Ghana Needs a Comprehensive Blueprint for Pandemic Management

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Abstract

This major study aimed to determine Ghanaian physicians, pharmacists, and nurses' knowledge, perception, and preparedness for a pandemic or another wave of COVID-19. The cross-sectional study, comprising 55 questions about COVID-19 knowledge, 29 about perception, and 21 about preparedness, was conducted between May and July 2023. The questionnaire was distributed through various social media platforms, ensuring a national reach. Participation from all 16 regions of Ghana was recorded for all three professionals. The inclusion criteria, a key aspect, are based on the healthcare professionals directly linked with hospitals and facilities who had direct contact with patients. Three thousand three hundred and twenty-three healthcare professionals responded to the survey, giving a 97% response rate. Seven hundred seventy-seven physicians, 1199 pharmacists, and 1347 nurses responded to the study, showcasing the extensive expertise of Ghanaian healthcare professionals. The findings reveal that Ghanaian physicians ranked high regarding their knowledge of COVID-19. Our study further shows that 98% of the pharmacist participants provided positive feedback about knowledge-related questions and an adequate understanding of attitudes toward coronavirus symptoms, transmission, disease severity, and preventive measures. The study also reveals that Ghanaian nurses were knowledgeable, had a good perception, and were prepared for a pandemic or another wave of COVID-19. However, the study also highlights a concerning trend where the level of preparedness for a pandemic or another wave of COVID-19 was low in all instances. In conclusion, this study underscores the critical role of knowledge in shaping the actions of Ghanaian healthcare professionals in response to the COVID-19 pandemic threats. It also emphasizes the urgent need for a comprehensive blueprint for pandemic management in Ghana to address this gap.

Keywords: *COVID-19, Ghana, Knowledge, Nurses, Physicians, Pharmacist, Perception, Preparedness.*

Introduction

The emergence of novel diseases during the 20th century led to a significant health crisis for the new generation (21). The coronavirus (COVID-19) pandemic has recently shaken the world globally. According to the report, by the 10th of August 2020, over 19.8 million people were affected, and more than 733,000 people

worldwide died due to coronavirus [8]. Healthcare professionals have been impacted particularly by this pandemic, which accounts for approximately 10% or more of the infections as per the World Health Organization (WHO) [17]. By July 2020, affecting over 10,000 medical professionals (across 40 countries), COVID-19 has remained the continuous cause of death of people in Africa [17, 24]. Underlying the epidemic among these frontline workers are various factors that may be shaping healthcare workers risk of COVID-19, including preparedness indicators such as inadequate training, protocols, knowledge, personal protection equipment (PPE), as well as weak health systems, slow national responses, and poor political leadership [13]. However, the data indicated the inadequate preparedness of the medical workers during the pandemic [19].

Despite the challenges, frontline healthcare professionals in Ghana have shown commendable resilience and positive attitudes toward health and safety practices during the COVID-19 pandemic [12]. Ghana's preparedness for health crises, including COVID-19, has similarities in training healthcare workers, health infrastructure, public engagement, and political decisions, drawing lessons from past crises like Ebola [4]. The COVID-19 pandemic in Ghana has had significant indirect effects, impacting health-seeking behaviour, access to healthcare, and malaria prevention measures [4]. A study evaluating Ghanaian health workers' response to COVID-19 found high compliance with safety protocols, with factors like profession, years of experience, facility type, and region influencing the perceived risk of COVID-19 [21]. These findings suggest that Ghanaian healthcare professionals are prepared to face future pandemics by emphasizing adherence to safety protocols and addressing individual and systemic factors affecting risk perception.

This study reveals the preparedness level of Ghanaian healthcare medical professionals and their positive perception of dealing with the upcoming future wave of the pandemic. This questionnaire-based survey is conducted at the national level in Ghana.

Materials and Methods

This cross-sectional questionnaire-based study was conducted to observe the preparedness level of healthcare professionals for a future pandemic or another wave of COVID-19 in Ghana. We used a convenient sampling technique to recruit professionals via social media platforms like Facebook, WhatsApp, and Email. The primary purpose of choosing this sampling technique is to obtain data across 16 different regions of Ghana at the national level. This design facilitates obtaining data at a single point without including observed variables.

The standard eligibility criteria were identifying as health workers based in Ghana. The requirements include only those professionals still practising and affiliated with hospitals or health centres at the Government, public, or private levels. The instruments utilized in prior relevant studies were analyzed thoroughly to make the questionnaire more feasible and valid. The data was collected between May and July 2023. All the 260 districts comprising 16 total regions were targeted, and data was collected across the board to make this study more purposeful at the national level. The study participants were physicians, pharmacists, and nurses only.

