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Evaluating the moderating role of information seeking platforms on university students' risk perception and anxiety during the COVID-19 pandemic in Ghana

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Introduction: The emergence of COVID-19 resulted in heightened usage of online information seeking platforms among students aimed at obtaining information about the virus. This situation further increased the levels of risk perception and anxiety levels as students managed to stay safe. This study examined the roles of information seeking platforms; specifically, social media platforms and professional platforms as moderators of the link between risk perception and anxiety among university students in Ghana.

Methods: Participants were recruited from two universities in Ghana; namely, University of Education, Winneba (UEW) and University of Cape Coast (UCC) through a survey approach. The study conveniently sampled 778 participants who completed a set of questionnaires.

Results: The study results revealed that COVID-19 risk perception was positively related to anxiety. Further, the use of specific online information platforms significantly moderated the link between risk perception and anxiety. Specifically, social media platforms significantly moderated the relationship between COVID-19 risk perception and anxiety level. Primarily, students who utilized social media as a COVID-19 information source reported high anxiety levels in the presence of high-risk perception compared to those who did not use social media. Additionally, professional platform usage acted as a buffer in the positive link between COVID-19 risk perception and anxiety levels. In the presence of high risk perception, students who used professional platforms, compared to those who did not use professional platforms, showed significantly low anxiety levels.

Conclusions: The findings suggest the key role social media and professional platforms played in shaping students' perceptions of COVID-19. These outcomes call for the swift scrutiny of health-related information obtained from social media platforms. Both users and disseminators of health-related information on social media platforms have the responsibility of verifying the credibility of whichever information they post and/or access. Risk perception should also be an integral part of effective risk communication planning in educational institutions during outbreak of diseases.

KEYWORDS

anxiety, COVID-19, Ghana, professional platform, risk perception, social media, university students

Introduction

The outbreak of COVID-19 greatly affected students' studies and lives globally. During the pandemic, students at all levels of education experienced unprecedented and sudden changes in their academic life. The unexpected change from traditional instructional delivery modes to online platforms or emergency remote learning caused students to experience varying levels of discomfort, fear, anxiety, depression, stress, and insecurity (Agomedah et al., 2020; Baloran, 2020; Radwan et al., 2020; Saravanan et al., 2021; Zimmermann et al., 2021; Quansah et al., 2022c). Several scholars have established that university students experienced a moderate to high level of anxiety during the COVID-19 pandemic. For example, Liyanage et al. (2022) established that students in the USA, Europe and Asia reported about 56, 51, and 33% prevalence of anxiety respectively. Similar findings were reported in Sub-Saharan African countries like Nigeria (Oyetunji et al., 2021) and Ghana (Quansah et al., 2022a,d).

Students' transition from COVID-19 lockdowns, quarantines, and isolations caused them to perceive themselves as being at risk of contracting the COVID-19 virus (Capone et al., 2020; Yildirim and Güler, 2020a,b; Hagan et al., 2022). Risk perception is a cognitive process that guides people's behaviors in potential risk situations. Based on an individual's subjective feeling and understanding of external objective stressors, which are affected by psychological, social, and even cultural factors (Cori et al., 2020; Xi et al., 2020). Drawing from the Health Belief Model, the perceptions of people on the threats of epidemics and possible actions for prevention determine their usage of preventive mechanisms (Becker, 1974; Brewer et al., 2007; Champion and Skinner, 2008). This premise suggests that the perceived risk of the COVID-19 pandemic is likely to encourage people to act towards reducing potential risks and vice versa (Becker, 1974; Brewer et al., 2004, 2007). Therefore, students' understanding of risky occurrences can direct and influence them to practice health-enhancing behaviors toward unanticipated hazards like COVID-19 (Yildirim and Güler, 2020a; Hagan et al., 2022).

Extant scholars have discovered a moderate to a high-risk perception among university students (Dratva et al., 2020; Borges and Byrne, 2022; Hagan et al., 2022). For example, Quansah et al. (2022a) found a high level of COVID-19 risk perception among university students and revealed social media and professional platforms as correlates of COVID-19 risk perception among the same sample. However, low perceived susceptibility and severity toward COVID-19 were discovered among students in Asia (Kuang et al., 2020; Rayani et al., 2021). According to some researchers, students' perceived risk during pandemics is related to anxiety (Ari et al., 2020; Capone et al., 2020; Dratva et al., 2020; Yildirim and Güler, 2020a,b; Oyetunji et al., 2021; Fu and Wang, 2022). For example, Oyetunji et al. (2021) and Fu and Wang (2022) revealed that students' risk perception positively predicted their anxiety symptoms (e.g., worry) and other mental disorders (e.g., depression).

