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University Students' Ability to Assess Misinformation About COVID-19

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Abstract

In a university student survey on COVID-19 information assessment, 66% participants identified the falsehood of all misinformation statements and 66% provided web page URLs that are adequate in supporting statement accuracy assessment. The most cited web resources were government websites (43%) and media reports (30%). Those who identified misinformation falsehood were more likely to have higher GPA and liberal-leaning political views, and to implement evidence-based COVID prevention measures including mask-wearing and not self-medicating on (hydroxy-)chloroquine.

Keywords:

Internet, information literacy, COVID-19.

Introduction

The Coronavirus Disease 2019 (COVID-19) pandemic is an ongoing public health crisis in the US and globally. It also presents challenges for health information seeking, evaluation, and utilization. Misinformation regarding COVID prevention and management has spread via mass media, social media, and the Internet [1]. Adverse health impacts of this misinformation have been reported, ranging from mental health issues to self-medicating that led to at least one death in the US [2, 3]. During this pandemic, university students may experience increased information needs, but they may have poor information literacy regarding information searching and evaluation [4]. To understand students' information seeking and utilization behaviors and relevant factors, we designed and administered a web-based questionnaire in 09/2020.

Methods

The web-based questionnaire included evaluating five COVID statements to understand students' ability to find and use online health information. Two statements were based on information by the Centers for Disease Control and Prevention (CDC) regarding COVID prevention and impact, and three misinformation statements were based on remarks made by the US President. Students were asked to evaluate if each statement was true or false, and to provide a URL that they trust to support their assessment. We also asked students to rate (on a Likert scale) their eHealth information literacy [5], and to answer demographic questions, COVID-19 knowledge questions [6], anxiety questions (adapted from GAD-7 [7] and HAI [8]), and questions regarding information seeking behaviors and COVID risk management behaviors.

On 9/21/2020, 219 students in 8 undergraduate classes at a US university were invited via class emails to complete the questionnaire, with 136 completing it (response rate = 62%) by 10/11/2020. Additionally, 103 students were recruited through the university Psychology Student Pool during the same 3-week study period.

This analysis focuses on understanding if students were able to use the Internet to identify the 3 misinformation statements that were inaccurate (in Table 1) and to provide an adequate web page to support their assessment, and understanding what factors may be associated with the statement assessment accuracy. Descriptive, chi-squared test and 2 independent sample t-test analyses were performed. The URL adequacy was reviewed by two authors independently with discrepancies in review results reconciled in discussions. Inter-reviewer kappa for the three URL fields were 0.94, 0.91, 0.84, respectively. Assuming the URL adequacy as the gold standard and student assessment correctness as the test, the sensitivity and positive predictive value (PPV) of the statement accuracy questions were calculated. Microsoft Excel and IBM SPSS were used in the data analysis (at <0.05 significance level). The study protocol was approved by the University Institutional Review Board (IRB#: 2020.136).

Results

Among those who completed the survey (N=239, median age = 21; 81% female), 157 students (66%) identified all three misinformation statements as inaccurate, see Table 2. On average, 66% students provided web page URLs that were adequate in supporting an assessment of the statement accuracy. Student-cited web resources were mostly government websites (43%) and media reports (30%). Sensitivity for 3 statement accuracy questions was 86%, 90%, and 97%, respectively, and 75%, 62%, and 73% as PPV. As shown in Table 3, the students who successfully identified all 3 misinformation statements as inaccurate were more likely to have higher GPA ($t=2.6$, $p=.01$) and liberal-leaning political views ($X^2=12.0$, $p=.002$), were more likely to implement evidence-based COVID prevention measures such as wearing masks in public most of time ($X^2=4.7$, $p=.03$) and not taking (hydroxy-)chloroquine for COVID prevention ($X^2=7.8$, $p=.005$). No significant differences were found between these two groups in terms of COVID knowledge level, anxiety levels, eHealth information literacy level, social distancing (6 feet apart) most of the time, or demographics.

Table 1– COVID misinformation statements in survey

Statements	Original remarks	Date*
A. Taking hydroxy-chloroquine or chloroquine (medications to treat malaria) are effective ways to prevent getting COVID-19.	"The front-line workers – many, many are taking it. I happen to be taking it." [1]	5/18/20 †
B. 99% of coronavirus cases are totally harmless.	"99% of which are totally harmless" [2]	7/4/20
C. Young people are almost immune to COVID-19.	"Young people are almost immune to this disease" [3]	7/30/20

* The earliest date of the remark on record.
† The President promoted (hydroxy-)chloroquine for COVID *treatment* as early as on 3/19/2020[4].

Table 2– Students who identified statement as inaccurate

Statement	Student #	%
A	197	82%
B	208	87%
C	211	88%
A & B & C	157	66%

Table 3– Comparison of students who identified all 3 misinformation statements as inaccurate and who didn't

Characteristics/behaviors of those who identifed –	All 3 (n=157)	Failed in ≥1 (n=82)
Female %	82%	80%
Mean age	20.9	20.9
White %	68%	63%
Hispanic %	20%	17%
Health related majors % †	67%	61%
Annual household income <75K %	60%	69%
Mean COVID knowledge index	11.8	11.8
Mean GAD-7 total	8.4	7.5
Mean HAI total	13.1	13.0
Mean Information literacy index	3.9	3.7
Mean GPA *	3.5	3.3
Political view *		
Liberal %	51%	28%
Middle %	36%	51%
Conservative %	12%	21%
Frequently social-distancing %	82%	77%
Frequently wearing mask % *	99%	95%
(Hydroxy-)chloroquine taker % *	0%	5%

† The percentage of students who major in health science, nursing, public health, or psychology
* $p<0.05$

Discussion and Conclusion

In a university student survey, one third of students failed to identify all COVID misinformation statements as inaccurate and one third failed to identify web resources adequate to support misinformation accuracy assessment. With good sensitivity and PPV found in this study, the statement accuracy questions are promising indicators for testing Internet search and utilization performance. Students' ability to identify misinformation as inaccurate was associated with implementing evidence-based COVID prevention measures, such as mask wearing and not taking unproven medications. These findings suggest a need to train students in health information seeking, evaluation, and utilization, especially in misinformation assessment. Study limitations included convenience sampling, small sample size, and no control group. Future development and evaluation of health literacy training programs should use a rigorous study design.

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[3] https://www.youtube.com/watch?v=czCxtAx5uqk
[4] https://www.youtube.com/watch?v=JKC8gu7UsVo&t=3m2s