




ORIGINAL RESEARCH

Perceived risk of contracting COVID-19 among healthcare workers in Ghana: A cross-sectional study

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Abstract

Background and Aims: The COVID-19 pandemic has stretched many healthcare systems, and it is having detrimental impacts on healthcare workers at the forefront, fighting to save lives. This study sought to assess the relationship between job factors and the perceived risk of contracting COVID-19 at the workplace among healthcare workers and how the relationships are augmented when sociodemographic characteristics are taken into consideration in a limited resource setting (Ghana).

Methods: A cross-sectional survey of 455 respondents was conducted.

Results: Overall, 5.93% of the respondents perceived low risk of contracting COVID-19 while 69.45% and 24.62% perceived medium and high risks of contracting COVID-19 at the workplace, respectively. The odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace was 0.461 times lower for healthcare workers who rated their workplace safety systems as good and 0.515 and 0.170 times lower for healthcare workers who indicated occasional and frequent work environment situational assessment (situational awareness), respectively. The odds of high perceived risk were 2.239 times higher for workers who are always emotionally fatigued and 1.829 times higher for healthcare workers who frequently contribute personally to workplace decision-making. The perceived risk of contracting COVID-19 at the workplace was also 1.780 times higher for healthcare workers with tertiary education.

Conclusion: In terms of health and safety at work, this study recommends that there should be an improvement in implementing safety protocols at health facilities to increase the confidence of healthcare workers. Furthermore, social and psychological support and work environment situational assessment, which can reduce stress and anxiety levels among the healthcare workers, should be implemented if contributing factors such as working outside their area of expertise or job scope cannot be eliminated.

KEYWORDS

COVID-19, health and safety, healthcare workers (HCWs), perceived risk

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1 | INTRODUCTION

The Novel coronavirus 2019 (COVID-19) has had a great effect on the lives and well-being of people in many parts of the world, stretching many healthcare systems beyond their capacity with healthcare providers at the forefront in the fight to save the lives of people. As of September 22, 2021, the world had recorded over 225 million cases of COVID-19 infections, with over 4.5 million deaths.¹ The rapid and serious outbreak of this pandemic has resulted in urgent responses, including lockdowns, social distancing, travel restrictions, regular washing of hands, and mandatory wearing of nose masks. The job demands of healthcare workers coupled with inadequate medical resources such as protective equipment for medical personnel and shortage of human resources during pandemics make working in the health sector a difficult and challenging task.²

In an attempt to manage and control this highly contagious pandemic, healthcare workers face the most risks and challenges. The WHO estimates about 115,000 cumulative death of healthcare workers from COVID-19 as of May 2021.¹ One major challenge of the Ghanaian healthcare system is the shortage of personnel. Ghana's healthcare staffing gap or shortage was reported to be 41% before the COVID-19 pandemic.³ Health facilities, as well as, the physical and mental well-being of healthcare workers can be tested when patient loads are increasing while losing other hospital staff through infections. This will consequently reduce the availability of healthcare professionals and can result in burnout among healthcare workers. The rapid rate of increase in COVID-19 infections has caused not only the risk of death but has also created unbearable psychological effects.⁴ The frequent admission of COVID-19 patients at various health facilities coupled with inadequate hospital staff increases the workload of healthcare workers and ultimately manifests in anxiety or depression, giddiness, tiredness, and a high sense of vulnerability to the risk of contracting the virus.

Risk perception is considered to be an individual's psychological evaluation of the probabilities and adverse consequences of an event.⁵ Risk as a psychologically oriented phenomenon can be influenced by other factors, including probability, the severity of outcome, controllability, and unfamiliarity of the hazards.⁶ Nielsen et al.⁷ reported in their study that psychological safety climate mediates the association between perceived risk and job satisfaction. To reduce work-related psychological stress while achieving optimum work efficiency, the working environment has to promote growth, learning, and the development of workers. These structures define the working environment for healthcare workers and will consequently affect how workers perceive the risk of infection at the workplace. The way and manner workers perceive their safety at work can be expressed in areas that define the organization's ability to manage workers' emotional stress and risk perception during pandemics.

The prevalence of fear, anxiety, and the feeling of insecurity by healthcare workers can be influenced by the coordination of factors that qualifies the working environment. Yildirim and Guler⁸ revealed that perceived risk is significantly associated with working conditions, individual knowledge gaps, and job security in the health sector. The limited availability of protective equipment coupled with job security

may largely contribute to the risk level of healthcare workers.⁹ Exploring issues faced by healthcare workers when attending to infected patients will help assess the resilience of healthcare systems in response to the crisis while enhancing the preparedness and recovery of the health system. Studies on the implementation of a global response to epidemics have highlighted the importance of workers' perceptions and experiences on healthcare delivery.¹⁰ This study is aimed at assessing healthcare workers' risk perception at work and how job demands and the perception of safety systems or protocols influence healthcare workers' perceived risk of contracting COVID-19 at the workplace. This will be vital in developing a healthy personnel policy, stress management programs, and effective workplace structures to address psychological hazards associated with health systems during and after epidemics.

