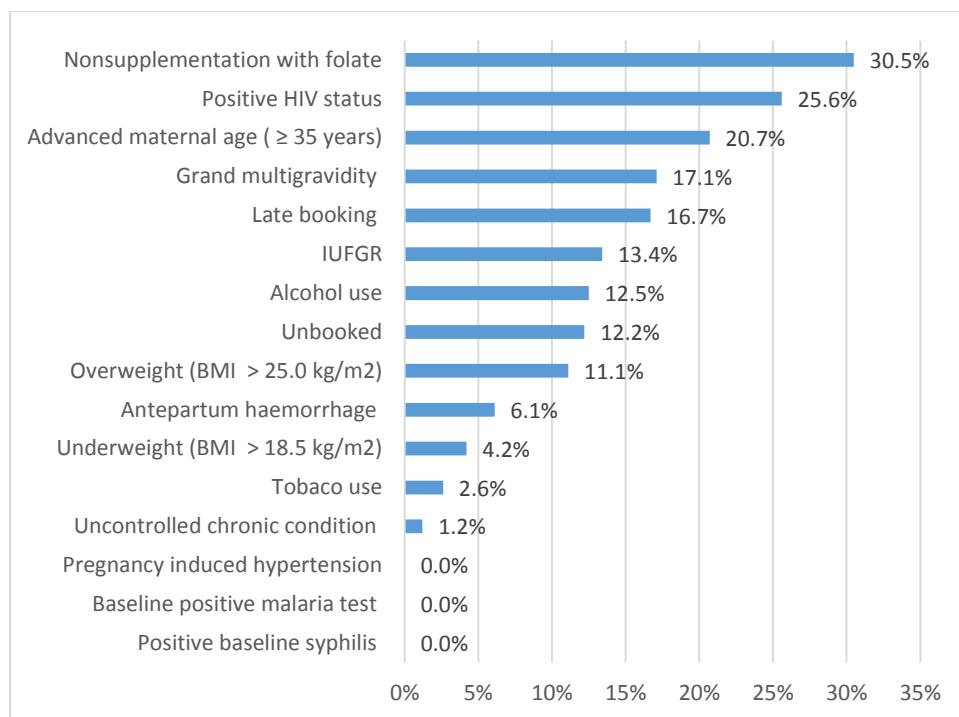
Figure 2: Frequency of each risk factor (n = 82)

Table 2: Comparison of prevalence between fresh and macerated stillbirths

Risk factor	Fresh		Macerated		Total		*p*-value	
	n	%	n	%	n	%		
No supplementation with folate (n = 82)	6	7.3%	19	23.2%	25	30.5%	0.051	
Positive HIV status (n = 82)	8	9.8%	13	15.9%	21	25.6%	0.801	
Advanced maternal age: ≥ 35 years (n = 82)	4	4.9%	13	15.9%	17	20.7%	0.106	
Grand multigravidity: gravidity ≥ 5 (n = 82)	6	7.3%	8	9.8%	14	17.1%	1.000	
Late booking (n = 72)**	8	11.1%	4	5.6%	12	16.7%	0.109	
IUFGR (n = 82)	5	6.1%	6	7.3%	11	13.4%	1.000	*
Alcohol use (n = 80)**	8	10.0%	2	2.5%	10	12.5%	0.013	*
Unbooked (n = 82)	3	3.7%	7	8.5%	10	12.2%	0.511	*
Overweight: BMI > 25.0 (n = 72)**	3	4.2%	5	6.9%	8	11.1%	1.000	*
Antepartum haemorrhage (n = 82)	3	3.7%	2	2.4%	5	6.1%	0.644	*
Underweight: BMI < 18.5 (n = 72)**	3	4.2%	0	0.0%	3	4.2%	0.075	*
Tobacco use (n = 73)**	1	1.3%	1	1.3%	2	2.6%	1.000	*
Uncontrolled chronic condition (n = 82)	1	1.2%	0	0.0%	1	1.2%	0.415	*

Chi-squared test used unless * is specified.

*Fisher's exact test used due to violation of assumptions for chi-squared test.