The sample size for the study was determined by using the online OpenEpi formula (https://www.openepi.com/SampleSize/SSPropo r.htm), targeting a 95% confidence level, a standard deviation of 0.5, and a confidence interval (margin of error) of ± 5%. The Statistical Package for the Social Sciences (SPSS Inc., version 22, IBM, Chicago, IL, United States) was used to analyze all study data with p < 0.05 as a level of statistical significance. Descriptive statistics will present frequency, percentages, mean, standard deviation, and median. A simple random sampling technique was opted for by every relevant member of this study. However, this study includes 3323 responses from all three

groups collectively from different backgrounds and regions of Ghana. The SurveyMonkey application was employed to target the primary responders and ease data analysis. The University of Health and Allied Sciences (UHAS) Ho, Ghana, approved the study's ethical clearance (UHAS-REC A 5 [4] 22-23).

Results

A total of 3323 healthcare professionals completed the questionnaires, giving a final response rate of 97%, an adequate response rate. The detailed demographic characteristics of the surveyed participants are presented in Table 1. The sample of respondents comprised 777 (23.4) general physicians, 1199 (36.1) pharmacists, and 1347 (40.5) nurses. The workers were mainly females 1881 (56.6), working in the governmental sectors, private sectors, and solo practice. This sample is pretty much like the population of healthcare professionals in Ghana. The mean ± SD age of the respondents was 31.59 ± 13.62 years for all the professions. There was a statistically significant difference ($p > 0.01$) in age between male and female professionals in all three groups.

Table 1. Demographic Characteristics of Healthcare Professionals

Variables	Total numbers (%) N = 3323
Gender	
Male	1442 (43.4)
Female	1881 (56.6)
Age	
Less than 30	354 (29.5)
31-40	529 (44.1)
41-50	219 (18.3)
Above 50	97 (8.1)
Profession	
Physicians	777 (23.4)
Pharmacists	1199 (36.1)
Nurse	1347 (40.5)
Years of Practice	
Less than 5	873 (26.3)
5-9	1279 (38.5)

10-14	609 (18.3)
15-19	354 (10.7)
Above 20	208 (6.3)

Table 2. Region of Practice of the Professionals

Region of practice	Profession			Total
	Pharmacist	Physician	Nurse	
Greater Accra	268	90	247	605
	44.3%	14.9%	40.8%	100.0%
Bono	90	30	66	186
	48.4%	16.1%	35.5%	100.0%
Savannah	18	21	60	99
	18.2%	21.2%	60.6%	100.0%
Western North	12	18	81	111
	10.8%	16.2%	73.0%	100.0%
Ashanti	37	117	87	241
	15.4%	48.5%	36.1%	100.0%
Central	102	18	166	286
	35.7%	6.3%	58.0%	100.0%
North East	6	39	111	156
	3.8%	25.0%	71.2%	100.0%
Northern	15	105	72	192
	7.8%	54.7%	37.5%	100.0%
Bono East	9	24	30	63
	14.3%	38.1%	47.6%	100.0%
Upper East	12	18	39	69
	17.4%	26.1%	56.5%	100.0%
Oti	6	30	39	75
	8.0%	40.0%	52.0%	100.0%
Upper West	177	21	39	237
	74.7%	8.9%	16.5%	100.0%
Volta	63	93	105	261
	24.1%	35.6%	40.2%	100.0%
Western	231	33	97	361
	64.0%	9.1%	26.9%	100.0%
Eastern Region	144	102	69	315
	45.7%	32.4%	21.9%	100.0%
Ahafo	9	18	39	66
	13.6%	27.3%	59.1%	100.0%
Total	1199	777	1347	3323
	36.1%	23.4%	40.5%	100.0%