The direction and magnitude of the relationship that exist between students' COVID-19 risk perceptions and anxiety could be reinforced or reduced by the sources or channels of information on COVID-19. During the pandemic, students across

all levels of education accessed COVID-19-related information from traditional media channels (e.g., TV, radio, and Newsletters), social media platforms (e.g., WhatsApp, Facebook, Instagram, Telegram) and professional platforms (e.g., Government websites) (Mirbabaie et al., 2020; Amiri et al., 2022; Quansah et al., 2022d). However, one of the major concern was the "COVID Infodemic" (Mian and Khan, 2020; Radwan and Radwan, 2020; Tasnim et al., 2020). The way information is sought and shared through social media can complicate diseases communication, shape people's risk perceptions, and subsequently affect their mental health and behaviors (Capone et al., 2020; Apuke and Omar, 2021; Dadaczynski et al., 2021; Alrasheed et al., 2022; Quansah et al., 2022b). Generally, social media information are not censored and peer-reviewed compared to information from professional platforms (Ahinkorah et al., 2020).

It has been established that social media platform exposure during the COVID-19 pandemic predicted public risk perceptions and anxiety (Jiang, 2021; Marpaung et al., 2021; Vaterlaus et al., 2021; Quansah et al., 2022d; Zhou, 2022). These experiences negatively undermined the effort of government and health agencies to control the effects of the COVID-19 disease. For example, Alrasheed et al. (2022) and Hu et al. (2022) found that high social media exposure was significantly associated with higher levels of COVID-19 risk perception among participants. Accordingly, we hypothesized that social media platforms would moderate the link between COVID-19 risk perception and anxiety among university students. Professional platforms during the pandemic were also found to influence university students' risk perceptions and anxiety levels. For example, respondents who received COVID-19 information from professional sources reported higher mental health and psychological wellbeing than those who received information from non-professional sources (Ko et al., 2020; Quansah et al., 2022d).

Besides, culture influences people's risk perceptions, and reactions to stressors like the COVID-19 pandemic. The way we interpret how individuals see risks related to COVID-19 fluctuates across nations due to dissimilarities in how the pandemic has unfurled and socio-cultural contrasts. During a pandemic, individuals in collectivistic societies might perceive greater risk due to their cultural doctrines emphasizing greater concern for the collective wellbeing, motivating them to practice preventive behaviors, therefore, it is reasonable to assume that university students in Ghana might perceive greater risk, which might influence their preventive behaviors and mental wellbeing compared to other jurisdictions. Further, even though previous studies found the use of social media platforms as a correlate of anxiety and risk perception among university students during the COVID-19 disease (Jiang, 2021; Marpaung et al., 2021; Vaterlaus et al., 2021; Quansah et al., 2022a), no study has been conducted in Ghana to examine the moderating role of information seeking platforms (e.g., professional and social media platforms) on university students' risk perception and anxiety during the COVID-19 pandemic. Based on these observations, we investigated the following: (1) relationship between risk perception and anxiety among university students amidst COVID-19, (2) moderating role of the utilization of social media platforms and (3) moderating role of the use of professional platforms in the relationship between risk

perception and anxiety. The outcome of this investigation could help inform all stakeholders the essence of health communication interventions aimed at changing university students' perceptions of COVID-19 and related prevention strategies to improve health-promoting behaviors.

Materials and methods

Study area

This study's setting comprised two Universities which are situated in the Central Region of Ghana. These two Universities were primarily targeted because of their similarities in characteristics of the students. Both Universities focus mostly on training teachers and have similar facilities regarding information searching. Additionally, both universities have a similar academic calendar so, at the time of data collection, all other universities were already on vacation.

Study design and sampling

Using a cross-sectional survey design, a total of seven hundred and seventy-eight ($n = 778$) students were drawn from two Ghanaian Universities namely; the University of Education, Winneba (UEW, $n = 456$) and University of Cape Coast (UCC, $n = 322$) in the Central Region of Ghana to participate in the study with the adoption of the convenience sampling technique. The convenience sampling technique was employed because, at the time of data collection, majority of the students were not willing to take part in the survey probably because of the fear that they could be infected with the COVID-19 virus. Hence, only those who were willing availed themselves to be included in the study under conditions of strict adherence to the COVID-19 safety protocols. The inclusion criteria involved all formally admitted students pursuing any regular programme whilst those pursuing sandwich and distance learning programmes were excluded.

Study variables

Predictor: Risk perception

The brief COVID-19 risk perception (CoRP) scale developed by Capone et al. (2020) was used to assess university students' risk perceptions of COVID-19. Risk perception is defined as the extent to which university students viewed their classroom environment as safe or otherwise in relation to the COVID-19 pandemic. The researchers made some alterations to the survey instrument to suit the context of the current study. Modifying the items became prudent because the questionnaire was developed based on a general Italian population whose ages ranged from 18 to 80 years. Five (5) items were then generated to be used for this study. Specific items generated include, "I am uncertain about the safety of the teaching environment," "I am worried that colleague students who have contracted the virus will transmit the virus to me," "It is very easy to contract COVID-19 virus within the teaching and learning environment," "I am at a high possibility of contracting the virus

within the teaching environment" and "I fear discussing issues with colleague students because I am likely to be infected." Responses were based on "yes" or "no" with a "yes" response scoring 1 whilst a "no" response scored 0. This approach to measurement has been supported by educational and psychological measurement experts (Cronbach, 1990; Crocker and Algina, 2008; Miller et al., 2009). The total score on the scale was 5. Thus, higher scores indicated high-risk perception of COVID-19 and lower scores indicated low-risk perception of COVID-19. The reliability value obtained in the current study was 0.79 using Kuder–Richardson (KR)'s 21 reliability estimate (DeVellis, 2017; Quansah, 2017). KR estimation procedure was adopted because of dichotomous responses, it is the most suitable approach to use (DeVellis, 2017; Quansah, 2017). Several recent studies have utilized the adapted version of this scale within the context of COVID-19 (Frimpong et al., 2022; Hagan et al., 2022).