**Some records either lacked data or started too late for the data to be used as baseline information.

3.3 Number of risk factors per woman who had a stillbirth

The average number of risk factors per stillbirth was 2.1 (standard (SD=1.12). Only 4.9% of women had none of the 16 risk factors, leaving the remaining 95.1% with a number of factors ranging from one to four (Figure 3).

There was a strong association between having a high number of risk factors and advanced age: $F(1,80) = 30.64$, $p = 0.00$; positive HIV status: $F(1,80) = 27.42$, $p = 0.00$; and grand multigravidity: $F(1,80) = 24.92$, $p = 0.000$.
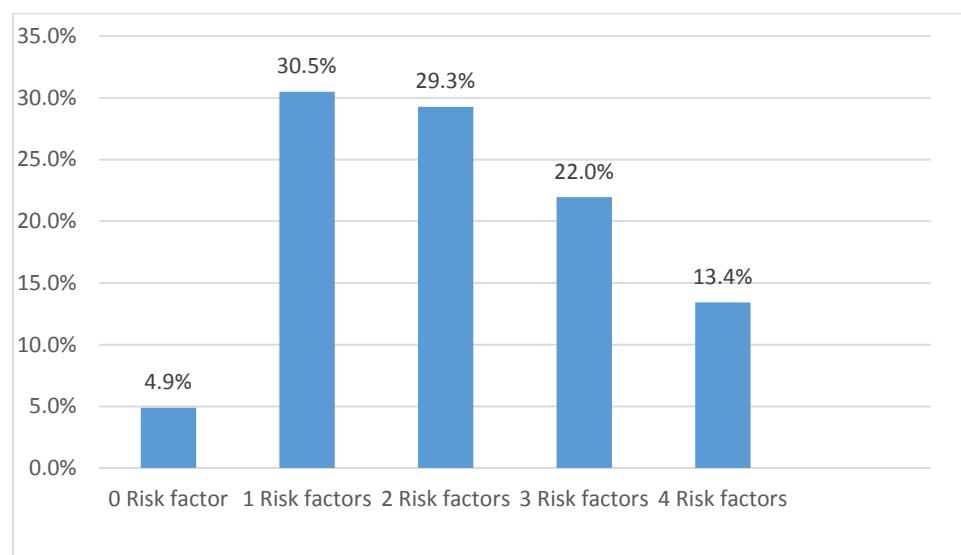

Figure 3: Number of risk factors per woman

4 Discussion

The results suggest that risk factors related to the quality of received antenatal care were the most prevalent (19.8%) and that some women received suboptimal antenatal care, either because they were not supplemented with folate (30.5%), they started antenatal visits late (16.7%) or they were unbooked (12.2%). It can be argued that not attending antenatal care services or starting them late could be women's own choice or a consequence of challenges in accessing these services, is a common occurrence in rural settings. These may be considered as missed opportunities for potentially preventing some of the stillbirths.

Folate supplementation is recommended by Namibian[24] and international guidelines.[25] These recommendations are based on evidence showing folate's association with reduction in the occurrence of neural tube defects, which may eventually lead to stillbirth.[26,27] Folate is widely available in most of the health facilities in the region and is provided as a combination pill with iron (Pregamal). According to the findings of this study, 98.2% of those who visited the health facilities were not supplemented with folate. This raises the question whether the high prevalence of nonsupplementation found in this study is due to poor documentation or is a reflection of what happens on the ground. These findings are supported by similar findings in West Africa (89.8%)[28] but are not supported by the Namibian Demographic Health Survey (DHS), which reports a lower figure of 22.8%.

