



Article

Analysis of COVID-19 Risk Perception and Its Correlates among University Students in Ghana

Frank Quansah ¹, Stephen Kofi Anin ², John Elvis Hagan, Jr. ^{3,4,*}, Edmond Kwesi Agormedah ⁵, Prince Oduro ⁶, Medina Srem-Sai ⁷, James Boadu Frimpong ³ and Thomas Schack ⁴

¹ Department of Educational Foundations, University of Education, Winneba P.O. Box 25, Ghana

² Department of Industrial and Health Sciences, Faculty of Applied Sciences, Takoradi Technical University, Takoradi P.O. Box 256, Ghana

³ Department of Health, Physical Education and Recreation, University of Cape Coast, Cape Coast P.O. Box 5007, Ghana

⁴ Neurocognition and Action-Biomechanics-Research Group, Faculty of Psychology and Sports Science, Bielefeld University, Postfach 10 01 31, 33501 Bielefeld, Germany

⁵ Department of Business & Social Sciences Education, University of Cape Coast, Cape Coast P.O. Box 5007, Ghana

⁶ Department of Special Education, University of Education, Winneba P.O. Box 25, Ghana

⁷ Department of Health, Physical Education, Recreation and Sports, University of Education, Winneba P.O. Box 25, Ghana

* Correspondence: elvis.hagan@ucc.edu.gh



Citation: Quansah, F.; Anin, S.K.; Hagan, J.E., Jr.; Agormedah, E.K.; Oduro, P.; Srem-Sai, M.; Frimpong, J.B.; Schack, T. Analysis of COVID-19 Risk Perception and Its Correlates among University Students in Ghana. *COVID* **2022**, *2*, 1125–1138. <https://doi.org/10.3390/covid2080083>

Academic Editors: Letizia Materassi, Andrea Guazzini, Mirko Duradoni, Guglielmo Bonaccorsi and Chiara Lorini

Received: 22 July 2022

Accepted: 9 August 2022

Published: 11 August 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Abstract: Monitoring students' risk perception forms part of emergency management during public health emergencies. Thus, public risk perception generally triggers attitudes, emotional responses, and prevention behaviors, which affect the evolution of emergencies and disease control strategies. However, research has paid less attention to the COVID-19 risk perception of students in Ghana. This study assessed the prevalence of COVID-19 risk perception and further identified its correlates among university students. In this study, 882 students from two public universities in Ghana were conveniently recruited. The data were analysed using frequency counts, percentages, and ordered logistic regression. The study revealed the prevalence of a high degree of COVID-19 risk perception among almost half (47.4%) of the sampled students. Results from ordered logistic regression analysis showed that age, sex, religion, use of professional and social media platforms, level (years) of study, and COVID-19 knowledge were significant correlates of COVID-19 risk perception. The dissemination of appropriate COVID-19 information and behavior-change communication to such relatively high-risk behavior sub-groups could help counter the debilitating effects of non-altruistic attitudes because of COVID-19 risk perception.

Keywords: COVID-19 knowledge; professional platforms; risk perception; social media platforms; university students

1. Introduction

The outburst of COVID-19 has become a social and health problem of concern on a global scale. The COVID-19 pandemic generally affected people's lives. In the educational sector, about 1.9 billion students were affected by school closures, postponements, and/or the cancellation of all campus-related academic and social activities because students particularly appeared vulnerable in the perceived unsafe learning environment [1,2]. With the case fatality rates around the globe, there is a tendency to subjectively appraise students' perception on the likelihood of getting infected with the COVID-19 virus [1–4]. This appraisal mechanism refers to risk perception, explained as a person's subjective assessments and judgment concerning the possibility of suffering harms or hazards [5,6]. According to Paek and Hove [7], individual risk perception is both cognitive (i.e., how much people understand risks) and affective (i.e., how people feel about risks).

Extant researchers have found moderate to high-risk perception of COVID-19 among students in Asia [8,9] and Europe [10,11]. In Asia, students in China, for instance, had a high-risk perception of COVID-19 [8], while those in Iran [12], Saudi Arabia, and India [13,14] had a moderate-risk perception [9,15]. Similar findings were reported in Europe, such as in Italy [16] and France [17], in the United States [18], and in Sub-Saharan Africa, like Libya [19], Egypt [20], Ethiopia [21], and other countries [22]. For example, Egyptian students felt that coronavirus infection is a life-threatening illness and a serious threat to society [20], while those in Ethiopia had a low perceived threat of COVID-19 [21]. Though these previous studies were conducted in different nations and at different phases of the pandemic, it is quite essential to understand the implications of the moderate to high degree of risk perception [6].

Students' risk perceptions of COVID-19 are influenced by several factors such as sex, age, level of study/education, COVID-19-related knowledge, and the use of professional platforms and social media. These factors vary by country, population, and socio-cultural context. Recent empirical investigations have found that risk perception among students is influenced by gender, age, and level of study/education [15,23,24]. For example, older female students and highly educated persons perceived a higher degree of risk than younger males and less-educated counterparts, respectively [8,25,26]. Students with high COVID-19 related knowledge had a higher-risk perception than others [8,24,27,28]. Residents, including students who used free media websites, or community information platforms as their main media information sources had a higher degree of perceived risk level [26]. Further, 4th-year university students had significantly lower risk perception than those in other year groups [15]. Similarly, students who spent fewer years in school (lower level) had a very high-risk perception probability [22].

Drawing from the classic health belief model, individuals' beliefs on the perceived threats of an epidemic and potential preventive actions define whether they would implement preventive measures [29]. Therefore, students' risk perception of the COVID-19 disease is an imperative determinant of their willingness and motivation to engage in health-preventive or -promoting behaviors [6,30]. Previous research on epidemics has revealed that adopting preventive measures is associated with reduced fear/worry/perceived risk [31–33] and adherence to prescribed interventions [34]. For example, students with lesser risk perception tend to adopt risk-taking behaviors and less preventive behaviors to protect themselves from the threat of infection [35], while those with high-risk perception tend to take preventive behavior [36]. Some other studies have examined the COVID-19 risk perception and related preventive behaviors (e.g., handwashing, social distancing, and intention to vaccinate) among students in developed countries like China [37], United States [18], Italy [16], France [17], Netherlands [11], and Poland [10] and developing countries like Egypt [20] and Libya [19]. According to these investigations, students are more likely to adopt and implement protective behaviors when they perceived that the risks of contracting COVID-19 and the perceived severity of the disease are both higher [10,11,24,38]. The negative perceptions of the risk and doubt of risk will increase the psychological pressure and negative emotions of students, threatening their mental health. Furthermore, high COVID-19 risk perception in students increases their psychological responses [39–41]. This is because the prevalence of the outbreaks will produce a demanding, traumatic, and unsafe learning environment for students leading to negative emotions and mental health problems.

