



Research article

The role of social media in spreading panic among primary and secondary school students during the COVID-19 pandemic: An online questionnaire study from the Gaza Strip, Palestine

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ABSTRACT

Background: The rapid outbreak of the COVID-19 pandemic has opened up various issues on social media platforms among school students. The dangerous issue is that misinformation, fake news, and rumours spread on social media faster than reliable information, and also faster than the virus itself, damaging the health systems and affecting the mental health of social media users.

Objective: The current study aims at determining how social media affects the spread of panic about COVID-19 among primary and secondary school students in the Gaza Strip, Palestine.

Methods: The data were collected through an online questionnaire. By utilizing convenience sampling, we have reached a total of 1067 school students, aged between 6 and 18 years, from 56 schools located in the Gaza Strip, Palestine. Independent Samples T-test, ANOVA, and chi-square tests were used to compare the data.

Results: The results showed that social media has a significant impact on spreading panic about COVID-19 among school students, with a potential negative impact on their mental health and psychological well-being. Facebook was the most common social media platform among students (81.8%), where female students had a higher likelihood than male students to use it to get news about COVID-19 ($p < 0.001$). Health news was the most frequently topic seen, read, or heard ($n = 529$, 56.2%) during the COVID-19 pandemic, where males were more likely to follow health news than females ($p < 0.001$). The majority of the students ($n = 736$, 78.1%) were psychologically affected, whereas those physically affected were the lowest ($n = 12$, 1.3%). Female students were psychologically affected and experienced greater fear significantly more than male students ($p < 0.001$). The effect of social media panic depending on a student's age and gender. ($p < 0.001$). This study showed a significant positive correlation between social media and spreading panic about COVID-19 ($R = 0.891$).

Conclusions: During the closure of schools, students are using social media to continue their learning as well as to know more information about the COVID-19 outbreak. Social media has a main role in rapidly spreading of panic about the COVID-19 pandemic among students in the Gaza Strip.

1. Introduction

Coronavirus disease 2019 (COVID-19) is a respiratory tract illness resulting from infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. In current months, the outbreak of the COVID-19 pandemic has become a major public health challenge for the health systems around the world. The COVID-19 crisis imposed

significant economic, social, health, and environmental challenges to countries on the globe [2, 3, 4, 5, 6].

Social media platforms are considered one of the most used sources of information around the World. The inexpensive access to the internet, easy to log in, and the presence of a significant number of users make social media one of the easiest and effective methods disseminate information. During the COVID-19 crisis, the response of people is a greater search for information related to the coronavirus outbreak. Social media

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platforms have played a positive and negative role during the COVID-19 pandemic. Social media has become a helpful tool for individuals to communicate with friends and family during quarantine periods to minimize the negative effect of isolation which has been linked with anxiety, stress, and fear [7]. Also, It helps to rapidly spread necessary information, identifying symptoms, sharing treatment, and employing control measures from other countries, and adapting them with available resources.

In the contrast, the COVID-19 pandemic has opened up various issues on social media platforms, including the misleading rumours, misinformation, life-endangering consequences of supposed cure of the disease, aetiology, preventions, vaccinations, and conspiracy theories about the origin of this virus [8]. The dangerous issue is that misinformation and rumours spread on social media faster than reliable information, damaging the authenticity, balance of the news system, in particular health systems [9]. Social media platforms are considered an important source of disseminating and posting information to the public [10,11]. Social media platforms are considered an important means and an efficient source of disseminating reliable information to the public, especially for the students who are recently using digital platforms to continue their learning or for those isolated during hospitalization or when quarantining at home.

1.1. COVID-19 cases in Palestine

In Palestine, the beginning of the outbreak of the COVID-19 pandemic was confirmed to have spread in the West Bank on 5 March 2020. Later, in the Gaza Strip, the first two cases were diagnosed on 21 March [12]. Before the COVID-19 outbreak, many individuals depend on social media platforms to obtain information, data, and news. Since the COVID-19 outbreak in December 2019, people in many countries, including Palestine, have depended on social media to gather information about the coronavirus.

The use of the internet is robustly linked to behaviours related to health information; individuals write posts and share news about their health on different social media platforms [13]. In many countries, internet data, including data from social media platforms (e.g. Facebook, Twitter, etc.), have been widely used in the past 20 years to understand health patterns and infectious disease outbreaks, a field known as infodemiology or infodemiology [14]. At the time of conducting this study, the spread of COVID-19 is still a rapidly evolving crisis around most countries in the world. The Palestinian Ministry of Health (MOH) created a webpage, which is continually updated by the Ministry of Health, to communicate information about the present status of the outbreak of the COVID-19 pandemic in Palestine. According to government statements, only the Palestinian Ministry of Health is considered the source of reliable information about COVID-19 cases in Palestine. Nevertheless, most individuals depend on social media platforms to know more information about COVID-19 instead of using the official webpage of the Ministry of Health.

1.2. Literature review

The first study of the effect of social media was conducted by Chew and Eysenbach [15] during the H1N1 pandemic. They found the prevalence of misinformation, terminology abuse, public sentiments, concerns, and fear of social media. The internet was and still used to collect data in research health regarding the people's practices during the outbreak of health diseases such as hand washing and sterilizing, using disinfectants, wearing face masks, and social distancing [16, 17, 18].

In recent months, the WHO stated that they are fighting not only the rapid outbreak of the pandemic, but also a social media infodemic, with some media reporting that the COVID-19 is considered the first social media infodemic, where misinformation, rumours, and propaganda are still spreading faster than the pandemic itself and is fueling fear, depressions, and panic among individuals [3,19]. On the contrary, social

media platforms are also good media for the posting of trusted information about the virus to the public. During the rapid outbreak of the COVID-19 pandemic, people turned to social media platforms to know more data and information about this virus [20,21]. The media has been called to take responsibility for providing the trust information, correcting misinformation, removing rumours and racisms, as well as enhancing the awareness of issues related to health diseases among the public [22]. Because most people could not have enough information about the COVID-19 pandemic, they depend on social media platforms to get any information, and at the same time, they share and post correct or false videos, photos, figures, and information [23,24].

