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MALNUTRITION AND MATERNAL MORTALITY IN BAUCHI NORTH SENATORIAL DISTRICT, BAUCHI STATE, NIGERIA

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ABSTRACT

Malnutrition is one of the common global health challenges that may influence deaths in developing countries, especially among pregnant women and children under 5 years. This paper looks into the influence of malnutrition on maternal mortality. A cross-sectional survey was adopted as the research design, and both qualitative and quantitative data were collected from the respondents. The study was guided by gender equity theory. The study findings indicated that majority of the pregnant women dieting and nutritional intake were poor. Also, the study found some intermediary factors in addiction to malnutrition that influenced maternal health and maternal mortality. These factors include age, and occupation among others. The paper recommends that government should introduce a policy on pre-marital health education. Moreso, drugs or supplements containing the required quantity of protein, vegetables, and fruits should be made available to pregnant women, during the first and second trimester of pregnancy.

Key words: Malnutrition, Maternal, Mortality.

1.0 Introduction

It is becoming a known fact that, most pregnant women in the developing countries of the world are facing numerous health challenges ranging from malaria, hunger and famine, malnutrition, respiratory and infectious diseases, and of the factors that are attributed to severe and acute ailment leading to the deaths of thousands, if not millions. Malnutrition is one of the common global health challenges that may influence deaths in developing countries, especially among pregnant women and children under 5 years (Klaus von Grebmer, Jill Bernstein, Miriam Wiemers, Keshia Acheampong, Reieal Ní Chéilleachair, Connell Foley, Seth Gitter, Kierstin Ekstrom, and Heidi Fritschel, 2020). Generally, women during pregnancy are expected to have a

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balance of protein, carbohydrates, vitamins, fats, and oil. In many countries in the world, pregnant women are battling with malnutrition, because many households could not afford to provide adequate nutritious food to their partners during pregnancy, such as fruits, fresh vegetables, meat, legumes, and milk as recommended. Due to economic situation, Women, children, and adolescents are at higher risk of malnutrition globally (Malaika, Zoaib, Habib, Sean, Asma'a, AbeerShahzad, & Mohammad. 2022).

The issue of maternal health was given substantial interest and attention so as to understand the socio-environmental factors associated with maternal death. specially in under-developed and developing countries over the past decades. Hence, the global interventions focus on programs that could give a greater chance of successful pregnancy and gestation (Saxena, Vartika, Jelly, Prasuna, Sharma & Rakesh. 2020). Many scholarly works have found that maternal mortality is closely associated with demographic and individual characteristics, such as age and level of education. A study aimed to examine the prevalence and associated factors of dietary supplement use among pregnant Chinese women indicates age and lifestyle as factors that influence maternal health (Xiang, Luo., Yang, Sun, M., Liu, H., Yang, Q., Ouyang, Y. 2022). This paper looks into the influence of malnutrition on maternal mortality.

Historically, pregnant women in developing countries are left at the grace of one or two square meals per day, sometimes with food that has inadequate nutrients. A number of women are vulnerable at their reproductive stages, due to inadequate dieting, or lack of it. Some have forgotten the taste of milk and fish. A situation that placed many mothers at risk of complications and infections during pregnancies with some leading to disabilities and even death. Incidences of maternal mortality cannot be over-emphasized. In most of the developing countries, the average prevalence of maternal mortality ratio (MMR) is 415 per 100 000 live births (WHO, 2019). Women in those countries have a risk of one-in-twenty chance, while in other countries the lifetime risk exceeds one in ten. The narration is completely different in the developed nations, which mostly are having 1-in-8,700 chance. (Yaya, S., Anjorin, S. S., &Adedini, S. A. 2021).

Maternal mortality is defined as the death of a woman while she is pregnant or within 42 days of the pregnancy's termination. Because one in every three pregnancy-related death occurs from a week to a year of that pregnancy (Jeong, W., Jang, S. I., Park, E. C., & Nam, J. Y. 2020). It is highly detrimental to women of reproductive ages, because it results in the loss of life specifically in women at their reproductive stages. The effect of such an unwanted situation trickles down to both members of the family and society at large. While malnutrition on the other end means deficiencies in nutrient intake or imbalance of the essential nutrients in the human system. Maternal mortality has been linked to not only medical issues but also socio-economic situations. Medical factors, on one hand, include hypertension, anemia, limited access to emergency care, endemic diseases such as malaria, hepatitis, lack of access to standard

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healthcare institutions, and medication (Joia, 2020). Other socio-economic factors attributed to maternal mortality include poor dieting, consumption behavior, and domestic violence among others.