In Ghana, the government, through its agencies, has implemented several preventive measures (e.g., physical/social distancing, nose masking) like other affected countries to control and minimize the spread of COVID-19. Despite these efforts, anecdotal information based on the researchers' observations showed that some residents, including university students, failed to strictly adhere to and observe the COVID-19 safety protocols. As of 8th August 2022, 168,306 positive cases had been recorded, out of which 166,848 had recovered and 1458 were dead [42]. Given the ever-changing situations of the COVID-19 crisis, the general public, including students, remain at high risk due to the poor adherence

to pandemic control protocols. Misconceptions about the contagion may have given rise to adverse risk behaviors across populations. Although students' risk perception has been well studied in some advanced and emerging economies [9,43], research on students' risk perception of COVID-19 in Ghana is very limited [44]. Most of the related studies in Ghana focus on students' readiness for and experience with online learning [45,46] and the safety of the learning environment and anxiety during the COVID-19 pandemic [4]. Monitoring students' risk perception form part of emergency management during public health emergencies like COVID-19 pandemic [47]. It is worthwhile to indicate that public risk perception generally triggers attitudes, emotional responses, and prevention behaviors, which affect the evolution of emergencies and disease control strategies [47].

Understanding the COVID-19 risk perception among students and the related influencing factors in Ghana is an important concern. The rationale of this study was to assess the prevalence of COVID-19 risk perception and further identify its correlates among university students. This inquiry may help to understand university students' attitudes and risk perception toward the emerging disease and to predict their behaviors. The outcome of this research would help the government and its agencies and the management of the universities in Ghana to develop educational and formal training programs to promote adherence to infection control practices among university students. The study findings would also inform policymakers to emphasize effective risk communication messages.

2. Materials and Methods

2.1. Research Approach and Design

This study employed a quantitative research approach using the descriptive cross-sectional survey design to investigate the prevalence of COVID-19 risk perception and its correlates among university students. This approach allowed the researchers to provide a more accurate and meaningful picture at one point in time [48], through a statistical description [49] of how the participants conceptualize and draw associations in relation to the issue under investigation. The choice of this design/approach places primary emphasis on generalization by ensuring that the knowledge gained is representative of the population from which the sample was drawn, as required by the research problem [50].

2.2. Participants' Selection

The study recruited 882 students from two public universities in Ghana, namely the University of Education, Winneba (UEW), and the University of Cape Coast (UCC), all within the central region of Ghana. This comprised more than one-third each of Level 200 and 400 students, with a few Level 100 students. The majority of the participants were males (see Table 1) and were selected through the convenience sampling technique. The participants were regular students who were in various degree and diploma programs and were available at the time of data collection. The survey procedure and ethical standards were designed according to the regulations of the Institutional Review Board (IRB) of the University of Cape Coast. By signing consent forms to declare their willingness to be involved in the study, every student at the said universities was eligible to be part of the study.

Table 1. Sociodemographic Characteristics.

Variables	Levels	Frequency	Percent
Age range	20–24 years	321	36.4
	25–29 years	125	14.2
	30–34 years	292	33.1
	35–39 years	28	3.2
	>39 years	116	13.2
Sex	Male	661	74.9
	Female	221	25.1
Religion	Christian	603	68.4
	Muslim	235	26.6
	Traditionalist	44	5.0
Use of professional platforms as COVID-19 information sources	Utilize	331	37.5
	Do not utilize	551	62.5
Use of social media as COVID-19 information sources	Utilize	572	64.9
	Do not utilize	310	35.1
Level of study	Level 100	20	2.3
	Level 200	338	38.3
	Level 300	204	23.1
	Level 400	320	36.3
Perceived COVID-19 knowledge	Knowledgeable	679	77.0
	Not knowledgeable	203	23.0

2.3. Data Collection Instrument

The investigators designed and validated a questionnaire for data collection. The items on the questionnaire were crafted using a BRUSO approach (Brief, Relevant, Unambiguous, Specific, and Objective). After this approach, content and face validity were ensured by using experts with public health, health psychology, and measurement and evaluation backgrounds. These experts, before the questionnaire administration, were consulted to make inputs, comments, and suggestions, particularly on the items on risk perception [51,52]. The various scales adapted to measure the key variables were also subjected to factor analysis.

The instrument had two major sections. The first part comprised sociodemographic variables, which included age, sex, religion, use of professional platforms as COVID-19 information sources, use of social media platforms COVID-19 information sources, level of study, and COVID-19 knowledge. Respondents’ perceived knowledge of COVID-19 was evaluated using a dichotomous scale. The respondents were asked to respond to six (6) questions relating to COVID-19 symptoms, transmission, treatment, and management. Examples of the items are: “Do health measures such as early case detention, isolation, contact tracing and social distancing help reduce the spread of disease?”, and “What are the main ways in which people are currently getting infected with the new disease?”. With options provided to the specific questions, respondents were expected to select from these responses. The items were scored dichotomously, as 1 represented a correct response, and 0 denoted an incorrect response. The correct and incorrect responses were categorized as knowledgeable and not-knowledgeable respectively. The second aspect of the instrument had 5 items measuring COVID-19 risk perception, which required a ‘yes’ or ‘no’ response.

In the context of the study, risk perception is the extent to which the school environment is perceived as safe from COVID-19 transmission and infection. The items for measuring risk perception were adapted from the COVID-19 risk perception (CoRP) scale developed and validated by Capone et al. [52]. The five items were: “It is very easy to contract COVID-19 virus within the school environment”, “I am afraid of contracting COVID-19 because I know of colleagues who have contracted the virus and still going about their normal activities”, “I fear talking to colleagues because I am likely to be infected when I do that”, “I am uncertain

about the safety of the school environment because of COVID-19”, and “I am at a high possibility of contracting the virus with the least mistake I make”. The risk perception scale was further validated through response factor analysis, which showed factor loadings ranging between 0.50 to 0.759. A test re-test was also carried out, and a reliability estimate of 0.792 was achieved. Results from a Kuder–Richardson 21 analysis also showed a reliability estimate of 0.714, which is deemed sufficient [53,54].

2.4. Data Collection Procedure

The data were collected during the first and second quarter of 2021 during the COVID-19 pandemic. During this period, the universities in Ghana had resumed to academic activities and in-person instruction after over 9 months of lockdown during the COVID-19 crisis. Having obtained ethical approval from the IRB of UCC in Ghana, with ethical code UCCIRB/EXT/2020/25, permission was sought from the authorities of the two universities on a familiarization visit. An appointment was then made for a second visit, so that it was possible to meet many of the students who took part in the study. Participants who showed interest in taking part in the study were debriefed accordingly. In addition, written consent was obtained from the participants. The full details of the study were made explicit to the students with an opportunity for them to ask any question for clarification. This was done to ensure that the students understood what the study was about. The participants were made aware that their participation was voluntary and that they were free to withdraw from the study at any time. The questionnaires were distributed directly to the study participants. With the approval of the faculty members, the survey was conducted about 15 min before the start of a lecture period; hence, all COVID-19 preventive measures were strictly adhered to. The participants were assured that the information gathered would only be used for research purposes. Further, the questionnaire items excluded any identification details, such as the name and address of respondents, for the sake of anonymity. The answered questionnaires were collected, sealed in white envelopes, and kept with one of the researchers. The entire data collection lasted for approximately 2 months.

