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COMPREHENSIVE ANALYSIS OF KNOWLEDGE, PERCEPTION, AND PREPAREDNESS OF GHANAIAN PHARMACISTS TOWARDS A PANDEMIC OR ANOTHER WAVE OF COVID-19

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ABSTRACT: *Despite the decline in infection and death rates, COVID-19 remains a significant global health concern. This study delves into Ghanaian pharmacists' knowledge, perception, and preparedness towards a pandemic or another wave of COVID-19. A cross-sectional survey was conducted among pharmacists across all 16 regions of Ghana between May and July of 2023, with a total of 1199 responses recorded. The data was analyzed using IBM Statistical Product and Service Solution (SPSS). Of the respondents, 629 (52.5%) were males, while 570 (47.5%) were females. Our study reveals that 98% of the participants provided positive feedback about knowledge-related questions. The study also found an adequate understanding of pharmacists' attitudes toward coronavirus symptoms, transmission, disease severity, and preventive measures. Ghanaian pharmacists' responses toward the perceived susceptibility to COVID-19 were analyzed using questions related to disease contamination, contracting, and fear level due to the disease. The optimistic behaviour and perception of Ghanaian pharmacists were commendable. However, only 45% of the pharmacists were confident about their level of preparedness, underlining the urgent need for updated information and infection control policies. Infection control policies with updated information should be available for all healthcare professionals. Moreover, Ghana needs a blueprint for pandemic management.*

KEYWORDS: Ghana, Pharmacists, COVID-19, pandemic

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BACKGROUND

COVID-19 remains a significant challenge for public health, especially in countries like Ghana, where healthcare services are strained (Lartey et al., 2023). Like other healthcare providers, pharmacists are crucial in managing the pandemic by offering accessible, cost-effective healthcare services (Victor C Wutor, 2021). With pharmacies staying open even during lockdowns, people increasingly rely on pharmacists for healthcare needs. (Shankar, Kumar, & Upadhyay, 2023)Pharmacists help with infection control and provide patient care and support, often in clinical and managerial capacities (Wutor, Victor, 2021). Therefore, several preventative measures have been taken to stop the COVID-19 virus from spreading. During the COVID-19 epidemic, good hygiene, face masks, and social distancing have all been recommended (Watson et al., 2023). Hand sanitizers and masks are the most frequently bought items at pharmacies, also visited by the general public for prescription drugs, medical supplies, and health-related information. (Phuong65, Thanh65, & Godman).

The guidelines released by the Centers for Disease Control and Prevention (CDC) and the International Pharmaceutical Federation (FIP) USA are to be followed by pharmacists during the coronavirus pandemic throughout the world (Aruru et al., 2021). The WHO also approved those guidelines. These guidelines included counselling, referring, educating, and informing the public, practising pharmacy vigilance, offering patient care and support in collaboration with other healthcare professionals, and ensuring the safe distribution and storage of pharmaceutical medicines, supplies, and other devices, such as masks, gloves, and other similar items. Hospital pharmacists are particularly vital in managing emergencies, ensuring the supply chain of essential medicines remains uninterrupted (Hayden & Parkin, 2020; Song et al., 2021). However, despite their vital role, pharmacists often receive less priority in accessing personal protective equipment (PPE). The increased workload, fear of infection, and disruption to individual and social lives due to lockdowns put pharmacists, like other healthcare professionals, at risk of mental health issues. Understanding pharmacists' perspectives on COVID-19 management and their preparedness is crucial for developing effective strategies to support them (Flotildes et al., 2023; Watson et al., 2023).

On March 12, 2020, Ghana, a country of 34 million people, declared its first COVID-19 case. Since then, the government has implemented strict measures. Such measurements were adapted to stop the virus's spread (Lamptey et al., 2023). Lockdowns have been imposed at specific times (with levels of lockdown ranging from partial to complete), massive gatherings have been prohibited, and a culture of social and hygienic distancing has been developed among residents and citizens, particularly when visiting rush places like markets or restaurants (Mendzhul, 2021).

The Ministry of Health (MOH) issued stringent directives in certain areas, including using suitable masks for safe isolation, availability of free hand sanitizers, temperature monitoring of patrons, and outside restrictions for people with high body temperatures. However, in April 2020, the lockdown was lifted, and public health measures remained in place. Ghana has recorded a total of COVID-19 instances of active cases 3701, with 698 deaths in a year till 2021 (Matthews et al., 2021). As a result, the importance of educating the public about COVID-19 and encouraging preventative steps to help communities survive this epidemic fell on pharmacists. This study aimed to assess the level of preparedness of both public and private sector pharmacies to supply prescription drugs during the COVID-19 pandemic. The study also

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investigated the knowledge and perception of community pharmacists in Ghana and the preparedness level of healthcare workers for upcoming pandemics like COVID-19.

METHODOLOGY

Study Design and Period

A cross-sectional survey comprised 55 questions about knowledge, perception, and preparedness for the coronavirus pandemic. The data was collected from the participants between May 2023 and July 2023.

The comprehensive analysis provides a better understanding of the pharmacists' data from Ghana. The observed variables, i.e., demographic characteristics of the study respondents, were obtained within a single period.

The inclusion criteria for the designed questionnaire were standard: pharmacists with direct care for COVID-19 patients. Demographic variables like gender, age, region, and number of years of practice were captured. The SPSS software was employed to analyze the data.