In many countries, the responsible authorities have called media companies to remove misinformation and rumours and provide correct and trust information due to its long and short consequences for the mental health and psychological status of the public. Social media did not only affect the psychological status of the public but also negatively affected the status of buying and selling in the countries that the COVID-19 pandemic has rapidly spread. It was noticed that the misinformation spread on social media made people buy a huge amount of face masks, soaps, toilet paper, medicines, foods, etc., these practices lead to an imbalance in the markets and affect the other sectors in these countries [7]. Also, some individuals posted or shared posts on social media platforms regarding empty shops, markets, and pharmacies lead to spread panic related to necessities shortage such as food, medicines, as well as detergents [25]. During the COVID-19 crisis, social media has become a key platform for presenting personal experiences, feelings, and opinions, and for discussing issues respecting this new disease, possible treatment, and symptoms, etc.

In the study of Merchant and Lurie [26], they reported that modern electronic methods, including social media platforms, were used to provide people with both true or false information. Also, some countries did not provide information to the individuals about the COVID-19 pandemic, therefore, individuals depended on social media platforms to know more information about the COVID-19 outbreak [27]. On the other hand, many countries showed a good example of dealing with social media platforms in a successful way, where the responsible authorities created formal accounts on social media to post correct information relating to the COVID-19 pandemic. It was reported that there has been an increase in the spread of false information, fake news and rumours about coronavirus on social media, especially the conspiracy theories and the origin of the new virus [3,21,28].

Also, Ali et al. [29] carried out a cross-sectional study to identify the knowledge and behaviours about COVID-19 among social media users. They showed that social media platforms are an impactful and analytical tool for gathering and receiving information regarding COVID-19, where the most used sources about COVID-19 information were social media platforms (83.5%). Al-Dmour et al. [30] conducted a study to investigate the effect of social media platforms on public health protection against the COVID-19 pandemic. The results showed that the use of social media platforms had a positive effect on public health protection against COVID-19. The responsible authorities may employ social media to enhance public health awareness through the posting of messages to the public. Zhao et al. [24] found out that social media can be used as a key tool to know the attention of the public toward public health emergencies. During the COVID-19 crisis, a significant amount of information was disseminated on social media and received the attention of people. Employing social media platforms can help the government better communicate with the individuals on health and preventive measures to prevent the spread of COVID-19.

Little or no studies are available on the influence of social media during the COVID19 pandemic on school students, in particular within areas that suffer from political, economic, and social problems such as the Gaza Strip in Palestine. Therefore, the current study aims to determine the impact of social media on spreading panic about COVID-19 among Palestinian students in the Gaza Strip, Palestine.

2. Methodology

2.1. Study population and sample

Before conducting the questionnaire, a pilot study was carried out to determine the feasibility of the questions, clarify misunderstand sentences, and determine weaknesses in the study. Respecting sample size, the estimation was done by applying the equation of probability and confidence interval. For pilot studies, Viechtbauer et al. [31] described a simple method for determining sample size that ensures the detection of potential problems with high confidence. For our calculations, the confidence level is set at 95%, meaning that a 5% significance level is set. According to Viechtbauer et al. [31], the equation for sample size sampling is expressed in Eq. (1):

$$n = \ln(1 - \gamma) / \ln(1 - \pi) \quad (1)$$

Where n denotes the number of study participants, γ denotes probability (0.05), and π denotes confidence level (95%). In the present study, for $\pi = 0.05$ probability, required the inclusion of $n = \ln(1-0.95)/\ln(1-0.05) = 58.40$, or 59 respondents in the pilot study, so that the problem was detected with a high confidence level. After conducting the pilot study, the questionnaire was applied to 1067 students during the school closure as a result of the COVID-19 outbreak.

The current study was conducted from July 6 to August 18 during the lockdown of all schools as a result of the COVID-19 pandemic. The target population consists of primary and secondary school students in the Gaza Strip with an estimated population of 1.4 million students. Due to outbreak of the COVID-19 pandemic, which is the topic of the current study and is still ongoing in Palestine and around the world, social isolation, quarantine, social distancing, and lockdown are being implemented as preventive requirements to control the widespread of the COVID-19 pandemic. Under the current circumstances, it was not possible to do a community-based sampling survey during the movement restriction period, therefore, data collection can be conducted through the internet only by using digital platforms.

Depending on the authors' relationships with school students living in the Gaza Strip, a poster was published on Virtual Classrooms, Facebook, and WhatsApp to allow the largest possible number of students to see it and participate in the study. This poster included a brief introduction, background of the study, procedures, objective, voluntary nature of participation, declarations of anonymity and confidentiality, and the link of the required questionnaire. School students over the age of 11 years, understood the content of the questionnaire and agreed to participate in the present study were instructed to complete the questionnaire on their own via clicking the link. On the other hand, for students under the age of 12 years, the students' guardians were instructed to answer the questionnaire on behalf of the student, after explaining and clarifying the questions to their students. The students' guardians who answered the questions on behalf were one of the student's parents (mother or father). In the case of absent one or both of them due to death or any other reason, his sister, brother, or anyone from relatives answered on his behalf.

In this study, convenience sampling was used in data collection, where it was not possible to determine the participated students in the digital environment. The required sample size was estimated to be 1067 based on a 95% confidence level and a 3% margin of error based on an estimated 50% outcome response. This sample size is considered to be adequate for the population of the present research. The authors invited 1067 students to fill the questionnaire and 942 participants from different 56 schools were included in data analysis (Figure 1). All Palestinian students are studying in private schools, public schools, or UNRWA schools. Private schools as well as public schools are supervised by the Palestinian Ministry of Education and Higher Education, whereas UNRWA schools are supervised by the United Nations Relief and Works Agency for Palestine Refugees (UNRWA).