2.5. Data Analysis

The questionnaires retrieved were sorted and screened, and entries were made using SPSS (version 21). Data-entry errors were also checked. Descriptive statistics, such as frequency counts and percentages were utilized to represent the distribution of responses on the sociodemographic characteristics of the respondents. Using the composite scores, the respondents were categorized into those with low-, moderate-, or high-risk perception. To address the last objective, ordered logistics regression was employed, after violating the normality assumption underlying the use of a parametric test tool. This justified the choice of a logistics regression analysis (distribution-free), which has been supported by previous literature [55]. A similar approach to analyzing similar data has been adopted by previous studies [4,56]. The assumptions underlying the use of ordered logistics regression were tested before the main analysis.

3. Results

3.1. Sociodemographic Characteristics of Participants

This research surveyed the sociodemographic information of the respondents, namely, age, sex, religion, use of professional platforms and social media platforms, level of study, and COVID-19 knowledge. The majority of the participants were 20–24-years-old ($n = 321$, 36.4%) whereas a few of them were 35–39-years-old ($n = 28$, 3.2%) (see Table 1). A number of the participants were 30–34-years-old ($n = 292$, 33.1%). The study comprised more male ($n = 661$, 74.9%) participants than female ($n = 221$, 25.1%). Most of the participants for the study were Christians ($n = 603$, 68.4%), with a few being traditionalists ($n = 44$, 5%).

A greater section of the participants reported that they did not, rather than did, make use of professional platforms in search of COVID-19 information ($n = 551$, 62.5%). Further, the participants stated that they largely made use of social media platforms for information

on COVID-19 ($n = 572, 64.9\%$). Over one-third of the respondents were recruited from levels 200 (38.3%) or 400 (36.3%). The majority of the participants indicated that they were knowledgeable on issues of COVID-19 ($n = 679, 77\%$).

3.2. Prevalence of COVID-19 Risk Perception among Students

The participants responded to a series of items on COVID-19 risk perception. Table 2 shows the details of the results.

Table 2. Frequency Distribution on the Prevalence of COVID-19 Risk Perception.

Levels	Range	Frequency	Percent
Low	0–1.0	265	30.0
Moderate	2.0–3.0	199	22.6
High	4.0–5.0	418	47.4
Total	-	882	100.0

The outcome of the analysis revealed a high degree of COVID19 risk perception prevailing among the students. Records showed that close to half of the respondents ($n = 418, 47.4\%$) exhibited a high degree of COVID-19 risk perception (see Table 2). Over 22% of the participants reported a moderate level of COVID-19 risk perception, and about 30% of them demonstrated a low level of COVID-19 risk perception.

3.3. Correlates of COVID-19 Risk Perception among University Students amid the COVID-19 Pandemic

The factors associated with COVID-19 risk perception among university students were examined in this study. The predictors were age, sex, religion, use of professional platforms and social media platforms, level of study, and COVID-19 knowledge. The outcome variable was COVID-19 risk perception, in three levels: low, moderate, and high. The outcome of the analysis from the ordered logistic regression is shown in Tables 3 and 4.

Table 3. Model Fitting Information.

Indicators	Model	–2 Log Likelihood	Chi-Square	df	Sig.
Log Likelihood	Intercept Only	1534.986			
	Final	1435.869	99.116	18	0.000
Goodness of Fit	Pearson	-	1366.903	327	0.000
	Deviance	-	1314.162	327	0.000

Cox and Snell = 0.406; Nagelkerke = 0.421.

The output in Table 3 presents the model fitting details of the specified ordered regression model. The likelihood ratio test revealed a significant improvement in the fit of the final model, which contains the complete set of predictors, compared to the intercept-only model, which is the null model, $\chi^2(18) = 1435.869, p < 0.001$. This showed that the model was fit. A contradictory result was revealed from the goodness of fit analysis, which indicated that the model was not fit: Pearson: $\chi^2(327) = 1366.903, p < 0.001$; deviance: $\chi^2(327) = 1314.162, p < 0.001$. This model misfit from the goodness of fit analysis can be explained by the sample size of this study (Pallant, 2010). To confirm this, fit indices associated with specific predictors were inspected, and it was found that all the predictors showed good model fit [57]. Table 4 shows the details of the predictors.

Table 4. Parameter Estimates for the Ordered Logistics Regression.

Parameter	B	Std. Error	95% Wald CI		Hypothesis Test			Exp(B)	95% Wald CI for Exp(B)		
			Lower	Upper	Wald Chi-Square	df	Sig.		Lower	Upper	
Threshold	Low risk perception	-0.509	0.4821	-1.454	0.436	1.115	1	0.291	0.601	0.234	1.546
	Moderate risk perception	0.522	0.4821	-0.423	1.467	1.173	1	0.279	1.686	0.655	4.337
Age range											
	20–24 years	0.410	0.2773	-0.134	0.954	2.186	1	0.139	1.507	0.875	2.595
	25–29 years	-0.807	0.2971	-1.390	-0.225	7.383	1	0.007	0.446	0.249	0.799
	30–34 years	0.253	0.2254	-0.189	0.694	1.255	1	0.263	1.287	0.828	2.003
	35–39 years	-0.544	0.4326	-1.391	0.304	1.578	1	0.209	0.581	0.249	1.356
	>39 years	0 ^a						1			
Sex											
	Male	0.427	0.1603	0.113	0.742	7.108	1	0.008	1.533	1.120	2.099
	Female (ref)	0 ^a						1			
Religion											
	Christian	-0.717	0.3044	-1.313	-0.120	5.545	1	0.019	0.488	0.269	0.887
	Muslim	-0.838	0.3211	-1.468	-0.209	6.813	1	0.009	0.432	0.230	0.812
	Traditionalist (ref)	0 ^a						1			
Use of professional platforms											
	Utilize	-0.349	0.1536	-0.651	-0.048	5.173	1	0.023	0.705	0.522	0.953
	Do not utilize (ref)	0 ^a						1			
Use of social media											
	Utilize	0.420	0.1544	0.117	0.722	7.399	1	0.007	1.522	1.124	2.059
	Do not utilize (ref)	0 ^a						1			
Level of study											
	Level 100	1.527	0.6175	0.317	2.738	6.117	1	0.013	4.606	1.373	15.450
	Level 200	0.122	0.2122	-0.294	0.538	0.332	1	0.565	1.130	0.745	1.713
	Level 300	0.316	0.2040	-0.084	0.716	2.399	1	0.121	1.372	0.920	2.046
	Level 400 (ref)	0 ^a						1			
COVID-19 knowledge											
	Knowledgeable	-0.121	0.0553	-0.013	-0.230	4.830	1	0.028	0.129	-1.013	-1.258
	Not knowledgeable (ref)	0 ^a						1			
	(Scale)	1 ^b									

Outcome variable: categories of risk perception. Model: (Threshold), age, sex, religion, professional platforms, social media, level of study, knowledge. ^a Set to zero because this parameter is redundant. ^b Fixed at the displayed value.