Study Area

This qualitative analysis was conducted in a sub-Saharan country of West Africa named Ghana. This study included all the regions (16) of Ghana. The questionnaire was shared among community and hospital pharmacists through social media platforms like Facebook, WhatsApp, and Telegram. Ghanaian Health Ministry has taken a massive step in collaborating with Health services nationwide to initiate preventive measures for the coronavirus.

Targeted Population

This specific study targets Pharmacists from all the various regions of Ghana. The pharmacists who are in service and have experience dealing directly with patients were included in the study. Signed consent forms were already obtained from the study participants.

Sampling

The study's sample size was determined using an online tool called OpenEpi. This tool aims for a 95% confidence level, a standard deviation of 0.5, and a confidence interval of ± 5%. All the data collected for the study were analyzed using the Statistical Package for the Social Sciences (SPSS Inc., version 22, IBM, Chicago, IL, United States), with a significance level set at $p < 0.05$. The findings are presented with descriptive statistics like frequency, percentages, mean, standard deviation and median.

As of December 2020, the total number of Pharmacists was 3353. In 2021, 249 students graduated. Assuming the same number of graduates in 2022, the total number of pharmacists will be 3851 (approximately 4000). We used a simple random sampling technique to select participants for this study. Using the OpenEpi online formulary, the sample size for pharmacists should be 351. However, we received 1199 responses from pharmacists across various backgrounds and regions in Ghana. To make data collection and analysis more accessible, we used the SurveyMonkey application to reach out to the primary respondents. The University of

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Health and Allied Sciences, Ho, Ghana, approved the study's ethical clearance (UHAS-REC A 5 [4] 22-23).

RESULTS

One hundred ninety-nine participants from different regions of Ghana responded to the questionnaire. The data was collected mainly from hospital and community Pharmacists, and the link to the questionnaire was distributed through social media apps.

The demographic characteristics of the study participants based on males and females, age groups, region of practice, and work experiences are shown graphically below.

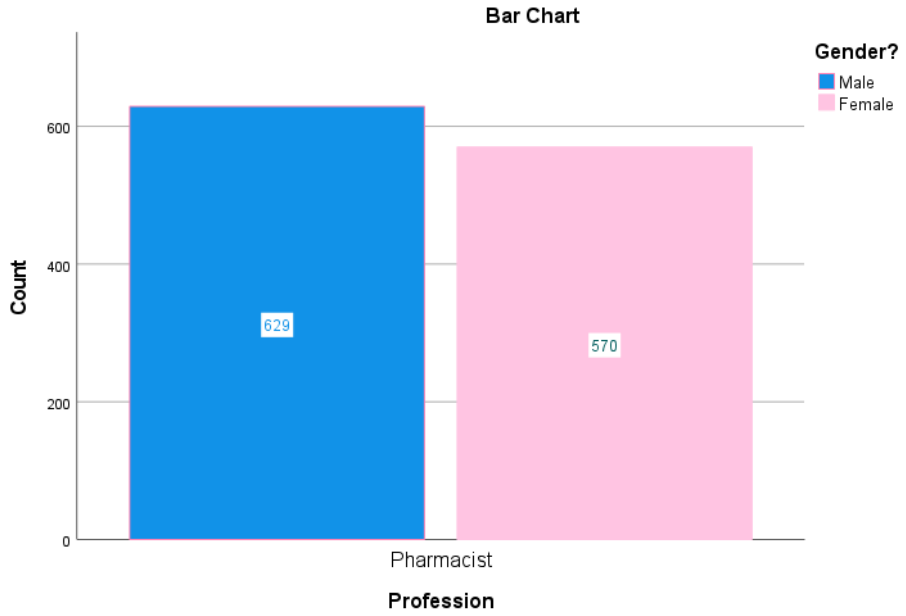

Figure 1: Graphical representation of Genders included in the study.

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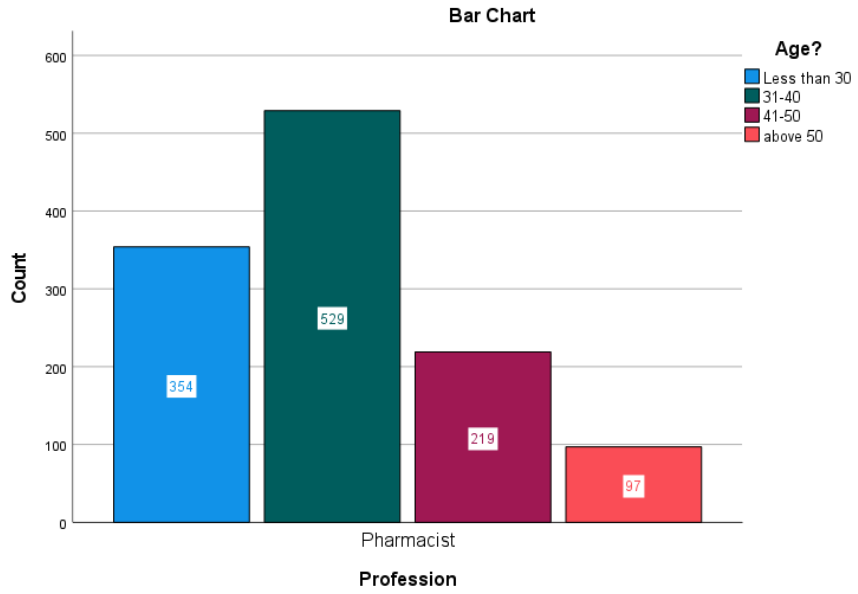