Table 3: General Knowledge Symptoms of Covid-19

Symptoms	Responses	Profession			Total	P-value
		Pharmacist	**Physician**	**Nurse**		
Fever	**Yes**	1178	750	1332	3260	$< .001$
	No	21	27	15	63	
	I do not know	0	0	0	0	
Runny Nose	**Yes**	1095	711	1299	3105	$< .001$
	No	104	63	45	212	
	I do not know	0	3	3	6	
Sore throat	**Yes**	1181	735	1258	3174	$< .001$
	No	18	42	82	142	
	I do not know	0	0	7	7	
Joint and muscle pain	**Yes**	1145	682	1237	3064	$< .001$
	No	49	87	95	231	
	I do not know	5	8	15	28	
Shaking chills	**Yes**	1130	682	1265	3077	$< .001$
	No	53	89	76	218	
	I do not know	16	6	6	28	
Shortness of breath	**Yes**	1173	723	1293	3189	$< .001$
	No	26	54	48	128	
	I do not know	0	0	6	6	
Diarrhea	**Yes**	1071	591	1185	2847	$< .001$
	No	119	162	143	424	
	I do not know	9	24	19	52	
Fatigue	**Yes**	1163	704	1264	3131	$< .001$
	No	36	72	71	179	
	I do not know	0	1	12	13	
Dry cough	**Yes**	1135	726	1283	3144	**$< .366$**
	No	61	48	58	167	
	I do not know	3	3	6	12	
Nasal congestion	**Yes**	1075	683	1197	2955	**$< .403$**
	No	117	91	138	346	
	I do not know	7	3	12	22	
Weight loss	**Yes**	1072	660	1117	2849	$< .001$
	No	102	96	197	395	
	I do not know	25	21	33	79	
Stomach discomfort	**Yes**	1044	573	1186	2803	$< .001$
	No	133	174	158	465	
	I do not know	22	30	3	55	
Difficulty sleeping	**Yes**	1081	695	1281	3057	$< .001$
	No	95	79	57	231	
	I do not know	23	3	9	35	
The incubation	**Yes**	1187	741	1311	3239	$< .001$
	No	6	27	30	63	

period is 5–14 days.	I do not know	6	9	6	21	

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

Symptoms	Responses	Profession			Total	P-value
		Pharmacist	**Physician**	**Nurse**		
Coughing or sneezing near people infected with the coronavirus (COVID-19)	**Yes**	1181	699	1299	3179	< .001
	No	15	78	48	141	
	I do not know	3	0	0	3	
Go to areas/countries affected by coronavirus (COVID-19)	**Yes**	1136	678	1269	3083	< .001
	No	60	93	78	231	
	I don't know	3	6	0	9	
Touching objects or surfaces that have been in contact with someone who has the virus	**Yes**	1172	720	1314	3206	< .001
	No	24	57	27	108	
	I don't know	3	0	6	9	
Shake hands with someone who has an active case of coronavirus (COVID-19)	**Yes**	1154	708	1148	3010	< .001
	No	42	63	199	304	
	I don't know	3	6	0	9	
Being on the same plane with someone with coronavirus (COVID-19)	**Yes**	1160	708	1290	3158	< .001
	No	36	66	57	159	
	I don't know	3	3	0	6	
Eating food prepared by someone infected or	**Yes**	679	636	774	2089	< .001
	No	492	126	537	1155	
	I don't know	28	15	36	79	

exposed to the coronavirus (COVID-19)						
Participate in blood transfusions	Yes	136	162	620	918	< .001
	No	1020	564	700	2284	
	I don't know	43	51	27	121	
By relating to people who were in a hospital or emergency room	Yes	725	471	771	1967	**< .163**
	No	456	300	552	1308	
	I don't know	18	6	24	48	
Relating to cases identified by doctors	Yes	1136	672	837	2645	< .001
	No	54	99	504	657	
	I don't know	9	6	6	21	
About cases identified during evaluations at entry points to my country	Yes	1142	684	888	2714	< .001
	No	45	81	459	585	
	I don't know	12	12	0	24	
Severity of the coronavirus (COVID-19).						
It can be cured	Agree	349	354	576	1279	< .001
	Disagree	787	348	173	1308	
	Not sure	63	75	598	736	
It is highly contagious	Agree	1166	696	1128	2990	< .001
	Disagree	6	9	6	21	
	Not sure	27	72	213	312	
The coronavirus mortality rate is worse than that of influenza or tuberculosis	Agree	938	696	1254	2888	< .001
	Disagree	216	30	15	261	
	Not sure	45	51	78	174	
COVID-19 causes permanent physical damage to patients	Agree	985	603	1134	2722	< .001
	Disagree	111	90	54	255	
	Not sure	103	84	159	346	
	Agree	1148	720	1272	3140	< .001