1.1 | Theoretical context

The COVID-19 pandemic has exacerbated the global crises of stress and burnout among healthcare workers, especially in a resource-limited setting like Ghana. Consequently, this has the potential of putting healthcare workers at the risk of contracting the COVID-19 virus. A high perceived risk of contracting COVID-19 at work among healthcare workers could lead to poor healthcare delivery and absenteeism. As of May 2021, when this survey was being conducted, Ghana had recorded over 91,000 confirmed cases of COVID-19 and 766 deaths, with over 2000 healthcare workers infected with the coronavirus and six confirmed deaths. Vaccination for frontline healthcare workers had also not commenced. The daily exposure and the fear of infecting themselves and/or their families, the long working hours, and the high mental workload could affect service delivery and the mental and physical state of the healthcare workers.¹¹

In most countries, exposure to COVID-19 by frontline healthcare workers is legally recognized as an occupational injury. In Ghana, this was identified and salary supplement schemes were instituted to support the frontline healthcare workers in recognition of the risk they accepted, both to themselves and their family members while providing care to patients with COVID-19. The capacity of healthcare systems to respond to the pandemic in Ghana appeared to have relied heavily on the flexibility of healthcare workers to work irrespective of the availability of PPEs or testing equipment, taking risks, working overtime, and working outside their areas of expertise. Healthcare workers as used in this study are defined as clinical and nonclinical staff who provide care for COVID-19 patients, including those who may not have provided direct care to the COVID-19 patients but may have contact with COVID-19 patients' body fluids and potentially contaminated items or environmental surfaces. They include healthcare professionals, allied health professionals, and other health workers, such as cleaning and laundry personnel, respiratory therapists, X-ray physicians, technicians, admission/reception clerks, and so forth who work in hospitals, clinics, and health centers in the study area.

Healthcare workers exposed to these psychological and social risk factors are likely to experience psychosocial situations and experiences

that have a high potential to seriously affect their physical and mental health.¹¹ Cox and Griffiths,¹² defined psychosocial risk factors at work as “those aspects of work design and the organization and management of work, and their social and environmental contexts, which have the potential for causing psychological, social or physical harm.” It is reported that healthcare workers experience higher rates of depression compared to the general population, especially in health emergencies¹³ and this could affect how they carry out their duties in times of crisis. It is in this context that this current study must be understood.

2 | MATERIALS AND METHODS

2.1 | Study area

This study was carried out in the Sekondi-Takoradi metropolis, the capital city of the Western Region of Ghana. Located in the south-western part of the country (see Figure 1), about 242 km to the west of Accra, the national capital, and approximately 280 km from Cote d'Ivoire in the west. With a total land area of about 50 km², Sekondi-Takoradi is the third largest and most industrialized city in Ghana after Accra and Kumasi and it is the hub for crude oil since the discovery of oil in commercial quantities in the country in 2007.

2.2 | Research design and instrument

A quantitative cross-sectional study was carried out among healthcare workers in the Sekondi-Takoradi area between April and May 2021. The questionnaire was adapted and developed from the COVID-19 Perceived Risk Scale¹⁴ and the Job Demands-Resources Model.¹⁵ The questionnaire had two parts: the sociodemographic aspect and work demand and resources aspects. A pilot study was conducted among 40 people with a similar background to the respondents of the study. The pilot group was asked to complete the questionnaire, and comment on the comprehensibility of the questions, which led to minor modifications of the questionnaire to improve understanding. Simple random sampling was employed to select volunteered participants for the survey. Participants were given unique numbers and a random number generator was used to select half of the participants present at a night and day shifts. Individuals who had their numbers selected were considered for the study. Overall, 455 filled questionnaires were retrieved and used for the study. However, 45 people did not return their questionnaires. Only healthcare workers above 18 years old were considered for this study.

2.3 | Measurements

2.3.1 | Measuring the perceived risk of contracting COVID-19 at work

The dependent variable “Perceived risk of contracting COVID-19” at the workplace was evaluated using the COVID-19 Perceived Risk

Scale.¹⁴ This includes a cognitive dimension (i.e., “What is the likelihood of you contracting COVID-19 at your workplace?”) and an emotional dimension (i.e., “How concerned are you about colleagues or supervisor getting COVID-19 at the workplace?”) of personal risk. This was measured on a 5-point Likert scale. Higher scores meant a high perceived risk of contracting COVID-19 at the workplace. Overall scores less than 4 were classified as “Medium/Low” and scores greater than or equal to 4 as “High.”

2.3.2 | Independent variables

The biosocial and sociocultural factors considered for this study are age (18–24, 25–34, 35–54, and above 54 years), gender (female, male), education (SHS/diploma, tertiary), experience (1–5, 6–10, and above 10 years), and facility type (hospital, health center).