Figure 2: Pharmacists' age groups

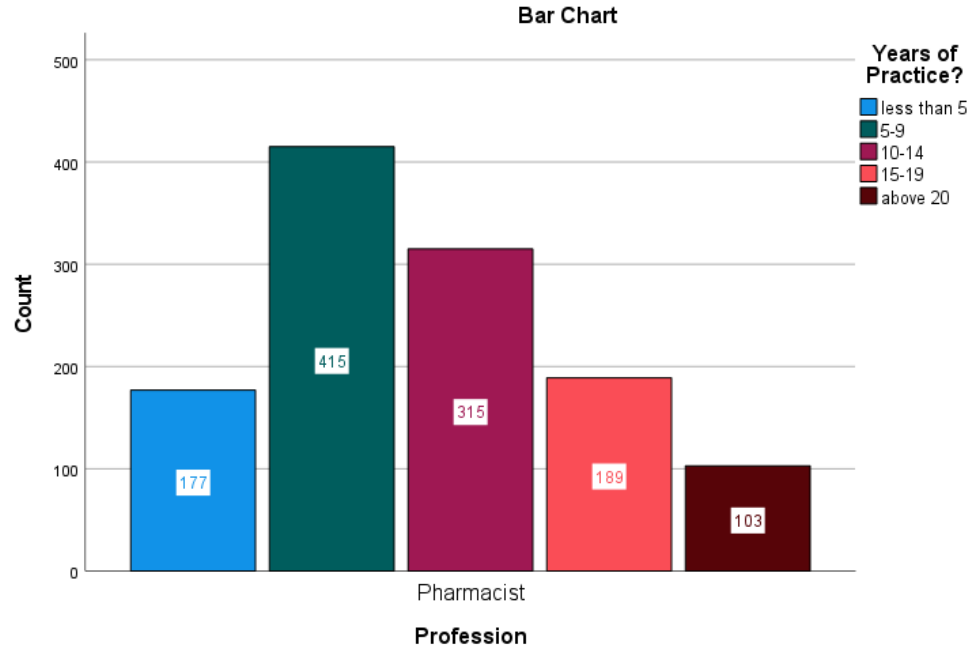

Figure 3: Pharmacists' years of practice

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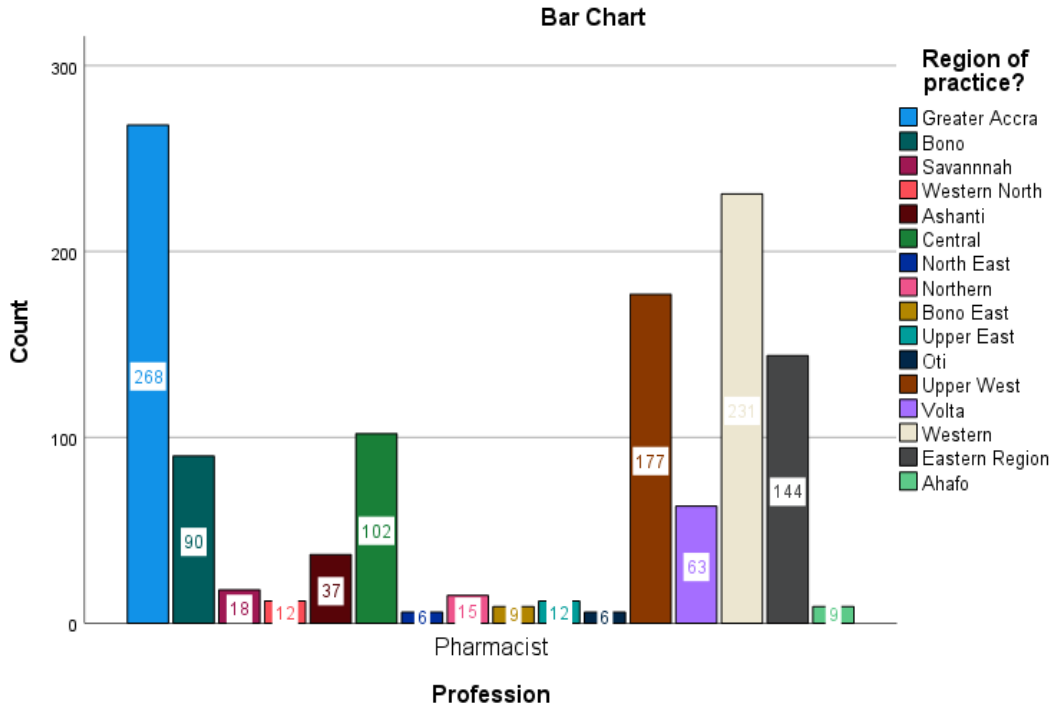

Figure 4: Pharmacists' region of practice

The different frequencies of the 1199 respondents were calculated. The variable frequencies and their distributions are listed in Figures 1, 2, 3 and 4.