The Nutritional status and health status of pregnant women may be connected to a high rate of maternal mortality. Malnutrition, in any form, raises the risk of infectious diseases including pneumonia, diarrhea, measles, and tuberculosis, as well as non-communicable diseases like heart disease, cancer, and diabetes, as well as maternal and neonatal fatalities (Who, 2019). During pregnancy, a woman's nutritional state has a significant impact on not just herself, but also the growth and development of the child she is carrying, as well as their overall health (Torlesse, 2020). In developing nations, malnutrition and sepsis are among the leading causes of infant mortality (Abolodje et al., 2021). In some situations, some families can't even put regular meals on the table for their members, not to talk of nutritious dishes. Poverty, food insecurity, food instability, housing instability, malnutrition, and exposure to violence and insecurity are all the major social factors that affect maternal health (Bloch et al., 2019).

2.0 Literature Review

Maternal mortality is one of the major global health challenges, it occurs frequently in develop countries. Maternal mortality with the factors that induce it has attracted a lot of concerns, which have warranted much of scholars' analysis and synthesis. Irvin (2020) for example, considered nutrition as a factor influencing maternal mortality. Christian (2018) who conducted a study in Cameroon indicates there is strong evidence that poor nutrition is one of the leading causes of maternal death, and that nutrition interventions can reduce the burden of life-threatening morbidities that lead to maternal death, The results further show, many low-income countries recorded higher cases of undernutrition, inadequate food intake, and micronutrient deficiencies in women of reproductive age (15–45 years), including pregnant women, are widespread. which has caused maternal mortality.

The nutritional status of women during pregnancy is a condition in which a women's body lacks the necessary nutrients it requires to maintain healthy tissues and organ function. In other words, poor nutrition is a lack of calories or one or more important nutrients. It is caused by a lack of food, a balanced diet, or the inability to properly absorb nutrients from the food consumed to maintain excellent physical and mental health (Ekesa N., Nabuuma Deborah, Namukose Samalie&Upenytho, George. 2018). Poor nutrition was blamed in a recent historical analysis of an increase in maternal mortality following short-term economic crises in six German villages (Christian, 2018).

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Everyone requires proper nourishment, women carrying pregnancy require more nourishment than any other person. Proper nourishment protects one against disease, speeds up healing, and lowers the danger of mortality (Who, 2019). The rate of maternal mortality was influenced by care during parturition rather than hunger and other poverty concomitants in regions of developed countries in the 19th and first half of the twentieth centuries (Irvine, 2020). However, a study conducted in India indicated that there is a substantial link between a woman's nutritional status and maternal mortality. It also found that moms with mid-upper arm circumference (MUACs) of less than 23.5 cm during pregnancy are more likely to have serious difficulties during labor (Susanti, I., Salimo, H., & Dewi, Y. L. R. 2020).

In low- and middle-income nations, maternal and child nutrition has been on the global agenda as being critical to health, sustainable development, and advancement. Nutrition remains a critical component of the unfinished mother and child health agenda. A research study in low-income countries by Omer indicates that in two decades since 1990, the maternal mortality ratio (MMR) has decreased by 47% globally; yet, the projected maternal mortality ratio in 2010 was still 240 in low-income nations, compared to 16 per 100,000 live births in high-income countries. The study shows Poor nutrition is identified as one of the factors slowing progress in lowering maternal mortality in low-income countries. One of the most important factors determining women's health is a healthy and balanced diet during pregnancy and after childbirth. Poor nutrition can harm a mother's health and lead to maternal morbidity and mortality. Women face discrimination at home as a result of their low social status. Sometimes they are not given the proper food, which is required during pregnancy (Omer, S., Zakar, R., Zakar, M.Z. 2021).

Malnutrition and its attendant difficulties are a major public health concern, with the global incidence of undernourished individuals rising from 777 million in 2015 to 815 million in 2016. Furthermore, malnutrition is most common among children and pregnant women in Southeast Asia and Sub-Saharan Africa (Ahinkorah et al., 2021). Pakistan is the world's sixth-largest country, with a population of more than 200 million people. The country suffers from malnutrition, particularly among pregnant women. The population's nutritional quality is typically low throughout the country, particularly among women aged 15–49, the elderly, and children under the age of five (Who, 2019).