The outcome of the analysis revealed the following variables as factors associated with COVID-19 risk perception: age, sex, religion, use of professional and social media platforms, level of study, and COVID-19 knowledge. Taking age, for example, students aged 25–29-years-old, compared to those older than 39 years, were less likely to exhibit a high level of COVID-19 risk perception, $B = -0.807$, $OR = 0.446$, $CI (0.249, 0.799)$. Male students, as compared to females, were more likely to show high COVID-19 risk perception, $B = 0.427$, $OR = 1.533$, $CI (1.120, 2.099)$. It was also observed from the analysis that Christians, $B = -0.717$, $OR = 0.488$, $CI (0.269, 0.887)$ and Muslims, $B = -0.838$, $OR = 0.432$, $CI (0.230, 0.812)$, compared to traditionalists, were less likely to experience high COVID-19 risk perception. Students who utilized social media platforms were more likely to exhibit high COVID-19 risk perception, $B = 0.420$, $OR = 1.522$, $CI (1.124, 2.059)$, whereas those who utilized professional platforms as COVID-19 information sources were less likely to experience a high level of risk perception, $B = -0.349$, $OR = 0.705$, $CI (0.522, 0.953)$. Students in Level 100, as compared to those in Level 400, were more likely to experience high COVID-19 risk perception, $B = 1.527$, $OR = 4.606$, $CI (1.373, 15.450)$. Students who were knowledgeable of COVID-19 were less likely to experience high degree of COVID-19 risk perception, $B = -0.121$, $OR = 0.129$, $CI (-1.013, -1.258)$.

4. Discussion

Students’ risk perception of COVID-19 was operationally defined in this study as the extent to which the teaching and learning environment is perceived as being prone to the transmission of and/or infection with respiratory disease [5,7]. This study sought to determine the prevalence and correlates of COVID-19 risk perception among university students in Ghana. The study revealed a high prevalence of COVID-19 risk perception among

almost half (47.4%) of the students. A much higher prevalence (76.3%) of COVID-19 risk perception was reported among undergraduate medical students in Egypt [20], and a high mean risk perception score was reported among college students across various provinces in China [8]. College students are a unique group of young people constituting a significant part of the intellectual and/or knowledge capital of any nation or society who have the propensity to spread their knowledge, awareness, and strong risk perception through their social networks on and/or off-campus. High COVID-19 risk perception among them is suggestive of the possibility of facilitating the dissemination of appropriate public health information about COVID-19 or, on the contrary, facilitating non-altruistic tendencies, misinformation, fake news, and disinformation as a counterproductive undertaking or phenomenon against appropriate preventive and control measures against the pandemic.

With the risk perception of COVID-19 as the outcome variable of interest at three levels (low, moderate, and high risk), the analysis revealed that age, sex, religion, use of professional and social media platforms, level (years) of study, and COVID-19 knowledge were statistically significant correlates of COVID-19 risk perception. Younger students were found to be less likely to demonstrate a high level of COVID-19 risk perception compared to older students (39 years or more). Similarly, age was found to be a significant predictor of COVID-19 risk perception among university students in Ethiopia [58], other community study settings in Ethiopia [59,60], and other study populations [26,61]. This finding is possibly because the risk of adverse health outcomes such as morbidity, hospitalization, intensive care therapy, and mortality rates are relatively higher among older persons than younger ones, thus influencing the perception of COVID-19 risks in younger people [62]. The widespread public health education and awareness about the vulnerability of older persons than younger people [63], who are often more likely to have underlying health conditions that predispose them to the adverse health outcomes of COVID-19 infections, are influenced by both the cognitive perception (how much people know and understand risks) and affective perception (how people feel about risks) of the students [7].

Male students were found to be more likely to show high COVID-19 risk perception compared to females. No study was identified that showed a similar inference on the perceived higher risk of contracting COVID-19 among males than females. In contrast, a study conducted among Spanish university students suggested that female students exhibited higher COVID-19 risk perception than their male counterparts, while the females expectedly showed higher levels of anxiety, conscientiousness, and neuroticism [64]. This tendency for females to exhibit higher levels of COVID-19 risk perception is also reported by Alsharawy et al. [65], Davidson and Freudenburg [66], Ding et al. [8], and Lewis and Duch [67]. This result might probably be attributed to the notion that females are more affective than cognitive-oriented relative to males when responding to threats or adverse conditions. This observation is in accord with the affect heuristic notion, that emotional experiences influence the perception of risk [65]. This study did not distinguish between the cognitive and affective perceptions of COVID-19 risk among the students in Ghana; however, the female students in this study probably provided their responses based on what they knew about COVID-19 and less of how they felt, as it was observed in our data that males had higher COVID-19 knowledge than females. This supports the finding that students who had higher knowledge of COVID-19 were less likely to experience high COVID-19 risk perception.

Christian and Muslim students were less likely to express a high COVID-19 risk perception compared to students who practiced traditional African religion. Christian students were, however, more likely to experience high COVID-19 risk perception compared to Muslims, and therefore, Christian students would be more likely to exhibit more caution and to comply with COVID-19 protocols. Religion plays an important role in the lives of Ghanaians in general, as espoused by Prempeh [68], especially so amid the pandemic. Muslims seem to have a firmer belief in the divine place of death and adverse life outcomes during one's lifetime compared to Christians and other religious beliefs in Ghana, probably due to some of their tenets of faith about the sovereignty of God regarding death and other

hardships of life [69]. Hence, the tendency to throw caution to the wind and engage in high-risk behavior toward COVID-19 exposure may be higher among Muslim students than their counterparts from other religious affiliations.

Students who sourced information about COVID-19 from professional platforms and sources considered to be generally peer-reviewed and reliable about COVID-19 were less likely to experience a high level of risk perception compared to those who did not. Zettler et al. [70] reported that people who paid high attention to the governmental media and trusted the governmental media exhibited lower levels of COVID-19 risk perception and therefore showed higher levels of compliance with the recommended protective behaviors. Students who sourced information about COVID-19 from social media platforms were more likely to exhibit high COVID-19 risk perception compared to those who do not. Similar findings corroborate the use of social media to obtain information about COVID-19 [26,58]. Students who obtained information from social media platforms were reported to be significantly more likely to have adequate knowledge about COVID-19 but less likely to observe mitigation practices on campus [71], probably due to non-altruistic attitudes and views on the perceived risks of COVID-19 to others. Social media platform use could also unfortunately be a common source of misinformation, fake news, and disinformation, leading to such non-altruistic dispositions [72].

Other findings suggest that students who had spent more years in school were less likely to exhibit high levels of COVID-19 risk perception. A similar inference was reported by [24], wherein undergraduates exhibited higher COVID-19 risk perception than junior college students. There is a possibility that students in the advanced stages of their studies have acquired better coping mechanisms in response to an imminent threat or danger in the school environment than students who have spent relatively fewer years in school. Further, students who were knowledgeable about COVID-19 were less likely to exhibit high levels of COVID-19 risk perception compared to those who were not adequately well informed about COVID-19's mode of transmission, common symptoms, preventive measures, and effects. Similar inferences were made from studies conducted among students in China [24], Malaysian dental students [73], and Nigerians [74]. One possible explanation was that higher levels of correct knowledge about COVID-19 were associated with less concern for the potentially imminent threat of COVID-19.

