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COVID-19 Vaccine Acceptance and Hesitancy among Pregnant Women: A Knowledge, Attitude, and Perceived Risks Survey in Lusaka, Zambia

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Abstract

Introduction: The coronavirus disease 2019 (COVID-19) is an infectious disease of the respiratory tract caused by SARS-CoV-2. Since its emergence, there have been increased rates of transmission and spread, morbidity and mortality which led to the development of COVID-19 vaccines to address the pandemic. This study assessed acceptance, knowledge, attitude, and perceived risks regarding COVID-19 vaccines among pregnant women attending antenatal care at two First-Level Hospitals in Lusaka, Zambia. **Materials and Methods:** This was a cross-sectional study that was conducted among 241 pregnant women using a questionnaire from August 2023 to October 2023 in two First-Level Hospitals in Lusaka district, Zambia. The collected data were analyzed using IBM Statistical Package for Social Sciences (SPSS) version 22.0. Statistical analysis was performed using a Chi-square test. The statistical significance was set at a 95% confidence level. **Results:** Of the 241 participants, 107 (42.7%) were aged between 24 and 34 years. Overall, 64.3% accepted the COVID-19 vaccines, of which 122 (50.6%) were already vaccinated. Further, 203 (84.6%) of the pregnant women had good knowledge, and 199 (82.6%) had positive attitudes towards COVID-19 vaccines. However, 58.5% thought COVID-19 vaccines were not safe and could cause infertility. Alongside this, 70.1% thought that COVID-19 vaccines were harmful during pregnancy. Having good knowledge of COVID-19 vaccines was associated with age ($p = 0.049$), education status ($p = 0.001$), and employment status ($p = 0.001$). Having a positive attitude towards COVID-19 vaccines was asso-

ciated with education status (p = 0.001) and employment status (p = 0.001).

Conclusion: This study found that most pregnant women had good knowledge, and positive attitudes, and the majority accepted the COVID-19 vaccine. Encouragingly, most of the pregnant women who accepted the COVID-19 vaccines were already vaccinated. Most pregnant women thought that COVID-19 vaccines had side effects, were not safe, and could be harmful during pregnancy. Consequently, this could have contributed to the hesitancy to receive a vaccine among some participants. The findings of this study demonstrate the need to provide pregnant women with continuous educational programs on the benefits of vaccinations for themselves and their children.

Keywords

COVID-19 Vaccines, Pregnant Women, Vaccine Acceptance, Vaccine Hesitancy, Zambia

1. Introduction

The severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is the cause of the coronavirus disease 2019 (COVID-19) [1] [2] [3]. In December 2019, China reported its first case of COVID-19 [1] [4] [5]. The virus is mostly transmitted through large droplets generated during coughing or sneezing of symptomatic and asymptomatic COVID-19 patients [6] [7] [8] [9] [10]. COVID-19 spread quickly across many countries and was declared a pandemic on March 11, 2020, by the World Health Organization (WHO) [1] [11] [12] [13]. The pandemic caused many effects including increased deaths, negative impacts on the global economy, the education sector, and mental health challenges among individuals [14]-[23]. The continuous impacts of COVID-19 led to the instigation of control measures to address the pandemic [7] [24] [25] [26] [27].

COVID-19 vaccines have been among the successful strategies instigated to mitigate the spread of SARS-CoV-2 and reduce the severity of symptoms and signs of disease [28] [29]. Some studies have shown that vaccination significantly reduces the severity of disease thereby reducing COVID-19-related mortality [30]-[36]. In this regard, promoting COVID-19 vaccine acceptance and uptake is currently being considered an important public health priority to help individuals develop immunity against SARS-CoV-2 [37]. On top of that, community protection against COVID-19 can be attained through community herd immunity [38] [39]. Therefore, this suggests that the majority of community members should receive COVID-19 vaccinations [40] [41] [42].

