

COVID-19-Related Information Sources and Their Relationships with Confidence of People in Coping with COVID-19: A Facebook Survey Study in Taiwan

Peng-Wei Wang, Wei-Hsin Lu, Nai-Ying Ko, Yi-Lung Chen, Dian-Jeng Li, Yu-Ping Chang, Cheng-Fang Yen

Submitted to: Journal of Medical Internet Research
on: May 09, 2020

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Abstract

Background: People obtain information on coronavirus disease 2019 (COVID-19) from the Internet and other sources. Understanding the factors related to such information sources aids health professionals in educating individuals.

Objective: This study used data collected from the Online Survey Study on COVID-19 in Taiwan to examine what major COVID-19 information sources are available and which sources are significantly related to the self-confidence of people in coping with COVID-19 in Taiwan.

Methods: A total of 1904 participants (1270 non-health-care workers and 634 health care workers) were recruited from the Facebook advertisement. Their major sources of information about COVID-19, the relationships between the sources and demographic factors, and the relationships between the sources and the self-confidence in coping with COVID-19 were surveyed.

Results: Most Taiwanese people relied on the Internet for COVID-19 information (80.6%). Many respondents also used a variety of sources of information on COVID-19, where such variety was associated with sex, age, whether one was a health care worker, and level of worry toward COVID-19. For health care workers, the use of formal lessons as an information source was significantly associated with better self-confidence in coping with COVID-19. The significant association between receiving information from more sources and greater self-confidence was found only in health care workers but not in non-health care workers.

Conclusions: Medical professionals should consider subgroups of the population when establishing the various means to deliver information on COVID-19.

(JMIR Preprints 09/05/2020:20021)

DOI: <https://doi.org/10.2196/preprints.20021>

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Original Manuscript

COVID-19-Related Information Sources and Their Relationships with Confidence of People in Coping with COVID-19: A Facebook Survey Study in Taiwan

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Abstract

Background: People obtain information on coronavirus disease 2019 (COVID-19) from the Internet and other sources. Understanding the factors related to such information sources aids health professionals in educating individuals.

Objective: This study used data collected from the Online Survey Study on COVID-19 in Taiwan to examine what major COVID-19 information sources are available and which sources are significantly related to the self-confidence of people in coping with COVID-19 in Taiwan.

Methods: A total of 1904 participants (1270 non-health-care workers and 634 health care workers) were recruited from the Facebook advertisement. Their major sources of information about COVID-19, the relationships between the sources and demographic factors, and the relationships between the sources and the self-confidence in coping with COVID-19 were surveyed.

Results: Most Taiwanese people relied on the Internet for COVID-19 information (80.6%). Many respondents also used a variety of sources of information on COVID-19, where such variety was associated with sex, age, whether one was a health care worker, and level of worry toward COVID-19. For health care workers, the use of formal lessons as an information source was significantly associated with better self-confidence in coping with COVID-19. The significant association between receiving information from more sources and greater self-confidence was found only in health care workers but not in non-health care workers.

Conclusion: Medical professionals should consider subgroups of the population when establishing the various means to deliver information on COVID-19.

Key words: COVID-19; information; Internet; coping

Introduction

The coronavirus disease 2019 (COVID-19) emerged in Wuhan, China, at the end of 2019 and rapidly spread worldwide. The World Health Organization (WHO) declared the ongoing outbreak of COVID-19 as a public health emergency demanding global concern. Early in the outbreak, Taiwan was predicted to have the second highest number of COVID-19 cases due to the many people moving to and from Taiwan and China [1]. After all, Taiwan experienced the severe outbreak of 2002–2003 Severe Acute Respiratory Syndrome (SARS), which originated from southern China; globally, Taiwan had the third highest number of SARS cases, after China and Hong Kong [2]. However, the experience with SARS made many Taiwanese people vigilant against COVID-19, which has aided in COVID-19 prevention.