The work factors included emotional fatigue, workplace safety systems, and work resources. “Emotional fatigue” was measured using the Maslach Burnout Inventory General Survey.¹⁶ This was made up of nine items on a 5-point scale with questions like “I feel emotionally exhausted at work.” Overall scores less than 3 were classified as “Occasionally” and scores greater than 3 as “Always.”

“Workplace safety systems” were also measured on a 5-point Likert scale and further categorized as “Poor” for scores less than 3 and “Good” for scores greater than 3. Workplace safety systems as used in this study referred to COVID-19-related safety measures/systems (e.g., availability of surgical and N-95 masks, adequate ventilation, gloves, etc.).

The work resources aimed at measuring the perception of employees from the organizational reaction to the pandemic and the personal contribution towards managing the COVID-19 risk. This included 20 items to examine five content domains. Each domain was measured on a 5-point Likert scale and further categorized into three points (Never, Occasionally, Always). These domains were workplace communication, workplace decision making, workplace fatigue management, workplace situational awareness, and personal contribution to workplace decision making. “Workplace communication” in this study meant the exchange of information and likely feedback related to COVID-19 risk among colleagues and supervisors. “Workplace decision-making” here means the process of making a selection or judgment, while “workplace situational awareness” implied regular monitoring of the working environment, taking note of happenings, and noticing possible or pertinent changes at the workplace relating to COVID-19 risk. “Workplace fatigue management” on the other hand is identifying experiences and outcomes of physical and mental fatigue in terms of protective behaviors at the workplace in addition to implementing coping strategies. “Contribution to workplace decision-making,” in this case, meant the extent to which healthcare centers and managers encourage healthcare workers to contribute to organizational decisions.

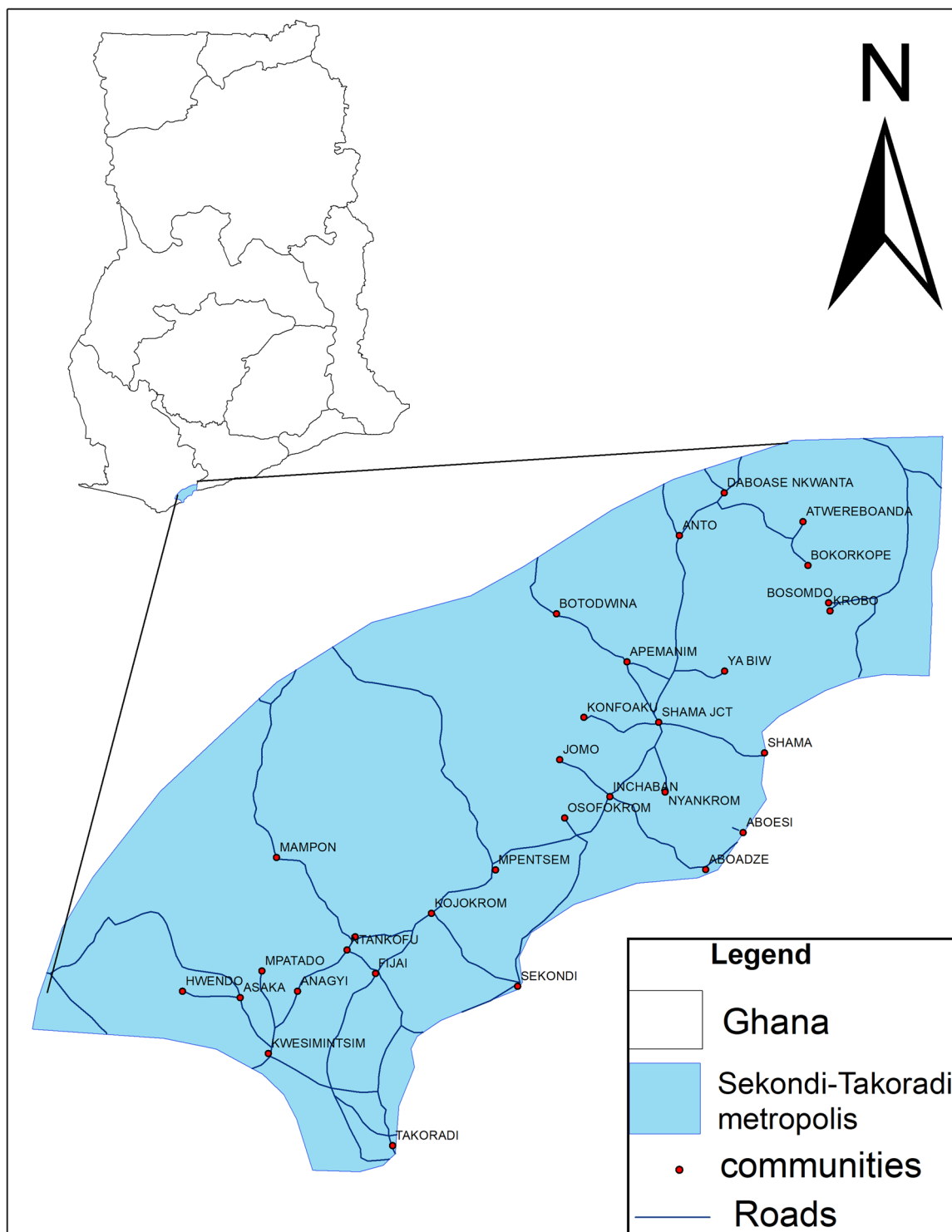


FIGURE 1 Map of the study area.