Pregnant women are vulnerable during disease outbreaks, including the COVID-19 pandemic, due to their increased risk of morbidity and mortality [43] [44]. Additionally, pregnant women suffering from COVID-19 have a high risk of experiencing adverse birth outcomes such as preterm births, stillbirths, cesarean

deliveries, and neonatal ICU admissions, indicating an increased likelihood of neonatal morbidity and mortality [45]. Due to the deadly effects of COVID-19, vaccination is a critical way to protect pregnant women and the fetus from serious illness and the consequences associated with COVID-19 [46]. Vaccinated pregnant women were found to have reduced risks of having preterm births, stillbirths, or very low birthweight babies compared to their unvaccinated counterparts [47]. However, there is limited information regarding the safety of COVID-19 vaccines during pregnancy [48].

Despite the recommendation of COVID-19 vaccination, low acceptance of vaccines is a global challenge hindering vaccine uptake [49]-[55]. Low vaccine acceptance among pregnant women has been seen in different countries such as Saudi Arabia (50%) [56], Jordan (37%) [57], the US (41%) [58], Türkiye (37%) [59], and in a large-scale study involving 16 countries (52.0%) [60]. The above findings are due to the global rise in vaccine hesitancy that leads to low uptake and acceptance of these vaccines, especially in pregnant women [49] [61]. Consequently, the fear of vaccine safety in pregnancy, concerns about vaccine effectiveness, and a lack of trust in the government and source have contributed to low acceptance of vaccines among pregnant women [62] [63] [64]. Healthcare workers can help address vaccine hesitancy by ensuring that pregnant women are educated about vaccines during antenatal care visits, have access to vaccines during prenatal care visits, advising and counselling women about the availability of vaccines, providing vital information on the effectiveness and safety of vaccines during pregnancy, improving access to vaccination services, and always having the vaccine available at the hospital [65] [66] [67].

In Zambia, COVID-19 was first reported on March 18 2020 [3] [5] [68]. However, the rollout and administration of COVID-19 vaccines only commenced in April 2021 [68]. Some studies have been published on the acceptance of COVID-19 vaccines among students, healthcare workers, the general population, and pregnant women [68]-[73]. However, there is a dearth of information on the acceptance, knowledge and attitudes towards COVID-19 vaccines among pregnant women in Zambia. It is against this background that we conducted a study to evaluate the acceptance, knowledge, and attitudes towards COVID-19 vaccines among pregnant women attending antenatal care at two First-Level Hospitals in Lusaka, Zambia.

2. Materials and Methods

2.1. Study Design, Site, and Population

This was a descriptive-cross-sectional study that was conducted among pregnant women using a structured questionnaire from August 2023 to October 2023 in first-level hospitals located in the Lusaka district of Zambia. The study population included pregnant women attending antenatal care at two First-Level Hospitals (Chilenje and Kanyama) in the Lusaka district of Zambia. We selected these hospitals because they provide services to a diverse range of Zambians, in-

cluding pregnant women. Alongside this, the two hospitals were chosen because they were also sites of treatment for patients suffering from COVID-19. Further, two hospitals were chosen because COVID-19 vaccines were being administered in the two Townships of Chilenje and Kanyama. The study included pregnant women attending antenatal care who provided informed and written consent to be part of the study. The study excluded pregnant women who were not attending antenatal care at the two First-Level Hospitals in Lusaka Zambia and those who were below the age of 18 years.

2.2. Sample Size Determination and sampling Technique

The sample size was determined using Cochran's formula [74]. Using a previous vaccine acceptance rate of 33.4% [71], and a margin of error of 10% at a 90% confidence level, we estimated the sample size to be 202 and we took into consideration a 10% non-response rate and a 1.5 design effect. Therefore, we planned to enrola minimum number of 202 pregnant women to participate in this study. The study utilized a simple random sampling method in which all available pregnant women were given numbers and then those that were selected randomly were requested to respond to the questionnaire. We printed a total of 250 questionnaires to capture as many participants as possible.