However, some studies also revealed other correlates of COVID-19 risk perception, such as income and a major subject of study among medical students in China [24], being in an open relationship, father's educational status, being diabetic, and using information sources from the ministry of health [58]; these correlates were not included in this study or were contrary to the factors found to be significant predictors of COVID-19 risk perception among students in this study. These disparities could be attributed to the study contexts, the timing of the conduct of these studies at various phases of the pandemic (early stage, and the first, second, and third wave stages), measurement dimensions of the concept of COVID-19 risk perception (cognitive or affective), other study biases, or factors unmeasured or unaccounted for in these studies.

4.1. Strengths and Limitations

This study is the first attempt to examine the correlates of COVID-19 risk perception among university students in Ghana. The use of a descriptive cross-sectional survey design and a non-probability sampling method (convenience) in this study precludes making causal inferences or the generalization of implications from the findings. The findings should therefore be alluded to and interpreted with caution in relation to the wider student population in Ghana faced with the COVID-19 pandemic. Furthermore, caution should be taken in making causal inferences and generalizing the findings to all the university students, since areas of specialization or programs of study could make a difference in the risk perception and the perceived knowledge of the COVID-19 pandemic. Though acceptable analytical corrective measures were implemented during the data analysis, possible errors that may have been introduced subjectively by over and/or under-reporting

of the students' COVID-19 risk perception and COVID-19 knowledge levels among others, potential confounders, and endogeneity biases inherent to cross-sectional study designs may not be entirely ruled out.

Despite these limitations, this study contributes significantly to the dearth of literature on the correlates of COVID-19 risk perception among students who are key stakeholders in the university campuses of Ghana and other such academic or pedagogical settings. These findings could contribute to the dilemma-filled debate about the return to a fully in-person mode of teaching and learning on our university campuses premised on COVID-19 risk perception among students.

4.2. Practical Implications

The findings of this study suggest that several factors play significant roles in the risk perception of people, especially among students, and that possibly other factors not necessarily examined in this study group, depending on the context, may influence the risk perception of students. A multi-faceted approach toward deploying mitigation measures against the spread of the virus on campuses would be more appropriate than a one-size-fits-all public health approach to addressing the pandemic's impact on university campuses in Ghana and other similar settings. Since higher COVID-19 risk perception could translate into relatively higher compliance with mitigation measures against the pandemic, targeted public health interventions to sub-groups with a potential to exhibit high-risk behaviors on university campuses, such as younger female Muslim students who do not use social media platforms as a source of information about COVID-19 but do utilize professional platforms as sources of information about COVID-19, should be deployed. The dissemination of appropriate COVID-19 information and behavior-change communication to such relatively high-risk-behavior sub-groups could help counter the debilitating effects of non-altruistic attitudes, fake news, misinformation, and disinformation on their COVID-19 risk perception.

5. Conclusions

The prevalence of COVID-19 risk perception among students on university campuses in Ghana is high, which could positively translate into higher levels of compliance with COVID-19 protocols deployed on the various campuses. On the contrary, non-altruistic attitudes and views held by students who have low COVID-19 risk perception could, unfortunately, manifest in high-risk behaviors that could counter the mitigation measures against the spread and transmission of COVID-19 on university campuses and similar settings in Ghana. With risk perception of COVID-19 as the outcome variable of interest at three levels (low, moderate, and high risk), the study showed that age, sex, religion, use of professional and social media platforms, level (years) of study, and COVID-19 knowledge were significant correlates of COVID-19 risk perception.

6. Recommendations

Future research could be conducted to examine the comparative associations and/or differences between the cognitive and affective dimensions of COVID-19 risk perception and various correlates not considered in the present study for a better understanding of the role of risk perception in helping contain this pandemic. More robust study designs and sampling methods should be employed to address the limitations inherent in cross-sectional study designs and non-probability sampling techniques. Multi-center campus studies could also be commissioned to help examine the generic and context-specific correlates of COVID-19 risk perception among students. Key players and decision-makers in the fight against the COVID-19 pandemic, especially on university campuses, such as the governing councils, management, lecturers, and administrators, have a role to play to avoid the stoppage of teaching and learning activities and to prevent the creation of a non-conducive school climate by implementing measures to positively influence the COVID-19 risk perception among their students. Additionally, it is recommended that interventions be

targeted at sub-groups among the students, such as younger female Muslim students who do not use social media platforms as a source of information about COVID-19 but do utilize professional platforms as sources of information about COVID-19, because they have the potential to exhibit high-risk behaviors deleterious to COVID-19 management protocols.

Author Contributions: Conceptualization: F.Q. and J.E.H.J.; data curation: F.Q., S.K.A. and E.K.A.; formal analysis: F.Q.; funding acquisition: T.S. and J.E.H.J.; investigation: S.K.A., J.E.H.J., E.K.A., P.O., M.S.-S., J.B.F. and T.S.; methodology: P.O.; roles/writing—original draft: F.Q., S.K.A., J.E.H.J., E.K.A., P.O., M.S.-S., J.B.F. and T.S.; supervision, validation, and visualization: T.S., J.B.F., M.S.-S. and J.E.H.J.; writing—review and editing: F.Q., J.E.H.J., E.K.A., M.S.-S. and T.S. All authors have read and agreed to the published version of the manuscript.

Funding: The authors sincerely thank Bielefeld University, Germany, for providing financial support through the “Special Funding Line, Corona 2021” for the data collection and the Open Access Publication Fund for the support for the article processing charges.

Institutional Review Board Statement: The study was approved by the Institutional Review Board of the University of Cape Coast, Ghana, with the reference number: UCCIRB/EXT/2020/25.

Informed Consent Statement: Written informed consent was taken from all study participants before data collection.

