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Socio-demographic factors associated with maternal fatality in Juba, South Sudan

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Abstract
Maternal fatality has long been a worldwide public health paying attention, and the capability to properly identify and report maternal deceases has mostly been a defy.
This paper aimed to identify the socio-demographic factors associated with maternal fatality in Juba, South Sudan using data collected from 160 pregnant women aged 15-49 years at Juba Teaching Hospital. The findings of logistic regression showed - that women's income, estimated distance to Juba Teaching Hospital and maternal education were significantly associated with maternal fatality. The paper recommends for improve economic situation, roads and means of transport and educational chances for women.

Keywords: maternal fatality, socio-demographic factors, logistic regression, Juba, South Sudan

Introduction

Maternal fatality has long been a worldwide public health paying attention, and the capability to properly identify and report maternal deceases has mostly been a defy [1, 2].

Although the attempts of the global community in monitoring maternal fatality, it still a main reason amongst women of reproductive age [3] and a worldwide public health dilemma [1, 4], particularly in developing nations [2, 5]. All over the world, a projected 300,000 maternal fatalities happen yearly due to reasons linked with pregnancy [6]. Nearly, 99 percent of worldwide maternal fatalities happen in developing nations, amongst the developing nations, Sub-Saharan Africa only about 66 percent tracked by Southern Asia 22 percent of maternal fatalities [7].

Unexpectedly, the level of maternal fatality varies tremendously amongst the main regions of the developing nations.

South Sudan's maternal fatality rate vestiges the top in the globe regardless of efforts made to reduce it [8, 9]. The risk of woman decease during a pregnancy in South Sudan is 1 in 7, in Africa is 1 in 16, Asia is 1 in 105, Europe is 1 in 1895 and North America is 1 in 3750, [6, 11, 12]. As a result, there is an exigent necessity for proof-founded interference to meaningfully decrease death rate in South Sudan.

The data issued by World Health Organization (WHO), United Nations Children Emergency Fund (UNICEF), United Nations Population Fund (UNFPA), United Nations Division and World Bank [6] displays that although the maternal fatality rate has reduced from 1000 deaths to 730 deaths per 100,000 during the period between 2005-2015 in South Sudan, it is static one of the top in the globe.

Knowing precisely what are the socio-demographic factors associated with maternal fatality is a crucial matter in forecasting the necessary interferences in governing the issue **[4]**. At the heart of those issues, woman's age is a great influence factor [7]. Such as, women's fatality for the period of early age is owing to the physical imperfect growth of their pelvis whereas amongst those at mature age, incremental hazard of having pregnancy linked problems is more protuberant reason of their fatality. Additional influence factor is maternal education, which was shown in various global studies and gave an indication that lower level of maternal education is linked with higher rates of maternal death [13].

Therefore, a study on the socio-demographic factors that associated with maternal fatality would be significant.

A full knowing of the socio-demographic factors that have associated with maternal fatality will help as a crucial guide to increase health interferences to inhibit more maternal fatalities.

A few studies have been carried out on maternal fatality in South Sudan; though, that study tried to assess the effect of the most powerful economic factors on the non-HIV maternal fatality [10]. Such as, Skilled Assistant at Birth, General Fertility Rate and Gross Domestic Product. Therefore, this paper aims to identify socio-demographic factors associated with maternal fatality in South Sudan.

Studies Related to Maternal Fatality

Tadele and Abebaw [14] conducted a study aimed to identify correlate of maternal fatality in developing nations using global data bases of health metrics from 2008 to 2016. The study found a significant association between the maternal fatalities with the gross national income per capita.

Cloudia and Joama [15] conducted a study to investigate the effects of distance to hospital providing delivery care on pregnancy-associated fatality in rural area, southern Tanzania by using logistic regression. The results showed that maternal fatality was associated with distance to health institutions, with women who resided more than 35 km were 3.68 times higher a risk of fatality than those who resided within 5 km from a health facility.

Koch *et al* [16] conducted a study to examine the association between maternal schooling and declined maternal fatality in Chile.

The study found that a year increase in maternal education had a helpful effect on maternal fatality.

Ramos [17] carried out an inclusive study of maternal fatalities in public hospitals between 2001 and 2002 in Argentina. The study results showed that number of

maternal fatalities was higher amongst women who delivered at a young age and amongst those who delivered after the age of 35 years. Also the study showed that mothers aged 20 to 29 years were 56 percent more probable to experience maternal fatality contrasted to mothers aged below 20 years. Conversely, mothers aged 30 to 39 years were 154 percent more predisposed to maternal fatality in contrast to mothers aged below 20 years.

Materials and Methods

A cross-sectional study was conducted at Juba Teaching Hospital, 2019. It is a largest hospital and most prepared one in the country. This hospital take delivery of the pregnant women and childbirth from the other counties that present with high danger pregnancies. One hundred and sixty (160) pregnant women were employed for the study.

A organized form was used to gather data from the participants on socio-demographic characteristics such as woman' age at marriage (below 20 years, 20-34 years, 35 years or above); marital status (married, unmarried); woman's highest education level (no formal education, basic education, secondary education or above); area of residence (rural, urban); income (have source of income, no source of income); estimated distance from home to health facility (<10 km, >10 km). Cross-tabulations was used to estimate maternal fatality proportion and logistic regression model to identify socio-economic factors associated with maternal fatality, estimated odds ratio at 95% confidence intervals.