Analysis of other studies indicates poor or malnutrition is one of the major public health issues that affect every country in the globe. Malnutrition increases the risk of disease and death in all types. Dietary risk factors are responsible for more than half of all deaths in one of every five adult deaths, particularly among pregnant women as well as children under the age of five globally. Nearly one in every three individuals on the earth suffers from some sort of malnutrition. Its Effects are more dangerous with women carrying a pregnancy. Despite ongoing gains in health outcomes and economic growth, maternal malnutrition rates remain unacceptably

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high, and progress toward lowering its burden is much too slow. Part of the reason for this is that maternal nutrition has not been addressed in health systems in a systematic way (Who, 2019).

A research study in Chad shows the country remains one of the 34 countries with the highest malnutrition burden, accounting for 90 percent of the global malnutrition burden. Moreso, malnutrition harms maternal health, and in turn, raises maternal and infant mortality (Obiang-obounou& Fuh, 2020). Nutrition is the core part of health, and a focus on improving maternal health should be geared toward safe motherhood techniques and maternal nutrition which may also have a role in reducing the risk of pregnancy-related mortality. Poor nutrition and health status of women before and during pregnancy are linked to maternal mortality (Torlesse, 2020). Hence, the role of diet and health care is very critical in reducing mother and newborn mortality.

It was reported that poor nutrition is one of the primary causes of maternal death. Empirical research findings indicate there is strong evidence that poor nutrition is one of the leading causes of maternal death. The evidence further indicates that nutrition interventions can reduce the burden of life-threatening morbidities that lead to maternal death. Particularly in many in low-income countries, where healthcare access is limited and maternal malnutrition is common (WHO, 2019). The results further show many low-income countries recorded higher cases of undernutrition, inadequate food intake, and micronutrient deficiencies in women of reproductive age (15–45 years), including pregnant women, which are widespread. Low body mass index (BMI), is becoming more common, which has consequences for maternal and pregnancy-related health outcomes (Christian, 2018). The finding further indicates that dietary survey data from many parts of the world suggest that maternal intakes of important minerals like iron, zinc, calcium, and vitamin A are below the recommended levels. As a result, maternal micronutrient deficiency is very common in developing countries, especially the African continent (Christian, 2018).

Immunity is a line of defense that protects pregnant women from harmful germs including bacteria, viruses, and parasites that can cause disease, illness, and mortality. Inadequate nutrition is known to be suppressed immunity which increases the risk of infection and disease (Fouani, 2019). Dieting is a very important component that determined nutrition level. With pregnancy, normal dieting needs to be improved. The reason is that the usual Dietary intake may not be sufficient to fulfill the increased requirements of pregnancy, especially during the first trimester.

2.1 Conceptual Model

The following conceptual model show the relationship between variables this study. It indicates how inadequate protein, too much carbohydrates and inadequate fats. As well as inadequate fruits and vegetables causes malnutrition. While malnutrition led to maternal mortality.

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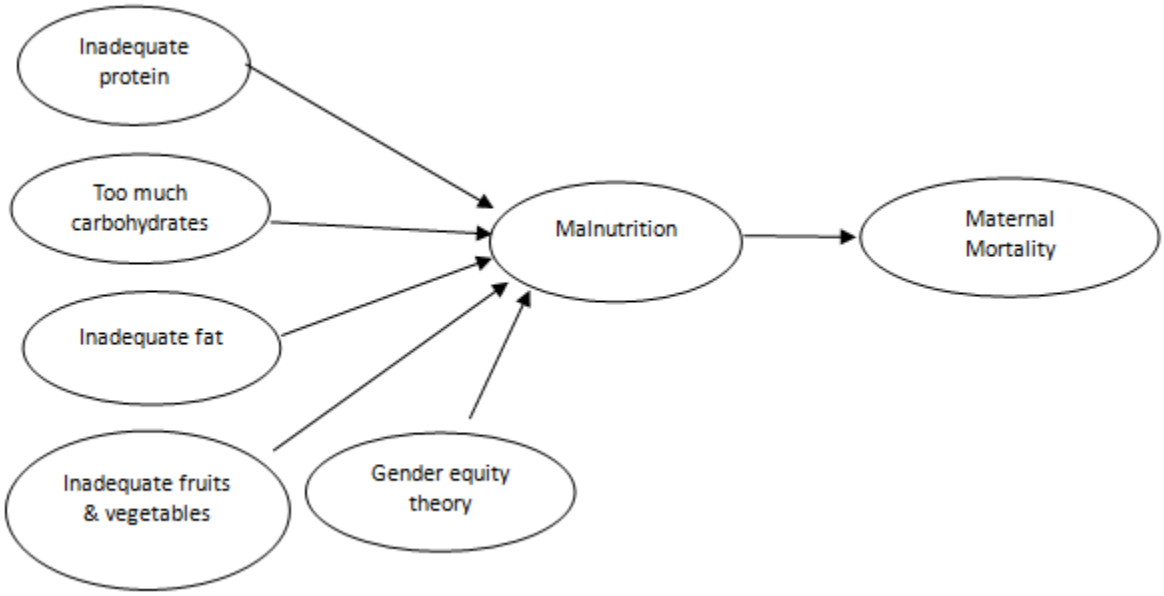

