Knowledge and Perception of COVID-19 and Its Psychosocial Impact on Pre- and Post-Natal Women in Tema Metropolis, Ghana, West Africa

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ABSTRACT

Background: The emergence of the coronavirus disease 2019 (COVID-19) pandemic incited series of societal changes. Adopted practices to mitigate the virus' spread included; limiting human contact, closure of workplaces, lockdown of cities, and thus limiting health care delivery to emergency services with interruption to routine visits— such as antenatal and postnatal care. During the onset of the pandemic there was a myriad of information on the virus, with several misconceptions involving the viral infection. This study was aimed at assessing the knowledge and perceptions of COVID-19, as well as its psychosocial impact among pregnant and postnatal women in the Tema Metropolis.

Subjects and Method: This cross-sectional survey was conducted among a total of 349 pregnant and postnatal women at the Tema General Hospital, Ghana. The dependent variable was outcome of a number of correct/incorrect responses given and the test scores. The independent variables were level of knowledge on COVID-19, prevention practices of COVID-19, and the psychosocial impact of COVID-19. Structured questionnaires were administered to participants to retrieve demographic information, knowledge, perception, and psychosocial impact of COVID-19 on participants. The data collected were imported into Microsoft Excel and analyzed with SPSS version 20. Data was presented as frequencies, percentages, and chi-square values.

Results: The study comprised of 295 (84.5%) pregnant and 54 (15.5%) postnatal women. Generally, 80.5% of the participants had good knowledge about COVID-19, whereas 2.6% exhibited poor knowledge. Most postnatal women had the right perceptions about COVID-19, with statistical significance (p<0.050) observed among all variables. With the preventive measures, significant associations amongst both pregnant and postnatal women were observed in monitoring body temperature (OR= 0.08; 95% CI= 0.01 to 0.02; p=0.002) and seeking medical advice when ill (OR= 0.83; 95% CI= 0.01 to 0.02; p= 0.004). Based on depression anxiety score, each variable recorded a postnatal woman experiencing extremely severe psychological impact because of COVID-19, whereas only one pregnant woman experienced same.

Conclusion: There were adequate knowledge about COVID-19 among both pre- and post-natal women in the study area, and very few were impacted psychologically as a result of COVID-19.

Keywords: COVID-19, prenatal, postnatal, psychological, pregnant women.

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BACKGROUND

The emergence of the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) during the latter part of 2019 (Ma et al., 2020) and the subsequent call for a state of international emergency by the World Health Organization (WHO) (Mascarenhas et al., 2020) has shed light on the need to perhaps reconsider the general view on infectious diseases in the wake of the fight against non-communicable diseases. Such infectious diseases typically affect individuals such as pregnant and lactating women (Mascarenhas et al., 2020), the aged and individuals living with chronic health conditions due to their varied forms of immune suppression (Asante and Mills, 2020). These aforementioned groups are deemed to be at a higher risk of disease transmission and susceptibility owing to the physiological and immunological changes that take place in these individuals (Mascarenhas et al., 2020).

The coronavirus pandemic which has spanned across several countries from the early part of 2020 till date, has incited a series of societal changes. Adopted practices to mitigate the virus' spread mainly focused on limiting human contact, lockdown of cities, closure of workplaces, amongst others (Molgora and Accordini, 2020). One critical area that was significantly affected was the access to health care services, with health care delivery limited to only emergency and critical conditions. Among those who were impacted by these measures were pregnant and postnatal women. Although pregnancy comes with its associated stressors and comorbidities, this pandemic and its related issues have further compounded them. Pregnancy has been identified as a critical period where certain conditions such as anxiety, depressive disorders (Zuccolotto et al., 2019) and gestational diabetes mellitus are more likely to develop (Catalano et al., 2019; Bick et al., 2020). Thus, easier access to healthcare during this period is paramount.

Pregnancy is a physiological state that starts from pre-conception through to the delivery of the new born. This period is characterized by a number of alterations in the psychological, physical, and emotional status of the pregnant and postpartum woman (Zuccolotto et al., 2019). These changes affect the wellbeing of the woman and thus requires adjustments to cope with the situation. The immune suppression due to pregnancy (Mascarenhas et al., 2020) predisposes both pre and postnatal mothers to infectious agents like SARS-CoV-2 which can make them morbid. A review (Atkinson et al., 2020) showed that pregnant women with COVID-19 infection experienced complications such as spontaneous abortion, premature rupture of membranes, restricted intrauterine growth, fetal distress, and premature labor which all have psychological

effects on the pregnant and postpartum woman. Restrictions passed to control the rate of spread of COVID-19 also had a telling negative effect on the clinical needs of pregnant women (Zuccolotto et al., 2019). Routine antenatal visits to the hospital were reduced to monthly physical visits (Gao et al., 2020) to reduce the risk of infection; partners and family of these women were also prevented from accompanying them to the hospital which has been the usual practice pre-pandemic. This also curtailed the psychosocial support and physical activity (Gao et al., 2020) required by pregnant women, further increasing their risk of negative birth outcomes (Zuccolotto et al., 2019).