2.3. Data Collection Tool

The study was done by the use of a structured questionnaire adopted from a previous study [75]. The questionnaire contained closed-ended questions in four sections namely; section A: social-demographic characteristics, Section B: participants' knowledge and attitude on COVID-19 vaccines, Section C: participant's acceptance and uptake of COVID-19 vaccines, Section D: participants perceived risks of COVID-19 vaccines. Each participant took approximately 20 to 30 minutes to complete filling in the questionnaire.

2.4. Data Analysis

Data was collected from every questionnaire that was answered by potential participants. This was double-checked for accuracy and the data was sorted out. The collected data was entered into a Microsoft Excel sheet and exported to the Statistical Package for Health Sciences (SPSS) version 22 for Analysis. The analyzed data was presented in tables and charts. In the analysis, each correct answer carried one point and each wrong or "I don't know" carried zero points [30] [76] [77] [78]. Knowledge questions were five, translating into a total score of 5, while the attitude questions were four, translating into a score of 4. After calculating the knowledge and attitude scores, participants who scored 3/5 (60%) were considered to have good knowledge and those who scored 2/4 (50%) were considered to have a positive attitude [30] [76] [77]. A chi-square test was used to determine the relationship between categorical variables. The univariate analysis was used to determine the significant associations between sociodemo-

graphic characteristics and the participant's knowledge and attitude toward COVID-19 vaccines. All statistical significance of the findings was conducted at a 95% confidence level.

2.5. Ethical Considerations

Ethical approval was sought from the University of Zambia Health Sciences Research Ethics (UNZAHSREC) with ID # 202301270006. The purpose of the study was explained to participants and participation was only after providing informed and written consent. The study upheld the ethical principles of confidentiality and anonymity. Besides, no harm was inflicted on the participants as this was a non-invasive study. No participant was paid for answering the questionnaire.

3. Results

In this study, a total of 241 participants were enrolled out of which 69.3% (n = 167) were married. The majority of the participants (42.7% (103) were aged between 25 - 34 years while 36.1% (n = 87) were aged 18 - 24 years, respectively. Furthermore, (59.3%, n = 143) of the participants were unemployed and (40.7%, n = 98) were employed. Regarding the level of education, 76.7% (n = 185) attained secondary and above (Table 1).

Table 2 shows respondents' acceptance and uptake of the COVID-19 vaccines. From this study, 64.3% (n = 155) of the pregnant women accepted the COVID-19 vaccines, 50.6% (n = 122) were already vaccinated and 49.4% (n = 119) were not. Of the unvaccinated pregnant women, 36.5% (n = 33) were willing to be vaccinated while 36.5% (n = 88) were not. For those who were vaccinated, 31.1% (n = 75) received 2 doses, and 19.5% (n = 47) received 1 dose (Table 2).

Table 3 shows participant's knowledge and attitude about the COVID-19 vaccine. This study found that 98.8% (n = 238) of the pregnant women had heard about COVID-19 vaccines. Approximately 64.3% (n = 155) felt that COVID-19 vaccines were not recommended for pregnant women. On the other hand, 82.6% (n = 199) said it was important for everyone to get aCOVID-19 vaccine. Consequently, 61.8% (n = 149) felt that the safety information regarding COVID-19 vaccines was not adequate. Alongside this, 76.3% (n = 184) of the participants knew that COVID-19 vaccines have side effects. However, the majority 78.0% (n = 188) agreed that being vaccinated against COVID-19 is good for their health. Finally, 82.2% (n = 198) of the participants said that they supported the recommended COVID-19 vaccine campaigns (Table 3).

From a total number of 241 participants who took part in the study, 84.6% had good knowledge about the COVID-19 vaccines while 15.4% had poor knowledge. Additionally, 82.6% had positive attitudes towards COVID-19 vaccines while 17.4% had negative attitudes (Figure 1).

This study found that there was a relationship between knowledge and education status, knowledge and age, and knowledge and employment status (Table 4).

Table 1. Distribution of participant's sociodemographics.