2.2 Theoretical framework

The gender equity theory guided this paper, this theory believes in the fact that for a successful pregnancy outcome, there must be provision for nutritious food that will give a mother the needed strength. The needed contents include protein, fruits, fat, and vegetables, which will give the needed energy at delivery and the postpartum period. This helps to explain inequalities that exist between genders concerning health and its determinants. especially the socio-economic opportunities, which are the key to accessing nutritious food and basic services.

The theory further notes that, opportunities for social and economic advancement have been a source of concern for many years, despite consistent efforts by international communities to reduce the disparities that existed between men and women in terms of access to economic opportunity. But still gab is very wide. Women are experiencing some restrictions on societal economic activities, coupled with patriarchal preference. These in return have denied women the opportunity to access the basic diets they deserve. Perhaps this increases their vulnerability to maternal morbidity and mortality.

Niva Piran (2017) believes that there are inequities in societies, even though some societies are better than others, and that progress toward gender equity, as reflected in some develop nations, stands in stark contrast to the quality of embodied lives of girls and women. Multiple social indicators show that there has been little consistent progress toward equity in the last decade, whether in terms of wage disparities, which allows accessing the needed nutritious foods.

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According to gender equity theory, maternal deaths and the risks associated with them should be avoided. When it comes to fairness and human rights, this theory aids in the creation of fairness and equality for women. Gender equity theory is deeply rooted in the pursuit of justice and equity in the two genders in economics, which is the major determinant of nutrition, social relationships, and health. The equity concept is divided into two parts: substantive equity and formal equity, which serve as the foundation for the rules that are established. Formal equality is also known as de jure equality. This type of equality is based on John Locke's philosophy of liberal individualism. Having this theory in place gives women a sense of belonging at the point of their basic health needs, and will also be treated fairly, which helps with quality service delivery and receiving useful information before and after pregnancy (Aboderin & Beard, 2010).

Moreso, the theorist refers to the UN's recognition of some gender inequalities similarly. Women continue to bear an increasing burden of poverty; Inequalities and inadequacies in education and training, as well as unequal access to health care and related services. Inequality in economic structures, and access to resources, to name a few examples. Women have been disadvantaged as a result of these inequalities.

3.0 Methodology

This study used mixed methods, both qualitative and quantitative data were collected from the respondents. A cross-sectional survey was adopted as the research design. This design is favored because it allowed the researcher to collect data from a large population using a sample drawn from that population. This study focused on women of reproductive age between 15 and 49, who were living in Bauchi North Senatorial District during this study period. Questionnaires were shared with this group of population composition. The study targeted 800 participants but only 764 women filled out and returned the questionnaires. While qualitative data was gotten 14 from healthcare workers across the public healthcare facilities in the zone.

4.0 Results

Table 1 presents the general socio-demographic characteristic of the study population. The study presents only the general analysis of the important characteristics of the respondent's other socio-demographic characteristics could be referred to in the tables below. The findings indicate that majority of the respondents 57.6%, (N=440) were between the ages of 15-21 years. According to the findings, 61.1 percent (N = 469) were married, while others were either single, divorced, or widows. The data indicates 51.8 percent of respondents (N = 396) attended formal school, others attended Islamiyah school, Adult and non-formal education, while the remaining respondents acquired home base (informal) education. The data revealed that 25.8 percent (N = 197) had primary education, and 30.2 percent of the respondents (N = 231) had a level of education that

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terminates at the secondary school level. 7.2 percent of the respondents (N = 55) were at the tertiary education level. While 1.8 percent (N= 14) were at the postgraduate level. The occupational status of the respondents indicates that the majority of the respondent's 39.4 percent (N = 301) were engaged in agriculture, while others are either civil servants or full-time housewives. The results further revealed, the majority of the respondent's, 52.7 percent (N=396) respondents had 4-6 children.