2.4 | Data analyses

Stata SE 15.0 (StataCorp) was used in analyzing the data. Descriptive analysis was performed to understand the distributions of all relevant variables. Pearson's χ^2 test of independence was further used to assess the associations between the perceived risk of contracting

COVID-19 and each independent variable. A binary logistic regression was then fitted to the data to observe the effects of the independent variables on the perceived risk of contracting COVID-19 at the workplace. Approximately 24.62% of the respondents perceived high risk of contracting COVID-19 at the workplace, indicating that the negative log-log link function was suitable for this

study. The results were presented using odds ratios (ORs) at a statistical significance of 0.05.

2.5 | Ethical considerations

Written permission was sought from the Ghana Health Service for ethical clearance to conduct the study. Written and oral consent were obtained from each respondent before the commencement of the study. All the participants willingly took part in the study.

3 | RESULTS

3.1 | Demographic factors and perceived risk of contracting COVID-19

Overall, 5.93% of the respondents perceived low risk of contracting COVID-19 while 69.45% and 24.62% perceived medium and high risks of contracting COVID-19 at the workplace, respectively. As indicated in Table 1, 51.21% of the participants were females. Across all socio-demographic and work factors, most respondents reported medium to high risks of contracting COVID-19 at work. For Pearson's χ^2 test as shown in Table 1, it is noted that most of the sociodemographic factors were not associated with the COVID-19 safety risk perception of the respondents. Only educational level, $\chi^2(2) = 7.4634$, $p < 0.05$, had a statistically significant association with the perceived risk of contracting COVID-19 at the workplace. Aside from personal contribution to workplace decision-making, $\chi^2(4) = 3.4799$, $p = 0.481$, all other work factors were associated with the perceived risk of contracting COVID-19 at the workplace. Significant associations were observed for workplace safety systems, $\chi^2(2) = 20.1505$, $p < 0.001$; emotional fatigue, $\chi^2(2) = 11.8541$, $p < 0.05$; workplace communication, $\chi^2(4) = 13.5734$, $p < 0.05$; workplace decision making, $\chi^2(4) = 21.3118$, $p < 0.001$; workplace fatigue management, $\chi^2(4) = 10.3365$, $p < 0.05$; and workplace situational awareness, $\chi^2(4) = 28.6055$, $p < 0.001$.

3.2 | Bivariate analysis of predictors of the perceived risk of contracting COVID-19 at the workplace

For the bivariate relationship between the perceived risk of contracting COVID-19 at work and the independent variables, as shown in Table 2, the odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace was 1.788 times higher for healthcare workers who are 25–34 years, 1.569 times higher for male healthcare workers and 1.721 times higher for tertiary-educated healthcare workers. For the work factors, the odds of a high perceived risk of contracting COVID-19 at the workplace were 2.114 times higher for healthcare workers who are always emotionally fatigued.

The odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace were 0.350 times lower for workers who rated their workplace safety systems as good, 0.520 times lower for healthcare workers who indicated there was occasional workplace communication, 0.496 and 0.464 times lower for occasional, and frequent COVID-19-related decision-making, respectively. Also, the odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace were 0.511 and 0.505 times lower for occasional and frequent workplace fatigue management, and 0.530 and 0.217 times lower for occasional and frequent workplace situational awareness, assessment respectively.

3.3 | Multivariate analysis of predictors of the perceived risk of contracting COVID-19 at the workplace

Two models were run for the multivariate analysis; the work factors model and the sociodemographic model as shown in Table 3. For the first model, which accounted for only work factors, the odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace was 0.433 times lower for healthcare workers who rated their workplace safety systems as good and 0.181 times lower for healthcare workers who indicated frequent workplace situational awareness assessment. Also, the odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace was 2.073 times higher for workers who are always emotionally fatigued than healthcare workers who are never emotionally fatigued.

In model 2, which controlled for sociodemographic attributes, some relationships emerged indicating mediation of such factors; “always contributing to workplace decision making” and “occasional situational awareness assessment” became significant predictors of the perceived risk of contracting COVID-19 at the workplace, which was not the case in the first model. Overall, the results of the second model showed similar relations as observed in the first model with marginal changes in odds ratios. In this instance, the odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace were 0.461 times lower for healthcare workers who rated their workplace safety systems as good and 0.515 and 0.170 times lower for workers who indicated occasional and frequent workplace situational awareness assessment respectively. Contrariwise, the odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace were 2.239 times higher for healthcare workers who are always emotionally fatigued and 1.829 times higher for healthcare workers who frequently contribute personally to workplace decision-making.

