

RESEARCH ARTICLE

University students' exposure to COVID-19 information on social media and adherence to health protocols

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ABSTRACT

With the continued threat of COVID-19 to public health, eHealth literacy among social media users increased as information abounded online. The study, which was based on the Cultivation Theory, used an online survey to examine the extent of exposure to COVID-19 information on social media and its relationship to knowledge, anxiety, and adherence to health practices among 192 Philippine university students.

Results show a high level of exposure of the respondents to COVID-19 news and updates from March 16 to June 16, 2020, but a decrease to moderate exposure from September 17 to December 16, 2020. Exposure registered a significant positive relationship with knowledge about COVID-19; however, relationship between exposure and anxiety is inverse. Physical and mental manifestations of anxiety tend to decrease with greater exposure, and vice versa. An inconclusive relationship was seen between exposure and adherence to health protocols. Frugality, resourcefulness, and having a close-knit community, combined with local health remedies and adaptation mechanisms, may have influenced how the Ilokano responded to health risks such as the present COVID-19 pandemic.

Coupled with the huge role that social media plays in information dissemination, this study puts forward the importance of considering the cultural background of the target audience, which may influence their response to health risk communication efforts.

Keywords: *health communication, eHealth literacy, social media, cultivation theory, COVID-19, public health, risk communications*

Introduction

Health is crucial because it has a huge impact on labor productivity, which in turn has a huge impact on a country's economic growth (Renny, 2012). With this, it is only essential that health literacy be cultivated in people. According to Ratzan & Parker (2000), health literacy is observed when people can answer the question, "How do I keep myself well?" (p. v). With the abundance of health-related messages in all forms of media that a person uses in a daily basis day (Walsh-Childers & Brown, 2008), the concept of eHealth literacy was established. eHealth literacy is the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to address or solve a health problem (Norman & Skinner, 2006).

In this regard, the Center for Disease Control and Prevention (n.d.) explains that "the health literacy skills [of people] and the contexts in which they communicate about health reflect their cultures" (Culture and Language section, para. 1). Analyses of public and health communication demonstrate that there is an increasing acknowledgment of the critical role of culture in affecting the effectiveness of health communication (Institute of Medicine, 2002). The cultural characteristics of a societal group may be directly or indirectly associated with the decisions, priorities, and rejection or acceptance of health communication and education initiatives (Pasick et al., 1996).

Agness-Whittaker and Macedo (2016) highlighted the critical need for health care professionals and providers to be culturally competent in order to address the needs of diverse patients, whereas Kreuter and McClure (2004) incorporated and applied culture to develop a model of health communication planning. Hence, the cultural background of the respondents was incorporated in the analysis of this study in order to better understand their response to COVID-19 information on social media. There has been relatively little research into how consumers look for and process health information found on the internet. Only vague, if not weak, gaps in people's cognitive, attitudinal, and behavioral changes are discovered as a result of their level of exposure to health information available online. Despite this, seeking health information has become one of the most common online activities (Greenberg et al., 2003).

One of the major schools of thought in media effects is the cultivation theory. This theory argues that social reality of people is shaped by constant, repetitive, pervasive patterns of information that media supply (Gerbner, 1998). According to the findings of studies conducted under this theory, at least three dimensions should be explored to come up with more inclusive and consistent results (Shanahan & Morgan, 1999). It is also worth noting

that almost all of the previous media effects studies have focused on media violence depicted on television. Other upsetting content, such as health dangers provided through other modes of communication, was ignored. The purpose of this study was to fill in the gaps that had been found.

Currently, the few literature on the media effects of social media discusses conflicting correlations between and among exposure level and other determinants. Violent content on social media becomes decontextualized and meaningless, resulting in a decrease in respondents' disgust, grief, indignation, and fear over violence (Yumrukuz, 2017; Choudhury et al., 2014; Li et al., 2017). Erfani et al. (2020), and Tadesse et al. (2020) discovered that higher knowledge did not have a negative effect to the positive attitude and behavior of their respective respondents. This contradicts the findings of Shekarappa et al. (2020) and Lau et al. (2020) who found that having a high level of knowledge did not translate into good attitude and behavior. These results from previous studies are taken with a grain of salt, and they are given equal weight in the succeeding results and discussion of the current research.