Data Availability Statement: The data are available upon reasonable request through the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Capone, V.; Caso, D.; Donizzetti, A.; Procentese, F. University Student Mental Well-Being during COVID-19 Outbreak: What Are the Relationships between Information Seeking, Perceived Risk and Personal Resources Related to the Academic Context? *Sustainability* **2020**, *12*, 7039. [CrossRef]
2. UNESCO. Adverse Consequences of School Closures. *Paris, France, UNESCO*. 2020. Available online: <https://en.unesco.org/covid19/educationresponse/consequences> (accessed on 17 March 2022).
3. Quansah, F.; Hagan, J.E., Jr.; Ankomah, F.; Srem-Sai, M.; Frimpong, J.B.; Sambah, F.; Schack, T. Relationship Between COVID-19 Related Knowledge and Anxiety Among University Students: Exploring the Moderating Roles of School Climate and Coping Strategies. *Front. Psychol.* **2022**, *13*, 820288. [CrossRef]
4. Quansah, F.; Hagan, J.E.; Sambah, F.; Frimpong, J.B.; Ankomah, F.; Srem-Sai, M.; Seibu, M.; Abieraba, R.S.K.; Schack, T. Perceived Safety of Learning Environment and Associated Anxiety Factors during COVID-19 in Ghana: Evidence from Physical Education Practical-Oriented Program. *Eur. J. Investig. Health Psychol. Educ.* **2022**, *12*, 28–41. [CrossRef]
5. Cori, L.; Bianchi, F.; Cadum, E.; Anthonj, C. Risk Perception and COVID-19. *Int. J. Environ. Res. Public Health* **2020**, *17*, 3114. [CrossRef]
6. Roshanshad, R.; Roshanshad, A.; Vardanjani, H.M.; Mashhadiagha, A.; Mobarakabadi, M.; Hoveidaei, A.; Hoveidaei, A.H. Risk perception, attitude, and practice related to COVID-19: A cross-sectional study among 1085 Iranian healthcare workers. *Ann. Med. Surg.* **2021**, *70*, 102865. [CrossRef]
7. Paek, H.-J.; Hove, T. Risk Perceptions and Risk Characteristics. In *Oxford Research Encyclopedia of Communication*; Oxford University Press: New York, NY, USA, 2017. [CrossRef]
8. Ding, Y.; Du, X.; Li, Q.; Zhang, M.; Zhang, Q.; Tan, X.; Liu, Q. Risk perception of coronavirus disease 2019 (COVID-19) and its related factors among college students in China during quarantine. *PLoS ONE* **2020**, *15*, e0237626. [CrossRef]
9. Taghrir, M.H.; Borazjani, R.; Shiraly, R. COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception. *Arch. Iran. Med.* **2020**, *23*, 249–254. [CrossRef]
10. Sobkow, A.; Zaleskiewicz, T.; Petrova, D.; Garcia-Retamero, R.; Traczyk, J. Worry, Risk Perception, and Controllability Predict Intentions Toward COVID-19 Preventive Behaviors. *Front. Psychol.* **2020**, *11*, 582720. [CrossRef]
11. Kollmann, J.; Kocken, P.L.; Syurina, E.V.; Hilverda, F. The role of risk perception and affective response in the COVID-19 preventive behaviours of young adults: A mixed methods study of university students in the Netherlands. *BMJ Open* **2022**, *12*, e056288. [CrossRef]
12. Samadipour, E.; Ghardashi, F.; Aghaei, N. Evaluation of Risk Perception of COVID-19 Disease: A Community-Based Participatory Study. *Disaster Med. Public Health Prep.* **2020**, 1–8. [CrossRef]
13. Batra, K.; Urankar, Y.; Batra, R.; Gomes, A.; S, M.; Kaurani, P. Knowledge, Protective Behaviors and Risk Perception of COVID-19 among Dental Students in India: A Cross-Sectional Analysis. *Healthcare* **2021**, *9*, 574. [CrossRef]

14. Purohit, D.; Pandey, P.; Makhij, M.; Manchanda, D.; Rathi, J.; Kumar, D.; Verma, R.; Jalwal, P.; Mittal, V.; Kaushik, D. Correlation of Risk Perception with the COVID-19 Related Knowledge and Preventive Measures: A Study on Indian Pharmacy Students. *Int. J. Curr. Res. Rev.* **2021**, *13*, 113–119. [[CrossRef](#)]
15. Alsoghair, M.; Almazyad, M.; Alburaykan, T.; Alsultan, A.; Alnughaymishi, A.; Almazyad, S.; Alharbi, M.; Alkassas, W.; Almadud, A.; Alsuhaibani, M. Medical students and COVID-19: Knowledge, preventive behaviors, and risk perception. *Int. J. Environ. Res. Public Health* **2021**, *18*, 842. [[CrossRef](#)]
16. Wheeler, D.R.; Chibbaro, S.; Karoutis, I.; Safa, A.; Tinterri, B.; Calgaro, G.; Yin, W.C.; Zaed, I. A study investigating the knowledge and responses of Italian medical students to the COVID-19 pandemic. *Pathog. Glob. Health* **2021**, *115*, 250–257. [[CrossRef](#)]
17. Detoc, M.; Bruel, S.; Frappe, P.; Tardy, B.; Botelho-Nevers, E.; Gagneux-Brunon, A. Intention to participate in a COVID-19 vaccine clinical trial and to get vaccinated against COVID-19 in France during the pandemic. *Vaccine* **2020**, *38*, 7002–7006. [[CrossRef](#)]
18. Qiao, S.; Tam, C.C.; Li, X. Risk Exposures, Risk Perceptions, Negative Attitudes Toward General Vaccination, and COVID-19 Vaccine Acceptance Among College Students in south Carolina. *Am. J. Health Promot.* **2021**, *36*, 175–179. [[CrossRef](#)]
19. Elhadi, M.; Msherghi, A.; Alsoufi, A.; Buzreg, A.; Bouhuwaish, A.; Khaled, A.; Alhadi, A.; Alameen, H.; Biala, M.; Elgherwi, A.; et al. Knowledge, preventive behavior and risk perception regarding COVID-19: A self-reported study on college students. *Pan Afr. Med. J.* **2020**, *35*, 75. [[CrossRef](#)]
20. Soltan, E.M.; El-Zoghby, S.M.; Salama, H.M. Knowledge, Risk Perception, and Preventive Behaviors Related to COVID-19 Pandemic Among Undergraduate Medical Students in Egypt. *SN Compr. Clin. Med.* **2020**, *2*, 2568–2575. [[CrossRef](#)]
21. Birhanu, Z.; Ambelu, A.; Fufa, D.; Mecha, M.; Zeynudin, A.; Abafita, J.; Belay, A.; Doyore, F.; Oljira, L.; Bacha, E.; et al. Risk perceptions and attitudinal responses to COVID-19 pandemic: An online survey in Ethiopia. *BMC Public Health* **2021**, *21*, 981. [[CrossRef](#)]
22. Eboreime, E.; Iyamu, I.; Afirima, B.; Okechukwu, E.F.; Kibombwe, G.I.; Oladele, T.; Tafuma, T.; Badejo, O.-O.; Ashiono, E.; Mpofu, M.; et al. COVID-19 risk perception among residents of seven sub-Saharan African countries: Socio-demographic correlates and predicted probabilities. *Pan Afr. Med. J.* **2021**, *39*, 227. [[CrossRef](#)]
23. Guastafierro, E.; Toppo, C.; Magnani, F.G.; Romano, R.; Facchini, C.; Campioni, R.; Brambilla, E.; Leonardi, M. Older Adults' Risk Perception during the COVID-19 Pandemic in Lombardy Region of Italy: A Cross-sectional Survey. *J. Gerontol. Soc. Work* **2021**, *64*, 585–598. [[CrossRef](#)] [[PubMed](#)]
24. Qin, H.; Sanders, C.; Prasetyo, Y.; Syukron, M.; Prentice, E. Exploring the dynamic relationships between risk perception and behavior in response to the Coronavirus Disease 2019 (COVID-19) outbreak. *Soc. Sci. Med.* **2021**, *285*, 114267. [[CrossRef](#)] [[PubMed](#)]
25. de Bruin, W.B. Age differences in COVID-19 risk perceptions and mental health: Evidence from a national US survey conducted in March 2020. *J. Gerontol. Ser. B* **2021**, *76*, e24–e29. [[CrossRef](#)] [[PubMed](#)]
26. He, S.; Chen, S.; Kong, L.; Liu, W. Analysis of Risk Perceptions and Related Factors Concerning COVID-19 Epidemic in Chongqing, China. *J. Community Health* **2020**, *46*, 278–285. [[CrossRef](#)]
27. Abir, T.; Kalimullah, N.; Osuagwu, U.; Yazdani, D.; Mamun, A.; Husain, T.; Basak, P.; Permarupan, P.; Agho, K. Factors Associated with the Perception of Risk and Knowledge of Contracting the SARS-Cov-2 among Adults in Bangladesh: Analysis of Online Surveys. *Int. J. Environ. Res. Public Health* **2020**, *17*, 5252. [[CrossRef](#)]
28. Domínguez, J.M.M.; Jiménez, I.F.; Eraso, A.B.; Otero, D.P.; Pérez, D.D.; Vivas, A.M.R. Risk Perception of COVID-19 Community Transmission among the Spanish Population. *Int. J. Environ. Res. Public Health* **2020**, *17*, 8967. [[CrossRef](#)]
29. Champion, V.L.; Skinner, C.S. The Health Belief Model. In *Health Behavior and Health Education: Theory, Research, and Practice*; Wiley: Hoboken, NJ, USA, 2008; pp. 45–65.
30. Sjoberg, L. Factors in Risk Perception. *Risk Anal.* **2000**, *20*, 1–12. [[CrossRef](#)]
31. Brewer, N.T.; Chapman, G.B.; Gibbons, F.X.; Gerrard, M.; McCaul, K.D.; Weinstein, N.D. Meta-analysis of the relationship between risk perception and health behavior: The example of vaccination. *Health Psychol.* **2007**, *26*, 136–145. [[CrossRef](#)]
32. Chapman, G.B.; Coups, E.J. Emotions and preventive health behavior: Worry, regret, and influenza vaccination. *Health Psychol.* **2006**, *25*, 82–90. [[CrossRef](#)]
33. Seale, H.; Heywood, A.E.; McLaws, M.-L.; Ward, K.F.; Lowbridge, C.P.; Van, D.; MacIntyre, C.R. Why do I need it? I am not at risk! Public perceptions towards the pandemic (H1N1) 2009 vaccine. *BMC Infect. Dis.* **2010**, *10*, 99. [[CrossRef](#)]
34. Bults, M.; Beaujean, D.J.; De Zwart, O.; Kok, G.; Van Empelen, P.; E Van Steenbergen, J.; Richardus, J.H.; Voeten, H.A.; Bults, M.; Beaujean, D.J.; et al. Perceived risk, anxiety, and behavioural responses of the general public during the early phase of the Influenza A (H1N1) pandemic in the Netherlands: Results of three consecutive online surveys. *BMC Public Health* **2011**, *11*, 2. [[CrossRef](#)] [[PubMed](#)]
35. Adefuye, A.S.; Abiona, T.C.; A Balogun, J.; Lukobo-Durrell, M. HIV sexual risk behaviors and perception of risk among college students: Implications for planning interventions. *BMC Public Health* **2009**, *9*, 281. [[CrossRef](#)] [[PubMed](#)]
36. Brug, J.; Aro, A.R.; Oenema, A.; De Zwart, O.; Richardus, J.H.; Bishop, G.D. SARS Risk Perception, Knowledge, Precautions, and Information Sources, the Netherlands. *Emerg. Infect. Dis.* **2004**, *10*, 1486–1489. [[CrossRef](#)]
37. Ahmad, M.I.; Naseem, M.A.; Rehman, R.U.; Zhuang, W.; Ali, R.; Manzoor, M.S. Risk Perception of International Medical Students About Coronavirus (COVID-19) in China and Their Willingness to Fly Back. *Risk Manag. Health Policy* **2021**, *14*, 503–510. [[CrossRef](#)] [[PubMed](#)]