During the onset of the pandemic there was a myriad of information on the virus. Much of the information about the virus and its effects on health was widely disseminated on the radio, TV, and social media (Asante and Mills, 2020; Molgora and Accordini, 2020; Tabong and Segtub, 2021). These avenues can either be sources of accurate news or false information, spreading fear and panic (Ma et al., 2020; Mahmood et al., 2020). Several misconceptions surrounding COVID-19 point to a multi-factorial cause involving the sources of information, information transmission and language barrier (Devkota et al., 2021; Tabong and Segtub, 2021). Current evidence has shown that the dissemination of wrongful information has led to diverse knowledge, perceptions and attitudes towards the preventive measures to contain the spread of the pandemic (Ferdous et al., 2020). Though the transmission, psychosocial and clinical effects of COVID-19 has so far receded and subsided, lessons from it can be incorporated into the global preparedness for the next pandemic should there be another.

This cross-sectional study was conducted with the aim of investigating the knowledge and perceptions of COVID-19 and its psychosocial impact among prenatal and postnatal women in the Tema Metropolis and its enclave in Ghana. The study's findings will be valuable for essential and appropriate stakeholders or organizations to review and formulate pragmatic policies that will sensitize prenatal and postnatal women about the knowledge and preventive measures of COVID-19 available.

SUBJECTS AND METHOD

1. Study Design
This study was cross-sectional design. The data were collected at the Tema General Hospital a referral health facility with the largest in and out-patient inflow in the metropolis from November 2021 to February 2022. Participants were recruited from pre- and postnatal women who sought pre- and postnatal care at the hospital at the time of the study and were able to understand the content of the questionnaire and give consent. Two trained investigators explained the study's objective, content, and cooperation to the consented participants. Participant interviewing was structured according to a predefined questionnaire which was administered by the investigators (research team) at a place far from the gathering, with participants assured of data safety and confidentiality of their responses.

2. Population and Samples
The population of this study comprised of 349 pre- and postnatal women visiting the Tema General Hospital and inhabiting the Tema metropolis and its adjoining communities and enclave. The study employed a simple random sampling under the following criteria:

The research subjects included both pre- and post-natal women who consented to participate and were able to understand the content of the questionnaire.

The exclusion criteria were based on

participants' inability to fill in the questionnaire due to personal reasons and unwillingness to participate in the survey.

3. Study Variables

The independent variables that were considered as part of the data included the level of knowledge on COVID-19, prevention practices of COVID-19, and the psychosocial impact of COVID-19. The outcome of a number of correct/ incorrect responses given and the test scores represented the dependent variables in thus study.

4. Definition Operational of Variables

Knowledge on COVID-19 was defined as a minimum of 9 correct responses on the study questionnaire.

Prevention practices of COVID-19 was defined as a minimum of 8 correct responses on the study questionnaire.

Psychosocial impact of COVID-19 was defined as whether or not the normal scores for the Depression Anxiety Stress 21 (DASS 21) diagnostic criteria was met.

5. Study Instruments

The data generated from this study consisted of both primary and secondary data. Discussions on the findings of this cross-sectional survey which employed the usage of a questionnaire with subjects provided the primary data for analysis.

6. Data Analysis

A univariate analysis was performed to determine the frequency distribution and characteristics of the study participants. Test item on the various responses from participants were categorized. The relationship between the independent and the dependent variables were also analyzed. The chi-square test was used to find the association between the covariates at $p<0.050$ as the set statistical significance.

7. Research Ethics

Throughout the study procedure, significant consideration was given to research ethical issues such as informed consent, anonymity, and confidentiality. Permission was also sought from the Medical Superintendent of the Tema General Hospital where the research was conducted. Research ethical clearance letter was issued for the study by the ethics committee of the Ghana Institute of Management and Public Administration (GIMPA) on December 20, 2022 (Ref. No. GM/IRB/07/23).