Aside from adding to the existing body of knowledge regarding the effects of media, this study is particularly significant since the findings would greatly assist health agencies and local government units in revising their health communication strategies and materials to prevent the spread of COVID-19.

Filipinos are the most critical of their government's COVID-19 response among Southeast Asians (Ranada, 2021; Seah et al., 2021). The great majority (72.3 percent) of Filipinos polled urged that more scientists and medical practitioners be encouraged to contribute to public policy discussions and heed their advice in order to properly solve COVID-19 (Radana, 2021; Seah et al., 2021).

The displeasure of Filipinos might stem from the fact that the Philippines, with 1,006,428 confirmed cases and 16,783 deaths (World Health Organization, 2021), ranks second to Indonesia (1,647,138) as the top country in Southeast Asia with the highest number of COVID-19 infections (Center for Strategic & International Studies, 2021).

In the local context, Ilocos Norte reached 566 new cases on August 13, 2021 which is the most recorded in a day since the pandemic broke (Mugas, 2021). This drives home the significance of evaluating and looking into the role of messages on social media for health literacy education and promotion, which will lead to minimizing and eventually stopping the spread of the virus. Further, through determining the cognitive, emotional, and behavioral responses of people to exposure to health information, more accurate health communication strategies can be developed for future pandemics to safeguard the health of the nation.

Taking all of this into account, this study investigated the effects of COVID-19 information on social media on Mariano Marcos State University (MMSU) students' adherence to health protocols as mediated by their knowledge and anxiety.

Cultivation theory, established by George Gerbner in 1969, posits that people's social reality is constructed through repeated and heavy exposure to media (Shanahan, 2009). Therefore, media consumption creates one's worldview, leading to the acceptance of particular attitudes and behaviors (Toribio, 2019). Furthermore, cultivation theory considers media exposure to have cognitive, emotional, and behavioral impacts (Shanahan, 2009). Findings from cultivation researches show repetitive 'distorted' reality that will gradually dominate the view of heavy media consumers (Stacks et al., 2015).

Guided by the aforementioned theory, this study looked at the respondents' level of exposure to COVID-19 information on social media as an independent variable. Galalac (2011) described respondents' level of exposure in terms of frequency of news exposure. This study also incorporated frequency to measure MMSU students' level of exposure to COVID-19 information. This served as the basis for determining whether or not 'cultivation' of media effects had occurred.

This study looked into two mediating variables: knowledge of COVID-19 (cognitive) and worry about COVID-19 (affective), with adherence to COVID-19 health protocols (behavioral) of MMSU students as the dependent variable, Shanahan and Morgan (1999) emphasized the importance of including at least three variables to determine possible media effects. Because previous research have failed to consider behavioral changes as a result of media exposure, the usefulness and significance of this study is highlighted. The study used these to investigate how the frequency of exposure to COVID-19 information on social media affects the conduct of MMSU students as mediated by their cognitive and affective states.

It is assumed that exposure to COVID-19 information on social media can influence MMSU students' adherence to protocols that must be observed to avoid contracting the virus. For exposure to have that influence on MMSU students, it must have been extensive enough to cultivate their minds on the subject at hand, COVID-19. Therefore, exposure in this study was measured by the frequency or the number of times the respondents were subjected to COVID-19 information on social media. However, such frequency of exposure can only result in adherence to protocols if the material exposed to has increased their knowledge and anxiety. As mediating variables, it can be assumed that increased knowledge and anxiety will lead to adherence to methods for preventing disease transmission.