Criterion variable: Anxiety

Participants' level of anxiety in relation to COVID-19 was measured using an adapted version of Beck et al. (1988) anxiety scale from which Quansah et al. (2022c) also used and reported an adequate reliability estimate of 0.73. In all, six items including, "I feel unrelaxed," "I fear the worst happening," "I feel nervous," "I feel unsteady," "I feel very much concerned" and "I have self-doubts" ranging on a scale from 0 "not at all" to 3 "very much so". Higher scores reflect higher levels of anxiety and vice versa. The present study recorded a reliability estimate of 0.79 using the omega reliability method.

Moderating variables

The study adopted two variables as moderators which were measured in dichotomous terms; social media use as well as professional media utilization. These variables focused on soliciting information from the participants regarding the platforms they relied on when seeking for COVID-19 information. The social media platforms had examples like Facebook, Twitter, WhatsApp, and Instagram, among others whereas the professional platforms comprised examples such as Ministry of Health portals, Ghana Health Service platforms, World Health Organisation's website/platforms, and other licensed health platforms. For each case, the participants were required to respond whether they relied on social media or not for COVID-19 information. Similarly, the respondents were requested to indicate whether they relied on professional platforms or not for COVID-19 information. Out of these two variables, a third variable was created; those who used a single platform (either social media or professional platforms) and those who utilized both platforms.

Control variables

Four demographic indicators served as the control variables for the regression analysis. These variables include age, gender, religion and years of study. The decision to control these variables was due to the variabilities observed in the number of cases for the levels of the variables and the belief that these variances could affect the outcome of the results. The ages of the participants

were used in their raw form and gender was conceptualized as “male” and “female”. Due to the small number of participants found in the traditionalist and atheist options, the religion variables were recategorised into “Christians” and “non-Christians”. The participants also indicated the approximate number of years they have schooled in their respective universities, with responses treated as continuous.

Procedure

Permission to conduct the study was granted by the Institutional Review Board of the University of Cape Coast in the Central Region of Ghana. Reference number UCCIRB/EXT/2020/25 was provided as evidence for ethical clearance. The Heads of Departments (HODs) of HPER and HPERS in UCC and UEW, respectively, also approved the conduct of this study in their respective schools. Following approval to carry out the research, the researchers familiarized themselves with both institutions during which the rationale of the study was discussed thoroughly with the HODs. After agreeing on the appropriate date and time conducive for data collection, the researchers recruited participants by visiting the two universities at separate times to meet with the students in those Departments and discuss the rationale of the study. Students who declared their willingness to take part in the study ticked “yes” under informed consent on the survey instrument. Prior to distributing the questionnaires to participants, ethical considerations including confidentiality, and freedom to withdraw or otherwise at any time without any penalty were assured. To ensure anonymity, participants were told not to write their names or any personal details on the questionnaires. To ensure privacy, all chairs in the lecture halls were rearranged and spaced enough to prevent the participants from interacting with one another when responding to the survey instruments. Participants were also informed to respond to the survey items themselves. Questionnaires were then distributed to the participants for completion after lectures for 2 days within a week.

Data collection started from 8:30 a.m. to 4:30 p.m. daily for 2-days a week for 2 weeks in each institution. Participants spent between 15 and 20 min answering the questionnaires and those who were unable to respond to the survey instrument immediately were given up to the second day before 4:30 p.m. to return the answered questionnaires. The entire data collection process took about 1 month after which the data were collected for safekeeping.

Data analyses

The data analyses were performed mainly with SPSS [Version 25, International Business Machines (IBM) Incorporation, New York]. Regression-based analyses were used to address the research objectives. First, a simple linear regression analysis was conducted to examine the relationship between risk perception and anxiety. Using Model 1 of Hayes PROCESS programming (Hayes, 2018), a series of moderation analyses were performed to understand the role of information-seeking platforms in the relationship between risk perception and anxiety. The analysis was carried

TABLE 1 Demographic profile of students.

| Variables | Levels | Frequency | Percent |
|---------------------------|----------------|-----------|---------|
| Gender | Male | 578 | 74.3 |
| | Female | 200 | 25.7 |
| Age | 16–20 years | 277 | 35.6 |
| | 21–25 years | 254 | 32.6 |
| | 26–30 years | 124 | 15.9 |
| | >30 years | 123 | 15.8 |
| Religion | Christian | 523 | 67.2 |
| | Muslim | 207 | 26.6 |
| | Traditionalist | 42 | 5.4 |
| | Atheist | 6 | 0.8 |
| Level of study | 1st year | 20 | 2.6 |
| | 2nd year | 185 | 23.8 |
| | 3rd year | 295 | 37.9 |
| | 4th year | 278 | 35.7 |
| Social media use | Yes | 506 | 65.0 |
| | No | 272 | 35.0 |
| Professional platform use | Yes | 125 | 16.1 |
| | No | 653 | 83.9 |