You have symptoms similar to common flu and influenza	**Disagree**	24	9	9	42	
	Not sure	27	48	66	141	
My community/ country does not have a coronavirus vaccine	**Agree**	258	261	561	1080	< .001
	Disagree	743	288	705	1736	
	Not sure	198	228	81	507	
My community/ country does not have adequate medicine or treatment for the disease	**Agree**	261	324	579	1164	< .001
	Disagree	716	270	693	1679	
	Not sure	222	183	75	480	
Hospitals in my community/ country have not taken adequate infection control measures	**Agree**	261	270	579	1110	< .001
	Disagree	716	300	699	1715	
	Not sure	222	207	69	498	
Coronavirus impact is worse compared to influenza or common cold	**Agree**	842	669	1169	2680	< .001
	Disagree	300	36	63	399	
	Not sure	57	72	115	244	
The authorities of my country are prepared to face the disease	**Agree**	896	543	1227	2666	< .001
	Disagree	42	27	21	90	
	Not sure	261	207	99	567	
The response of the health	**Agree**	892	525	1236	2653	< .001
	Disagree	39	30	27	96	
	Not sure	268	222	84	574	

authorities of my country/community is effective						
Knowledge about contagion prevention/precaution measures						
Washing hands vigorously (soap/water) for 20 seconds helps prevent disease	**Agree**	1094	732	1290	3116	< .001
	Disagree	33	18	0	51	
	Not sure	72	27	57	156	
Special care should be taken if a person has coronavirus (COVID-19) symptoms in my community	**Agree**	1169	714	1287	3170	< .001
	Disagree	0	0	0	01163	
	Not sure	30	63	60	153	
Personal hygiene	**Agree**	1163	723	1293	3179	< .001
	Disagree	3	0	0	3	
	Not sure	33	54	54	141	
Healthy lifestyle	**Agree**	1163	705	1248	3116	< .001
	Disagree	3	3	0	6	
	Not sure	33	69	99	201	
Daily temperature monitoring	**Agree**	1108	663	1296	3067	< .001
	Disagree	19	33	0	52	
	Not sure	72	81	51	204	
Avoid travelling abroad	**Agree**	230	333	520	1083	< .001
	Disagree	912	357	641	1910	
	Not sure	57	87	186	330	
Use of mask	**Agree**	1130	690	1311	3131	< .001
	Disagree	0	6	3	9	
	Not sure	69	81	33	183	
Clean environment	**Agree**	1163	720	927	2810	< .001
	Disagree	3	0	102	105	
	Not sure	33	57	318	408	
Stay home if one is experiencing	**Agree**	1166	693	1281	3140	< .001
	Disagree	3	15	3	21	
	Not sure	30	69	63	162	

symptoms of COVID-19.						
Seek medical attention if one is experiencing symptoms of COVID-19	**Agree**	1181	708	1296	3185	< .001
	Disagree	3	0	0	3	
	Not sure	15	69	51	135	
Avoid crowded places	**Agree**	1166	705	1302	3173	< .001
	Disagree	6	0	0	6	
	Not sure	27	72	45	144	
Sending passengers with coronavirus symptoms (COVID-19) to a hospital or referral centre for examination	**Agree**	1165	708	1278	3151	< .001
	Disagree	7	6	3	16	
	Not sure	27	63	66	156	
Use a disinfectant at home or work	**Agree**	1148	717	1287	3152	< .001
	Disagree	0	0	3	3	
	Not sure	51	60	57	168	
Confirm symptoms on any website	**Agree**	1075	636	880	2591	< .001
	Disagree	67	42	62	171	
	Not sure	57	99	405	561	
Wore something to clean objects that may have come in contact with someone with coronavirus (COVID-19)	**Agree**	1111	684	1284	3079	< .001
	Disagree	16	18	3	37	
	Not sure	72	75	60	207	
Avoid Asian restaurants or shops	**Agree**	87	162	396	645	< .001
	Disagree	1024	510	738	2272	
	Not sure	88	105	213	406	
Cancel appointment	**Agree**	177	303	504	984	< .001
	Disagree	950	399	735	2084	

s in hospitals or doctor's offices.	**Not sure**	72	75	108	255	
Avoid public transportatio n	**Agree**	1089	657	1128	2874	< .001
	Disagree	59	18	69	146	
	Not sure	51	102	150	303	
Antibiotics are the first-line treatment for the management of coronavirus (COVID-19)	**Agree**	1098	654	1232	2984	< .001
	Disagree	71	72	24	167	
	Not sure	30	51	91	172	
Preparation of raw meats and other foods with different knives	**Agree**	166	183	691	1040	< .001
	Disagree	978	453	572	2003	
	Not sure	55	141	84	280	

Table 2 shows that most professionals, 605, were from the Greater Accra region of Ghana. Among them, 268 (44.3%) are pharmacists, 90 (14.9%) are physicians, and 247(40.8%) are nurses. This is presented graphically (Figure 1).