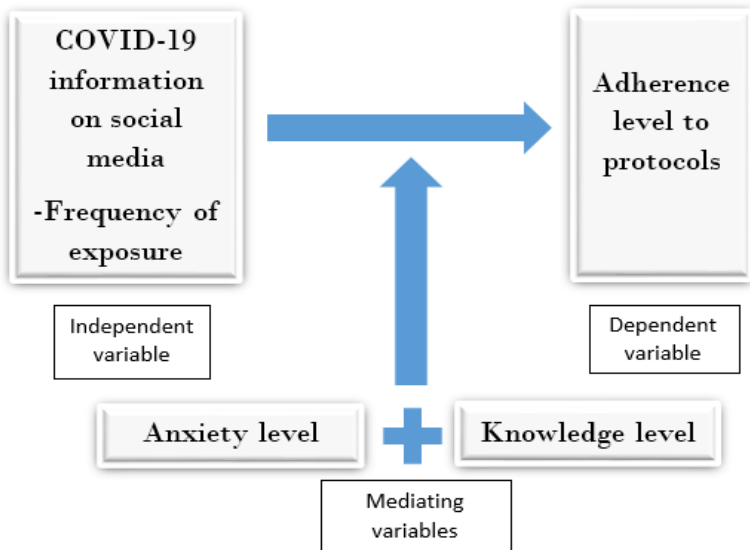
Knowledge in this study refers to the understanding of respondents to COVID-19 facts about familiarity of the symptoms, causes, incubation period, treatment, vulnerable group, and preventive practices of the disease. It can be further assumed that because the respondents are always connected to social media, they could have been exposed to COVID-19 information extensively as well which would have increased their knowledge level about COVID-19. Since they have been exposed extensively to COVID-19 information, it can be deduced that their anxiety levels may have also increased because they might contract the disease. Establishment of extensive exposure is then necessary for cultivation effects to manifest.

Anxiety in this study refers to feeling of nervousness, worrying, relaxation, restlessness, irritability/annoyance, fear, and uneasiness of respondents which was measured by the Beck Anxiety Inventory I scale. Without the vaccines yet, the likelihood of contracting the disease would also be high. Hence, knowledge and anxiety levels would determine adherence to protocols.

In this study, adherence to protocol refers to the extent to which respondents implemented preventive actions to limit the spread of COVID-19. This was measured by an affirmative response to relevant item-indicators, indicating their adherence to preventive practices. Thus, if knowledge and anxiety levels are high, exposure to COVID-19 information on social media may lead to protocol adherence (Figure 1).

Figure 1.

Exposure to COVID-19 information and concomitant effects



Methods

This study employed quantitative method approach with survey research design. Quantitative research draws its strength from structured procedures and formal instruments for collecting data (Queirós et al., 2017).

This study was conducted at the Mariano Marcos State University, Ilocos Norte, Northern Luzon, Philippines. Being one of the biggest universities in the province, MMSU has a diverse set of students in terms of literacy, religious affiliations, economic statuses, and ethnic affiliations. This high level of diversity may provide a broad and comprehensive view of how Ilokano people respond to health information exposure on social media.

The respondents were 192 bona fide students of the Mariano Marcos State University for the Second Semester, Academic Year 2020-2021, and were 18 years old and above to correspond to the standards of the MMSU University Research Ethics and Review Board (URERB).

The respondents were chosen because they account for the major portion of social media users. They were also selected since the academe is one of the sectors most affected by the COVID-19 pandemic, and the potential anxiety of the respondents caused by the current pandemic was investigated.

A survey questionnaire with item-indicators was used to collect data from respondents to determine their level of exposure to COVID-19 information, knowledge, anxiety, and adherence to COVID-19 health procedures, with the timeline divided into three quarters as follows:

- Quarter 1: March 16 to June 16, 2020
- Quarter 2: June 17 to September 16, 2020
- Quarter 3: September 17 to December 16, 2020

Hence, the study instrument was divided into four (4) sections: COVID-19 information sources, Quarter 1, Quarter 2, and Quarter 3. Item-indicators were included for each quarter to determine the respondents' level of exposure to COVID-19 information, awareness about COVID-19, anxiety about COVID-19, and adherence to COVID-19 health procedures.

A pre-test of the questionnaire was undertaken before distribution to ensure its reliability. It was subjected to Cronbach's alpha, and the computed reliability coefficient of 0.911 indicated that it was highly reliable.

Sources of COVID-19 Information. Social media sites and platforms where the respondents access and retrieve information about COVID-19 were also identified: Facebooks pages of news agencies, Facebook pages of government agencies, Twitter pages of news agencies, and other sources.