RESULTS

1. Sample Characteristics

A total of 349 subjects who's with a mean age ± standard deviation: 29.51 ±6.196 were recruited into the study. Of this, pregnant participants constituted the most populated group (n=295, 84.5%) whereas postnatal women had the least numbers (n=54, 15.5%). Generally, most subjects were clustered within the age of 26-35 years, married, Christians, and had attained minimum education at the secondary level.

The biodata of pregnant subjects' reveals that about half were within the ages of 26 to 35 years, whereas one-third were within the ages of 15 to 25 years. More than two-thirds (n=162, 82.4%) of the pregnant women were married, followed by single and divorced participants. Also, all subjects had acquired some form of formal education, with very few (n=4, 1.4%) obtaining a masters' degree and almost half (n=127, 43.2%) attaining a secondary education.

Among the postnatal women, almost all were married (n=51, 94.4%), Christians (n=49, 90.7%) and had subscribed to the national health insurance scheme (n=49, 94.2%). None of the postnatal participants had a masters' degree. An almost negligible difference of one was observed between subject's who had attained basic and senior high school education. Similar frequencies were observed between unemployed participants and those in the formal sector (see Table 1).

2. Knowledge about COVID-19

On a whole, participants demonstrated an appreciable knowledge with regards to issues about COVID-19. As shown (Figure 1), 80.5% (n=281) participants had good knowledge, whereas 16.9% (59) and 2.6% (9) participants exhibited moderate and poor knowledge on the topic.

All postnatal mothers agreed that frequent hand washing and wearing of nose masks were preventive measures. Knowledge on transmission reveals that majority of participants (both pregnant and postnatal) indicated that COVID-19 is highly infectious, with the main route of transmission through respiratory droplets, with crowded gatherings acting as a channel for spreading infection. Although majority identified that asymptomatic persons could transmit the virus, about one-fifth of pregnant women (n=65, 22.2%) had no idea on asymptomatic transmissions. Also, 52.4% (n=183) of the participants had no knowledge about the incubation period prior to infection.

Table 1: Sample Characteristics

Variable	Pregnant		Postnatal	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Age groups				
15-25	80	27.4	9	17.0
26-35	162	55.5	32	60.4
36-45	50	17.1	12	22.6
Marital status				
Unmarried	50	16.9	3	5.6
Married	243	82.4	51	94.4
Divorced	2	0.7	0	0.0
Educational background				
Basic	39	13.3	8	14.8
Junior	72	24.5	17	31.5
Senior	127	43.2	22	40.7
Bachelor's	52	17.7	7	13.0
Master's and above	4	1.4	0	0.0
Occupation				
Formal	84	28.5	9	16.7
Informal	161	54.6	37	68.5
Unemployed	50	16.9	8	14.8
Religion				
Christian	237	80.9	49	90.7
Islam	49	16.7	5	9.3
Others	7	2.4	0	0.0
Subscription to NHIS				
Yes	261	92.9	49	94.2
No	20	7.1	3	5.8
Reason for no NHIS				
Too expensive	1	4.5	0	0.0
Private insurance	6	27.3	0	0.0
Not interested	15	68.2	3	100.0

Knowledge on susceptibility showed that majority knew the public were susceptible to infection. Handwashing and the usage of nose mask were the most predominant preventive measures known (97.6% and 100%), followed by the usage of 60-75%

concentration of alcohol-based hand sanitizer (90.8% and 77.8%) among pregnant and postnatal women respectively.

Self-isolation was observed as a control method, of which most postnatal participants concerted to than pregnant women. Similarly, majority of the postnatal women said an infected person can self-medicate, whereas almost two-thirds of the pregnant population had the same knowledge.

Statistically significant associations based on knowledge of COVID-19 amongst post-natal and pregnant women were observed and these included self-medication during outbreak periods (p<0.001 with C.I of 0.000-0.009), use of alcohol-based hand sanitizers (p=0.002 with C.I of 0.000-0.014), isolation of suspected and confirmed cases in designated areas (p=0.047 with C.I of 0.022-0.065), presence of fever (p=0.027 with C.I of 0.000-0.028) and asymptomatic transmission of COVID-19 (p=0.036 with C.I of 0.009-0.043) (Table 2).
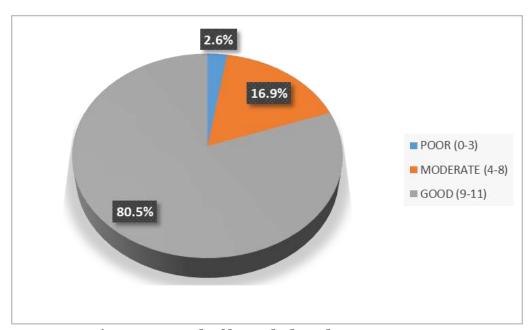