Results

Table 1 shows that the higher proportion of fatality 10.9% were amongst women in urban area; while the lower 10.2% were amongst women in rural area. Also, the higher proportion of fatality 15.8% and 12% were amongst women aged 35 or above and below 20 years, respectively, while the lower 6.9% were amongst women aged 20-34 years. In addition, the higher proportion of fatality 11.1% were amongst women who have unmarried, whereas 10.5% were amongst women who have married. Likewise, the higher proportion of fatality 15.5% were amongst women who have no source of income, while the lower 3.2% were amongst women who have source of income. Besides, the higher proportion of fatality 14.7% were amongst women who live in distance >10 km, while the lower 7.6% were amongst women who live in distance <10 km. Furthermore, the higher proportion of fatality 17.7% were amongst women with no formal education, whilst the lower 2.6% and 4.8% were amongst women with secondary education or above and basic education level, respectively.

Table 1: Differentials of Maternal Fatality Proportion By Socio-demographic Factors

Variables	N	Maternal Fatality	
		Alive	Dead
Place of residence			
Urban	101	90 (89.1)	11 (10.9)
Rural	59	53 (89.8)	6 (10.2)
Maternal age			
Below 20	50	44 (88.0)	6 (12.0)
20-34	72	67 (93.1)	5 (6.9)
35 or above	38	32 (84.2)	6 (15.8)
Marital status			
Unmarried	36	32 (88.9)	4 (11.1)
Married	124	111 (89.5)	13 (10.5)
Women's income			
Have source of income	63	61 (96.8)	2 (3.2)
No source of income	97	82 (84.5)	15 (15.5)
Estimated distance to Juba Teaching Hospital			
< 10km	92	85 (92.4)	7 (7.6)
> 10km	68	58 (85.3)	10 (14.7)
Maternal education			
No formal education	79	65 (82.3)	14 (17.7)
Primary education	42	40 (95.2)	2 (4.8)
Secondary education or above	39	38 (97.4)	1 (2.6)

Results of Logistic Regression for Socio-demographic Factors Associated with Maternal Fatality

Table 2 shows that place of residence was found to be insignificantly associated with maternal fatality. Women who resided in urban areas were 1.573 times more probable to die than those women who resided in rural areas in reference category. Also, maternal age was found to be insignificantly associated with maternal fatality. Women aged 35 years or above were 1.495 times more probable to die when compared with women aged below 20 years in reference category. However, those women aged 20-34 were 0.411 times less probable to die than women aged 35 years or above.

In addition, marital status found to be insignificantly associated with maternal fatality. Women who were married were 0.667 times less probable to die compared to women who were unmarried in reference category. Besides, women's income was found to be significantly associated with maternal fatality. Women who have source of income were 0.184 times less probable to die compared to women who have no source of income in reference category. Moreover, estimated distance to Juba Teaching Hospital was found to be significantly associated with maternal fatality.

Women who resided in distance >10 km were 3.689 times more probable to die when compared with women who resided in distance <10 km in reference category.

Furthermore, maternal education was found to be significantly associated with maternal fatality. Women with secondary education level or above were about 0.097 times

less probable to die compared to those women with no formal education in reference category. Similarly, women with basic education level were 0.183 times less probable to die compared to those women with no formal education in reference category.

Table 2: Results of Logistic Regression for Factors Associated with Maternal Fatality

Variables	B	Sig.	OR	95% CI	
				Lower	Upper
Place of residence (RC = Rural)					
Urban	0.453	0.492	1.573	0.432	5.729
Maternal age (RC = below 20)					
20-34	- 0.888	0.221	0.411	0.099	1.704
35 or above	0.402	0.582	1.495	0.357	6.252
Marital status (RC = Unmarried)					
Married	- 0.406	0.575	0.667	0.161	2.753
Women's income (RC=No income)					
Have source of income	-1.692	0.043	0.184	0.036	0.948
Estimated distance to Juba					
Teaching Hospital (RC = < 10 km)					
>10km	1.305	0.043	3.689	1.042	13.061
Education (RC = No formal education)					
Basic education	- 1.700	0.045	0.183	0.035	0.963
Secondary education	- 2.338	0.038	0.097	0.011	0.877

Findings and Discussion

This study found that women's income, estimated distance to Juba Teaching Hospital and maternal education were significantly associated with maternal fatality. Women who have source of income were more probable to die compared to women who have no source of income. This finding is consistent with previous study by Girum and Wasie [14] conducted in developing nations.

Also, women who resided in distance >10 km have more chances to die than women who resided in distance <10 km. This finding is concurring with previous study conducted by Cloudia and Joama [15]

in southern Tanzania who found that maternal fatality was associated with distance to hospitals, with women who resided more than 35 km were more likely die than women who resided within 5 km from a health facility.

In addition, women with basic and secondary school level or above have a lower chances to die than women with no formal education. This finding is in line with earlier study by Koch *et al*. [16] in Chile who found that a year increase in maternal education had a helpful impact on maternal death. This finding underlined the significance of women's education for enhancement in maternal fatality.

Conclusion

The study aimed to identify socio-demographic factors associated with maternal fatality in South Sudan. Socio-demographic factors that associated with maternal fatality in Juba were women's income, estimated distance to health facilities and maternal education. Women who have source of income were less probable to die compared to women who have no source of income. Also, women who resided in distance >10 km were more probable to die than women who resided in distance <10 km. Moreover, women with secondary education level or above were less probable to die than those women with no formal education. Similarly, women with basic education level were less probable to die compared to those women with no formal education.

Recommendations

Founded on the findings, this study recommends that a lot of attempts needs to be prepared by the government to improve economic situation of the people particularly women, also improve roads and means of transport, the level of education of women and establish health facilities in remote areas to reduce maternal fatality.

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