Variable	Response	%(n)
Age	18 - 24 years	36.1% (87)
	25 - 35 years	42.7% (103)
	>35 years	21.2% (51)
Marital Status	Married	63.3% (167)
	Unmarried	30.7% (74)
Residential Area	Urban	100% (241)
	Rural	0% (0)
Educational Status	No formal Education	4.6% (11)
	Primary	18.7% (45)
	Secondary and Above	76.7% (185)
Employment Status	Employed	40.7% (98)
	Unemployed	59.3% (143)

Table 2. Participant's acceptance and uptake of the COVID-19 vaccines.

COVID-19 acceptance questions	Yes	No	I don't know	p-value
Are you willing to receive the COVID-19 vaccines?	64.3% (155)	36.5% (86)	0	0.001
Are you vaccinated against COVID-19?	50.6% (122)	49.4% (119)	0	0.897
How many COVID-19 doses have you received?	2 = 31.1% (75), 1 = 19.5% (47)	49.4% (119)	- -	0.001

Table 3. Participant's knowledge and attitude about COVID-19 vaccines.

|	Knowledge questions and attitude statements	Yes	No	I don't know	p-value
Knowledge questions	Have you ever heard about the COVID-19 vaccine?	98.8% (238)	1.2% (3)	0	0.001
	Are you aware that the COVID-19 vaccines are recommended during pregnancy?	34.44% (83)	64.32% (155)	1.24% (3)	0.001
	Do you think it is important for everyone to get the COVID-19 vaccine including women?	82.6% (199)	14.9% (36)	2.5% (6)	0.001
	Do you think there is adequate safety information on the COVID-19 vaccine in pregnancy?	28.6% (69)	61.8% (149)	9.6% (23)	0.001
	Do you think the use of COVID-19 vaccines has side effects?	76.3% (184)	19.5% (47)	4.2% (10)	0.001
Attitude statements	Taking the COVID-19 vaccine is important for our health?	78.0% (188)	20.3% (49)	1.7% (4)	0.001
	I will take the COVID-19 vaccine without any fear	46.5% (112)	51.8% (125)	1.7% (4)	0.303
	I will encourage my family/friends to take the COVID-19 vaccine	76.3% (184)	23.7% (57)	0	0.001
	I support currently recommended COVID-19 vaccine campaigns and programs	82.2% (198)	16.1% (39)	1.7% (4)	0.001
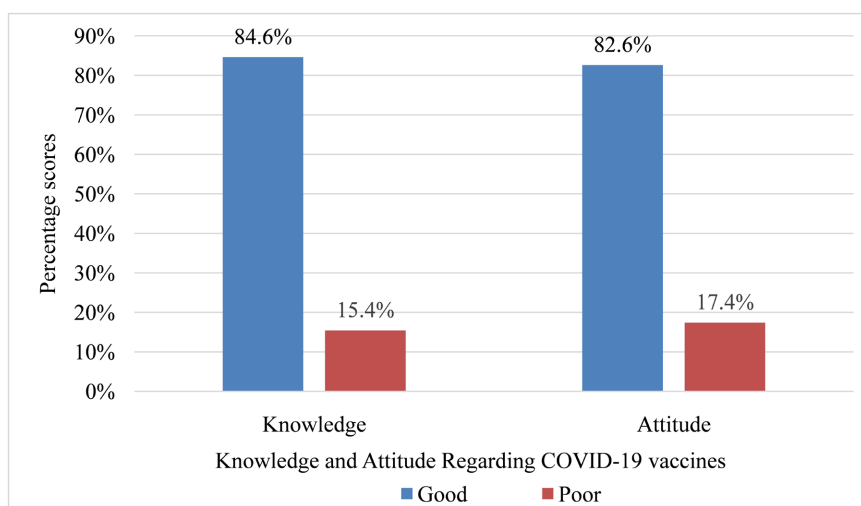
Figure 1. Participant's overall knowledge and attitude levels regarding COVID-19 vaccines.

Table 4. Association of participants' sociodemographic characteristics and the level of knowledge about the COVID-19 vaccines.