Exposure to COVID-19 Information. The respondents were asked about their level of exposure to COVID-19 news and updates in terms of frequency

of access : *everyday, several times a week, several times a month, rarely, and only by chance*. This study adopted questions by Toribio (2019) in his study on the desensitization of Ilokano youth to violence in televised news. The questions were modified to suit the needs of this study. The item-indicators asked to the respondents remained unchanged throughout Quarters 1, 2, and 3. In the study, exposure is regarded as the independent variable.

Knowledge about COVID-19. Eight (8) questions about COVID-19 news development, quarantine guidelines and protocols, symptoms, cause, incubation period, treatment, vulnerable group, infection, recovery and death counts, and disease prevention activities were established for a specific quarter. Knowledge item-indicators varied, necessitating the development of questions that differed from quarter to quarter. One of the two mediating variables is knowledge.

Anxiety about COVID-19. The study used the original Beck Anxiety Inventory I (Reliability – Internal Consistency = 0.92) to determine the respondents' anxiety about COVID-19 on social media. Anxiety is characterized by the following indicators: nervousness, worrying, relaxation, restlessness, irritability/annoyance, fear, uneasiness, etc. A four-point Likert scale with the following ranks was used to establish respondents' emotional state as a result of being exposed to COVID-19 information on social media: 1 (Not at All), 2 (Mildly but it did not bother me much), 3 (Moderately – it wasn't pleasant at times), and 4 (Severely – it bothered me a lot). The set of indicators remained the same for the Quarters 1, 2, and 3. Anxiety and knowledge serve as the mediating variable.

Adherence to COVID-19 health protocols. The study adopted the questionnaire by Erfani et al. (2020). Modifications were made to account for the quarantine and health protocols of Ilocos Norte from March 16 to December 16, 2020, the timeline of the study. The same set of item-indicators were posed to the respondents for the three quarters. Adherence to health protocols is the dependent variable in the study.

In addition, to facilitate recall of the respondents, a short narrative of the highlights of the quarter were given before they answered the questions related to their exposure, knowledge, anxiety, and adherence to health protocols for each quarter at the beginning of Parts 2, 3, and 4. Furthermore, the inclusion of statements evoking the events during the quarter was done to ensure that the respondents provided information pertinent to that quarter. Essentially, this is to reduce the possibility of inaccuracy caused by self-reports.

The data was analyzed by tabulating the results and relating them to various ideas and existing information from relevant studies and literature.

In statistically treating the data acquired, the mean and correlation using Pearson’s coefficient were used. IBM SPSS was used for correlation analysis.

Results and Discussion

Profile of Student-Respondents

In terms of age, 86.98% (167) respondents were between the ages of 18 and 20 . It can be implied that this was a homogeneous group that provided a decent representation of the sample of the study. Since their ages did not differ significantly , it can be assumed that their exposure to social media is similar because they belong to the Gen Z generation. As Gen Z people are born and raised with technology, they are digital-centric, and technology is their identity (Gaidhani et al., 2019). Almost all of the students (180 or 93.75%) came from Ilocos Norte while the rest came from nearby provinces such as Ilocos Sur, Cagayan, and Apayao (Table 1).

Table 1. Distribution of respondents by profile

Respondents	f $n=192$	%
<u>Age</u>		
18 to 20 years old	167	86.98
21 to 23 years old	22	11.46
24 to 27 years old	3	1.56
<u>Province</u>		
Ilocos Norte	180	93.75
Ilocos Sur	4	2.08
Cagayan	6	3.13
Apayao	2	1.04

Sources of COVID-19 Information

Table 2 show the sources of COVID-19 information used by respondents. Facebook pages of government agencies (88%) and Facebook pages of news agencies (78.6%) are the two main sources of COVID-19 news and updates for the respondents. This means that they prefer Facebook as the social media channel from where they obtain COVID-19 information . With nearly all (98.7 percent) of the 88.4 million Filipino Facebook users accessing the app on mobile devices as of February 2021 (NapoleonCat, 2021; Datareportal,

2021), this indicates the respondents' preference for Facebook is due to its accessibility and ease of use.