The findings also show a substantial proportion of women with risk factors related to their general and reproductive personal characteristics. They were either of advanced age (20.7%), were grand multiparous (17.1%) or used alcohol (12.5%). These factors may be associated either with personal health choices or with a lack of information for making sensible choices concerning these factors, common in these settings. Further enquiry is therefore needed to assess the level of knowledge and awareness regarding these risk factors and their prevention. The prevalence of advanced maternal age found in this study was higher than that found in similar studies in Zambia (29.4%) and South Africa (23%).[7,15] However, the prevalence of grand multigravidity (17.6%) was consistent with the findings of previous studies in South Africa (21.6%)[7] and Saudi Arabia (22.5%).[4]

Among the medical conditions, one finding of this study was the high prevalence of HIV infection (25.6%) among women who had a stillbirth. This rate is higher than the 17.7% reported by the 2014 Namibia HIV Sentinel Survey for the Omusati

Region, or 16.9% for Namibia.[29] It is not known how many women were on antiretroviral treatment because it was beyond the scope of this study. However, it is worthwhile noting that prevention of mother-to-child transmission interventions at the time of data collection did not include initiation of highly active antiretroviral therapy (HAART) regardless of the level of CD4 count. These changes occurred towards the end of the data collection period, and they were yet to be implemented in all facilities in the region. These were potential missed opportunities because not all women were provided with HAART.

The prevalence of suspected IUFGR was the most notable among the risk factors related to antenatal obstetric complications at 13.4%. As stated earlier, IUFGR was assessed using Williams' charts[21] because of limited access to tools such as ultrasound in the region. Early detection could have possibly led to remedial interventions. This was another missed opportunity since some of the districts had capabilities for ultrasound but did not use them because they were not compelled to do so. The examination is not recommended as part of routine antenatal care in the country. This prevalence of IUFGR (19%) is similar to that reported in New Zealand[5] but lower than in Saudi-Arabia[4] and Mexico,[30] at 3.6% and 3.1% respectively.

It is also important to note that the stillbirth rate reported in this study (12 per 1 000 births) appears to be lower than that of recent years for the region (around 15 per 1 000). It is important to note that historical stillbirth rates were estimated using data from the regional health information system, which itself may contain some inaccuracies. The other possibility is to regard the reduced stillbirth rate reported in this study as the beginning of a downward trend for the region. This possibility is supported by the fact that an even lower rate was reported by the 2013 DHS (2 per 1 000) for the region.[10] However, this DHS rate is too low and should be interpreted with methodological differences in mind. The DHS used verbal autopsy, which is based on mothers' recall of previous perinatal deaths

5 5 Limitations of this study

The main limitations of this study include the relatively small sample, due to the low prevalence of the condition, and the type and quality of the data sources, which were partly from historical records and may have been affected by inaccuracies and omissions.

6 Conclusion

The objective of this study was to determine the prevalence of modifiable antepartum risk factors associated with stillbirths in a rural primary health care setting.

The findings show that 81.3% of the 16 risk selected for this study factors were prevalent among women who had a stillbirth. The most prevalent group of factors was those related to the quality of received antenatal care with an average of 19.8%, followed by those related to maternal characteristics with an average of 11.4%, then preexisting medical conditions at 8.9% and lastly obstetric complications at 6.5% of these risk factors.

In terms of risk factors related to the quality of received antenatal care, there were, for example, no folate supplementation at 30.5%, late booking at 16.7% and no booking at 12.2%. The most prevalent maternal characteristics-related risk factors were advanced age at 20.7%, grand multigravidity at 17.1% and alcohol use at 12.5%. Positive HIV status at 25.6% was the most prevalent medical condition-related risk factor, while undiagnosed IUFGR was the most prevalent obstetric complication-related risk factor at 13.4%.

The prevalence of these risk factors could be reduced and their occurrence could be prevented by providing women with better antenatal education to improve their ability to make informed reproductive health choices and to heighten their awareness of these risk factors.

7   7 Recommendations

First, community awareness and health education on the availability and importance of antenatal care services should be scaled up. This may improve awareness of timing and adherence to prenatal services.

Second, an inquiry should be conducted into the reasons why there is such a low uptake of folate supplementation among women who access the antenatal services. In that way, possible causes may be identified and addressed.

Third, an exploration should be made of the possibility of introducing ultrasound screening at least once during pregnancy for all women attending antenatal care in the region. In that way, foetal wellbeing may be assessed, IUFGR may be detected early and possible supportive measures may be implemented.

Last, prepregnancy health awareness and education should be enhanced. Women need to be educated about healthy living, alcohol avoidance and pregnancy planning in terms of timing and spacing.

8   Acknowledgements

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