38. de Bruin, W.B.; Bennett, D. Relationships between initial COVID-19 risk perceptions and protective health behaviours: A national survey. *Am. J. Prev. Med.* **2020**, *59*, 157–167. [[CrossRef](#)] [[PubMed](#)]
39. Cao, W.; Fang, Z.; Hou, G.; Han, M.; Xu, X.; Dong, J.; Zheng, J. The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Res.* **2020**, *287*, 112934. [[CrossRef](#)]
40. Guo, J.; Fu, M.; Liu, D.; Zhang, B.; Wang, X.; van Ijzendoorn, M.H. Is the psychological impact of exposure to COVID-19 stronger in adolescents with pre-pandemic maltreatment experiences? A survey of rural Chinese adolescents. *Child Abus. Negl.* **2020**, *110*, 104667. [[CrossRef](#)]
41. Haliwa, I.; Spalding, R.; Smith, K.; Chappell, A.; Strough, J. Risk and protective factors for college students' psychological health during the COVID-19 pandemic. *J. Am. Coll. Health* **2021**, 1–5. [[CrossRef](#)]
42. WHO. WHO Health Emergency Dashboard. 2022. Available online: <https://covid19.who.int/region/afro/country/gh> (accessed on 1 August 2022).
43. de Zwart, O.; Veldhuijzen, I.K.; Elam, G.; Aro, A.R.; Abraham, T.; Bishop, G.D.; Voeten, H.A.C.M.; Richardus, J.H.; Brug, J. Perceived Threat, Risk Perception, and Efficacy Beliefs Related to SARS and Other (Emerging) Infectious Diseases: Results of an International Survey. *Int. J. Behav. Med.* **2009**, *16*, 30–40. [[CrossRef](#)]
44. Hagan, J.E., Jr.; Quansah, F.; Frimpong, J.B.; Ankomah, F.; Srem-Sai, M.; Schack, T. Gender Risk Perception and Coping Mechanisms among Ghanaian University Students during the COVID-19 Pandemic. *Healthcare* **2022**, *10*, 687. [[CrossRef](#)]
45. Agormedah, E.K.; Henaku, E.A.; Ayite, D.M.K.; Ansah, E.A. Online Learning in Higher Education during COVID-19 Pandemic: A case of Ghana. *J. Educ. Technol. Online Learn.* **2020**, *3*, 183–210. [[CrossRef](#)]
46. Henaku, E.A. COVID-19: Online Learning Experience of College Students: The case of Ghana. *Int. J. Multidiscip. Sci. Adv. Technol.* **2020**, *1*, 54–62.
47. Burns, W.J.; Slovic, P. Risk Perception and Behaviors: Anticipating and Responding to Crises. *Risk Anal.* **2012**, *32*, 579–582. [[CrossRef](#)] [[PubMed](#)]
48. Creswell, J.W. *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research*; Pearson Education, Inc.: Upper Saddle River, NJ, USA, 2018.
49. Vega, A.C.; Maguiña, J.L.; Soto, A.; Lama-Valdivia, J.; López, L.E.C. Cross-sectional studies. *Rev. Fac. Med. Hum.* **2021**, *21*, 164–170. [[CrossRef](#)]
50. Cohen, L.; Manion, L.; Morrison, K. *Research Methods in Education*; Routledge: New York, NY, USA, 2013.
51. Dunn, J.G.H.; Bouffard, M.; Rogers, W.T. Assessing Item Content-Relevance in Sport Psychology Scale-Construction Research: Issues and Recommendations. *Meas. Phys. Educ. Exerc. Sci.* **1999**, *3*, 15–36. [[CrossRef](#)]
52. Capone, V.; Donizzetti, A.R.; Park, M.S.-A. Validation and Psychometric Evaluation of the COVID-19 Risk Perception Scale (CoRP): A New Brief Scale to Measure Individuals' Risk Perception. *Int. J. Ment. Health Addict.* **2021**, 1–14. [[CrossRef](#)]
53. Anselmi, P.; Colledani, D.; Robusto, E. A Comparison of Classical and Modern Measures of Internal Consistency. *Front. Psychol.* **2019**, *10*, 2714. [[CrossRef](#)]
54. Quansah, F. The Use of Cronbach Alpha Reliability Estimate In Research Among Students In Public Universities In Ghana. *Afr. J. Teach. Educ.* **2017**, *6*, 56–64. [[CrossRef](#)]
55. Tripepi, G.; Jager, K.; Dekker, F.; Zoccali, C. Linear and logistic regression analysis. *Kidney Int.* **2008**, *73*, 806–810. [[CrossRef](#)]
56. Guan, Y.; Deng, H.; Zhou, X. Understanding the impact of the COVID-19 pandemic on career development: Insights from cultural psychology. *J. Vocat. Behav.* **2020**, *119*, 103438. [[CrossRef](#)]
57. Pallant, J. *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS*, 4th ed.; Allen & Unwin: Crows Nest, Australia, 2010.
58. Tadese, M.; Haile, A.B.; Moltot, T.; Silesh, M. Perceived Risk of COVID-19 and Related Factors Among University Students in Ethiopia During School Reopening. *Infect. Drug Resist.* **2021**, *14*, 953–961. [[CrossRef](#)] [[PubMed](#)]
59. Kabito, G.G.; Alemayehu, M.; Mekonnen, T.H.; Wami, S.D.; Azanaw, J.; Adane, T.; Azene, Z.N.; Merid, M.W.; Muluneh, A.G.; Geberu, D.M.; et al. Community's perceived high risk of coronavirus infections during early phase of epidemics are significantly influenced by socio-demographic background, in Gondar City, Northwest Ethiopia: A cross-sectional -study. *PLoS ONE* **2020**, *15*, e0242654. [[CrossRef](#)] [[PubMed](#)]
60. Asefa, A.; Qanche, Q.; Hailemariam, S.; Dhuguma, T.; Nigusie, T. Risk Perception Towards COVID-19 and Its Associated Factors Among Waiters in Selected Towns of Southwest Ethiopia. *Risk Manag. Health Policy* **2020**, *13*, 2601–2610. [[CrossRef](#)] [[PubMed](#)]
61. Clavel, N.; Badr, J.; Gautier, L.; Lavoie-Tremblay, M.; Paquette, J. Risk Perceptions, Knowledge and Behaviors of General and High-Risk Adult Populations Towards COVID-19: A Systematic Scoping Review. *Public Health Rev.* **2021**, *42*, 1603979. [[CrossRef](#)]
62. Wolfe, K.; Sirota, M.; Clarke, A.D.F. Age differences in COVID-19 risk-taking, and the relationship with risk attitude and numerical ability. *R. Soc. Open Sci.* **2021**, *8*, 201445. [[CrossRef](#)]
63. Kim, J.K.; Crimmins, E.M. How does age affect personal and social reactions to COVID-19: Results from the national Understanding America Study. *PLoS ONE* **2020**, *15*, e0241950. [[CrossRef](#)]
64. Rodriguez-Besteiro, S.; Tornero-Aguilera, J.F.; Fernández-Lucas, J.; Clemente-Suárez, V.J. Gender Differences in the COVID-19 Pandemic Risk Perception, Psychology, and Behaviors of Spanish University Students. *Int. J. Environ. Res. Public Health* **2021**, *18*, 3908. [[CrossRef](#)]
65. Alsharawy, A.; Spoon, R.; Smith, A.; Ball, S. Gender Differences in Fear and Risk Perception During the COVID-19 Pandemic. *Front. Psychol.* **2021**, *12*, 689467. [[CrossRef](#)]
66. Davidson, D.J.; Freudenburg, W.R. Gender and Environmental Risk Concerns. *Environ. Behav.* **1996**, *28*, 302–339. [[CrossRef](#)]