TABLE 2 Descriptive statistics of anxiety and risk perception.

| Statistics | Anxiety | Risk perception |
|--------------------|---------|-----------------|
| Mean | 1.57 | 2.43 |
| Standard deviation | 0.62 | 1.5 |
| Minimum | 0 | 0 |
| Maximum | 3 | 5 |
| Skewness | −0.12 | 0.03 |
| Kurtosis | −0.52 | −1.08 |

out through the bootstrapping approach, specifically using 5,000 bootstrap samples. The bootstrapping approach was utilized since it provides accurate parameter estimates. Accordingly, the interpretations of the moderation analyses were based on the confidence intervals (CI); results with CI including zero were regarded as not significant whereas significant results showed CI without the zero value. All assumptions of the regression analysis were tested before analyzing the data. The normality of the dependent variables was tested without any skewness (i. e., zero skewness).

Results

Descriptive statistics on the demographic profile of respondents

The sample was dominated by male students who constituted nearly two-thirds (74.3%) of the total sample (Table 1). A larger proportion of the respondents were between the ages

TABLE 3 Regression parameters for the relation between risk perception and anxiety.

| Model | | Sum of squares | df | Mean square | F | p | R ² |
|-------|-----------------------|----------------|-------|-------------|--------|-------|----------------|
| 1 | Regression | 8.012 | 5 | 1.602 | 4.252 | 0.001 | 0.27 |
| | Residual | 290.985 | 772 | 0.377 | | | |
| | Total | 298.997 | 777 | | | | |
| | | B | SE | Beta | t | p | f ² |
| 1 | (Constant) | 1.127 | 0.138 | | 8.167 | 0.000 | 0.36 |
| | Risk perception | 0.184 | 0.048 | 0.136 | 3.811 | 0.000 | |
| | Age | 0.028 | 0.018 | 0.060 | 1.592 | 0.112 | |
| | Gender (male) | 0.053 | 0.052 | 0.037 | 1.015 | 0.311 | |
| | Religion (Christians) | 0.048 | 0.035 | 0.049 | 1.368 | 0.172 | |
| | Years of study | -0.032 | 0.032 | -0.037 | -1.000 | 0.318 | |

Dependent variable: anxiety.

Predictors: (Constant), risk perception.

TABLE 4 Moderation parameters for social media use in the link between risk perception and anxiety.

| | B | SE | t | p | LLCI | ULCI | R ² | F | df1 (df2) | p |
|-----------------------|--------|-------|--------|-------|--------|--------|----------------|-------|-----------|-------|
| Constant | 1.685 | 0.200 | 8.427 | 0.000 | 1.293 | 2.078 | 0.58 | 6.775 | 7 (770) | 0.000 |
| Risk perception | -0.012 | 0.093 | -0.129 | 0.897 | -0.194 | 0.170 | | | | |
| W1 | -0.656 | 0.191 | -3.429 | 0.001 | -1.031 | -0.280 | | | | |
| W1*risk perception | 0.255 | 0.108 | 2.366 | 0.018 | 0.043 | 0.466 | | | | |
| Age | 0.029 | 0.017 | 1.657 | 0.098 | -0.005 | 0.063 | | | | |
| Gender (male) | 0.034 | 0.051 | 0.672 | 0.502 | -0.066 | 0.135 | | | | |
| Religion (Christians) | 0.039 | 0.035 | 1.104 | 0.270 | -0.030 | 0.107 | | | | |
| Years of study | -0.045 | 0.032 | -1.419 | 0.156 | -0.108 | 0.017 | | | | |

W1- Do not use social media platforms as a COVID-19 information source.

of 16 and 20 years (35.6%). Quite a number of them were between 21 and 25 years (32.6%). Majority of the students were Christians (67.2%), with a few being atheists (0.8%). Most of the respondents were in their third year (37.9%), followed by about 35.7% being in their fourth year. A greater percentage of the respondents reported that they made use of social media platforms (e.g., Facebook, Instagram, Twitter), for searching for COVID-19 information (65%). Regarding professional platforms (e.g., Health portals, Websites of Doctors, Ministry of Health, Ghana Health Service, Food and Drugs Authority and Health Insurance Companies), few respondents reported having used these platforms as a sources of COVID-19 information.

The descriptive statistics for anxiety and risk perception

The mean values for anxiety and risk perception variables were 1.57 (SD = 0.62) and 2.43 (SD = 1.5), respectively. The skewness and kurtosis values were within the acceptable ranges of ± 2 and ± 7 , respectively (see Table 2).

Relationship between risk perception and anxiety among university students amidst COVID-19

With the use of simple regression analysis, this study examined the relationship between risk perception and anxiety among university students. Full details are presented in Table 3.