The inclusion criteria for the study were:

- Primary or secondary school students aged between 6 to 18 years and being a student of private, public, or UNRWA school.
- Students who use social media platforms during the COVID-19 pandemic to know information about COVID-19 or for any purpose.

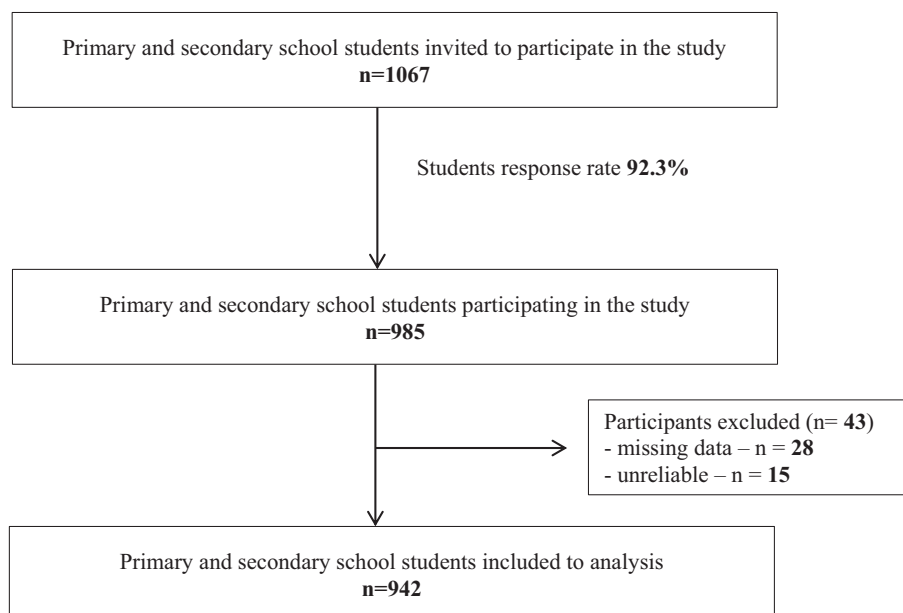


Figure 1. The procedures of sampling and inclusion for the study participants.

Both were verified based on the answers in the required questionnaire. The exclusion criteria were:

- Students out of the required age.
- Students who did not use social media platforms to get information related to the current crisis.

2.2. Study instruments

To measure the impact of social media platforms on primary and secondary school students' panic about COVID-19, the authors applied the questionnaire which was developed by Ahmad and Murad [21]. The questionnaire consists of three main sections as follows; (1) Demographic characteristics, (2) The social media platforms employed during the COVID-19 pandemic, (3) the effect of social media panic on study participants. The first section included demographic questions such as age, gender, and device used to connect to social media; the second section contained questions about employed social media in the time of the COVID-19 lockdown such as type social media platforms used to get information about COVID-19, classifications of news topics, and categories of information shared on social media networking. The last section covered questions about the impact of social media panic on the study participants. The questionnaire was written originally in the English language and then translated to Arabic by a specialist proficiency in both languages. Some sentences were modified to fit the educational level of the participating students, particularly students aged between 6-9 years.

Initially, a reliability test was applied to measure the internal consistency of the questionnaire. A Cronbach's alpha coefficient was found 0.879 in our sample, indicating acceptable internal consistency [32].

2.3. Statistical analysis

The Statistical Package for the Social Sciences (SPSS) software, version 22 (IBM, Chicago, Illinois, USA) was used to analyze the data in this study. An analysis of descriptive statistics was applied to show the demographic characteristics of the study participants. Also, Independent Samples T-test was used to compare mean scores between females and males for answers to questions regarding the impact of social media on spreading panic about COVID-19. One-way analysis of variance test statistics was used to make comparisons based on the variable of age. The chi-square test was used to compare proportions of male and female, and age groups of students to analyze questionnaire-related categorical variables. Also, we carried out a simple regression analysis to test whether the usage of social media was associated with the spreading of panic about COVID-19. Differences were considered statistically significant at a p-value of 0.05.

2.4. Ethical consideration

Before data collection, it was explained that participation was entirely voluntary and could be terminated at any time throughout the study. The

approval was obtained from all participants. All data were collected and kept confidential. Ethical approval for this study was obtained from the Ministry of Education and Higher Education responsible for primary and secondary schools in the Gaza Strip, Palestine. The procedures of this study complied with the provisions of the Declaration of Helsinki respecting research on Human participants.

3. Results

Nine hundred and eighty-five ($n = 985$) out of 1067 students participated in this study with a response rate of 92.3%. Of the 985 questionnaires received, 942 were considered valid and suitable for analysis. Only 43 questionnaires were removed and excluded from the data analysis due to missing or unreliable answers. The general characteristics of the study participants were presented in Table 1. Of 942 students, 65.8% were female and more than half (59.0%) of the students aged between 10 to 14 years. The most common device used to connect social media was smartphones (51.5%), while a home PC was the least (5.5%).

On the question of which social media platforms do you use to get information about COVID-19?, the results showed that most of the participants (81.8%) used Facebook to obtain more information about COVID-19. Facebook is one of the most widely used applications because of its popularity among students and easy to use. Female students had a higher likelihood than male students to use the Facebook platform to get news about COVID-19 ($p < 0.001$). The students aged 10–14 years were more likely ($n = 536$, 96.4%) to use Facebook than the other counterparts ($p < 0.001$). There was a significant association of gender and age with the type of social media used to get information about COVID-19 ($p < 0.001$) (see Table 2).