Figure 1: Level of knowledge about COVID-19

Table 2. Knowledge of COVID 19 from study subjects

Statement	Response	Pregnant	Postnatal	C.I	p
Transmission mainly occurs through respiratory droplets and close contact	True	283(96.3)	53(98.1)	0.72-0.81	0.687
	False	1(0.3)	0(0.0)		
	Don't know	10(3.4)	1(1.9)		
The population is generally susceptible to infection	True	282(95.9)	52(96.3)		0.897
	False	4(1.4)	1(1.9)	0.99-1.00	
	Don't know	8(2.7)	1(1.9)		
It is highly infectious and spreads quickly	True	283(96.9)	52(96.3)	0.99-1.00	0.787
	False	1(0.3)	0(0.0)		
	Don't know	8(2.7)	2(3.7)		
Washing hands frequently, wearing masks and other measures can effectively prevent infection	True	287(97.6)	54(100.0)		0.536
	Don't know	7(2.4)	0(0.0)	0.65-0.78	

Statement	Response	Pregnant	Postnatal	C.I	p
Crowded social gatherings may spread infection	True	276(94.2)	51(96.2)		0.734
	False	1(0.3)	0(0.0)	0.76-0.84	
	Don't know	16(5.5)	2(3.8)		
The incubation time of the disease is 1-14 days, typically 3-7 days	True	117(39.8)	25(46.3)		0.504
	False	21(7.1)	2(3.7)	0.46-0.56	
	Don't know	156(53.1)	27(50.0)		
Covid-19 asymptomatic person can transmit the virus	True	212(72.4)	48(88.9)		0.036
	False	16(5.5)	1(1.9)	0.01-0.04	
	Don't know	65(22.2)	5(9.3)		
Most people infected present with fever, fatigue, and dry cough as the main symptoms	True	249(84.7)	52(96.3)		0.027
	False	5(1.7)	0(0.0)	0.00-0.03	
	Don't know	40(13.6)	2(3.7)		
Suspected and confirmed patients should be isolated and treated in designated areas (eg. Hospitals) with effective isolation and protective conditions	True	259(88.1)	52(96.3)		0.047
	False	3(1.0)	1(1.9)	0.02-0.07	
	Don't know	32(10.9)	1(1.9)		
If you develop a fever during the outbreak, you can take your own medicine	True	168(57.5)	50(92.6)		0
	False	114(39.0)	3(5.6)	0.00-0.01	
	Don't know	10(3.4)	1(1.9)		
60-75% concentration of alcohol-based hand sanitizers can effectively inactivate the virus	True	265(90.8)	42(77.8)		0.002
	False	7(2.4)	0(0.0)	0.00-0.01	
	Don't know	20(6.8)	12(22.2)		

3. Perceptions about COVID-19

Based on statements presented to participants recruited in the study, it is evident that subjects had diverse opinions about COVID-19. Comparatively, contrasting views on source of infection, population susceptible to infection and severity of disease were most common among participants, with a majority from postnatal women. Statistical significance was also observed among all variables considered with regards to subjects' perception of COVID-19 (Table 3).

Table 3. Perceptions about COVID 19

Statement	Response	Pregnant	Postnatal	95% CI	p
Punishment from God	Neutral	93(31.6)	8(14.8)	0.07-0.04	0.030
	Agree	12(4.1)	0(0.0)		
	Strongly agree	30(10.2)	10(18.5)		
	Disagree	26(8.8)	6(11.1)		
	Strongly disagree	133(45.2)	30(55.6)		
Disease from Satan/ witches	Neutral	70(23.8)	11(20.4)		<0.001
	Agree	2(0.7)	1(1.9)	0.00-0.01	
	Strongly agree	7(2.4)	2(3.7)		
	Disagree	98(33.3)	4(7.4)		
	Strongly disagree	117(39.8)	36(66.7)		
Disease for rich	Neutral	22(7.5)	0(0.0)		<0.001