Variable	Characteristics	Attributes	Good n (%)	Poor n (%)	p-value
Knowledge	Age	18 - 24	69 (28.63)	18 (7.47)	0.049
		25 - 34	94 (39.0)	9 (3.73)	
		35≥	41 (17.01)	10 (4.15)	
	Marital status	Married	145 (60.17)	22 (9.13)	0.113
		Unmarried	59 (24.48)	15 (6.22)	
	Residential area	Urban	204(84.65)	37 (15.35)	-
	Educational status	No formal education	4 (1.66)	7 (2.90)	0.001
		Primary education	34 (14.11)	11 (4.56)	
		Secondary and above	166 (68.88)	19 (7.88)	
	Employment status	Employed	92 (38.17)	6 (2.49)	0.001
		Unemployed	112 (46.47)	31 (12.86)	

Table 5. Association between participant's sociodemographic characteristics and level of attitude towards COVID-19 vaccines.

Variable	Characteristics	Attributes	Positive n (%)	Negative n (%)	p-value
Attitude	Age	18 - 24	68 (28.22)	19(7.88)	0.305
		25 - 34	86 (35.68)	17 (7.05)	
		35≥	45 (18.67)	6 (2.49)	
	Marital status	Married	141 (58.51)	26 (10.79)	0.169
		Unmarried	58 (24.05)	16 (6.64)	
	Residential area	Urban	199 (82.57)	42 (17.43)	-
	Educational status	No formal education	0 (0.00)	11 (4.56)	0.001
		Primary education	33 (13.69)	12 (4.98)	
		Secondary and above	166 (68.88)	19 (7.88)	
	Employment status	Employed	92 (38.17)	6 (2.49)	0.001
		Unemployed	107 (44.40)	36 (14.94)	

Table 6. Participants' perceptions about COVID-19 vaccines.

Perception statement	Yes	No	p-value
The vaccine is not safe and causes infertility	58.5% (142)	41.5% (99)	0.010
The vaccine is harmful during pregnancy	70.1% (169)	29.9% (72)	0.001
The vaccines available in Africa are less effective than those in Europe	61.8% (149)	38.2% (92)	0.001
Getting vaccinated during pregnancy is a benefit for a pregnant woman	50.6% (122)	49.4% (119)	0.001
COVID-19 vaccines are as safe as older ones	43.6% (105)	56.4% (136)	0.001

This study found that there was a relationship between attitude and education status and attitude and employment status (Table 5).

Table 6 shows participants' perceptions concerning the COVID-19 vaccines. The majority 58.5% (n = 142) of the participants felt that the vaccine was not safe during pregnancy and caused infertility. Additionally, 70.1% (n = 169) felt that the vaccine was harmful during pregnancy. Finally, 61.8% (n = 149) felt that the COVID-19 vaccines available in Africa are less effective than vaccines available in Europe. Notably, 50.6% (n = 122) of the pregnant women felt that being vaccinated against COVID-19 was beneficial (Table 6).

4. Discussion

The present study provides important insights into the knowledge, attitude, perceived risks, and acceptance of COVID-19 vaccines among pregnant women in Lusaka, Zambia.

The current study found that 64.3% of pregnant women accepted the COVID-19 vaccines of which 50.6% were already vaccinated. This acceptance and uptake of COVID-19 vaccines among pregnant women is similar to the one reported in a recent study in Zambia [79]. These findings indicate that most pregnant women knew the benefits of vaccinations against COVID-19. Our findings also corroborate those reported in Thailand in which the vaccine acceptance rate was 60.8% [44]. Additionally, another study in New South Wales found that 68% of pregnant women accepted to be vaccinated against COVID-19 [80]. Similar findings have been reported in other studies where most pregnant women were willing to receive the COVID-19 vaccine including 62.2% in Ethiopia [81], South Africa (63.3%) [82], Saudi Arabia (68%) [83], Southwest Ethiopia (70.7%) [84], 77.4% in China [85], and Italy (82.7%) [86]. COVID-19 vaccine acceptance level was above 80% for pregnant women in Mexico and India [60]. In the current study, 50.6 % of the participants felt that getting the vaccine during pregnancy can benefit the pregnant woman. Conversely, 42.3% felt that the COVID-19 vaccines were as safe as the other vaccines.