As presented in Table 3, the results showed a significant model fit, $F_{(1, 777)} = 4.252$, $p = 0.001$. After controlling for the demographic variables of the participants (i.e., age, gender, religion and approximated years of study), risk perception contributed 27% variability in the anxiety of students. COVID-19 risk perception was positively related to anxiety, $B = 0.184$, $t = 3.811$, $p < 0.001$. Higher levels of risk perception reflect higher levels of anxiety during COVID-19.

How social media platforms moderate the link between COVID-19 risk perception and anxiety

This research further examined the role of social media use as an information source for COVID-19 in the relationship

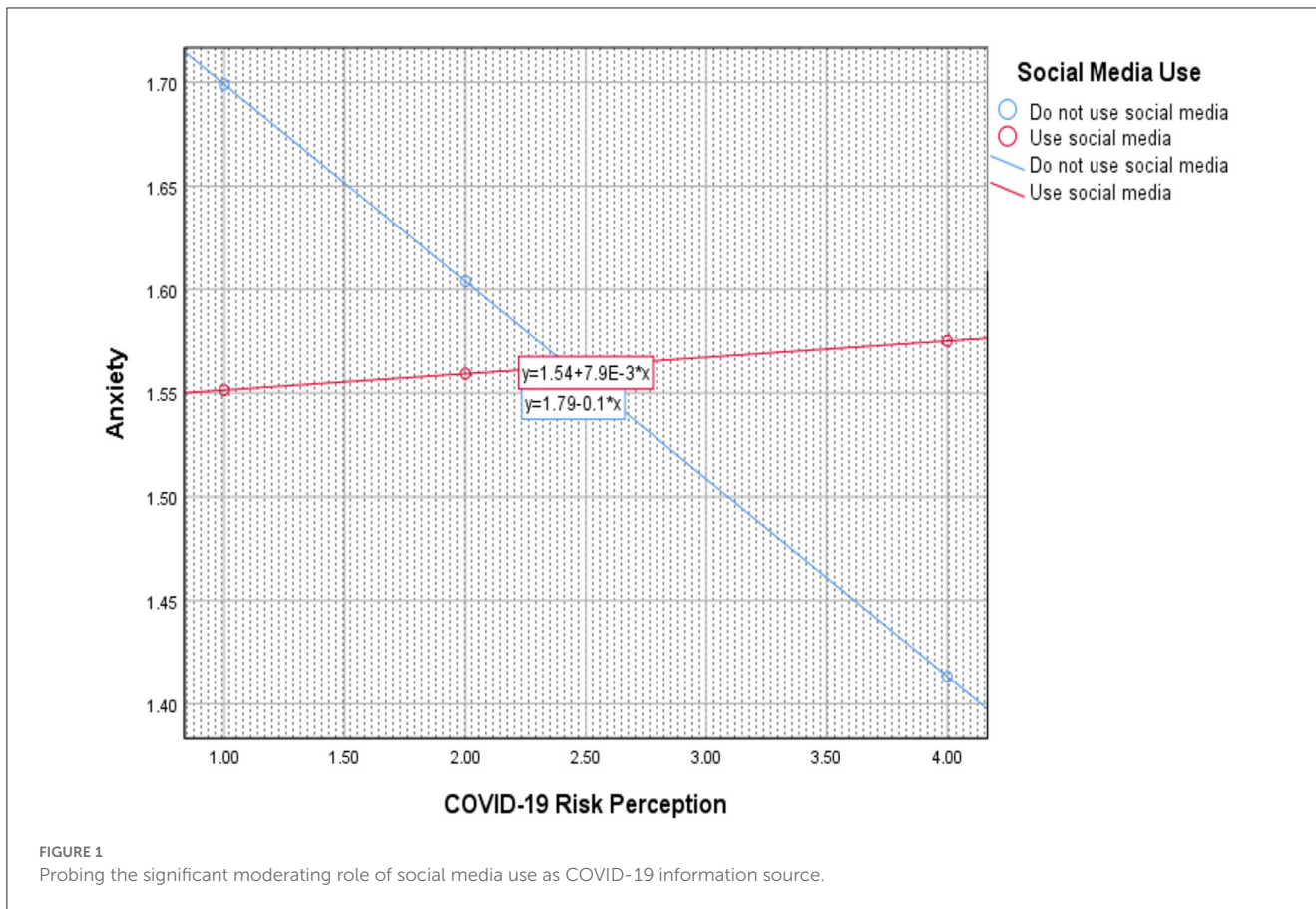


TABLE 5 Moderation parameters for professional platform use in the link between risk perception and anxiety.