Statement	Response	Pregnant	Postnatal	95% CI	p
people	Agree	3(1.0)	0(0.0)	0.00-0.01	
	Strongly agree	1(0.3)	0(0.0)		
	Disagree	103(35.0)	2(3.7)		
	Strongly disagree	165(56.1)	52(96.3)		
COVID-19 cannot	Neutral	17(5.8)	1(1.9)		<0.001
infect and kill	Agree	3(1.0)	0(0.0)	0.00-0.01	
rural/urban	Strongly agree	3(1.0)	3(5.6)		
inhabitants	Disagree	105(35.7)	2(3.7)		
	Strongly disagree	166(56.5)	48(88.9)		
COVID-19 is not real	Neutral	16(5.4)	0(0.0)		<0.001
	Agree	0(0.0)	2(3.7)	0.00-0.01	
	Strongly agree	1(0.3)	5(9.3)		
	Disagree	106(36.1)	2(3.7)		
	Strongly disagree	171(58.2)	45(83.3)	0.00-0.01	
COVID-19 is not	Neutral	15(5.1)	0(0.0)		<0.001
deadly	Agree	1(0.3)	2(3.7)	0.00-0.01	
	Strongly agree	1(0.3)	3(5.6)		
	Disagree	106(36.1)	3(5.6)		
	Strongly disagree	171(58.2)	46(85.2)		

4. Prevention measures of COVID-19

Almost all participants (98.6%) were aware of practices that could be adopted to prevent COVID-19 (Fig. 2). Generally, all postnatal mothers demonstrated good preventive measures as compared to pregnant women.

Amongst the measures relating to personal hygiene, frequent hand washing and wearing of nose mask were the most common (99.7%), followed by good coughing or sneezing etiquette (99.3%), and ownership of alcohol-based hand sanitizer.
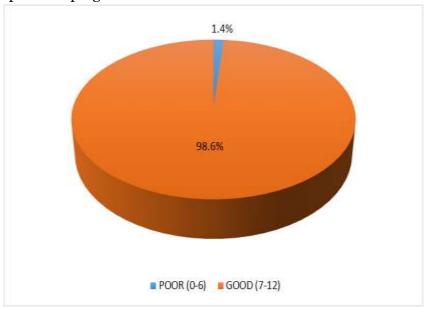

Figure 2. General distribution of prevention measures among participants

Rating awareness based on environmental practices; avoidance of direct contact

with surfaces in public was most dominant

(100%), followed by reduced visits to crowded areas (99.3%), disinfection of homes and aeration of rooms (99%).

Observed amongst other practices, having enough rest, seeking medical attention in the presence of fever and cough, as well as monitoring body temperature ranged from 96.2%, 86.3% and 81.2% respectively.

Although most COVID-19 preventive measures assessed among the two populations was not statistically significant, seeking medical advice and monitoring body temperature revealed significant associations between pregnant and post-natal women (p= 0.004 with 95% CI= 0.00 to 0.02 and p= 0.002 with 95% CI= 0.00 to 0.02 respectively) (Table 4).

Table 4. Preventive measures of COVID-19

Question	Response	Pregnant	Postnatal	OR	95% CI	p
Own a hand sanitizer	Yes	289(99.0)	53(100.0)	0.845	0.44 – 0.56	0.316
	No	3(1.0)	0(0.0)			
Wear a mask when going out	Yes	291(99.7)	53(100.0)	0.846	0.69 – 0.75	0.563
	No	1(0.3)	0(0.0)			
Wash hands with soap under running water	Yes	291(99.7)	53(100.0)	0.846	0.70 – 0.75	0.563
	No	1(0.3)	0(0.0)			
Seek medical advice when symptoms such as fever and cough appear	Yes	252(86.3)	53(100.0)	0.826	0.00 – 0.02	0.004
	No	40(13.7)	0(0.0)			
Monitor body temperature	Yes	237(81.2)	52(98.1)	0.083	0.00 – 0.02	0.002
	No	55(18.8)	1(1.9)			
Open windows to keep the air fresh	Yes	289(99.0)	53(100.0)	O.845	0.47 – 0.54	0.316
	No	3(1.0)	0(0.0)			
Rest properly and don't stay up late	Yes	281(96.2)	53(100.0)	0.841	0.07 – 0.08	0.053
	No	11(3.8)	0(0.0)			
Home environment disinfection	Yes	289(99.0)	53(100.0)	0.845	0.46 – 0.57	0.316
	No	3(1.0)	0(0.0)			
Reduce visits to crowded places	Yes	291(99.3)	54(100.0)	0.843	0.57 – 0.65	0.41
	No	2(0.7)	0(0.0)			
Avoid direct contact with public facilities that may be infected, such as elevator buttons and stair railings	Yes	293(100.0)	54(100.0)			
Active quarantine after contact with high-risk groups	Yes	289(98.6)	54(100.0)	0.843	0.38 – 0.43	0.243
	No	4(1.4)	0(0.0)			
Cover mouth and nose when coughing or sneezing	Yes	291(99.3)	54(100.0)	0.843	0.60 – 0.64	
	No	2(0.7)	0(0.0)			