For information on COVID-19, timeliness and accuracy—although difficult to attain and measure—are foundational to mitigating and curing the disease for both the public and the scientific community [3]. Among the general public, the Internet is the most popular source of information on the etiologies and intervention models of medical illnesses [4]. Information has been proliferating on traditional and social media since the COVID-19 outbreak [5]. A recent study of 21 countries found that the number of Google searches for “wash hands” increased with the lower speed of COVID-19 spread [6]. Misinformation on COVID-19, however, has also been proliferating on the Internet, especially on social media [7,8].

In addition to the Internet, traditional media are also important sources of information during disease outbreaks. However, repeated media exposure to crisis-related information elevates anxiety and stress responses among people [9]. The public may also receive information on COVID-19 from medical staff and laypeople, such as their friends, family members, and coworkers. Because people obtain information on COVID-19 from various sources, understanding the factors related to such information sources aids health professionals in educating individuals in particular and the public at large. Thus, by developing information-delivery systems that are transparent and effective, self-confidence in coping with the pandemic can be improved in their audience.

The Online Survey Study on COVID-19 in Taiwan (hereafter referred to as the Taiwan COVID-19 survey) was conducted to assess the life experiences of people in Taiwan during the COVID-19 outbreak. Generally, the online survey is a promising method for assessing how members of the public general public understand and perceive a fast-moving infectious disease outbreak [10]. The present study used data collected from the Taiwan COVID-19 survey to examine the following 2 issues: first, what major COVID-19 information sources are available as well as the relationships between these sources and demographic factors, and second, which sources are significantly related to the self-confidence of people in coping with COVID-19. We were particularly interested in the information sources of traditional media and the Internet with regard to the advice to social distancing. Furthermore, because Taiwan's Ministry of Health and Welfare recommends that health care workers should learn about COVID-19 through online or in-person lessons, we were also interested in whether the associations of information sources with people's self-confidence differed between health care workers and non-health care workers.

Methods

Participants

Participants were recruited through a Facebook advertisement on April 10 to April 20, 2020. Facebook users were eligible for this study if they were ≥ 20 years old and living in Taiwan. The Facebook advertisement included a headline, main text, pop-up banner, and link to the research questionnaire website. We designed the advertisement to appear in the Facebook users' "news feeds," which is a continually updated list of updates from advertisers and the user's connections (such as friends and the Facebook groups that they have joined). Our advertisement only targeted users' news feeds, as opposed to other Facebook advertising locations (e.g. the right column), because news feed advertisements are most effective in recruiting research participants [11]. We targeted the advertisement to Facebook users by location (Taiwan) and language (Chinese), where

Facebook's advertising algorithm determined which users to show our advertisement to. To ensure that health care workers are recruited, we also posted the link of the Facebook advertisement to LINE (a direct messaging app) and Facebook groups joined by health care workers.

This study was approved by the Institutional Review Board (IRB) of Kaohsiung Medical University Hospital (KMUHIRB-EXEMPT(I) 20200011). Because participation was voluntary and survey responses were anonymous, the IRB ruled that this study did not require informed consent. Our study participants were given no incentive for participation. We provided links to COVID-19 information from the Taiwan Centers for Disease Control (Taiwan CDC), Kaohsiung Medical University Hospital, and Medical College of National Cheng Kung University for participants to learn more about COVID-19.

Measures

In the survey, participants were asked about the following:

Sources of Information About COVID-19

We measured participants' frequency of receiving COVID-19-related information from the following sources: the Internet (including blogs, Internet news, and social media, such as Facebook, Line, Twitter, and Plurk), friends, traditional media (including television, newspapers, and radio broadcasting), formal lessons on COVID-19 (whether online or in-person), medical staff in health care settings, coworkers, and family members. Participants rated their frequency for each source as never, sometimes, or frequently. Sources rated frequently were classified as major sources of information. The total numbers of sources of information about COVID-19 were summed.

Worry About COVID-19

We used the following question from the study of Liao et al. [12] to assess how much respondents worried about COVID-19: "Please rate the level of your current worry toward COVID-19." This question was rated from 1 (very mild) to 10 (very severe).