| | <i>B</i> | <i>SE</i> | <i>t</i> | <i>p</i> | LLCI | ULCI | <i>R</i> ² | <i>F</i> | df1 (df2) | <i>p</i> |
|-----------------------|----------|-----------|----------|----------|--------|--------|-----------------------|----------|-----------|----------|
| Constant | 1.654 | 0.211 | 7.844 | 0.000 | 1.240 | 2.068 | 0.41 | 4.64 | 3 (770) | 0.000 |
| Risk perception | -0.123 | 0.111 | -1.109 | 0.268 | -0.340 | 0.094 | | | | |
| W1 | -0.684 | 0.206 | -3.317 | 0.001 | -1.089 | -0.279 | | | | |
| W1*risk perception | -0.386 | 0.123 | -3.140 | 0.002 | -0.145 | -0.628 | | | | |
| Age | 0.025 | 0.018 | 1.414 | 0.158 | -0.010 | 0.059 | | | | |
| Gender (male) | 0.057 | 0.052 | 1.112 | 0.266 | -0.044 | 0.159 | | | | |
| Religion (Christians) | 0.050 | 0.035 | 1.425 | 0.155 | -0.019 | 0.119 | | | | |
| Years of study | -0.028 | 0.032 | -0.872 | 0.384 | -0.091 | 0.035 | | | | |

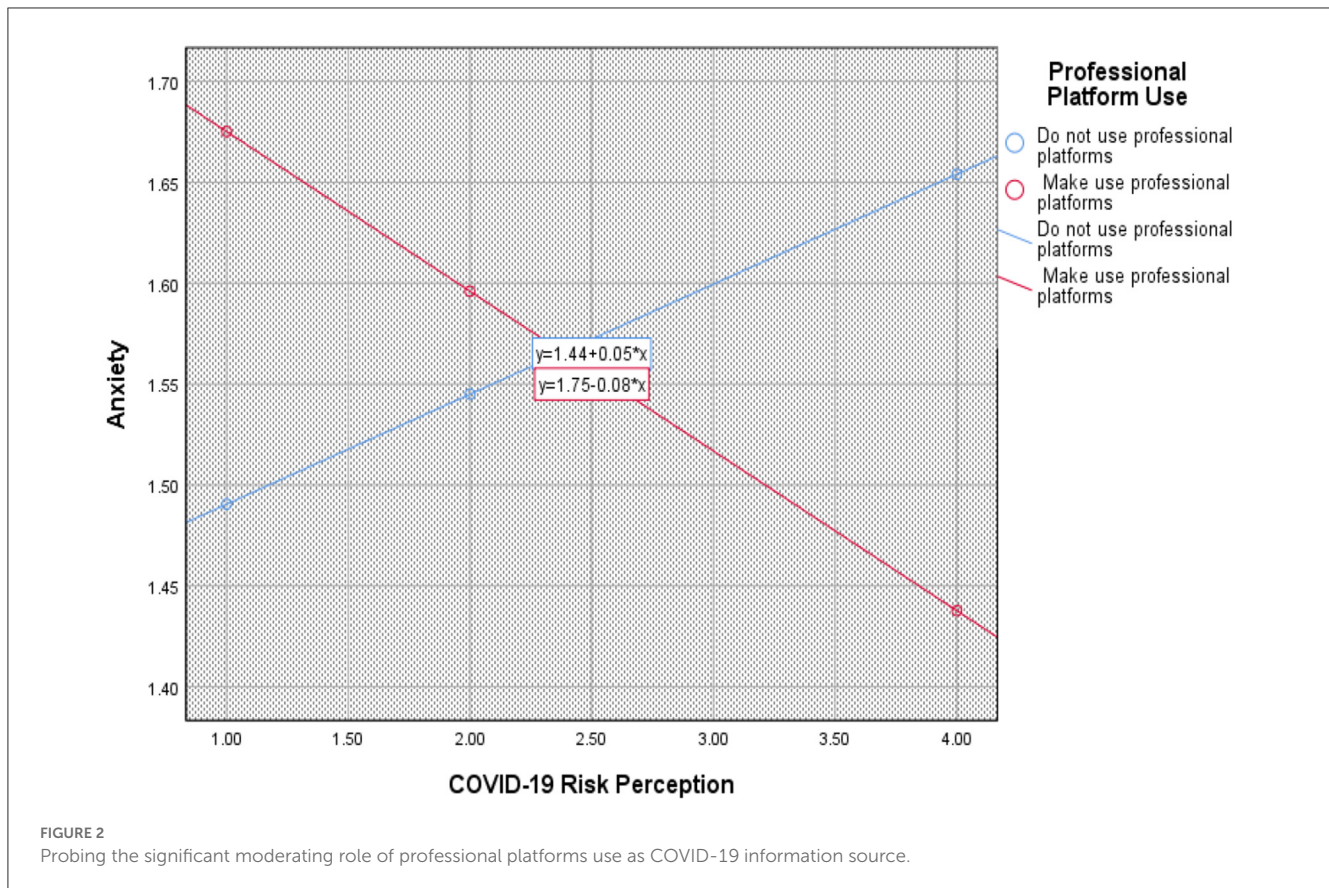
W1- Do not use professional platforms as a COVID-19 information source.

between COVID-19 risk perception and anxiety. The details of the moderation model are shown in Table 4.

After controlling for the demographic variables of the participants (i.e., age, gender, religion and approximated years of study), social media platforms significantly moderated the relationship between COVID-19 risk perception and anxiety level, $B = 0.255$, $t = 2.366$, $BootCI (0.043, 0.466)$ (see Table 4). Further results showed that students who utilized social media as a COVID-19 information source reported high anxiety levels amid high risk perception

compared to those who did not use social media (see Figure 1).