5. Psychological impact of COVID-19 on study subjects

Based on the three thematic sections assessed (depression, anxiety and stress), majority had scores equivalent to normal outcomes. However, an increased level of anxiety was generally observed amongst pregnant and postnatal women. The predominant state of

anxiety in pregnant women was mild (n=13, 4.5%), whilst that of postnatal was moderate (n=2, 3.7%).

In all three sections, an episode of severe and or extremely severe case was seen in postnatal participants. Only one extremely severe case of anxiety was observed in the pregnant women, (p= 0.402 with 95% CI of 0.36 to 0.47) (Table 5).

Table 5. Psychological impact of COVID 19 on study subjects

Variable	Pregnant	Postnatal	95% CI	p
Depression				
Normal	287(98.3)	52(96.3)	0.03-0.08	0.095
Mild	1(0.3)	1(1.9)		
Moderate	4(1.4)	0(0.0)		
Severe	0(0.0)	1(1.9)		
Anxiety				
Normal	272(93.2)	50(92.6)	0.37-0.47	0.402
Mild	13(4.5)	1(1.9)		
Moderate	4(1.4)	2(3.7)		
Severe	2(0.7)	0(0.0)		
Extremely severe	1(0.3)	1(1.9)		
Stress				
Normal	290(99.3)	52(96.3)	0.15-0.23	0.115
Mild	2(0.7)	1(1.9)		
Extremely severe	0(0.0)	1(1.9)		

DISCUSSION

Knowledge about COVID-19 and its possible detrimental effects on both expectant and postnatal mothers will serve to dispel unfounded rumors and myths about the disease and thereby influence the preventive measures that have been adopted thus far in a positive manner. This will also serve as basis for awareness creation and clinical sensitization of pre- and postnatal women in future pandemic occurrence.

According to the survey, pregnant and postnatal women in the Tema Metropolis had high understanding of COVID-19 (80.5%). This result is comparable to a study conducted in China where more than 70% of the women had enough understanding of COVID-19 (Maharlouei et al., 2020). Similarly, a study conducted in Iran revealed that about 70% of the participants demonstrated good knowledge of the topic (Clements, 2020). Studies carried out in various regions of the world, including West Africa, Asia, and the United States of America, also found equivalent findings (Mannan and Mannan, 2020; Nwafor et al., 2020; Zhong et al., 2020; Turan, Kul and Turgut, 2021) which strengthens the general conclusion of the current study.

Further, both groups of women exhibited significant knowledge regarding the infection, with more postnatal women (98.1%) demonstrating improved understanding of the transmission dynamics as compared to pregnant women (96.3%). These results are comparable to reports of similar studies from Turkey (98.51%) (Omobowale et al., 2021), Iran (80%) (Clements, 2020), and India (82.3%) (Nwafor et al., 2020). Also, majority of the women in both study cohorts responded being aware that COVID-19 can spread even in asymptomatic

individuals. The degree of knowledge demonstrated by the study participants might be due to the fact that majority of subjects (86.7%) had completed at least a senior high school, which suggests that they were more receptive and adept to learning and comprehending new information. With the exception of one postnatal woman (1.9%), all of them felt that COVID-19 may be spread by respiratory droplets and close touch. However, in the pregnant women, 3.7% were unaware of the transmission route for COVID-19. This might be indicative of the fact that, some pregnant women were marginally more vulnerable and susceptible to the SARS-CoV-2 infection than the postnatal women as a result of the information gap regarding its transmission.

Although postnatal women (96.3%) had a higher score than pregnant women (84.7%), the majority of participants had adequate knowledge of the symptoms of COVID-19. This discrepancy may be due to the fact that postnatal women, who would have spent some time in the hospital before leaving for their various homes, may have been educated about the symptoms experienced before, during, and after childbirth. However, unlike postpartum mothers, pregnant women mostly rely on Antenatal care (ANC) visits for clinical information, which had curtailed in the advent of the COVID-19 pandemic. Thus, they may not have interacted with healthcare professionals as frequently as expected. Approximately 45% subjects among the pregnant women strongly debunked the belief of COVID-19 as a punishment from God (Pieterse and Landman, 2021). However, approximately 10% of the same study participants had strong convictions that COVID-19 was a punishment meted to mankind by God (Pieterse and Landman, 2021). Again, it was evident that most people were not in agreement with the claim that COVID-19 is a disease for rich