Most respondents (96.2%) worked in public health care centres and hospitals. The mean ± SD total years of experience of respondents was 9.56±7.43 overall.
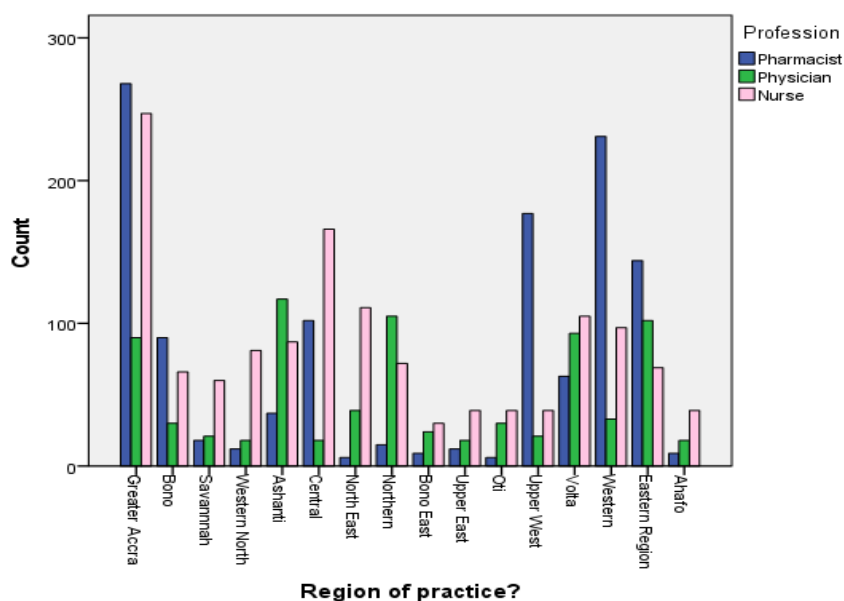

Figure 1. Graphical Representation of Respondents from the 16 Regions of Ghana

Table 3 describes the general knowledge-related questions about the coronavirus. The responses to these questions were evaluated for each of the professionals collectively. The significant P>0.01 value indicates the respondents' sufficient knowledge about COVID-19. In the Central region, more nurses participated in the research (166, 58%), while more pharmacists participated in the Upper, Western and Eastern regions, 45.7%, 64% and 45.7 %, respectively. In the Ashanti and Northern regions, more physicians responded to the questionnaires. 48.5 %, 54.7 %, respectively.

Most Physicians show higher knowledge levels than pharmacists and nurses. In response to the Dry cough and nasal congestion as a general symptom of Coronavirus was observed as not sure by the pharmacists and nurses. The data obtained was non-significant for the question "By relating to people who were in a hospital or emergency room" **< .163**. It is indicated by the "No" as a response by all the professionals.

Table 4 describes the perception level of pharmacists, physicians, and nurses toward the COVID-19 pandemic. The questions were related to susceptibility perception to COVID-19. The survey results in an excellent perception (96%) among all the three groups. However, a strong perception was observed specifically among the nurses in response to the fear level.

Table 4. Perceived Susceptibility to Covid-19

Questions	Responses	Profession			Total	P-value
		Pharmacist	**Physician**	**Nurse**		
Do you think there is a stigma related to the coronavirus (COVID-19)	**Yes**	926	600	1119	2645	< .001
	No	261	171	168	600	
	I don't know	12	6	60	78	
Thinking that I could become infected with coronavirus (COVID-19) makes me nervous/anxious	**Yes**	536	423	775	1734	< .001
	No	663	345	536	1544	
	I don't know	0	9	36	45	
Nothing I do can stop the risk of catching me	**Yes**	471	390	595	1456	< .001
	No	692	378	713	1783	
	I don't know	36	9	39	84	
If I contracted the coronavirus (COVID-19), it will have serious consequences for me or my relatives	**Yes**	478	399	600	1477	< .001
	No	703	357	705	1765	
	I don't know	18	21	42	81	
I get upset when I think about the coronavirus (COVID-19)	**Yes**	448	282	591	1321	< .001
	No	733	474	729	1936	
	I do not know	18	21	27	66	
Coronavirus (COVID-19) problems will pass quickly	**Yes**	516	420	729	1665	< .001
	No	647	342	381	1370	
	I do not know	36	15	237	288	
Are you afraid of:						
Fear of being in contact with people with flu symptoms (e.g., cough,	**Yes**	932	621	750	2303	< .001
	No	264	147	579	990	
	I do not know	3	9	18	30	