The results revealed that the COVID-19 pandemic is influencing the type of news topics most commonly followed on social media platforms. Health news was the most frequently topic seen, read, or heard ($n = 529$, 56.2%) during the COVID-19 pandemic and sports news were the least ($n = 1$, 0.1%). Males were more likely to follow health news than females ($p < 0.001$). Follow of health news was most common in participants older than 14 years ($n = 120$, 66.3%) as compared to other participants aged 14 years or less ($p < 0.001$). There was a significant association between the age-group and the type of news topic frequently followed on social media during the COVID-19 pandemic ($p < 0.001$).

About 76.4% ($n = 720$) of the participants thought that posting more information related to COVID-19 on social media has spread panic among the individual, whereas 11.1 % ($n = 105$) did not think (Figure 3). Males were more likely than females to support this idea ($p = 0.036$) (Table 3). Participants aged 10–14 years showed higher mean scores compared to their counterparts concerning this question ($p < 0.001$).

The analysis showed that 46.0% ($n = 433$) of the participants thought that, on social media, the level of Palestinian pages in covering COVID-19 topic was good. Only 91 (9.7%) answered neutrally. There was no statistically significant difference between males and females concerning their thoughts about the level of Palestinian groups, pages, and accounts

Table 1. The Demographic characteristics of the study participants (N = 942).

Variables	Groups	n	%
Gender	Female	620	65.8
	Male	322	34.2
Age	6–9 years	205	21.8
	10–14 years	556	59.0
	15–18 years	181	19.2
A device used to connect to social media	Smartphone	485	51.5
	Laptop	123	13.1
	Home PC	52	5.5
	iPad/Tab	282	29.9
Total		942	100.0

Table 2. Summary of response to some questions respecting the gender and age of the study participants (n = 942).

Variables	Total (n = 942) n(%)	Gender		P value ¹	Age			P value ¹
		Females (n = 620) n(%)	Males (n = 322) n(%)		6–9 years (n = 205) n(%)	10–14 years (n = 556) n(%)	15–18 years (n = 181) n(%)	
Q1: Which social media platform do you use to get news and information about COVID-19?*								
Facebook	771 (81.8)	530 (85.5)	241 (74.8)	<0.001	185 (90.2)	536 (96.4)	50 (27.6)	<0.001
WhatsApp	60 (6.4)	41 (6.6)	19 (5.9)		4 (1.9)	6 (1.1)	50 (27.6)	
Instagram	56 (5.9)	22 (3.5)	34 (10.6)		2 (0.9)	10 (1.7)	44 (24.4)	
Twitter	21 (2.2)	11 (1.8)	10 (3.1)		0 (0.0)	1 (0.2)	20 (11.0)	
YouTube	13 (1.4)	7 (1.1)	6 (1.9)		11 (5.4)	1 (0.2)	1 (0.6)	
Telegram	18 (2.0)	6 (1.0)	12 (3.7)		3 (1.5)	1 (0.2)	14 (7.7)	
TikTok	3 (0.3)	3 (0.5)	0 (0.0)		0 (0.0)	1 (0.2)	2 (1.1)	
Q2: What news topic has you have mainly seen/read/heard of social media during the COVID-19 pandemic?								
Social news	30 (3.2)	21 (3.4)	9 (2.8)	<0.001	0 (0.0)	0 (0.0)	30 (16.5)	<0.001
Health news	529 (56.2)	338 (54.5)	191 (59.4)		89 (43.4)	320 (57.5)	120 (66.3)	
Technology news	4 (0.4)	1 (0.2)	3 (0.9)		3 (1.5)	1 (0.2)	0 (0.0)	
Economic news	6 (0.6)	1 (0.2)	5 (1.6)		1 (0.4)	4 (0.7)	1 (0.6)	
Sport news	1 (0.1)	0 (0.0)	1 (0.3)		0 (0.0)	1 (0.2)	0 (0.0)	
Educational news	340 (36.1)	242 (39.0)	98 (30.4)		83 (40.5)	228 (41.0)	29 (16.0)	
Miscellaneous news	20 (2.1)	11 (1.8)	9 (2.8)		19 (9.3)	0 (0.0)	1 (0.6)	
Political news	2 (0.2)	0 (0.0)	2 (0.6)		1 (0.4)	1 (0.2)	0 (0.0)	
Cultural news	10 (1.1)	6 (0.9)	4 (1.2)		9 (4.5)	1 (0.2)	0 (0.0)	

* The authors excluded social media platforms that were not used by the study participants (n = 0) as follows: Snapchat, Skype, Viber, Line, WeChat, Vkontakte, Badoo, and Myspace.

¹ Calculated by Chi-squared (χ^2) test, P-value significant at ≤ 0.05 .