67. Lewis, A.; Duch, R. Gender differences in perceived risk of COVID-19. *Soc. Sci. Q.* **2021**, *102*, 2124–2133. [[CrossRef](#)]
68. Prempeh, C. Religion and the state in an episodic moment of COVID-19 in Ghana. *Soc. Sci. Humanit. Open* **2021**, *4*, 100141. [[CrossRef](#)] [[PubMed](#)]
69. Kristiansen, M.; Sheikh, A. Understanding faith considerations when caring for bereaved Muslims. *J. R. Soc. Med.* **2012**, *105*, 513–517. [[CrossRef](#)] [[PubMed](#)]
70. Zettler, I.; Schild, C.; Lilleholt, L.; Kroencke, L.; Utesch, T.; Moshagen, M.; Böhm, R.; Back, M.D.; Geukes, K. The Role of Personality in COVID-19-Related Perceptions, Evaluations, and Behaviors: Findings Across Five Samples, Nine Traits, and 17 Criteria. *Soc. Psychol. Pers. Sci.* **2021**, *13*, 299–310. [[CrossRef](#)]
71. Acheampong, E.; Adu, E.A.; Anto, E.O.; Obirikorang, Y.; Adua, E.; Lopko, S.Y.; Acheampong, E.N.; Anto, A.O.; Baah, V.; Obirikorang, C. Putative factors influencing knowledge and behavioural practices of health science undergraduate students towards COVID-19 infection ahead of re-opening universities in Ghana. *J. Public Health Emerg.* **2021**, *5*, 11. [[CrossRef](#)]
72. Ahinkorah, B.O.; Ameyaw, E.K.; Hagan, J.E.J.; Seidu, A.-A.; Schack, T. Rising Above Misinformation or Fake News in Africa: Another Strategy to Control COVID-19 Spread. *Front. Commun.* **2020**, *5*, 45. [[CrossRef](#)]
73. Ismail, A.; Ismail, N.H.; Abu Kassim, N.Y.M.; Lestari, W.; Ismail, A.F.; Sukotjo, C. Knowledge, Perceived Risk, and Preventive Behaviors amidst COVID-19 Pandemic among Dental Students in Malaysia. *Dent. J.* **2021**, *9*, 151. [[CrossRef](#)]
74. Iorfa, S.K.; Ottu, I.F.A.; Oguntayo, R.; Ayandele, O.; Kolawole, S.O.; Gandi, J.C.; Dangiwa, A.L.; Olapegba, P.O. COVID-19 Knowledge, Risk Perception, and Precautionary Behavior Among Nigerians: A Moderated Mediation Approach. *Front. Psychol.* **2020**, *11*, 566773. [[CrossRef](#)]