General knowledge about COVID-19 was determined by the 14 questions related to the symptoms due to coronavirus like fever, runny nose, sore throat, joint and muscle pain, shaking chills, shortness of breath, diarrhoea, fatigue, dry cough, nasal congestion, weight loss, stomach discomfort, difficulty in sleeping and the incubation period of the virus. The responses were compliance as 'Yes,' 'No,' and 'I do not know.' The p-value > 0.001 is stated as a significant value.

Table 1: General Knowledge Symptoms of Covid-19

Symptoms	**Responses**	**Pharmacist**	**P-value**
Fever	**Yes**	1178	< .001
	No	21	
	I do not know	0	
Runny Nose	**Yes**	1095	< .001
	No	104	
	I do not know	0	
Sore throat	**Yes**	1181	< .001
	No	18	
	I do not know	0	
Joint and muscle pain	**Yes**	1145	< .001
	No	49	
	I do not know	5	
Shaking chills	**Yes**	1130	< .001

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	No	53	
	I do not know	16	
Shortness of breath	**Yes**	1173	< .001
	No	26	
	I do not know	0	
Diarrhea	**Yes**	1071	< .001
	No	119	
	I do not know	9	
Fatigue	**Yes**	1163	< .001
	No	36	
	I do not know	0	
Dry cough	**Yes**	1135	< .001
	No	61	
	I do not know	3	
Nasal congestion	**Yes**	1075	< .001
	No	117	
	I do not know	7	
Weight loss	**Yes**	1072	< .001
	No	102	
	I do not know	25	
Stomach discomfort	**Yes**	1044	< .001
	No	133	
	I do not know	22	
Difficulty sleeping	**Yes**	1081	< .001
	No	95	
	I do not know	23	
The incubation period is 5–14 days.	**Yes**	1187	< .001
	No	6	
	I do not know	6	

General knowledge about COVID-19 is captured in Table 1 above.

Table 2: Which of the following situations are means of transmission/spread of coronavirus (COVID-19)?

Symptoms	**Responses**	**Pharmacist**	**P-Value**
Coughing or sneezing near people infected with the coronavirus (COVID-19)	**Yes**	1181	< .001
	No	15	
	I do not know	3	
Go to areas/countries affected by coronavirus (COVID-19)	**Yes**	1136	< .001
	No	60	
	I do not know	3	
Touching objects or surfaces that have been in contact with someone who has the virus	**Yes**	1172	< .001
	No	24	
	I do not know	3	
	Yes	1154	< .001

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Shake hands with someone who has an active case of coronavirus (COVID-19)	**No**	42	
	I do not know	3	
Being on the same plane with someone with coronavirus (COVID-19)	**Yes**	1160	< .001
	No	36	
	I do not know	3	
Eating food prepared by someone infected or exposed to the coronavirus (COVID-19)	**Yes**	679	< .001
	No	492	
	I do not know	28	
Participate in blood transfusions	**Yes**	136	< .001
	No	1020	
	I do not know	43	
By relating to people who were in a hospital or emergency room	**Yes**	725	< .001
	No	456	
	I do not know	18	
Relating to cases identified by doctors	**Yes**	1136	< .001
	No	54	
	I do not know	9	
About cases identified during evaluations at entry points to my country	**Yes**	1142	< .001
	No	45	
	I do not know	12	

Knowledge about the transmission of coronavirus remained a primary source of prevention. The virus spreads from human to human through coughing, sneezing, blood transfusions, childbirth, handshaking, airplane travel, close contact at restaurants, markets, local shops, etc. Pharmacists' knowledge of the source of transmission of the virus is analyzed in Table 2.

Table 3: Severity of the coronavirus (COVID-19).

It can be cured	**Agree**	349	< .001
	Disagree	787	
	Not sure	63	
It is highly contagious	**Agree**	1166	< .001
	Disagree	6	
	Not sure	27	
The coronavirus mortality rate is worse than that of influenza or tuberculosis	**Agree**	938	< .001
	Disagree	216	
	Not sure	45	
COVID-19 causes permanent physical damage to patients	**Agree**	985	< .001
	Disagree	111	
	Not sure	103	
You have symptoms similar to common flu and influenza	**Agree**	1148	< .001
	Disagree	24	
	Not sure	27	
My community/country does not have a coronavirus vaccine	**Agree**	258	< .001
	Disagree	743	

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	Not sure	198	
My community/country does not have adequate medicine or treatment for the disease	**Agree**	261	< .001
	Disagree	716	
	Not sure	222	
Hospitals in my community/country have not taken adequate infection control measures	**Agree**	261	< .001
	Disagree	716	
	Not sure	222	
Coronavirus impact is worse compared to influenza or common cold	**Agree**	842	< .001
	Disagree	300	
	Not sure	57	
The authorities of my country are prepared to face the disease	**Agree**	896	< .001
	Disagree	42	
	Not sure	261	
The response of the health authorities of my country/community is effective	**Agree**	892	< .001
	Disagree	39	
	Not sure	268	

The severity of the disease leads to difficulty in treating and curing the virus. Mortality rates due to the coronavirus were observed more than during the influenza and tuberculosis pandemics. The responses were collected as 'Agree,'' Disagree,' and 'Not sure.' (Table 3)