runny nose, sneezing, fever)						
Fear of eating out (for example, street vendor centres, food courts)	Yes	562	510	564	1636	< .001
	No	628	264	723	1615	
	I do not know	9	3	60	72	
Fear of being in contact with people who have just returned from abroad	Yes	488	327	552	1367	< .001
	No	699	450	729	1878	
	I do not know	12	0	66	78	
Fear of visiting hospitals	Yes	511	258	594	1363	< .001
	No	673	519	735	1927	
	I do not know	15	0	18	33	
Perceived susceptibility to coronavirus infection (COVID-19). Evaluation of the possibility of contracting the disease						
Oneself	Very likely	646	513	240	1399	< .001
	Probable	481	81	234	796	
	Unlikely	72	183	873	1128	
My relatives	Very likely	931	597	561	2089	< .001
	Probable	214	120	321	655	
	Unlikely	54	60	465	579	
People over 60years	Very likely	1036	660	696	2392	< .001
	Probable	163	102	648	913	
	Unlikely	0	15	3	18	
Adults	Very likely	992	621	741	2354	< .001
	Probable	201	126	582	909	
	Unlikely	6	30	24	60	
Children	Very likely	307	276	231	814	< .001
	Probable	435	225	354	1014	
	Unlikely	457	276	762	1495	
Medical services personnel	Very likely	1001	630	420	2051	< .001
	Probable	174	126	909	1209	
	Unlikely	24	21	18	63	
Food vendors	Very likely	692	600	492	1784	< .001
	Probable	453	156	834	1443	
	Unlikely	54	21	21	96	
Food handlers	Very likely	674	612	474	1760	< .001
	Probable	468	153	843	1464	
	Unlikely	57	12	30	99	
General public	Very likely	994	657	1029	2680	< .001
	Probable	205	117	318	640	
	Unlikely	0	3	0	3	
Taxi drivers	Very likely	1033	672	813	2518	< .001
	Probable	163	84	534	781	
	Unlikely	3	21	0	24	
Where are people likely to get coronavirus (COVID-19)?						

		Pharmacist	Physician	Nurse	Total	P-value
Home	**Very likely**	201	156	148	505	< .001
	Probable	624	180	604	1408	
	Unlikely	374	441	595	1410	
Health institutions	**Very likely**	1004	675	399	2078	< .001
	Probable	159	90	927	1176	
	Unlikely	36	12	21	69	
Public transport	**Very likely**	1058	681	1092	2831	< .001
	Probable	141	90	255	486	
	Unlikely	0	6	0	6	
Markets or shops	**Very likely**	1030	666	1068	2764	< .001
	Probable	163	105	267	535	
	Unlikely	6	6	12	24	
Countries affected by the coronavirus (COVID-19)	**Very likely**	1052	681	876	2609	< .001
	Probable	144	90	465	699	
	Unlikely	3	6	6	15	
What do you think the percentage of?						
Efficacy of treatments for coronavirus (COVID-19)	**Very likely**	309	366	645	1320	< .001
	Probable	881	384	681	1946	
	Unlikely	9	27	21	57	
Likelihood of having a major outbreak of coronavirus (COVID-19) from person to person in my community	**Very likely**	777	606	254	1637	< .001
	Probable	400	153	640	1193	
	Unlikely	22	18	453	493	
Concern that you or your family members will get the virus	**Very likely**	361	306	254	921	< .001
	Probable	778	417	628	1823	
	Unlikely	60	54	465	579	
Having effective medications or remedies available	**Very likely**	370	294	695	1359	< .001
	Probable	766	354	646	1766	
	Unlikely	63	129	6	198	

Ghanaian frontline healthcare professionals have demonstrated commendable resilience and dedication in responding to the COVID-19 pandemic. The readiness and preparedness of all the healthcare workers illuminate their enthusiasm and strength to face the upcoming challenges of another wave of COVID-19.

In Table 5, questions about preparedness level were asked and analyzed based on the responses obtained. Statistically significant data was obtained from all the professional groups. Despite the challenges due to proper vaccination and treatment, Ghana's health professionals are equipped to face the new pandemic.