TABLE 1 The association between sociodemographic factors and perceived risk of contracting COVID-19 at the workplace among healthcare workers in Ghana.

Variables	Number (%)	Perceived risk			Inferential statistics
		Low (%)	Medium (%)	High (%)	
Age (years)					$\chi^2(6) = 5.62, p = 0.468$
18–24	79 (17.36)	5 (6.33)	60 (75.95)	14 (17.72)	
25–34	169 (37.14)	9 (5.33)	109 (64.50)	51 (30.18)	
35–54	145 (31.87)	10 (6.90)	102 (70.34)	33 (22.76)	
Above 54	62 (13.63)	3 (4.84)	45 (72.58)	14 (22.58)	
Gender					$\chi^2(2) = 5.30, p = 0.071$
Female	233 (51.21)	18 (7.73)	166 (71.24)	49 (21.03)	
Male	222 (48.79)	9 (4.05)	150 (67.57)	63 (28.38)	
Education					$\chi^2(2) = 7.46, p < 0.05$
SHS/diploma	273 (60.00)	18 (6.59)	200 (73.26)	55 (20.15)	
Tertiary	182 (40.00)	9 (4.95)	116 (63.74)	57 (31.32)	
Experience (years)					$\chi^2(4) = 3.99, p = 0.408$
1–5	133 (29.23)	10 (7.52)	89 (66.92)	34 (25.56)	
6–10	184 (40.44)	12 (6.52)	123 (66.85)	49 (26.63)	
Above 10	138 (30.33)	5 (3.62)	104 (75.36)	29 (21.01)	
Facility					$\chi^2(4) = 0.75, p = 0.689$
Hospital	250 (54.95)	17 (6.80)	172 (68.80)	61 (24.40)	
Health center	205 (45.05)	10 (4.88)	144 (70.24)	51 (24.88)	
Workplace safety systems					$\chi^2(2) = 20.15, p < 0.001$
Poor	337 (74.07)	18 (5.34)	218 (64.69)	101 (29.97)	
Good	118 (25.93)	9 (7.63)	98 (83.05)	11 (9.32)	
Emotional fatigue					$\chi^2(2) = 11.85, p < 0.05$
Occasionally	154 (33.85)	15 (9.74)	113 (73.38)	26 (16.88)	
Always	301 (66.15)	12 (3.99)	203 (67.44)	86 (28.57)	
Workplace communication					$\chi^2(4) = 13.57, p < 0.05$
Never	201 (44.18)	11 (5.47)	125 (62.19)	65 (32.34)	
Occasionally	236 (51.87)	14 (5.93)	180 (76.27)	42 (17.80)	
Always	18 (3.96)	2 (11.11)	11 (61.11)	5 (27.78)	
Workplace decision-making					$\chi^2(4) = 21.31, p < 0.001$
Never	146 (32.09)	11 (7.53)	81 (55.48)	54 (36.99)	
Occasionally	243 (53.41)	11 (4.53)	187 (76.95)	45 (18.52)	
Always	66 (14.51)	5 (7.58)	48 (72.73)	13 (19.70)	
Workplace fatigue management					$\chi^2(4) = 10.34, p < 0.05$
Never	66 (14.51)	5 (7.58)	35 (53.03)	26 (39.39)	
Occasionally	218 (47.91)	13 (5.96)	156 (71.56)	49 (22.48)	
Always	171 (37.58)	9 (5.26)	125 (73.10)	37 (21.64)	
Workplace situational awareness					$\chi^2(4) = 28.61, p < 0.001$
Never	136 (29.89)	8 (5.88)	76 (55.88)	52 (38.24)	
Occasionally	232 (50.99)	10 (4.31)	170 (73.28)	52 (22.41)	
Always	87 (19.12)	9 (10.34)	70 (80.46)	8 (9.20)	

TABLE 1 (Continued)

Variables	Number (%)	Perceived risk			Inferential statistics
		Low (%)	Medium (%)	High (%)	
Contribution to workplace decision-making					$\chi^2(4) = 3.48, p = 0.481$
Never	178 (39.12)	13 (7.30)	117 (65.73)	48 (26.96)	
Occasionally	175 (38.46)	7 (4.00)	125 (71.43)	43 (24.57)	
Always	102 (22.42)	7 (6.86)	74 (72.55)	21 (20.59)	

TABLE 2 Bivariate logistic regression of predictors of the perceived risk of contracting COVID-19 at the workplace.