Self-confidence in Coping with COVID-19

We used the following question adapted from the questionnaire on risk perception of an

infectious disease outbreak [13] to assess how self-confident respondents were in coping with COVID-19: “How confident are you that you can cope well with COVID-19?” The question was rated from 1 (not confident at all) to 5 (very confident).

Demographic Variables

Data on respondents' gender (female and male), age, and education level were also collected. Respondents who had high school qualifications or below and respondents who had university qualifications or above were classified into low and high education level groups, respectively. Respondents were also asked whether they were health care workers.

Statistical Analysis

Data analysis was performed using SPSS 22.0 statistical software (SPSS Inc., Chicago, IL, USA). For each participant, the frequency of information-source use is expressed in terms of percentage. The associations of demographic characteristics and worry toward COVID-19 with COVID-19 information sources were examined using logistic regression analysis. The *P* value, odds ratio (OR), and 95% confidence interval (CI) were used to indicate significance. Because multiple comparisons were conducted, a *P* value of $<.007$ ($.05/7$) indicated significance. The factors related to the total number of major sources of information about COVID-19 were examined using multiple regression analysis. Moreover, the associations of each information source and total number of information sources with self-confidence were examined using multiple regression analyses as well as for the subgroups of health care workers and non-health-care workers. A 2-tailed *P* value of $<.05$ indicated statistical significance.

Results

In total, the data of 1904 respondents (1282 female and 622 male participants) were analyzed, with 70 of the original 1974 respondents excluded due to missing data. Table 1 presents the descriptive statistics for demographic characteristics, worry toward COVID-19, self-confidence in

copied with COVID-19, and COVID-19 information sources. The mean age was 38.0 years (standard deviation [SD] = 10.8 years); 88.9% had a high education level; and 33.3% were health care workers. The mean scores for worry and self-confidence were 6.1 (SD = 2.2) and 3.1 (SD = 0.8), respectively.

The major source of information on COVID-19 in a high proportion of users was the Internet (80.6%), followed by traditional media (53.5%), family members (24.9%), coworkers (24.3%), friends (21.2%), formal lessons (20.5%), and medical staff (27.3%). Furthermore, 10.5%, 25.9%, 23.8%, 14.9%, 10.3%, and 14.6% of participants received COVID-19-related information from 0, 1, 2, 3, 4, and ≥ 5 sources, respectively, with 2.4 sources as the mean (SD = 1.8).

[Table 1 about here]

Table 2 presents the multiple regression results on the associations of demographic characteristics and worry toward COVID-19 with each information source. The results indicated that women were more likely to obtain information from traditional media and family members; older people were more likely to obtain information from traditional media and were less likely to obtain information from the Internet and their work colleagues; and health care workers were more likely to obtain information from formal lessons, medical staff, and coworkers. For all information sources, except for formal lessons and medical staff, worry was significantly associated with information-source use.

[Table 2 about here]

Table 3 presents the multiple regression results on the associations of demographic characteristics and worry toward COVID-19 with the number of information sources each respondent used. The results indicated that women and health care workers tended to use more information sources relative to their counterparts. Worry was also significantly associated with the number of information sources used.

[Table 3 about here]

Table 4 presents the multiple regression results on the associations of each information source and the number of information sources used by a respondent with self-confidence for the health care worker and non-health-care worker subgroups. For health care workers, those who received information from formal lessons and from more sources had significantly greater self-confidence. For non-health-care workers, a nonsignificant association was noted between each information source and the total number of sources used by a participant with self-confidence.

[Table 4 about here]

Discussion

This Online Survey Study found that most Taiwanese people relied on the Internet for COVID-19 information, followed by traditional media. Many respondents also used a variety of sources of information on COVID-19, where such variety was associated with sex, age, whether one was a health care worker, and level of worry toward COVID-19. For health care workers, the use of formal lessons as an information source was significantly associated with better self-confidence in coping with COVID-19. The significant association between receiving information from more sources and greater self-confidence was found only in health care workers but not in non-health care workers.