Notably, a global meta-analysis from 32 countries reported that 54% of pregnant women accepted the COVID-19 vaccines [87]. Additionally, a study that was done in 16 countries reported that 52% of pregnant women intended to receive the COVID-19 vaccination during their pregnancy if an efficacy of 90% was achieved [60]. Another study that was conducted across seven countries in

low- and medium settings found an acceptance of 54.7% [88]. A Canadian study also found a low (57.5%) vaccine acceptance among pregnant women [89]. COVID-19 vaccine acceptance level was below 45% in the US, Australia, and Russia [60]. Although in a multi-methods study in the UK, respondents who were pregnant at the time of the survey were more likely to oppose the idea of getting a COVID-19 vaccine while expecting a child, 62.1% of respondents said they would unquestionably accept or were leaning toward accepting a future COVID-19 vaccine for themselves [90]. Consequently, a low vaccine acceptance was reported in Wales where 34.1% of pregnant women were vaccinated with most of them accepting to be vaccinated postpartum [91]. Low vaccine acceptance and uptake were also reported among pregnant women in Ethiopia and Japan, respectively [49] [92]. A study that was done in Cameroon showed a persistent lack of acceptability where only 31% accepted to receive the COVID-19 vaccine as many participants cited concerns about vaccine safety [63]. Vaccine hesitance among pregnant women has been driven by fears of the effects of the vaccine on the fetus, safety concerns, and adverse birth concerns [48] [88] [92] [93].

The current study's findings demonstrated that the majority (84.6%) of participants had a good knowledge of COVID-19 vaccinations and a favourable attitude (82.6%) towards them. These findings are in line with an earlier publication in Zambia which found that most pregnant women had good knowledge and positive attitudes towards COVID-19 vaccines [79]. The results of this current study conform with those that were reported in India where 97.2% of pregnant women were highly knowledgeable about the COVID-19 vaccines [94]. In contrast to the above findings, a study that was done in Saudi Arabia revealed most pregnant women had poor knowledge of COVID-19 vaccines with only 37% having good knowledge [95]. A study that was conducted in Indonesia found low knowledge of COVID-19 vaccines among pregnant women [96]. Low knowledge about COVID-19 vaccines among pregnant women can contribute to vaccine hesitancy. The present study demonstrated that good knowledge about the COVID-19 vaccines in pregnant women was influenced by age, education, and employment status. The above findings were similar to a study that was done in China where knowledge of the COVID-19 vaccine in pregnant women was influenced by age [94]. Additionally, our findings regarding education status influencing the knowledge of pregnant women conform with studies that were done in India and China [85] [94].

The present study found that most pregnant women had heard about COVID-19 vaccines and knew that it was important for everyone to be vaccinated. However, the majority were not aware that COVID-19 vaccines were recommended for pregnant women. Our findings are in line with those reported in Ethiopian studies where most pregnant women had heard about COVID-19 vaccines [81] [97]. Consequently, most participants in the current study felt that there was no adequate safety information on COVID-19 vaccines in pregnancy, which was similarly reported in a study that was done in Italy [86]. The inade-

quate information about the safety of COVID-19 vaccines in pregnant women and its effects on the fetus affects the acceptance and uptake of the vaccines [81] [98]. The findings showed that after the introduction of COVID-19 vaccines in pregnancy in Zambia, only 34.4% of pregnant women were aware that COVID-19 vaccines were recommended for pregnant women. These findings were in line with the results of the study done in China that reported that most of the participants were not aware of the recommendation of getting a COVID-19 vaccine during pregnancy [99]. On the other hand, a study that was done in Spain found that 78.3% of pregnant women were aware of the recommendation of using COVID-19 vaccines during pregnancy to protect them and the fetus from SARS-CoV-2 [100]. Indeed, when healthcare workers recommend COVID-19 to pregnant women, they accept and get vaccinated [101]. Our study found that most of the participants felt that the vaccine had side effects. Concerns about COVID-19 vaccine side effects have been reported among pregnant women in several studies [49] [78] [102] [103] [104].