Variables	OR	Robust SE	p value	Confidence interval	
Age (Ref: 18–24 years)					
25–34	1.788	0.519	0.045	1.012	3.160
35–54	1.228	0.368	0.493	0.683	2.208
Above 54	1.313	0.462	0.439	0.659	2.616
Gender (Ref: Female)					
Male	1.569	0.319	0.027	1.053	2.337
Education (Ref: SHS/diploma)					
Tertiary	1.721	0.359	0.009	1.144	2.591
Experience (Ref: 1–5 years)					
6–10	1.085	0.279	0.751	0.656	1.795
Above 10	0.942	0.243	0.815	0.568	1.560
Facility (Ref: Hospital)					
Health center	1.091	0.220	0.664	0.735	1.620
Workplace safety systems (Ref: Poor)					
Good	0.350	0.081	<0.001	0.222	0.552
Emotional fatigue (Ref: occasionally)					
Always	2.114	0.486	0.001	1.347	3.316
Workplace communication (Ref: Never)					
Occasionally	0.520	0.110	0.002	0.344	0.787
Always	0.675	0.434	0.540	0.191	2.378
Workplace decision making (Ref: Never)					
Occasionally	0.496	0.119	0.003	0.310	0.793
Always	0.464	0.160	0.026	0.237	0.911
Workplace fatigue management (Ref: Never)					
Occasionally	0.511	0.165	0.037	0.271	0.960
Always	0.505	0.166	0.038	0.265	0.962
Workplace situational awareness (Ref: Never)					
Occasionally	0.531	0.128	0.009	0.332	0.852
Always	0.217	0.070	<0.001	0.115	0.408
Contribution to workplace decision making (Ref: Never)					
Occasionally	1.009	0.231	0.969	0.645	1.579
Always	0.765	0.211	0.333	0.445	1.315

Note: Bold values are significant < 0.05.

TABLE 3 Multivariate logistic regression of predictors of the perceived risk of contracting COVID-19 at the workplace.

Variables	Model 1: Work factors				Model 2: Work factors + sociodemographic factors					
	OR	Robust SE	p value	Confidence interval	OR	Robust SE	p value	Confidence interval		
Workplace safety systems (Ref: Poor)										
Good	0.433	0.125	0.004	0.246	0.764	0.461	0.137	0.009	0.258	0.827
Emotional fatigue (Ref: Occasionally)										
Always	2.073	0.511	0.003	1.279	3.361	2.239	0.563	0.001	1.368	3.665
Workplace communication (Ref: Never)										
Occasionally	0.743	0.185	0.233	0.455	1.212	0.707	0.179	0.171	0.430	1.162
Always	1.454	0.900	0.545	0.432	4.891	1.390	0.982	0.641	0.348	5.551
Workplace decision-making (Ref: Never)										
Occasionally	0.728	0.230	0.315	0.392	1.352	0.759	0.257	0.416	0.391	1.473
Always	1.518	0.752	0.399	0.575	4.011	1.491	0.798	0.455	0.523	4.255
Workplace fatigue management (Ref: Never)										
Occasionally	0.825	0.321	0.621	0.385	1.769	0.777	0.309	0.526	0.356	1.696
Always	1.589	0.709	0.299	0.663	3.808	1.499	0.682	0.374	0.614	3.657
Workplace situational awareness (Ref: Never)										
Occasionally	0.592	0.193	0.107	0.313	1.120	0.515	0.180	0.050	0.260	1.020
Always	0.181	0.082	<0.001	0.074	0.438	0.170	0.079	<0.001	0.068	0.421
Contribution to workplace decision-making (Ref: Never)										
Occasionally	1.517	0.391	0.106	0.916	2.515	1.558	1.413	0.094	0.927	2.618
Always	1.923	0.654	0.054	0.988	3.745	2.284	1.829	0.023	1.122	4.651
Age (Ref: 18–24 years)										
25–34						1.677	0.522	0.097	0.911	3.086
35–54						1.123	0.356	0.714	0.604	2.089
Above 54						1.547	0.595	0.257	0.728	3.289
Gender (Ref: Female)										
Male						1.328	0.299	0.208	0.854	2.066
Education (Ref: SHS/diploma)										
Tertiary						1.780	0.423	0.015	1.118	2.835
Experience (Ref: 1–5 years)										
6–10						1.003	0.267	0.991	0.595	1.691
Above 10						1.148	0.316	0.615	0.669	1.970
Facility (Ref: Hospital)										
Health center						1.092	0.236	0.685	0.714	1.668

Note: Bold values are significant < 0.05.

For the sociodemographic factors, only educational level had a statistically significant relationship with the perceived high risk of contracting COVID-19 at the workplace. Here, the odds of a high perceived risk versus the combined medium and low perceived risk of contracting COVID-19 at the workplace were 1.780 times higher for healthcare workers with tertiary education than their compatriots with senior high or diploma level education.