The Internet and Traditional Media as COVID-19 Information Sources

Approximately 80% of participants received COVID-19 information online. The Internet makes information on COVID-19 more accessible, especially for those staying indoors due to the pandemic, with the websites of official public health organizations being the highest-quality source of online information on COVID-19 and how to prevent it [14]. We found that age was positively and negatively related with receiving COVID-19 information from traditional media and from the Internet, respectively. This result suggests a cohort effect on the information source related to major health issues. Because the Internet is a popular and accessible information source, medical professionals should consider subgroups of the population, especially with respect to Internet access, when delivering information online. Although of the popularity and accessibility of the Internet, we

did not find a significant association between use of the Internet as an information source on COVID-19 and self-confidence in coping with COVID-19. Misinformation on COVID-19 is rife, especially on social media. The WHO and Taiwan's Ministry of Health and Welfare made efforts to dispel such misinformation [7,8].

Sources of Information About COVID-19 Among Health Care Workers

Because Taiwan's Ministry of Health and Welfare recommended health care workers to attend formal lessons (whether online or in-person) on COVID-19, they were more likely to receive COVID-19 information from formal lessons, which resulted in greater self-confidence. A study in China reported depression, anxiety, insomnia, and distress in a high proportion of health care workers who were ever exposed to information on COVID-19 [15]. It was the uncertainty surrounding COVID-19, in addition to physical and psychological exhaustion, that resulted in such mental health problems [16]. Thus, our study and previous studies have demonstrated the necessity of providing timely and transparent formal lessons on COVID-19 for health care workers.

Worry About COVID-19 and Sources of Information

We noted that more severe worry about COVID-19 was significantly associated with using more information sources. More sources of information about COVID-19 were also associated with higher self-confidence to cope with COVID-19 in health care workers. Overall, these results imply the benefits of using multiple information sources during the COVID-19 pandemic. However, the direction of the association is unclear: greater self-confidence can lead one to access information from multiple sources. Clarifying this direction of association warrants further study.

Limitations

The present study has some limitations. First, although recruiting participants through Facebook is a promising research method targeting the general public during fast-moving infectious disease outbreaks [10], Facebook users may not be representative of the population. A review of a study that recruited participants through Facebook reported a bias in favor of women, young adults, and people with higher education and incomes [17]. Second, the cross-sectional design of this study limited

causal inference between sources of information, worry about COVID-19, and self-confidence. Third, this study was conducted during the period of COVID-19 mitigation but not during period when COVID-19 first emerged in Taiwan.

Conclusion

People may use a variety of sources to search for information on COVID-19, whereas various sources of information had various relationships with the confidence in coping with COVID-19. Medical professionals should consider subgroups of the population when establishing the various means to deliver information on COVID-19.

Acknowledgement: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Authors' Contributions: C-FY and N-YK designed and conducted the study. Y-LC and D-JL analyzed the data. P-WW, C-FY, W-HL and Y-PC drafted the manuscript. All authors have read and agreed to the published version of the manuscript

Conflicts of Interest: None declared.

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Abbreviations

COVID-19: coronavirus disease

SARS: Severe acute respiratory syndrome

Taiwan CDC: Taiwan Centers for Disease Control

WHO: World Health Organization

Table 1. Descriptive statistics for demographic characteristics, worry toward COVID-19, self-confidence in coping with COVID-19, and COVID-19 information sources (N = 1904)

	<i>n</i> (%)	Mean (SD)	Range
Gender			
Female	1282 (67.3)		
Male	622 (32.7)		
Age (years)		38.0 (10.8)	20-74
Education level			
Low (high school or below)	212 (11.1)		
High (university or above)	1692 (88.9)		
Health care workers			
No	1270 (66.7)		
Yes	634 (33.3)		
Severity of worry toward COVID-19		6.1 (2.2)	1-10
Self-confidence in coping with COVID-19		3.4 (0.8)	1-5
Sources of information about COVID-19			
Internet	1535 (80.6)		
Friends	403 (21.2)		
Traditional media	1018 (53.5)		
Academic lessons	391 (20.5)		
Medical staff	367 (19.3)		
Work colleagues	462 (24.3)		
Family members	475 (24.9)		
Number of information sources			
0	200 (10.5)		
1	494 (25.9)		
2	453 (23.8)		
3	284 (14.9)		
4	196 (10.3)		
5	129 (6.8)		
6	66 (3.5)		
7	82 (4.3)		
Total number of information sources		2.4 (1.8)	0-7