Table 2. Sources of COVID-19 information of the respondents

Sources	<i>f</i>	%
Facebook pages of news agencies	151	78.6
Facebook pages of government agencies	169	88.0
Twitter pages of news agencies	54	28.1
Others	56	29.2

Exposure to COVID-19 Information

Data in Table 3 reveal that MMSU students maintained a high level of exposure during Quarter 1 (3.92) and Quarter 2 (3.93). This means that they were exposed to COVID-19 updates and developments, infection, recovery, and mortality numbers, and quarantine recommendations several times a week from March 16 to September 16, 2020. Attainment of this level proves the respondents' extensive and pervasive exposure to COVID-19 information. Despite this, there is a decreased to moderate (3.23) exposure in Quarter 3. Following the framework of the study, a sufficient exposure level should be able to affect the respondents' knowledge and anxiety, and in turn, their adherence to health protocols.

Table 3. Respondents' median scores of their level of exposure to COVID-19 information

Exposure	Quarter 1 (March 16 to June 16, 2020)		Quarter 2 (June 17 to September 16, 2020)		Quarter 3 (September 17 to December 16, 2020)	
	Mean	Descriptive Rating	Mean	Descriptive Rating	Mean	Descriptive Rating
I intently read/watched COVID-19 information on social media.	4.13	High	3.82	High	3.38	Moderate
I intentionally looked for COVID-19 information on social media.	4.15	High	3.75	High	3.35	Moderate

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I really allot time to read/watch COVID-19 on in social media.	3.82	High	3.57	High	3.18	Moderate
I felt like the day was not complete when I did not read/watch COVID-19 information on social media.	3.59	High	3.41	High	3.00	Moderate
Overall Exposure Level	3.92	High	3.68	High	3.23	Moderate

<i>Statistical Range</i>	<i>Descriptive Rating</i>
1.00 – 1.80	<i>Very Low</i>
1.81 – 2.60	<i>Low</i>
2.61 – 3.40	<i>Moderate</i>
3.41 – 4.20	<i>High</i>
4.21 – 5.00	<i>Very High</i>

With statistics showing that the Philippines has one of the highest numbers of social network users in Southeast Asia (Statista, 2020) and a social media penetration rate of 67% in January 2021 (Datareportal, 2021), it could be assumed that information related to COVID-19 posted and shared on social media plays a significant role in the lives of the respondents. The COVID-19 pandemic resulted in an increase of 16 million social media users in the Philippines between 2020 and 2021 (Datareportal, 2021; Global Web Index, 2020). Filipino social media users account for 80.7% of the overall population in January 2021 (Datareportal, 2021), with an average of 10.56 hours per day spent on online media (Statista, 2021).

Knowledge about COVID-19 Information

A significant positive relationship (coefficient: 0.599; strength: moderate) was established in the correlation between exposure and knowledge of respondents about COVID-19. With this, it can be said that the two variables are directly related: as the degree of exposure increases, knowledge increases, and when the level of exposure drops, knowledge decreases. This specifically means that the respondents' high level of exposure to COVID-19 news and updates on social media made them knowledgeable about the transfer

mechanisms, symptoms, provincial quarantine and mobility requirements, and other information related to COVID-19.

The study concludes that respondents with a high amount of exposure to COVID-19 information on social media are knowledgeable, whereas those with a low level of exposure are not. According to the study’s framework, constant exposure meant that the respondents were routinely reading and/or seeing COVID-19 information, and one of the cultivation outcomes was a growth in knowledge.