As observed in Figure 1, the regression slope for those who do not use social media platforms is negatively sloped whereas that of respondents who used social media platforms is positive. The graph indicates that using the COVID-19 platform for seeking COVID-19 information is likely to result in higher levels of anxiety with any given level of risk perception. For those who reported not using social media platforms, an increasing rate of risk perception yielded decreasing anxiety.



Examine the moderating role of professional platforms in the relationship between risk perception and anxiety

We also assessed the moderating role of professional platforms in the link between risk perception and anxiety (see the details of the analysis in Table 5).

After controlling for the demographic variables of the participants (i.e., age, gender, religion and approximated years of study), professional platform usage acted as a buffer against the positive link between COVID-19 risk perception and anxiety levels, $B = -0.386$, $t = -3.140$, $BootCI (-0.145, -0.628)$ (Table 5). In the presence of high-risk perception, students who used professional platforms, compared to those who did not use professional platforms, showed significantly low anxiety levels (also see Figure 2).

The graph (Figure 2) shows some contradictory levels of regression slopes for each category of persons regarding their utilization of professional platforms. Whereas, the regression slope looks positive for those who do not use professional platforms, the slope is negative for those who make use of such platforms. For those who utilized professional platforms, increasing risk perception is linked to decreasing rate of anxiety.

Testing the differential roles of the use of both social media and professional platform

Further analysis was carried out to examine whether participants who relied on both social media and professional platforms for COVID-19 information differed from those who used only one media source in terms of the link between risk perception and anxiety. The details of the analysis are shown in Table 6.

The results, after controlling for the demographic variables of the participants (i.e., age, gender, religion and approximated years of study), showed that the relationship between risk perception and anxiety was the same for students who utilized both social media and professional platforms, and those who relied on only one media, $B = -0.386$, $t = -3.140$, $BootCI (-0.145, -0.628)$ (Table 6).

Discussion

The study examined the roles of information seeking platforms; specifically, social media platforms and professional platforms as moderators in the link between risk perception and anxiety among university students. It emerged from findings that risk perception positively predicts anxiety among university students. Practically,

TABLE 6 Moderation parameters for both social media and professional platform use in the link between risk perception and anxiety.

| | B | SE | t | p | LLCI | ULCI | R ² | F | df1 (df2) | p |
|-----------------------|--------|-------|--------|-------|--------|-------|----------------|-------|-----------|-------|
| Constant | 1.146 | 0.158 | 7.243 | 0.000 | 0.835 | 1.457 | 0.027 | 3.047 | 7 (770) | 0.004 |
| Risk perception | 0.171 | 0.063 | 2.697 | 0.007 | 0.047 | 0.295 | | | | |
| W1 | -0.052 | 0.175 | -0.297 | 0.766 | -0.395 | 0.291 | | | | |
| W1*risk perception | 0.034 | 0.101 | 0.336 | 0.737 | -0.164 | 0.232 | | | | |
| Age | 0.028 | 0.018 | 1.610 | 0.108 | -0.006 | 0.063 | | | | |
| Gender (male) | 0.053 | 0.052 | 1.016 | 0.310 | -0.049 | 0.155 | | | | |
| Religion (Christians) | 0.050 | 0.036 | 1.406 | 0.160 | -0.020 | 0.121 | | | | |
| Years of study | -0.033 | 0.032 | -1.018 | 0.309 | -0.097 | 0.031 | | | | |

W1- Do use both social media and professional platforms as a COVID-19 information source.

variances in anxiety due to risk perception were about one-quarter. The result implies that students who perceived COVID-19 as riskier were more likely to experience anxiety. This implication means that the anxiety levels of students were heightened as students felt more susceptible and prone to COVID-19. Our finding conforms with extant scholars that students' perceived risk during a pandemic is related to anxiety (Ari et al., 2020; Capone et al., 2020; Dratva et al., 2020; Yildirim and Güler, 2020b; Oyetunji et al., 2021; Fu and Wang, 2022). Though too much anxiety can negatively affect the mental health of students (Radwan et al., 2020; Saravanan et al., 2021), it can be argued that some levels of anxiety are required to motivate students to act in a particular way to protect themselves of COVID-19. This notion suggests that the higher levels of risk perception leading to higher levels of anxiety may encourage students to adopt effective mechanisms for reducing their rate of infection. Taking support from the Health Belief Model, when students perceive the threats surrounding the COVID-19 virus, the degree of anxiety could determine the use of preventive coping strategies (Becker, 1974; Brewer et al., 2007; Champion and Skinner, 2008).