The current study found that most pregnant women had positive attitudes towards COVID-19 vaccines. Our current findings corroborate those reported in a recent study that was done in Zambia [79]. This finding is in line with a study that was conducted in India where most pregnant women had positive attitudes towards COVID-19 vaccines [94]. Another study conducted in Turkey also reported that despite finding some high levels of hesitation, most pregnant women had positive attitudes towards COVID-19 vaccines [105]. Conversely, a study that was done in Saudi Arabia found that most pregnant women had negative attitudes towards COVID-19 vaccines [95]. The present study found that there was a relationship between attitude and education status and attitude and employment status. Our findings are in line with those reported in China where education status influenced the attitude of pregnant women regarding COVID-19 vaccines [85]. Our study also revealed that employed pregnant women had positive attitudes towards COVID-19 vaccines. Our study found that most pregnant women knew that being vaccinated against COVID-19 was important for their health. Consequently, approximately half of the participants said they would take the COVID-19 vaccine without any fear. The benefits of getting a COVID-19 vaccine during pregnancy outweigh the risks [106]. Alongside this, most participants said they would encourage their family members to take the COVID-19 vaccine. On the other hand, most pregnant women said that they supported the recommended COVID-19 vaccine campaigns. COVID-19 campaigns are very essential in promoting vaccine acceptance and uptake [107] [108] [109] [110].

In this study, most participants felt that the COVID-19 vaccines were not safe during pregnancy and caused infertility. Consequently, 70.1% said the vaccines were harmful during pregnancy. Fears of COVID-19 not being safe in pregnancy and harmful to the fetus have been reported in other studies [59] [98] [101]. Alongside this, most pregnant women in the present study felt that COVID-19 vaccines that were being administered in Africa were less effective compared to

those that were being administered in Europe. A study in Cameroon reported that most participants expressed uncertainty about vaccine efficacy (55%), vaccine safety during pregnancy (61%), the impact of vaccination on fertility (73%), and whether the vaccine could cause fetal harm during pregnancy (31%) [63]. Additionally, the Cameroonian study showed that some pregnant women felt that COVID-19 vaccines used in Africa were less effective than those used in Europe, 30% agreed, 15% disagreed, and 55% were not sure [63]. Another study in Japan reported that potential negative effects on the fetus (85.3%), adverse reactions at the time of injection (83.6%), anxiety about potential negative effects on the breastfed infant (67.6%), and the trustworthiness and reliability of the vaccine (49.1%) were concerns of participants towards COVID-19 vaccination [92].

We are aware that our study has some limitations. For instance, the study was conducted in two First-Level Hospitals in the Lusaka District of Zambia, hence, generalization of the findings must be done with caution as the findings may not represent those across the country. Additionally, cross-sectional study designs limit the ability to establish cause-and-effect relationships between variables, as it is unclear whether one factor precedes another. However, we feel these findings are critical in developing strategies to address vaccine hesitancy among pregnant women in the future.

5. Conclusion

This study demonstrated that pregnant women attending antenatal care in two First-Level Hospitals in Lusaka, Zambia had good knowledge and positive attitudes towards COVID-19 vaccines. Despite the good knowledge and positive attitudes reported in this study, the acceptance and uptake of COVID-19 was moderate, but very encouraging looking at this vulnerable population. Consequently, the study demonstrated that most of the participants felt that COVID-19 vaccines were not safe for pregnant women and this could be one of the reasons for vaccine hesitancy among some women. Therefore, there is a need to provide sensitization programs and campaigns on safety information and the benefits of COVID-19 vaccines in pregnancy, especially during antenatal visits.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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