Table 4: Knowledge about contagion prevention/precaution measures

Washing hands vigorously (soap/water) for 20 seconds helps prevent disease	**Agree**	1094	< .001
	Disagree	33	
	Not sure	72	
Special care should be taken if a person has coronavirus (COVID-19) symptoms in my community	**Agree**	1169	< .001
	Disagree	0	
	Not sure	30	
Personal hygiene	**Agree**	1163	< .001
	Disagree	3	
	Not sure	33	
Healthy lifestyle	**Agree**	1163	< .001
	Disagree	3	
	Not sure	33	
Daily temperature monitoring	**Agree**	1108	< .001
	Disagree	19	
	Not sure	72	
Avoid travelling abroad	**Agree**	230	< .001
	Disagree	912	
	Not sure	57	
Use of mask	**Agree**	1130	< .001
	Disagree	0	
	Not sure	69	
Clean environment	**Agree**	1163	< .001
	Disagree	3	

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	Not sure	33	
Stay home if one is experiencing symptoms of COVID-19.	**Agree**	1166	< .001
	Disagree	3	
	Not sure	30	
Seek medical attention if one is experiencing symptoms of COVID-19	**Agree**	1181	< .001
	Disagree	3	
	Not sure	15	
Avoid crowded places	**Agree**	1166	< .001
	Disagree	6	
	Not sure	27	
Sending passengers with coronavirus symptoms (COVID-19) to a hospital or referral center for examination	**Agree**	1165	< .001
	Disagree	7	
	Not sure	27	
Use a disinfectant at home or work	**Agree**	1148	< .001
	Disagree	0	
	Not sure	51	
Confirm symptoms on any website	**Agree**	1075	< .001
	Disagree	67	
	Not sure	57	
Wore something to clean objects that may have come in contact with someone with coronavirus (COVID-19)	**Agree**	1111	< .001
	Disagree	16	
	Not sure	72	
Avoid Asian restaurants or shops	**Agree**	87	< .001
	Disagree	1024	
	Not sure	88	
Cancel appointments in hospitals or doctor's offices.	**Agree**	177	< .001
	Disagree	950	
	Not sure	72	
Avoid public transportation	**Agree**	1089	< .001
	Disagree	59	
	Not sure	51	
Antibiotics are the first-line treatment for the management of coronavirus (COVID-19)	**Agree**	1098	< .001
	Disagree	71	
	Not sure	30	
Preparation of raw meats and other foods with different knives	**Agree**	166	< .001
	Disagree	978	
	Not sure	55	

Prevention of infection is an integral part of pandemic management. Ghanaian pharmacists' knowledge about the contagion and preventive measures was analyzed and presented in Table 4.

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Table 5: Perceived Susceptibility to Covid-19

Questions	Responses	Pharmacist	P-Value
Do you think there is a stigma related to the coronavirus (COVID-19)	**Yes**	926	< .001
	No	261	
	I do not know	12	
Thinking that I could become infected with coronavirus (COVID-19) makes me nervous/anxious	**Yes**	536	< .001
	No	663	
	I do not know	0	
Nothing I do can stop the risk of catching me	**Yes**	471	< .001
	No	692	
	I do not know	36	
If I contracted the coronavirus (COVID-19), it will have serious consequences for me or my relatives	**Yes**	478	< .001
	No	703	
	I do not know	18	
I get upset when I think about the coronavirus (COVID-19)	**Yes**	448	< .001
	No	733	
	I do not know	18	
Coronavirus (COVID-19) problems will pass quickly	**Yes**	516	< .001
	No	647	
	I do not know	36	

The risk of perception toward coronavirus by the Pharmacists was determined. The significant values in compliance with the responses collected are 'Yes,' 'No,' and 'I do not know.' These responses are given in **Table 5**.

Table 6: Are you afraid of:

Questions	Responses	Pharmacists	P-Value
Fear of being in contact with people with flu symptoms (e.g. cough, runny nose, sneezing, fever)	**Yes**	932	< .001
	No	264	
	I do not know	3	
Fear of eating out (for example, street vendor centers, food courts)	**Yes**	562	< .001
	No	628	
	I do not know	9	
Fear of being in contact with people who have just returned from abroad	**Yes**	488	< .001
	No	699	
	I do not know	12	
Fear of visiting hospitals	**Yes**	511	< .001
	No	673	
	I do not know	15	

Pharmacists were among the healthcare workers on the front lines during the pandemic outburst. The participants' fear level was perceived and analyzed. The questions are listed in Table 6.

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Table 7: Perceived susceptibility to coronavirus infection (COVID-19), Evaluate the possibility of contracting the disease:

Oneself	**Very likely**	646	< .001
	Probable	481	
	Unlikely	72	
My relatives	**Very likely**	931	< .001
	Probable	214	
	Unlikely	54	
People over 60years	**Very likely**	1036	< .001
	Probable	163	
	Unlikely	0	
Adults	**Very likely**	992	< .001
	Probable	201	
	Unlikely	6	
Children	**Very likely**	307	< .001
	Probable	435	
	Unlikely	457	
Medical services personnel	**Very likely**	1001	< .001
	Probable	174	
	Unlikely	24	
Food vendors	**Very likely**	692	< .001
	Probable	453	
	Unlikely	54	
Food handlers	**Very likely**	674	< .001
	Probable	468	
	Unlikely	57	
General public	**Very likely**	994	< .001
	Probable	205	
	Unlikely	0	
Taxi drivers	**Very likely**	1033	< .001
	Probable	163	
	Unlikely	3	

The possibility of contracting the disease was examined and reported in Table 7 above.