people although a study in Nigeria had a varying opinion as a significant majority believed COVID-19 was a disease for the upper class (Omozuwa and Uwaibi, 2021). This idea, was attributed to the supposed extravagant life such as international travel by air among this group, influencing the contraction and importation of the disease. The study's findings revealed that 98.6% of subjects had a strong understanding of COVID-19 and the fundamental precautions to avoid contracting the virus. This is corroborated by a research conducted in Nigeria that produced comparable results (Lettor et al., 2020). However, one may argue that the current study's large percentage of individuals having at least a high school education helps to explain the aforementioned occurrence. Results from this study indicates that postnatal mothers had a much better level of awareness and understanding of infection prevention control measures in comparison with pregnant women. This understanding translated in a better awareness level and response to questions surrounding basic personal hygiene.

About social distancing, environmental hygiene and sanitary practices, subjects demonstrated awareness of the need to avoid direct contact with public facilities that may be infected, such as elevator buttons and stair railings. They also shared that ensuring good ventilation and regular disinfection was key to reducing the spread of infection. Correspondingly, this finding is supported by other studies (Saba et al., 2020; Ding et al., 2021), where majority of the study participants believed COVID-19 could be transmitted by touching droplets on surfaces or objects. A possible explanation may be attributed to the intense health education done through the media and other platforms as well as the health facilities although data on the source(s) of the subjects' information was not solicited for

which was a limitation in the study. Though, current evidence has shown that the dissemination of wrongful information has led to diverse knowledge, perceptions and attitudes towards the preventive measures to contain the spread of pandemic viruses (Ferdous et al., 2020; Tabong and Segtub, 2021), the converse is also true.

Superstitions and perceptions surrounding the origin of the SARS-CoV-2 virus have caused many to be indifferent (Donders et al., 2020). Whilst treatment protocols clearly state and require individuals showing clinical signs and symptoms to go into quarantine, some do not heed to this (Ferdous et al., 2020). It was revealed from this study that, some pregnant (1.4%; n=4) women did not think it was necessary to go into active quarantine after coming into contact with high-risk groups. This can be justified since issues of public health concern such as this, is relatively new to many, especially those in sub-Saharan Africa and needed some time to adapt to new norms. Likewise, some pregnant women (13.7%; n=40) from this study did not find it important to seek medical advice when they experienced symptoms such as fever and cough. Aligning this to the role of belief system in Africa especially as an important determinant of health, it is apparent that similarities in the religious, superstitious beliefs and perceptions of subjects may have played an influencing role.

Infections such as COVID-19 are classically marked by a rise in body temperature above normal levels (Baran et al., 2021). Awareness of this is important in the diagnoses of an infection and in the case of COVID, routine temperature checks have been advocated at various points of entry (Molgora and Accordini, 2020). Majority of the study subjects (82.8%; n= 289), pregnant 237 (81.2%) and postnatal 52(98.1%) knew and were aware of regular monitoring

of body temperature was important in assessing infection. Perhaps, the high literacy levels of study participants may have been a contributing factor to the high awareness level. This finding is however consistent with other studies (Saba et al., 2020; Omobowale et al., 2021). On the contrary, some pregnant 55 (18.8%) and postnatal 1 (1.9%) woman were not aware that regular monitoring of body temperature was important in assessing infection. It can be elucidated that, a reduction in the frequency of attending prenatal clinic by some of the study participants due to fear of contracting the virus may have denied them access to health education in this regard.

Psychologically, the state of being pregnant and motherhood has been shown to induce some level of impact on the mental health of potential mothers and postnatal mothers alike (Zuccolotto et al., 2019). Concerns emanating from thoughts about the child bearing process, the well-being of the fetus or child, amongst others are common issues that linger and influence the mental status of pregnant and postnatal mothers (Ahmad and Vismara, 2021). In the wake of the COVID-19 pandemic, these concerns have been proven to worsen over the course of time. Using the Depression Anxiety Stress Scale 21 (DASS-21), results from this study indicate that 287 (98.3%) pregnant women had a normal depression status. With poor knowledge and heightened fear of being infected and transmitting the disease to the developing fetus playing a vital role in one's susceptibility to being depressed (Anandhi et al., 2021), it can be deduced that pregnant women in this study having exhibited good knowledge on SARS-CoV-2 infection may have influenced the normal depression status. With lots of uncertainties and false news debunked by state media agencies and other health organizations amidst calls for inten-

sification of education on the pandemic (Atkinson et al., 2020; Molgora and Accordini, 2020), it can be said that these efforts have yielded positive results in Ghana and maybe beyond.