Table 4.1 Socio-Demographic Characteristics of the Study Respondents

Variable	Items	Frequency	Percentage
Age	15-21 years	440	57.6
	22-28 years	164	21.5
	29-35 years	79	10.3
	36-42 years	63	8.2
	43-49 years	18	2.4
	Total	**764**	**100**
Marital status	Single	179	23.2
	Married	469	61.1
	Divorced	98	13.2
	Separated	0	0
	widow	18	2.5
	Total	**764**	**100**
Types of School attend	Formal School	396	51.8
	Adult & Nonformal	101	13.2
	Islamiyah School	236	30.9
	Others	31	4.1
	Total	**764**	**100**
Educational qualification	Primary education	197	25.8
	Secondary education	231	30.2
	Tertiary education	55	7.2
	Postgraduate	14	1.8
	Total	**497**	**65**
Occupation	Civil servant		
	House Wives	99	13.1
	agriculture	301	39.4
	Trader	157	20.5
	Self-employed	101	13.2

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	Any other	24	31
	Total	**764**	**100**
Religious affiliation	Christianity	67	9.1
	Islam	686	89.6
	ATR	11	1.3
	Total	**764**	**100**
Location	Urban	102	13.2
	Semi-urban	222	29.2
	Rural	440	57.6
	Total	**764**	**100**
Number of children	1-3 children	145	18.7
	4-6 children	396	52.7
	7-9 children	148	19.1
	10 and above	49	6.1
	No Child	26	3.4
	Total	**764**	**100**

Source: Field data, 2022

Table 4.2 presented the responses on pregnant women's nutritional status and the influence of malnutrition on maternal mortality, using a two-point measurement scale of Yes and No,this aspect sought to determine whether women during pregnancy are having enough special dieting that will give them the necessary nutrient they require. The result reveals that 72.4 percent (N= 553) thick No, while the remaining respondent's 27.6 percent (211) thick Yes, this data indicates the majority of the women in this area, are not taking enough or special dieting that will give them the necessary nutrient, they require with pregnancy. While on women eating protein during pregnancy, the result showed that 68.3 of the respondents (N= 520) thick No, other respondents' 31.7 percent (N= 244) thick Yes, the data indicates majority of the respondents were not having protein. In support of this response, some qualitative response indicates that some pregnant women have even forgot the taste of milk and meat.

Attempt to determine whether the women eat the needed fruits during pregnancy, the findings showed that 80.1 percent (N= 612) of the total study respondents indicates No, they are not getting the needed fruits. Other respondents of this study 19.9 percent (N= 152) thick Yes, that women eat enough fruits during pregnancy. However, 80.8 percent of the study respondents (N= 616) thick Yes, that women eat vegetables during pregnancy, 19.2 percent of the respondents (N= 148) thick No. The qualitative data open up on this response, some of the qualitative indicates that the outcome is connected with the agricultural nature of society. Because, green and other

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vegetable leaf are planted at the backyards. Women were asked whether they eat a variety of foods, during pregnancy, result showed that 85.2 percent of the respondents (N= 651) thick No, while 14.8 percent of the respondents (N= 113) indicates Yes. However, majority of the respondents testify eating three times a day, while others were having less.

In an effort to determine whether women eat a lot of carbohydrates, during pregnancy, the study findings revealed that 78.3 percent of the respondents (N= 596) thick Yes (SA), that meals with a high concentration of carbohydrates are their common food. In addition, other 21.7 percent of the study respondents (N= 168), thick No. On whether women regulating their diets at the last stage of pregnancy, the study findings revealed that 77.2 percent of the respondents (N= 589) thick NO, meaning they are not regulating their diets. While the remaining 22.8 percent of the study respondent's (175) indicates Yes. Moreover, study respondents were asked whether taking good nutritious food during pregnancy reduces the risk of maternal mortality, the result revealed 83.2 percent of the respondents (N= 637) thick Yes, while other 16.8 percent of the response (N= 127) indicates No. Furthermore, the data revealed that 80.5 percent of the respondents (N= 615) thick Yes that many pregnant women die in the area due to malnutrition. Other respondents thick No.