Table 8: Where are people likely to get coronavirus (COVID-19)?

Home	**Very likely**	201	< .001
	Probable	624	
	Unlikely	374	
Health institutions	**Very likely**	1004	< .001
	Probable	159	
	Unlikely	36	
Public transport	**Very likely**	1058	< .001
	Probable	141	

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	Unlikely	0	
Markets or shops	**Very likely**	1030	< .001
	Probable	163	
	Unlikely	6	
Countries affected by the coronavirus (COVID-19)	**Very likely**	1052	< .001
	Probable	144	
	Unlikely	3	

COVID-19 spreads from an infected person to others. People are more likely to get COVID-19 primarily by travelling from one place to another, e.g., from an environment of no infection to one with a very high infection rate. The pharmacists' perception knowledge was analyzed, and the responses are provided in Table 8.

Table 9: What do you think is the percentage?

Efficacy of treatments for coronavirus (COVID-19)	**Very likely**	309	< .001
	Probable	881	
	Unlikely	9	
Likelihood of having a major outbreak of coronavirus (COVID-19) from person to person in my community	**Very likely**	777	< .001
	Probable	400	
	Unlikely	22	
Concern that you or your family members will get the virus	**Very likely**	361	< .001
	Probable	778	
	Unlikely	60	
Having effective medications or remedies available	**Very likely**	370	< .001
	Probable	766	
	Unlikely	63	

Table 9 presents data on the efficacy of treatment, the likelihood of a significant COVID-19 outbreak, and effective medication for treatment.

Table 10: Level of Preparedness

Question	**Response**	**Pharmacist**	**P-Value**
Education/training about COVID-19 infection control and update policy as required?	**Done**	527	< .001
	In progress	549	
	I do not know	123	
Informational materials (e.g., brochures and posters) on COVID-19?	**Done**	521	< .001
	In progress	573	
	I do not know	105	
Is alcohol-based hand sanitizer for hand hygiene available in every patient room?	**Done**	775	< .001
	In progress	331	
	I do not know	93	
PPE available immediately outside of the patient room is provided	**Done**	714	< .001
	In progress	368	

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	I do not know	117	
Ensuring safety in working place	**Done**	541	< .001
	In progress	526	
	I do not know	132	
Readiness to implement every standard precaution	**Done**	433	< .001
	In progress	625	
	I do not know	141	
Activities to prevent COVID-19 transmission to family members	**Done**	361	< .001
	In progress	652	
	I do not know	186	
Readiness for caring for febrile patients	**Done**	373	< .001
	In progress	664	
	I do not know	162	
Readiness of self away from family members	**Done**	376	< .001
	In progress	667	
	I do not know	156	
Readiness for caring for COVID-19-infected patients	**Done**	372	< .001
	In progress	653	
	I do not know	174	
Readiness overwhelmed with the new COVID-19	**Done**	380	< .001
	In progress	579	
	I do not know	240	
Readiness for telling family and friends if infected with COVID-19	**Done**	367	< .001
	In progress	618	
	I do not know	214	
Readiness for caring for COVID-19-infected patients if their colleagues are infected with COVID-19	**Done**	398	< .001
	In progress	606	
	I do not know	195	
The readiness of the institution to support healthcare providers	**Done**	391	< .001
	In progress	622	
	I do not know	186	
Readiness for COVID-19 crisis that increased workload	**Done**	382	< .001
	In progress	643	
	I do not know	174	
Proper infection control training has been given	**Done**	419	< .001
	In progress	618	
	I do not know	162	
Support from your team members	**Done**	382	< .001
	In progress	643	
	I do not know	174	
Readiness that might eventually get COVID-19 at work	**Done**	382	< .001
	In progress	637	
	I do not know	180	
19. Determine a contingency staffing plan.	**Done**	367	< .001
	In progress	670	

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	I do not know	162	
Designate a point of contact for the healthcare union.	**Done**	400	< .001
	In progress	636	
	I do not know	163	
Designate a point of contact for the family members.	**Done**	454	< .001
	In progress	594	
	I do not know	151	

The level of preparedness of Pharmacists against COVID-19 is an indication of how prepared Ghana is for a pandemic or another wave of COVID-19. Results were captured with responses 'Done,' 'In progress,' and 'I do not know' options and presented in Table 10.

DISCUSSION

Our study findings indicate pharmacists' knowledge, perception, and preparedness level about the COVID-19 pandemic. According to the International Pharmaceutical Federation (FIP), pharmacists are the first responders for coronavirus patients. The primary purpose of this comprehensive analytical study was to investigate pharmacists' services as a measure of their readiness to protect the citizens of Ghana.

The traditional primary task of pharmacists is to provide medicines to patients as prescribed by Physicians or Doctors. (Ghaibi, Ipema, & Gabay, 2015), the role of the pharmacist has expanded dramatically over the years. Pharmacists must have knowledge and awareness about general safety precautions and personal protective equipment, including face masks, hand sanitizers, gloves, etc. Using medicinal products during the pandemic and providing pharmaceutical services to their patients or clients is necessary and one of the guidelines provided by FIP.

Our study indicates that 98% of the participants gave positive feedback about the knowledge-related questions. This study observed adequate knowledge about coronavirus symptoms, transmission, disease severity, and preventive measures. These results are consistent with those of several other studies on pharmacists. (Emre, Demirkan, & Serhat, 2020; Huynh et al., 2020; Saqlain et al., 2020).