Equally, 52 (96.3%) postnatal mothers also reported to have normal status on the depression scale. Although not statistically significant (p= 0.095), 5 (1.7%) of the pregnant subjects stated they experienced depressive episodes (Mild 1 (0.3%) and Moderate 4 (1.4%)). Also, in comparison to a systematic review report, the prevalence of depression among pregnant women in this study was lower than the prevalence of depression in several countries (29.6-72%) (Anandhi et al., 2021; Peng et al., 2021; Almeida et al., 2020). It is however reported that, higher depression scores and cases were recorded during the first wave of the pandemic amongst pregnant women as compared to those recorded prior to the pandemic (Ahmad and Vismara, 2021). Notwithstanding, fear and key stressors arising from concerns about their vulnerability to infection, the risk of vertical transmission as well as worries about the risk of pregnancy related complications have been cited as factors that compound the susceptibility of experiencing depressive episodes (Zhou et al., 2021). Among postnatal mothers, 2 (3.8%) were reported to be depressed (Mild 1 (1.9%) and Severe 1 (1.9%)). In a similar study, (Almeida et al., 2020) reported a 33.8% prevalence of postnatal mothers interviewed with postpartum depression. Issues bordering marital status, unwanted pregnancy, unexpected gender, infant illnesses, and low social support have been posited as independent predictors contributing to this occurrence (Ahmad and Vismara, 2021). Nonetheless, differences between reported prevalence's may be attributed to the increased sample size and variabilities in the study site and period.

With respect to anxiety, a total of 272 (93.2%) pregnant women had normal status whilst 20 (6.9%) had some form of anxiety disorder (Mild 13 (4.5%), Moderate 4 (1.4%), Severe 2 (0.7%) and extremely severe 1 (0.3%)). Pregnant women included in this study although asymptomatic, did not know their COVID-19 status and hence may have accounted for the lower anxiety disorder prevalence. A total of 50(92.6%) of postnatal mothers also had normal anxiety status whilst cumulatively, 4 (7.5%) of the study participants (1 (1.9%), 2 (3.7%), and 1 (1.9%)) reported mild, moderate and extremely severe anxiety levels respectively. Similarly, according to a study by (Almeida et al., 2020), 6(8.5%) postnatal mothers were found to exhibit some signs consistent with postpartum anxiety. Several concerns including financial issues, inadequate social support from family, partners and loved ones besides COVID-19 have been named to influence the likelihood of heightened anxiety in postnatal mothers (Peng et al., 2021). Not only so, it has been seen that postnatal mothers who had low birthweight babies (Ahmad and Vismara, 2021), experienced lactation problems and/or other postnatal complications were more prone to having higher anxiety levels.

In relation to stress, it was observed that 290 (99.3%) of pregnant women expressed that they had normal stress levels. On the other hand, 2 (0.7%) pregnant subjects reported that they had mild levels of stress. This could be attributed to interpersonal differences amongst study participants and the cross-sectional study nature of this survey which relies on self-reported information, which is prone to bias, recall error and personal prejudice. Based on findings from this study, 52 (96.3%) out of the total postnatal mothers reported normal stress levels, however, among two participants, one experienced mild stress levels

whereas the other experienced extremely severe levels of stress. A review of literature during the pre- and post-pandemic period showed that stress levels have increased over the course of the COVID-19 pandemic (Anandhi et al., 2021; Peng et al., 2021). The lower stress levels reported in this study could be attributed to the fact that, the postnatal mothers did not have to worry about vertical transmission since they had already put to birth.

The study is limited in failing to solicit for subjects' source(s) of information about COVID-19. However, in general majority of the participants seem well informed and had adequate knowledge about the symptoms of COVID-19 although more postnatal than pregnant women had higher scores. Post-natal mothers had a much better level of awareness and understanding of infection prevention control measures in comparison with pregnant women. In comparison, post-natal mothers demonstrated good know-ledge and perceptions about COVID-19 as opposed to their counterparts, the pregnant women. However, the psychological health of postnatal women in this study seemed to be impacted as opposed to the pregnant women. We will highly recommend the availability of clinical psychologists in the various referral health centers' who will psyche and talk through pre and postnatal mothers through during their clinical care visits.

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CONFLICT OF INTERESTS

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