4 | DISCUSSION

The COVID-19 pandemic has affected many healthcare workers and has overwhelmed many healthcare systems, especially in sub-Saharan Africa.¹⁷ The morbidity and mortality rates of the virus coupled with the associated lack of resources at many healthcare centers in Ghana are likely to create a high sense of insecurity in terms of contracting

the COVID-19 virus for frontline healthcare workers. The high perceived risk of contracting the COVID-19 virus when not managed properly causes substantial fear, panic, anxiety, and burnout among these healthcare workers. Risk perception plays a critical role in determining the willingness of healthcare workers to dispense their responsibilities effectively in this crisis. Factors like perceived susceptibility may affect the compliance of healthcare workers to infection control precautions and their readiness to provide clinical services to infected patients. Previous studies on COVID-19 have indicated that the risk perception of workers in the health sector is relatively high.¹⁸⁻²⁰ The protection-motivation theory postulates that there is a link between an individual's perceived vulnerability, the severity of the threatening event, response efficiency, and situational awareness of the system.²¹ This study assessed the relationship between the perceived risk of contracting COVID-19 at the workplace among healthcare workers in Ghana and their work factors while controlling for their sociodemographic factors.

Our study found that having good workplace safety systems could reduce the perceived risk of contracting COVID-19 at the workplace among healthcare workers. This meant that healthcare workers who thought policies, processes, and interventions put in place to manage and mitigate the risk of contracting COVID-19 were good and effective were less likely to suffer from stress and burnout. This is in tandem with Falco et al.¹⁹ who found that the availability and effectiveness of health and safety-related interventions and policies are valuable in coping with the perceived risk of infection at the workplace. Healthcare workers have close contact with infected people, and also most of them have had to adjust and adapt to unfamiliar procedures with special working conditions. This is likely to result in discomfort, worry, and anxiety among the healthcare workers. Moss et al.²² posited that working under unusual working conditions is likely to increase the risk of burnout, anxiety, stress, and depression among healthcare workers. Therefore, knowing that there are effective workplace safety protocols or procedures and interventions has the tendency for self-assurance and a high sense of security, which, in turn, reduces anxiety and fear. Almost 74% of the respondents in this study rated their workplace safety systems as poor, with 94.66% of this number indicating medium to a high perceived risk of contracting COVID-19 at work. This represents a fair assessment of Ghana's health systems, as reported by Afulani et al.²³ Some respondents further indicated that they had to wash and reuse disposable PPEs. Noteworthy is the fact that the lack of this basic equipment and protocols, even in a nonpandemic era, is a probable trigger for poor service delivery, stress, and anxiety among healthcare workers.

The adequacy of workplace protection measures, safety systems, and policies influence workers' perception of their safety at work. However, unavailability of efficient organizational systems that promote the mental and social well-being of workers while addressing job demands affect risk perception when attending to infected patients and may potentially underscore the confidence in infection-control measures.⁹ In periods of pandemics and health crises, there will always be an increase in the intensity of workload of healthcare workers, most especially workers at the frontline in the fight against the pandemic, consequently resulting in physical and emotional fatigue. This study

found that healthcare workers who were always emotionally fatigued were more likely to have a high perceived risk of contracting COVID-19 at the workplace. Organizational stress management policies are inevitable tools in addressing workplace fatigue as well as the emotional well-being of workers, which consequently reduces the anxiety and the high sense of vulnerability to the risk of contracting the virus. For instance, some healthcare workers who mentioned that they received some form of psychological and moral support at work applauded how beneficial it was in dealing with the uncertainties associated with working on the frontlines. Also, a high perceived risk of infection is likely to compel healthcare workers to invest in additional resources for their health and safety at work. This includes cognitive and behavioral coping strategies, such as adopting protective behaviors, having counterfactual thoughts about health and safety-related occurrences, and working environment monitoring for potential hazards.¹⁹ In this instance, resources such as psychological and physical energies and time will be invested, resulting in resource depletion and, ultimately, emotional fatigue. It is, however, critical for healthcare facilities to consider the social, psychological, and moral support of the healthcare workers in an attempt to manage the possible stress and burnout even if the high perceived risk cannot be managed directly.

Individuals' subjective understanding and situational awareness of systems in the working environment influence their decisions, behaviors, and efforts to uphold workplace safety measures. This consequently influences how workers in the health sector carry out their duties.^{8,24} Self-physical health protection has been a primary concern for many healthcare workers in pandemic situations.²⁵ Our study found that healthcare workers who indicated that there were occasional and frequent monitoring of the happenings and detection of potential modifications related to COVID-19 risk in the work environment were less likely to have a high perceived risk of contracting COVID-19 at the workplace. Afulani et al.²³ found that perceived preparedness and management support of healthcare workers were associated with lower stress and burnout. Team or group-level strategies that promote regular monitoring of the working environment can lessen the physiological and psychological impacts accompanying perceived risk. Regular or timely monitoring of the working environment will help identify potentially risky situations and mitigate such risks. As reported by Falco et al.¹⁹ healthcare workers will invest in coping strategies such as monitoring the work environment for potential hazards if they perceive a high risk of infection. The sight of frequent work environment situational assessment is likely to create a sense of security and confidence among the healthcare workers.