Accessing COVID-19 information from social media platforms heightened students' anxiety levels. However, for students who did not use information from social media platforms, their anxiety levels decreased as they perceived COVID-19 as riskier. This result questions the usefulness of COVID-19 information obtained from social media platforms, suggestive of possible information contamination or misinformation on social media platforms. Granted there is information contamination or misinformation, such information is likely to cause uneasiness and intense fear among students. It has been reported that information sharing and use of social media can complicate disease communication, shape people's risk perceptions and eventually affect their mental health and behaviors (Capone et al., 2020; Apuke and Omar, 2021; Dadaczynski et al., 2021; Jiang, 2021; Alrasheed et al., 2022). For example, studies have found that social media use increases the risk perception of COVID-19 among students (Erubami et al., 2021; Jiang, 2021; Totu et al., 2021; Tsoy et al., 2021; Alrasheed et al., 2022). Once social media use increases risk perception, it is not surprising our study found a debilitating effect of its use on students' anxiety levels. Hence, social media use moderates the influence of risk perception and anxiety levels.

Additionally, the use of professional platforms moderated the relationship between risk perception and anxiety. Specifically, students who utilized COVID-19 information from professional platforms had reduced anxiety even with the increasing perception of risk. Contrarily, anxiety levels increased with risk perception among students who did not use COVID-19 information from professional platforms. The utilization of COVID-19 information from professional platforms resulted in variations in the relationship between risk perception and anxiety. This finding suggests a buffering effect of professional platform usage. Acknowledging the dearth of literature on professional platforms as a moderator, only few studies have consistently found consumption of information on professional platforms to be associated with risk perception and anxiety (Ko et al., 2020; Radwan and Radwan, 2020; Quansah et al., 2022d). Thus, students who received COVID-19 information from professional platforms reported decreased anxiety levels relative to those who did not. Typical information available on professional platforms is well-scrutinized and verified before dissemination. Further, such information is likely to be more educative on issues related to COVID-19.

The result generally implies that as students perceived they were vulnerable to COVID-19 and foresaw the potential negative implications, accessing COVID-19 related information from professional platforms caused a decrease in anxiety levels. During the COVID-19, various institutions like the Ministry of Health, Ministry of Information, Ghana Health Service, private companies and corporate institutions used their websites and other platforms to educate the masses on COVID-19 cases recorded, practicing social distancing, use of masks, and basic hand washing practices, among others. Particularly, the essence of the updates on COVID-19 cases was to allay the fears associated with the continuous reportage by different media outlets. The result also means that irrespective of the level of COVID-19 risk one perceives, access to accurate COVID-19 information tends to reduce the rippling psychological or mental effect of the risk perception.

Summarily, the effects of social media use and professional platform use are paradoxical. Consumers of information on the two platforms have different effects as they perceived COVID-19 as riskier. While professional platform use appears to subdue anxiety experiences, social media use rather aggravates the psychological

consequences of COVID-19 risk perception. Similar findings have been reported in Ghana by Quansah et al. (2022d) that university students who obtained COVID-19 information from social media and radio were more likely to experience high levels of anxiety compared to those who accessed COVID-19 information from professional platforms and TV. A possible reason for the paradox is that social media information is not censored or filtered and peer-reviewed compared to information from professional platforms (Ahinkorah et al., 2020). The former may suggest that social media platforms, may generate inaccurate information or misinformation that is circulated but not regulated and properly scrutinized.

Strengths and limitations

This study attempts to provide explanations for possible reasons why the influence of risk perception could vary among the same group of students. It highlights information sources (e.g., social media) could be detrimental to the mental and psychological health of students exposed to COVID-19 disease. The present study does not in any way seek to make any causal inference due to the cross-sectional design employed. Additionally, generalizations made from this study should be done with caution as convenient sampling was used in the selection of participants for the study. This notwithstanding, this study opens the chapter for investigations into the moderating roles of social media and professional platforms for future epidemics or pandemics.

Practical implications

Findings call for the swift scrutiny of health-related information accessed from social media platforms. Both users and disseminators of health-related information on social media platforms have the responsibility of verifying the credibility of whichever information they post or access. Managers and administrators of various social media platforms are encouraged to censor and regulate information disseminated on their platforms. The findings call for the intensification of health-related education on professional platforms such as the websites of governmental agencies. Possibly, information on coping strategies could be added since the use of such platforms is useful in anxiety reduction.

Conclusion

The study examined the moderating roles of COVID-19 information consumption from social media and professional platforms vis a vis the link between risk perception and anxiety among university students. While our research revealed moderating roles of the utilization of the two platforms, they appeared paradoxical. Users of COVID-19 information from social media reported increased anxiety levels relative to the users of COVID-19 information from professional platforms with the same

level of risk perception. Findings caution against the use of information from uncredited and unregulated media platforms as they could endanger one's psychological or mental health (Jiang, 2021; Marpaung et al., 2021; Vaterlaus et al., 2021).

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Institutional Review Board of University of Cape Coast, Ghana, with a reference number: UCCIRB/EXT/2020/25. The patients/participants provided their written informed consent to participate in this study.

Author contributions

FQ and JH: conceptualization. FQ: data curation and formal analysis. TS and JH: funding acquisition. JH, FA, EA, MS-S, and TS: investigation. FQ, JH, FA, EA, MS-S, and TS: methodology, supervision, validation, visualization, writing original draft, review, and editing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer MA declared a shared affiliation with the authors FQ and MS-S at the time of review.

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