Table 2. Factors related to COVID-19 information sources

	Internet		Friends		Traditional media		Academic lessons		Medical staff		Work colleagues		Family members	
	OR	P	OR	P	OR	P	OR	P	OR	P	OR	P	OR	P
	(95% CI)		(95% CI)		(95% CI)		(95% CI)		(95% CI)		(95% CI)		(95% CI)	
Males ^a	.814	.100	1.008	.950	.724	.001	.939	.635	.818	.163	.741	.017	.718	.006
	(.638-1.040)		(.790-1.286)		(.594-.883)		(.724-1.218)		(.618-1.084)		(.579-.948)		(.566-.911)	
Age	.977	<.001	.987	.023	1.016	<.001	1.000	.997	.991	.177	.983	.002	.997	.525
	(.967-.988)		(.976-.998)		(1.007-1.025)		(.988-1.012)		(.979-1.004)		(.972-.994)		(.986-1.007)	
High educational level ^b	1.545	.013	1.016	.932	.822	.202	.995	.981	.683	.088	.706	.055	.712	.039
	(1.097-2.176)		(.701-1.474)		(.608-1.111)		(.653-1.515)		(.441-1.058)		(.495-1.008)		(.515-.983)	
Health care workers ^c	.827	.129	1.309	.026	.992	.940	5.891	<.001	10.645	<.001	3.500	<.001	.827	.111
	(.647-1.057)		(1.032-1.661)		(.814-1.210)		(4.600-7.543)		(8.067-14.046)		(2.783-4.402)		(.655-1.045)	
Worry toward COVID-19	1.107	<.001	1.107	<.001	1.094	<.001	1.013	.644	1.065	.035	1.084	.002	1.102	<.001
	(1.052-1.165)		(1.051-1.165)		(1.049-1.140)		(.959-1.069)		(1.004-1.129)		(1.031-1.141)		(1.050-1.156)	

^aFemale as reference.
^bHigh school or below as reference.
^cNon-health-care worker as reference.

Table 3. Factors related to number of COVID-19 information sources

	Beta	<i>t</i>	<i>P</i>
Males ^a	-.066	-2.909	.004
Age	-.037	-1.585	.113
High educational level ^b	-.024	-1.067	.286
Health care workers ^c	.117	5.218	<.001
Worry toward COVID-19	.230	10.132	<.001

^aFemale as reference.

^bHigh school or below as reference.

^cNon-health-care worker as reference.

Table 4. Associations of COVID-19 information sources with self-confidence in coping with COVID-19

	Non-health care workers						Health care workers					
	Beta	t	P	Beta	t	P	Beta	t	P	Beta	t	P
Males ^a	.082	3.030	.002	.081	3.009	.003	.069	1.781	.075	.089	2.279	.023
Age	.002	.088	.930	.002	.054	.957	-.008	-.205	.838	-.015	-.401	.688
High educational level ^b	.052	1.902	.057	.050	1.854	.064	-.001	-.039	.969	.014	.361	.718
Worry toward COVID-19	-.307	-11.258	<.001	-.309	-11.363	<.001	-.323	-8.525	<.001	-.333	-8.747	<.001
Information from the Internet	.001	.051	.960				.064	1.552	.121			
Information from friends	-.027	-.906	.365				.019	.435	.664			
Information from traditional media	-.022	-.767	.443				-.072	-1.628	.104			
Information from academic lessons	.049	1.659	.097				.144	2.969	.003			
Information from medical staff	.024	.782	.435				.085	1.608	.108			
Information from work colleagues	-.016	-.492	.623				-.081	-1.644	.101			
Information from family members	.052	1.703	.089				-.042	-.986	.324			
Total number of information sources				.035	1.296	.195				.078	2.041	.042

^aFemale as reference.
^bHigh school or below as reference.