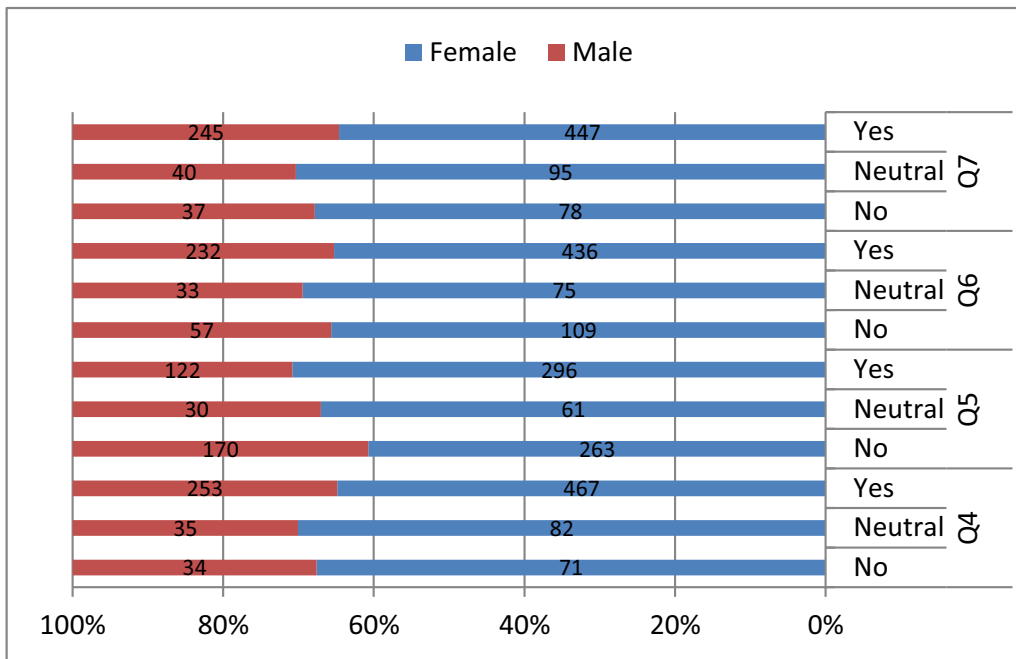


Figure 2. Response to some questions with regard to the gender of the study participants (n = 942).

in covering COVID-19 on social media ($p = 0.962$). Participants aged 6–9 years showed higher mean scores compared to their counterparts concerning this question ($p < 0.001$).

In answer to the question regarding posting information about COVID-19 on social media, more male than female answered yes (Figure 2). Males had a higher score than females ($p = 0.025$). The highest mean scores ($p < 0.001$) were obtained for students aged 10–14 years (2.60 ± 0.72), whereas students aged 15–18 years scored the lowest (2.31 ± 0.89). On social media platforms, the majority of the students ($n = 692, 73.5\%$) agreed with the necessity of following a specific policy during the time of the COVID-19 pandemic (Figure 3). Male students believed that the filters need to be set up and a specific policy should be followed significantly more than female students ($p =$

0.018). Participants aged between 10 and 14 years were found to have significantly higher mean scores (2.68 ± 0.63) as compared to other counterparts concerning this question ($p = 0.002$).

To further explore the influence of social media on students' panic about COVID-19, we analyzed and compared the responses of students for the question about the category of information has the most impact on creating panic on social media?. The majority of the students ($n = 553, 58.7\%$) confirmed that dissemination the number of COVID-19 infections and fake news about the COVID-19 outbreak is considered the most type of information participated in spreading panic about COVID-19 (Table 4). Female students were significantly more likely to agree than male students with this opinion ($p = 0.008$). Students aged between 10–14 years were significantly less likely to agree with this idea ($p <$

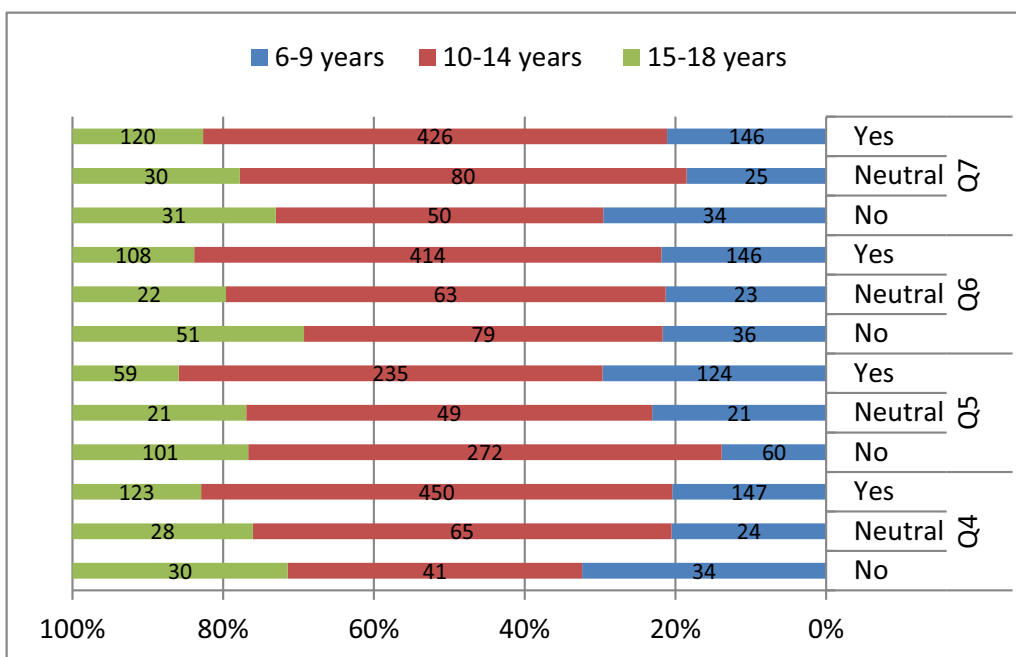


Figure 3. Response to some questions with regard to the age of the study participants (n = 942).

Table 3. A comparison of mean (\pm SD) scores for selected questions by demographic variables in a sample of 942 school students.