Table 5. Level of Preparedness

Questions	Responses	Profession			Total	P-value
		Pharmacist	**Physician**	**Nurse**		
Education/training about COVID-19	**Done**	527	378	715	1620	< .001
	In progress	549	384	563	1496	

infection control and update policy as required?	**I do not know**	123	15	69	207	
Informational materials (e.g., brochures and posters) on COVID-19?	**Done**	521	393	673	1587	< .001
	In progress	573	369	620	1562	
	I do not know	105	15	54	174	
Is alcohol-based hand sanitizer for hand hygiene available in every patient room?	**Done**	775	447	685	1907	< .001
	In progress	331	291	605	1227	
	I do not know	93	39	57	189	
PPE available immediately outside of the patient room is provided	**Done**	714	438	652	1804	< .001
	In progress	368	294	641	1303	
	I do not know	117	45	54	216	
Ensuring safety in working place	**Done**	541	351	637	1529	< .001
	In progress	526	402	647	1575	
	I do not know	132	24	63	219	
Readiness to implement every standard precaution	**Done**	433	354	628	1415	< .001
	In progress	625	393	662	1680	
	I do not know	141	30	57	228	
Activities to prevent COVID-19 transmission to family members	**Done**	361	342	633	1336	< .001
	In progress	652	375	644	1671	
	I do not know	186	60	70	316	
Readiness for caring for febrile patients	**Done**	373	342	624	1339	< .001
	In progress	664	381	657	1702	
	I do not know	162	54	66	282	
Readiness of self away from family members	**Done**	376	342	640	1358	< .001
	In progress	667	378	650	1695	
	I do not know	156	57	57	270	
Readiness for caring for COVID-19-infected patients	**Done**	372	360	640	1372	< .001
	In progress	653	351	644	1648	
	I do not know	174	66	63	303	
Readiness overwhelmed with the new COVID-19	**Done**	380	336	240	956	< .001
	In progress	579	366	978	1923	
	I do not know	240	75	129	444	
Readiness for telling family and friends if	**Done**	367	375	648	1390	< .001
	In progress	618	345	630	1593	

infected with COVID-19	**I do not know**	214	57	69	340	
Readiness for caring for COVID-19-infected patients if their colleagues are infected with COVID-19	**Done**	398	378	633	1409	< .001
	In progress	606	345	653	1604	
	I do not know	195	54	61	310	
The readiness of the institution to support healthcare providers	**Done**	391	351	606	1348	< .001
	In progress	622	363	684	1669	
	I do not know	186	63	57	306	
Readiness for COVID-19 crisis that increased workload	**Done**	382	342	615	1339	< .001
	In progress	643	363	666	1672	
	I do not know	174	72	66	312	
Proper infection control training has been given	**Done**	419	312	648	1379	< .001
	In progress	618	420	645	1683	
	I do not know	162	45	54	261	
Support from your team members	**Done**	382	321	612	1315	< .001
	In progress	643	393	669	1705	
	I do not know	174	63	66	303	
Readiness that might eventually get COVID-19 at work	**Done**	382	327	226	935	< .001
	In progress	637	375	1013	2025	
	I do not know	180	75	108	363	
Determine a contingency staffing plan.	**Done**	367	324	615	1306	< .001
	In progress	670	384	666	1720	
	I do not know	162	69	66	297	
Designate a point of contact for the healthcare union.	**Done**	400	333	663	1396	< .001
	In progress	636	393	633	1662	
	I do not know	163	51	51	265	
Designate a point of contact for the family members.	**Done**	454	402	685	1541	< .001
	In progress	594	333	620	1547	
	I do not know	151	42	42	235	

Discussion

This is the first-ever survey to be conducted in Ghana to measure the preparedness of healthcare professionals for the COVID-19 pandemic in Ghana. To date, many other studies have been conducted to investigate the attitudes and

behaviour of all health workers. However, our study is the only one that compares the preparedness levels of physicians, pharmacists, and nurses. Other studies focus on the perception and behaviour of workers toward COVID-19. The present work assessed information resources that physicians, pharmacists, and nurses utilize. The respondents were also surveyed concerning their information-seeking behaviour and awareness of the coronavirus. They were also questioned regarding their expectations and future information needed. We tried to obtain a representative sampling of physicians, pharmacists, and nurses to obtain a reasonable response rate to assure the study's validity. All the respondents were working and in service regularly on their practice sites during the study. Our response rate was favourable and consistent with other surveys of health workers' perceptions, knowledge, and attitudes elsewhere. All regions of Ghana were represented in this survey, so it is fair to say that the study provides a sound foundation for at least some tentative conclusions about the preparedness level raised in this study.