This study also found that healthcare workers' contribution to workplace decision-making influenced their perceived risk of contracting the virus. In this instance, healthcare workers who frequently contributed to workplace decision-making were 2.284 times higher to have a high perceived risk of contracting COVID-19 at the workplace. This could emanate from the fact that contributing to management in such times of crisis increases the psychological load on these healthcare workers hence their high sense of vulnerability to contracting the virus. This finding is in tandem with Xu and Zhang,²⁶ who found that healthcare workers who had

multiple and conflicting roles had adverse emotional reactions as a result. This could mean that the ideal situation for healthcare workers during crises is to perform tasks within their area of expertise. However, working conditions (high ratio of healthcare workers to the population) in resource-limited settings like Ghana require healthcare workers to regularly perform tasks outside their area of expertise. Hence, reducing the frequency of such responsibilities, from frequently to occasionally, could avert some associated impacts.

In this study, healthcare workers with high-level education were also more likely to have a high perceived risk of contracting COVID-19 at the workplace. This finding is contrary to Lanciano et al.²⁷ who found that among general workers, respondents with high education had low health risk perception in terms of the likelihood of contracting the virus. However, in this study, there was a high perceived risk of contracting COVID-19 at the workplace among healthcare workers with tertiary level education. Higher education usually corresponds with higher knowledge. This finding could mean that although healthcare workers with higher education were knowledgeable about the virus, they might still not have been favorably disposed to the control measures required to prevent the spread of the virus.²⁸

4.1 | Implications

This study is among the few studies in Ghana to examine issues of job demands, safety systems, and perceived risk of infection among healthcare workers during the COVID-19 pandemic. The findings will contribute to addressing the challenges in Ghana's and, to a large extent Africa's response to this and future pandemics. Our findings contribute data on frontline healthcare workers and have implications for the pandemic response in Ghana, particularly given the effects of job demands and safety systems on stress, burnout, and healthcare service delivery in a pandemic. Importantly, healthcare workers' concerns about emotional fatigue, safety protocols, work environment situational awareness, and working outside their area of expertise must be addressed, given the evidence that these factors shape the perceived risk of contracting the virus at the workplace. The governments of Ghana, as well as the management of health facilities, must therefore take meaningful steps to support healthcare workers. For instance, improvement in the implementation and enforcement of safety protocols, the provision of social and psychological support systems, and incentivization may increase healthcare workers' capacity, confidence, and morale in responding to the pandemic.

4.2 | Limitations of the study

This study is a cross-sectional survey, hence associations found are not causal, especially in the sequential order of events. This study took place while the vaccination of healthcare workers in Ghana had not started. It is, however, acknowledged that vaccination could influence the risk perception among healthcare workers. Also, the use of self-reported measures in this study could be a limitation.

Healthcare workers may be disgruntled about issues unrelated to this study to provide distorted responses. Anonymity and confidentiality were however assured to minimize it. Habituation response bias was also minimized by mixing positively worded questions with a couple of questions worded differently. Further, the question of the perceived risk of exposure captures healthcare workers' emotional response, and this may not capture the full range of their feelings about the threat.

5 | CONCLUSION

This study sought to assess the relationship between job factors and the perceived risk of contracting COVID-19 at the workplace among healthcare workers and how the relationships vary when socio-demographic characteristics are taken into consideration in a resource-limited setting like Ghana. This study was based on defined variables from the COVID-19 Perceived Risk Scale, Job Demands-Resources Model, and the Safety at Work Model. Binary logistic regression analysis revealed that the effectiveness of workplace health and safety policies and processes (workplace safety systems); emotional fatigue; regular workplace situational awareness assessment (work environment monitoring), which gives workers the understanding and clarity of the level of seriousness of a particular condition and how it is handled; and, the capacity to communicate and get involved in making decisions is the job factors that affect the perceived risk of contracting COVID-19 at the workplace. Also, the educational levels of healthcare workers influence their perceptions of the risk of contracting COVID-19 at the workplace. In terms of health and safety at work, this study recommends that there should be an improvement in implementing safety protocols at health facilities to increase the confidence of healthcare workers. Furthermore, social and psychological support and work environment situational assessment, which can reduce stress and anxiety levels among the healthcare workers, should be implemented if contributing factors such as working outside their area of expertise or job scope cannot be eliminated.

AUTHOR CONTRIBUTIONS

Simon Appah Aram: Conceptualization; data curation; formal analysis; resources; supervision; writing—original draft; writing—review & editing. **Benjamin M. Saalidong:** Data curation; formal analysis; methodology; resources; writing—original draft; writing—review & editing. **Erica Odwira Opoku:** Data curation; methodology; resources; visualization. **Isaac Sam Hayford:** Data curation; investigation; writing—original draft.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Simon Appah Aram accepts full responsibility for the accuracy and integrity of the data provided.

TRANSPARENCY STATEMENT

This manuscript is an honest, accurate, and transparent account of the study being reported; no important aspects of the study have been omitted, and any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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