Variables	Total (n = 942)	Gender		P value ¹	Age group (years)			P value ²
		Female (n = 620)	Male (n = 322)		6-9 (n = 205)	10-14 (n = 556)	15-18 (n = 181)	
Q4: Do you think that publishing more news related to COVID-19 on social media has spread fear and panic among the people?	2.65 \pm 0.67	2.63 \pm 0.69	2.68 \pm 0.64	0.036	2.55 \pm 0.76	2.74 \pm 0.59	2.51 \pm 0.76	<0.001
Q5: Do you think the level of Palestinian pages, groups, and accounts on social media covering COVID-19 is good?	1.98 \pm 0.95	1.97 \pm 0.95	2.00 \pm 0.95	0.962	2.31 \pm 0.89	1.93 \pm 0.95	1.77 \pm 0.91	<0.001
Q6: Have you published any information and news related to COVID-19 on social media?	2.53 \pm 0.78	2.51 \pm 0.79	2.56 \pm 0.75	0.025	2.54 \pm 0.78	2.60 \pm 0.72	2.31 \pm 0.89	<0.001
Q7: Filters need to be set up for social media and a specific policy followed during humanitarian crises such as the spread of the COVID-19.	2.61 \pm 0.69	2.59 \pm 0.72	2.64 \pm 0.66	0.018	2.55 \pm 0.76	2.68 \pm 0.63	2.49 \pm 0.77	0.002

¹ Calculated by independent sample t-test to test for mean differences between the groups, P-value significant at \leq 0.05.

² Calculated by ANOVA, P-value significant at \leq 0.05.

0.0001). Compared with other age groups, students aged 6–9 years (n = 150, 72.5%) reported the highest rate of agree with this answer (p < 0.001).

About 14.0% of the students (n = 132) thought that dissemination of the number of COVID-19 infections and panic-inducing information about COVID-19 has played a key role in spreading panic on social media. Females were significantly more likely to agree than males with this idea. Students aged between 15-18 years were significantly less likely to agree with this opinion. The lowest percentage of students (n = 6, 0.6%) chosen the answer of both (A) and (B). Female students were significantly more likely to agree than male students with this idea. Students aged between 10-14 years were significantly more likely to agree with this opinion. This result shows that misinformation, fake news, and spreading fear-inducing information about COVID-19 have a negative impact on students during the COVID-19 pandemic.

Table 5 illustrates the impact of panic resulting from social media about COVID-19. The results revealed that the majority of the students (n = 736, 78.1%) were psychologically affected, whereas those physically affected was the lowest (n = 12, 1.3%). Female students were

psychologically affected significantly more than male students (p < 0.001). Psychological effects were most prevalent among students aged 15–18 years (n = 163, 90.1%), whereas the students aged 6–9 years (n = 141, 68.1%) being least affected (p < 0.001). About 11.7% (n = 110) of the students reported that spreading panic on social media did not affect them, therefore they did not be afraid of COVID-19. Female students experienced greater fear of COVID-19 than male students, in which males (n = 104, 32.3%) less afraid than females (n = 26, 4.1%). The students aged 6–9 year (n = 37, 18.0%) reported lower fear ratings for COVID-19 compared to the older students. A significant association was observed between the impact of social media panic about COVID-19 with the gender and age group of the students (p < 0.001). Answers of the students revealed that fear was mainly a psychological response that leads to decreasing body immunity when infected with the coronavirus.

Analysis of the results showed that there is a significant positive statistical correlation between social media and the spreading of panic concerning COVID-19. The total variation was found to be 79.3%, which points out that 79.3% of the variation in spreading panic regarding COVID-19 has been explained by the social media variable, and the other

Table 4. Type of information related to COVID-19 that impacts on creating panic on social media.

Variables	Total (n = 942) n(%)	Gender		P value ¹	Age group (years)			P value ¹
		Female (n = 640) n(%)	Male (n = 322) n(%)		6-9 (n = 205) n(%)	10-14 (n = 556) n(%)	15-18 (n = 181) n(%)	
Dissemination of the number of COVID-19 infections (A)	38 (4.0)	23 (3.7)	15 (4.7)	0.008	2 (1.0)	31 (5.6)	5 (2.8)	<0.001
Dissemination of the death toll (B)	9 (1.0)	4 (0.6)	5 (1.6)		0 (0.0)	6 (1.1)	3 (1.7)	
Dissemination of panic-inducing information about COVID-19 (C)	50 (5.3)	23 (3.7)	27 (8.4)		1 (0.5)	31 (5.6)	18 (9.9)	
Posting of videos, photos, and news of the countries with a high number of cases (D)	9 (1.0)	7 (1.1)	2 (0.6)		0 (0.0)	7 (1.3)	2 (1.1)	
Fake news about the COVID-19 outbreak (E)	68 (7.2)	46 (7.4)	22 (6.8)		2 (1.0)	51 (9.2)	15 (8.3)	
Dissemination of the number of infections (A) and dissemination of the death toll (B)	6 (0.6)	5 (0.8)	1 (0.3)		1 (0.5)	4 (0.7)	1 (0.6)	
Dissemination of the number of COVID-19 infections (A) and dissemination of panic-inducing information about COVID-19 (C)	132 (14.0)	81 (13.1)	51 (15.8)		32 (15.5)	82 (14.8)	18 (9.9)	
Dissemination of the number of infections (A) and posting of videos and photos of the countries with a high number of cases (D)	40 (4.2)	19 (3.1)	21 (6.5)		5 (2.4)	27 (4.9)	8 (4.4)	
Dissemination of the number of infections (A) and fake news about the COVID-19 outbreak (E)	553 (58.7)	386 (62.3)	167 (51.9)		150 (72.5)	302 (54.5)	101 (55.8)	
Dissemination of the death toll (B) and dissemination of panic-inducing information about COVID-19 (C)	19 (2.0)	13 (2.1)	6 (1.9)		8 (3.9)	3 (0.5)	8 (4.4)	
Others	18 (1.9)	13 (2.1)	5 (1.6)		6 (2.9)	10 (1.8)	2 (1.1)	

¹ Calculated by Chi-squared (χ^2) test, P-value significant at \leq 0.05.

Table 5. Summary of the impact of panic resulting from social media about COVID-19 between female vs. males and age groups.