Table 4.2 Measuring scale on Women's Nutritional Status and the influence of malnutrition on maternal mortality

		Frequency and percentage	
Q/No	Item	Yes	No
1	In my community, pregnant women are given enough and special dieting	211 (27.6)	553 (72.4)
2	I eat much of protein during pregnancy	244 (31.7)	520 (68.3)
3	I take much of fruits during pregnancy	152 (19.9)	612 (80.1)
4	I eat much of vegetables during pregnancy	616 (80.8)	152 (19.9)
5	I eat variety of food during pregnancy	113651 (14.8)	(85.2)
6	I eat three square meals every day during	529235 (74.9)	(25.1)

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	pregnancy		
7	I eat a lot of carbohydrates during pregnancy	168 (21.7)	596 (78.3)
8	I usually regulate my diets at the last stage of my pregnancy	175 (22.8)	589 (58.9)
9	Taking good nutritious food during pregnancy reduces the risk of maternal mortality	637 (83.2)	127 (16.8)
10	In my community many pregnant women die due to malnutrition	615 (80.5)	149 (19.5)

Source: Field data, 2022

5.0 Discussions of the Findings

The study found a number of intermediary factors in addiction to malnutrition that influenced maternal health and maternal mortality. These factors include age, and occupation among others. The results reveal that majority of the respondents, 57.6% (N= 440), were between the ages of 15-21 years, and were married. This may be connected to cultural and religious preference of marriage at early maturity ages. The findings have proved the expectation of many scholars, that age plays a significant role in the death of women during pregnancy. This show there is a need to review or put more mechanisms in place, in such a way that ladies that are marrying at these age categories, must have a kind of health education on how to manage themselves and rear pregnancy. However, there is a number of policies and program on women's affairs and gender, but this situation calls for overhauling of such policies, to accommodate matters of early marriage. Like it was reflected in the spiritual laws, because of their importance, especially in this kind of society. Our results of this study are consistent with other research and studies conducted outside Nigeria, the data indicate an interconnection between education, economic status, or the nature of household occupation and maternal mortality. Most of the respondents, 56% (N= 428), terminate their education at the secondary school level or below and were engaged in local agriculture, directly or indirectly.

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The qualitative data clearly indicates that most of the victims of maternal mortality were low-status women. It was reflected in many reviews and studies that the socio-economic status of a woman, and specifically their economic status, appeared to have a serious effect on their access to needed nutrients and healthcare services. Saxena et al. (2020), found in their study that poor status was independently connected with less access to basic nutrients and use of maternal health services. Moreso, a study in India found that low-status women in terms of autonomy and decision-making, were more vulnerable to maternal mortality because they could not afford maternal care (Hamal, M., Dieleman, M., De Brouwere. 2020).

On women's nutrition, the findings indicate that majority of the pregnant women dieting and nutritional intake were poor, despite the recognition the importance of nutrition to maternal health. However, the majority of the study respondents 72.4% (N= 531) were not having enough special dieting that will give them the necessary nutrients they require, e.g. protein, fruits, and vegetables. One of the interviewed health workers informed the researchers that some pregnant women were not having three square meals, not to talk of special dieting. She went further to say that other households brought their wives to the hospital for delivery, but they can't make provisions for their food and drugs. sometimes, they looked for help from philanthropists. A study that evaluates the effect of nutritional status on maternal and child health in Yemen, revealed that, it cannot be possible to separate the effect of inadequate nutrition from changes that result in chronic diseases, which eventually could lead to death (Malaika et al. 2022).

Moreso, the data revealed that many pregnant women die in the area due to malnutrition. The study results are in accordance with the finding of similar research in China, which showed the majority of pregnant women had the perception that inadequate dietary supplements could course or worsen chronic diseases (Xiang et al. 2022). Poor nutrition and health status of women before and during pregnancy are linked to maternal mortality (Torlesse, 2020). Malnutrition has a negative impact on maternal health. This, in turn, raises maternal and infant mortality (Obiang-obounou& Fuh, 2020).

6.0 Conclusion

This study measured the effect of malnutrition on maternal mortality. It was found that the majority 62.4% of women were not having enough special dieting that will give them the necessary nutrients they required, and other women were not even having the cultural three-square meals, A situation that made them malnourished. Results further indicate many women die in the study area either during pregnancy or at the point of gestation due to malnutrition.

7.0 Recommendation

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The study recommends that government should make a policy on pre-marital health education so that ladies getting married especially at early ages will be familiar with how to manage their health and the maintenance of pregnancy. Also, drugs or supplements containing the required quantity of protein, vegetables, and fruits should be made available to pregnant women both in the healthcare facility and within the community.

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