The knowledge behaviour related to the general symptoms of all three selected groups in Ghana was not significantly different from those of many developed countries such as the USA and the UK. [2, 5]. The results of our study show excellent knowledge of all the participants (97%), which is validated by the significant P-value. Physicians' knowledge was observed to be higher in response to the question of dry cough and stomach discomfort as general corona symptoms. Most of the responders marked it as "I do not know." However, many studies support these symptoms as a significant source of virus transmission [11, 20]

Interestingly, 119 pharmacists, 162 physicians, and 143 nurses do not consider diarrhoea a symptom of COVID-19. Three hundred ninety-five respondents said weight loss was not a side effect of COVID-19, while 79 indicated that they did not know. Also, 465 (133, 174, and 158 pharmacists, physicians, and nurses, respectively) did not consider stomach discomfort a symptom.

While 1279 respondents agreed that COVID-19 could be cured, 1308 disagreed, and 736 indicated they were unsure. A large number of the respondents (567) were not sure if the authorities in Ghana were prepared to face the disease, and 574 did not believe that the response by the health authorities at the national and community levels was effective.

The spread and rapid transmission of COVID-19, combined with inadequate preparedness, majorly contributes to many psychological issues, especially among frontline health professionals globally [15]. Since the declaration of COVID-19 as a global pandemic by WHO, there has been a constant increase in the number of studies conducted to examine the perception and attitude-behavior and psychological impact on frontline workers [10, 16]. However, this study results in the positive feedback perception of the health workers toward the coronavirus. The Ghana medical care heroes are not afraid and ready to face the new challenges of the pandemic in the future.

The level of preparedness of healthcare professionals was troubling. When the survey was conducted, nearly 50 % of all respondents still indicated that educational/training about COVID-19 infection control and policy updates were in progress, and 207 did not know what was happening. The same trend was observed regarding the availability of information materials on COVID-19. Measures to ensure the safety of staff and patients at the workplace were not in place (1575 indicated that it was in progress, 1529 responded that it was done, and 219 did not know). More respondents showed their facilities were unprepared to care for infected patients (Table 5). In response to the question about the readiness of institutions to support healthcare providers, 1348 indicated that they were ready, while 1669 said measures were in progress, and 306 respondents stated that they did not know. Most healthcare professionals who

responded to the survey did not receive proper infection control training.

Preparedness has been linked to various factors among medical professionals before epidemic outbreaks. However, fewer studies have examined the inadequate level in the context of COVID-19. To our knowledge, no studies have been directly linked with that in Ghana and have specifically examined the perceived preparedness among HCWs to respond to COVID-19. The constrained and underfunded health conditions in Africa made the situation worse during the COVID-19 pandemic [9]. No empirical studies on this issue for health workers have been reported in the context of preparedness level. HCWs in African countries have been working under excessive workloads and psychologically charged environments due to a shortage of staff and limited resources, thus increasing the capacity demand [7]. Ghana has Africa's third-highest COVID-19 cases, with over 2,000 HCWs infected [6]. The country's preparedness for the upcoming pandemic is much less than other countries. In the history of the Ebola outbreak, especially in Ghana, previous studies also reported the same inadequate preparation issues (PPE, medical staff, treatment) [1, 2]. However, this study indicates the preparedness level of pharmacists, physicians, and nurses. It also addresses the issues and interventions related to the perception of adequate preparedness in response to COVID-19 and other factors in Ghana.

Conclusions

This finding is likely replicable in other low-resource settings, potentially globally, and highlights the need for interventions to increase providers' preparedness. The government of Ghana has demonstrated a commitment to addressing the needs of healthcare professionals. However, more effort is needed. Government and other stakeholders must institute necessary training, protections, and incentives to improve HCWs' psychological well-being and ability to respond to the pandemic. With the medical professional shortage in Africa, many cases among these frontline workers, inadequate PPE and preparedness, and growing work demands, such interventions are critically needed to retain them and maintain the quality of care in already strained health systems. Studies in different settings examining the impact of these factors on healthcare quality and outcomes in the context of the pandemic are also needed. From all indications, we believe Ghana needs a pandemic management blueprint covering prevention, education, containment, collaboration, research and development and immediate response.

Data Availability: All information will be confidential and securely stored. However, information collected in this survey may be anonymized to allow reuse within the research team and other third parties for COVID-19 health service-related research only.

Consent: Informed consent was obtained from all eligible study participants.

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