The misconceptions and infodemics during the COVID pandemic lead to disinformation globally. (Shimizu, 2020)This indirectly increases the disease's severity and spread. As a result, healthcare workers are more reliable and responsible for providing awareness and the correct information from reliable sources. (Tamrat Befekadu Abebe et al., 2016) (Coronavirus, 2020). These results are similar to findings from previous work. (Darko et al., 2021; Sogbe, 2021).

Responses toward public transportation, restaurants, and markets as a transmission source were >96%. The results show significant p values. Other studies also determined similar values. (Huang et al., 2020; Larisa et al., 2020; Tirachini & Cats, 2020).

Ghanaian pharmacists' responses to perceived susceptibility to COVID-19 were analyzed using questions related to disease contamination, contracting, and fear level due to the disease. The participants indicated the fear of contracting disease from the infected patients and then passing

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it on to their families because of their occupational exposure. However, the responders positively perceive the stress and discomfort due to disease contamination as part of their professional obligations. The pharmacists' optimistic behaviours and perceptions provide significant data that further validates their role as frontline healthcare professionals.

Personal protective equipment and medical devices (thermometers, heart rate monitor devices, etc) must be provided in adequate quantity at the pharmacies in the country. As the disease spread globally and the pandemic was severe back in 2019-2020, the coronavirus attack affected middle-low countries like Ghana. (Afriyie et al., 2020; Gyimah et al.). Most pharmacists surveyed expressed positive adherence to COVID-19 infection safety and protection measures.

The pharmacists were questioned regarding their preparedness for a pandemic or another wave of COVID-19. Only 45% of the pharmacists were confident about their level of preparedness about their educational knowledge and training.

All healthcare workers should receive infection control policies and updated information about pandemics. Information materials like posters, awareness programs, and the use of medical devices and PPE were marked as ‘Done’ by 44% of the respondents. In comparison, 48% indicated those processes were ‘In Progress.’

In Ghana, 65% of pharmacists are prepared to provide alcohol-based sanitizers to 90% of hospital patients. Forty-four per cent of the participants reported progress in ensuring workplace safety from viral contraction. At the same time, 30% of pharmacists are prepared to restrict their activities to prevent the virus from spreading to family members. The other 55% have a progressive attitude, and 15% do not know about this.

Only thirty-one per cent of pharmacists indicated they were ready to care for febrile patients. The results show almost >50% positive feedback on the pharmacists' preparedness for future pandemics. These positive results indicate significant values and validate the data. The observed p-values >0.001 are statistically significant.

This study is the first in Ghana to examine Pharmacists’ knowledge, perception, and preparedness regarding COVID-19.

CONCLUSION

In conclusion, our comprehensive analysis of Ghanaian pharmacists' knowledge, perception, and preparedness towards a pandemic or another wave of COVID-19 has shed light on several crucial aspects. Our findings indicate that Ghanaian pharmacists possess a satisfactory level of understanding and knowledge regarding COVID-19 and exhibit commendable practices in managing the pandemic. Utilizing pharmacists' knowledge and expertise could benefit national governments and organizations in their efforts to prevent or mitigate future waves of COVID-19. Moving forward, it is imperative to address the gaps and ensure the active involvement of pharmacists in pandemic preparedness and response strategies. Additionally, further research and interventions in the future are warranted to validate the capacity of Ghanaian pharmacists and optimize their role in protecting public health during pandemics. Ghana needs a blueprint for pandemic management.

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REFERENCES

Afriyie, D. K., Asare, G. A., Amponsah, S. K., & Godman, B. (2020). COVID-19 pandemic in resource-poor countries: challenges, experiences and opportunities in Ghana. *The Journal of Infection in Developing Countries*, *14*(08), 838-843.

Aruru, M., Truong, H.-A., & Clark, S. (2021). Pharmacy Emergency Preparedness and Response (PEPR): A proposed framework for expanding pharmacy professionals' roles and contributions to emergency preparedness and response during the COVID-19 pandemic and beyond. *Research in Social and Administrative Pharmacy*, *17*(1), 1967-1977.

Novel Coronavirus (2019-nCoV) (2020) Situation Report – 11. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200131-sitrep-11-ncov.pdf (Assessed on May 18, 2024)

Darko, A. O., Mariwah, S., Abane, A. M., Amoako-Sakyi, R. O., & Pereko, K. A. (2021). Public road transport system and the spread of infectious diseases: Perspectives of operators and passengers in Accra, Ghana. *Ghana Journal of Geography*, *13*(3).

Emre, K., Demirkan, K., & Serhat, Ü. (2020). Knowledge and attitudes among hospital pharmacists about COVID-19. *Turkish journal of pharmaceutical sciences*, *17*(3), 242.

Flotildes, M. J., Garcia, G., Piol, A. M., Simeon, E. N. J., Miranda, K. J., & Carandang, R. R. (2023). Lived experiences and resilience of hospital pharmacists during the COVID-19 pandemic: An interpretative phenomenological analysis—exploratory *Research in Clinical and Social Pharmacy*, *11*, 100299.

Ghaibi, S., Ipema, H., & Gabay, M. (2015). ASHP guidelines on the pharmacist's role in providing drug information. *American Journal of Health-System Pharmacy*, *72*(7), 573-577.