Variables	Total (n = 942) n(%)	Gender		P value ¹	Age group (years)			P value ¹
		Female (n = 640) n(%)	Male (n = 322) n(%)		6-9 (n = 205) n(%)	10-14 (n = 556) n(%)	15-18 (n = 181) n(%)	
Psychological	736 (78.1)	539 (84.2)	197 (61.2)	<0.001	141 (68.9)	432 (77.6)	163 (90.1)	<0.001
Physical	12 (1.3)	11 (1.7)	1 (0.3)		4 (2.0)	7 (1.3)	1 (0.6)	
Psychological and physical	50 (5.3)	37 (5.8)	13 (4.0)		21 (10.2)	29 (5.2)	0 (0.0)	
All of them	34 (3.6)	27 (4.2)	7 (2.2)		2 (0.9)	32 (5.8)	0 (0.0)	
I was not afraid	110 (11.7)	26 (4.1)	104 (32.3)		37 (18.0)	56 (10.1)	17 (9.4)	

¹ Calculated by Chi-squared (χ^2) test, P-value significant at ≤ 0.05 .

variables (20.7%) are due to random error (Table 6). This result reveals that 79.3% of the factors that affect the spreading of panic regarding COVID-19 are related to social media.

4. Discussion

The current study investigated the impact of social media on spreading panic about the coronavirus outbreak in an online survey study. Based on the literature, we expected that social media platforms would increase panic of the coronavirus among students due to the rapid spreading of rumours, fake news and misinformation. Additionally, we expected that more exposure to misinformation about COVID-19 and its consequences on the educational status (e.g. Schools closure) on social media would spread panic and fear among school students. In line with these predictions, we found that social media has played a key role in affecting the students during the COVID-19 pandemic.

The results showed that most of the participants (81.8%) used Facebook to know more information about COVID-19. It was reported that Facebook has become the most common and extensively used social media platform among students. This makes it a popular channel for communication and obtains information about health and science-related topics [33, 34, 35]. During the COVID-19 lockdown period, internet users shifted to social media, particularly Facebook, for different purposes such as communicate with friends, educators, families and stay informed about developments regarding the COVID-19 outbreak in their countries [36, 37, 38, 39, 40]. The results also found that females had a higher likelihood than males to use the Facebook platform to get news about COVID-19. This result was in accordance with the result reported in the study of Biernatowska et al [41], they revealed that females were more likely than males to use Facebook and treat it as an integral part of life. This result justified that, during the COVID-19, males may be particularly attracted to platforms that present images or pictures about COVID-19 such as Instagram due to short text content that these sites may present through images. On contrary, the Facebook provide an opportunity to provide long and full-text posts about COVID-19 topic, therefore some males, particularly who have no enough time, maybe avoid to use it and save the time to do other tasks.

The results revealed that the COVID-19 pandemic is influencing the type of most popular news followed on social media platforms. The top most read/seen/heard the news by the school students were health and medical news, whether true or fake medical news [10,42]. This could be due to those people, including students, want to stay informed about all topics regarding the COVID-19 outbreak and its effect on the several aspects of life.

On social media platforms, most students agreed with the necessity of following a specific policy during the time of the COVID-19 pandemic. The previous studies showed that limiting the dissemination of fake news, filtering the content of social media and following right policies are essential procedures to control the negative impacted of fake news and misinformation on the public health of people [43].

The results revealed that the majority of the students were psychologically affected, whereas those physically affected was the lowest (1.3%). The small number of students who were physically affected can be explained by the fact that the number of people infected with Coronavirus was relatively small during conducting the current study. On the other hand, the percentage of students who were psychologically affected by the COVID-19 outbreak was high, the reason for this is due to an increase in the percentage of students who are using social media platforms to communicate with teachers and complete taking lessons online. As a result of the increase in the time spend on social media, the students have become more exposed to read, heard, or see news related to the COVID-19 and therefore they were psychologically affected. Similar findings were previously mentioned in the studies conducting during the COVID-19 pandemic [44, 45, 46, 47, 48, 49, 50, 51, 52, 53]. It was reported that the students were experiencing psychological issues related to panic, depression, stress, anger, anxiety, sadness, fear confusion, as well as social dysfunction during the COVID-19 pandemic. Also, the most popular psychological and behavioural reactions on the individuals during the COVID-19 crisis were nervousness, irritability, frustration, emotional disturbance, exhaustion, boredom, insomnia, guilt, stigma, poor concentration, indecisiveness, detachment, deteriorating work performance, and financial problems [54]. Also, the results showed that female students were psychologically affected significantly more than male students. This result supports the previous studies conducted during the COVID-19 pandemic in which depression, fear and anxiety were significantly higher among the females compared to males [47,55, 56, 57, 58, 59]. This could be due to that females express emotions to a greater extent than males do, and the COVID-19 pandemic may have increased this situation [60]. The results also showed that psychological effects were more common in older students than in younger students. The older students and teenagers tend to present with more worry and depressive more than children [56,61, 62, 63, 64, 65] due to feeling with anxiety due to several reasons such as worry about their educational performance during the closure of schools or fear being infected by the coronavirus [54]. It was reported that anxiety in teens is more common than in younger children due to the presence of many physical and emotional changes that can participate in developing anxiety [66].

Table 6. The impact of social media on spreading panic: results form linear regression analysis.

Model	Unstandardized coefficients		t-test	P-value	R	R ²	F test	P-value
	B	SE						
Constant	0.594	0.035	16.895	<0.001	0.891	0.793	3610.55	<0.001
Social media	0.797	0.013	60.087	<0.001	N/A*	N/A	N/A	N/A

*N/A: Not applicable.

The regression analysis showed that there is a significant positive correlation ($R = 0.891$) between social media and spreading panic concerning the COVID-19 pandemic. The students are depending on social media platforms to gather information and they are unable to know which information on social media is false and which is trusted and true, therefore, participating in the rapid spread of misinformation, fake news, and rumours about the COVID-19 pandemic. All these practices cause more fear, panic, anxiety and depression among school students. The previous studies showed that the panic resulted from the spreading of information about the COVID-19 pandemic on social media spreads faster than the virus itself and has short and long consequences [7,21,67].