Gyimah, N., Kudjo, T., Officer, I., Nkuah, R., Krampah, E., Darko-Joshua, C., Enock, B. A., Misroame, P., & Acheampong, L. C. Impact of Personal Protective Equipment in the Covid-19 Era: A Study of Health Workers in Ghana.

Hayden, J. C., & Parkin, R. (2020). The challenges of COVID-19 for community pharmacists and opportunities for the future. *Irish journal of psychological medicine*, *37*(3), 198–203.

Huang, J., Wang, H., Fan, M., Zhuo, A., Sun, Y., & Li, Y. (2020). Understanding the impact of the COVID-19 pandemic on transportation-related behaviours with human mobility data. Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining,

Huynh, G., Han, N. T. N., Ngan, V. K., Van Tam, V., & Le An, P. (2020). Knowledge and attitude toward COVID-19 among District 2 Hospital, Ho Chi Minh City healthcare workers. *Asian Pacific Journal of Tropical Medicine*, *13*(6), 260-265.

Lamptey, E., Yaidoo, S., tia Banoya, M., osei Boakye, E., Aki Benita, D., & Kumi Senkyire, E. (2023). Decline of handwashing and masking among the general population in post-Covid-19 pandemic: Insights from a mixed methods study in Ghana. *medRxiv*, 2023.2007. 2003.23292119.

Article DOI: 10.52589/IJPHP-ZVMWXTPS
DOI URL: https://doi.org/10.52589/IJPHP-ZVMWXTPS

Larisa, M., Arkadiy, K., & Tatyana, K. (2020). Food safety practices in catering during the coronavirus COVID-19 pandemic. *Foods and Raw Materials*, *8*(2), 197-203.

Lartey, M., Kenu, E., Ganu, V. J., Asiedu-Bekoe, F., Opoku, B. K., Yawson, A., & Ohene, S.-A. (2023). Risk factors for COVID-19 infections among health care workers in Ghana. *Plos one*, *18*(7), e0288242.

Matthews, D., Brown, A., Gambini, E., Minssen, T., Nordberg, A., Sherkow, J. S., Wested, J., van Zimmeren, E., & McMahon, A. (2021). The role of patents and licensing in the governance of human genome editing: a white paper. *Queen Mary Law Research Paper* (364).

Mendzhul, M. (2021). Measures to counter the COVID-19 pandemic and the permissibility of human rights restrictions. *Const. & Legal Acad. Stud.*, p. 26.

Ogunleye, OO, Basu, D, Mueller, D et al., (2020). Response to the Novel Corona Virus (COVID-19) Pandemic Across Africa: Successes, Challenges, and Implications for the Future. *Pharmaceutical Medicine and Outcomes Research, Frontiers in Pharmacology 11(1205)*

Saqlain, M., Munir, M. M., Rehman, S. U., Gulzar, A., Naz, S., Ahmed, Z., Tahir, A. H., & Mashhood, M. (2020). Knowledge, attitude, practice and perceived barriers among healthcare workers regarding COVID-19: a cross-sectional survey from Pakistan. *Journal of Hospital Infection*, *105*(3), 419–423.

Shankar, R., Kumar, M., & Upadhyay, P. K. (2023). Pharmacist: A Healthcare Professional Serving as Frontline Warrior Completely Overlooked. *Ind. J. Pharm. Edu. Res*, *57*(2), 337–341.

Shimizu, K. (2020). 2019-nCoV, fake news, and racism. *The Lancet*, *395*(10225), 685–686.

Sogbe, E. (2021). The evolving impact of the coronavirus (COVID-19) pandemic on public transportation in Ghana. *Case Studies on Transport Policy*, *9*(4), 1607–1614.

Song, Z., Hu, Y., Zheng, S., Yang, L., & Zhao, R. (2021). Hospital pharmacists' pharmaceutical care for hospitalized patients with COVID-19: recommendations and guidance from clinical experience. *Research in Social and Administrative Pharmacy*, *17*(1), 2027-2031.

Tamrat Befekadu Abebe, T. B. A., Akshaya Srikanth Bhagavathula, A. S. B., Yonas Getaye Tefera, Y. G. T., Akram Ahmad, A. A., Muhammad Umair Khan, M. U. K., Sewunet Admasu Belachew, S. A. B., Brown, B., & Tadesse Melaku Abegaz, T. M. A. (2016). Healthcare professionals' awareness, knowledge, attitudes, perceptions and beliefs about Ebola at Gondar University Hospital, Northwest Ethiopia: a cross-sectional study.

Tirachini, A., & Cats, O. (2020). COVID-19 and public transportation: Current assessment, prospects, and research needs. *Journal of Public Transportation*, *22*(1), 1-21.

Victor C Wutor (2021). The Pharmacist is a member of the COVID-19 Public Health Team. *Ghana College of Pharmacists Journal.* 1 (1) 49-52

Watson, K., Lee, D., Nusair, M., & Al Hamarneh, Y. (2023). Worldwide Impact of COVID-19 on Frontline Pharmacists' Roles and Services: INSPIRE International Questionnaire. *Prehospital and Disaster Medicine*, *38*(S1), s110-s111.

Wutor, V (2021). While waiting for COVID-19 vaccine rollout and treatment*! International Journal of Community Medicine and Public Health Wutor V. Int J Community Med Public Health.* 2021 Feb;8(2):845-848

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