In the study of Mertens et al. [68], they conducted a study to assess fear of the coronavirus by applying the Fear of the Coronavirus Questionnaire (FCQ) consisting of eight questions relating to various dimensions of fear. They found out that more exposure to misinformation from social media would increase panic and fear of COVID-19. González-Padilla and Tortolero-Blanco [7] highlighted the impact of social media during the COVID-19 pandemic. They reported that Social media has a positive and negative impact, the correct use of social media platforms can help to rapidly spread trusted information, sharing possible treatments, avoiding infection, quarantine measurements as well as follow-up protocols for both suspected and confirmed cases of COVID-19. On the other hand, social media platforms have dangerous consequences due to using these platforms to spread fake news, misinformation, rumours, myths, and pessimist information about quarantine states, which lead to destroying the mental health of individuals. Li et al. [69] reported the advantages of internet surveillance using social media platforms and internet searches (e.g. Sina Weibo Index, Google Trends, and Baidu Index) to monitor a new infectious disease including the COVID-19 pandemic. Accurately gathered early at a low cost. The Internet surveillance data provided a reliable prediction about the COVID-19 pandemic. Ni et al. [70] concluded that social media could be harnessed for telemedicine during the COVID-19, but spending more time should be avoided due to spreading the infodemic and misinformation on social media platforms.

In the study of Lin et al. [71], they showed that social media platforms play an important role in disseminating and sharing reliable information, eliminate and cancel misinformation and fake news, and help to enhance of psych behavioural responses of the public towards the COVID-19 pandemic. Hassounah et al. [72] confirmed that the ministry of health in Saudi Arabia used social media platforms to disseminate correct information about COVID-19 and to distribute health education materials that cover topics related to COVID-19. Shimizu [73] reported that the media has concentrated on the COVID-19 and considered it as a dangerous threat, which has added to fear, stress, and panic among the public. Also, it was found that the emergence of false information and racism in the media against patients has reached a critical level in some countries. Also, Depoux et al. [67] revealed that social media platforms have played an important role in the rapid outbreak of the COVID-19 pandemic in many countries through three main roles as follows: (1) Publishing correct information and facts about the COVID-19 outbreak, (2) Publishing rumours, false formation, racism, and fake news about the COVID19 outbreak, as well as (3) Participating in spread fear and panic about the new virus.

Some suggestions for the management of social media panic can be made based on our results. Particularly, the observed relationship between social media exposure and panic of COVID-19 suggests that exposure to misinformation, rumours, and fake news on social media platforms can lead to more panic. If this is indeed the causal connection between these constructs, then there are opportunities for school teachers, policymakers, households, and journalists to affect excessive panic. One way to do this is to ensure that the only true information and real data should be presented to students without intimidation and directing students to visit the official websites to know more information about COVID-19. Also, there are opportunities for school students themselves to tackle and mitigate their panic. Students can be advised to minimize their

exposure to social media pages which disseminates information about COVID-19 and continuously visit the sites which present well-being and educational services. Moreover, students can also be advised to avoid social media pages that disseminate opinions, personal experiences, and fake information about the COVID-19 crisis. Furthermore, students should visit social media for a limited period per day not throughout the day. Another way to manage social media panic of the coronavirus could focus on educating students about what the home activities should be done during school closure due to health crises, particularly school closure once again due to the start of the second wave of the COVID-19 pandemic. Overall, the responsible authorities should take into consideration their important role respecting to check the information about COVID-19 to ensure only the right information communicates to the public, especially school students.

5. Conclusions

In conclusion, in this online study, we found that social media has a significant effect on spreading panic about the COVID-19 pandemic among students, with a potential negative impact on their mental health and psychological well-being. This study showed a significant positive correlation between social media and the spreading of panic about COVID-19. During the closure of schools, students are using social media to continue their learning as well as to know more information about the COVID-19 outbreak. The effect of social media panic among students varies depending on a student's age and gender. As teachers, we have a significant role to educate students who are frequently using social media to evaluate, find, or gather more information about the COVID-19 crisis. We should communicate with the students during the current crisis and provide them with the trusted links about COVID-19 and present the required advice at the correct time. Besides employing preventive measures, we can protect our students from this new virus and mitigate its harmful consequences on their health. These results may help policymakers to manage panic among students due to the COVID-19 outbreak.

6. Strengths and limitations

The strengths of this study include the temporal proximity to the developments regarding the coronavirus outbreak in the Gaza Strip, Palestine. This study was carried out during the closure of schools as a result of the COVID-19 outbreak. Limitations of this study include the lockdown period and restriction of the movement were a constraint to communicate with study participants and collected the required data in a systematic method. It was difficult to find participants who wished to participate in this study, but they were not participating due to technical problems regarding the internet connection. Also, the non-representativeness of our sample, which consisted of a large extent of female students aged between 10 and 14. This may limit the generalizability of our findings to a wider population. Despite that most of the Palestinians in the Gaza Strip are educated, they are suffering from collapsing the economic status and poverty due to the political pressures prevailing during the last decades [74, 75, 76]. Therefore, students from low-income families have no device (smartphone, tablet, laptop, etc.) to log in to social media networking and interact with the posts related to COVID-19. For future studies, it's very important to make a comparison between students who use social media and other counterparts who never use social media (or using traditional devices such as T.V and radio) to identify the panic level about COVID-19 resulting from exposure to fake news and misinformation.

Declarations

Author contribution statement

E. Radwan: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

A. Radwan: Analyzed and interpreted the data; Wrote the paper.
W. Radwan: Contributed analysis tools or data; Wrote the paper.

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Data availability statement

Data included in article.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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