Table 4. Correlations of the level of exposure of MMSU students to their knowledge on COVID-19 Information

Exposure	Knowledge
I intently read/watched COVID-19 information on social media.	0.635**
I intentionally looked for COVID-19 information on social media.	0.569**
I really allot time to read/watch COVID-19 on in social media.]	0.417**
I felt like the day was not complete when I did not read/watch COVID-19 information on social media.	0.597**
Overall Exposure Level	0.599**

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

With all of the exposure item-indicators registering a significant positive relationship with knowledge, the indicator *I intently read/watched COVID-19 information on social media* obtained the highest correlation strength of 0.635 with moderate relationship strength. This suggests that because the respondents focused and concentrated while reading/watching COVID-19 news and information on social media, they were able to internalize and retain this information. Respondents had less affective filtering while seeking information entirely on their own choice, which could have affected their understanding and retention of material. This proactive role assumed by the respondents complemented by the feeling of incompleteness they experienced when they did not read/watch COVID-19 information on social media (correlation coefficient: 0.597; strength: moderate) and intentionally looking for such (correlation coefficient: 0.569; strength: moderate) in their purposeful allocation of time several times a week (correlation coefficient: 0.417; strength: weak) enabled them to be exposed to COVID-19 news and updates. Accordingly, cultivation effects occurred in the form of increase of knowledge of the respondents about means of transmission, causes,

symptoms, and contextualized information about COVID-19 specifically true for the province of Ilocos Norte.

In terms of cultural context, Ilokanos' ingenuity and need to be up-to-date about their surroundings can be traced back to their adaptive capabilities as a result of living in a terrain that is difficult to till during the hot season and perilous during the wet season (Galeon, 2020). Being a community acclimated to surviving harsh conditions, Ilokanos understand the importance of staying informed about what is going on in their neighborhood in order to respond to difficulties and continue living.

Anxiety about COVID-19

This study saw an overall significant negative relationship (correlation coefficient: -0.156; strength: very weak) between the respondents' level of exposure to COVID-19 information on social media and their anxiety. This means that the two variables are indirectly related: when the level of exposure increases, the anxiety decreases; and when the level of exposure decreases, the anxiety increases. This is contrary to cultivation theory which served as the framework of the study. This means that cultivation has not yet occurred, as evidenced by the increase in anxiety that should have resulted after exposure. It is then assumed that the respondents' level of exposure was insufficient, and that the fall in exposure to moderate in Quarter 3 from high in Quarters 1 and 2 played a significant impact in this outcome.

Table 5. Correlations between the level of exposure of the respondents to indicators of anxiety about COVID-19

Indicators of Anxiety	Exposure Level
Numbness or tingling	-0.227**
Feeling hot	-0.073
Wobbliness in legs	0.049
Unable to relax	-0.308**
Fear of worst happening	-0.100
Dizzy or lightheaded	-0.286**
Heart pounding/racing	-0.184*
Unsteady	-0.279**
Terrified or afraid	-0.179*
Nervous	-0.181*
Feeling of choking	-0.012
Hands trembling	-0.110
Shaky/unsteady	-0.134
Fear of losing control	-0.154*

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Difficulty in breathing	0.055
Fear of dying	-0.171*
Scared	-0.127
Indigestion	-0.088
Faint/lightheaded	-0.063
Face flushed	0.020
Hot/cold sweats	-0.023
Overall Anxiety	-0.156*

** *Correlation is significant at the 0.01 level (2-tailed).*

* *Correlation is significant at the 0.05 level (2-tailed).*

Nine (9) out of the 21 indicators of anxiety have inverse relation with exposure. On one hand, anxiety item-indicators such as numbness or tingling (-0.227), dizziness or lightheadedness (-0.286), and unsteadiness (-0.279) recorded a very weak significant negative relationship with exposure, while inability to relax (-0.308) had a weak relationship strength at 0.01 level. On another hand, *heart pounding/racing* (-0.184), *terrified or afraid* (-0.179), *nervous* (-0.181), *fear of losing control* (-0.154), and *fear of dying* (-0.171) all registered a very weak but negatively significant relationship at 0.05 level.

The findings of this study contradict those of Tadesse et al. (2020), who studied 415 Ethiopian nurses. Tadesse et al. (2020) discovered that, despite having a favorable attitude, i.e. believing that COVID-19 can be successfully controlled, Ethiopia winning the battle against COVID-19, being confident that they nor their family members will contract the disease, etc., the majority (85.3%) of the respondents had a “disturbed” psychological response (Abstract section, para. 1). The disturbed psychological response of the Ethiopian nurses included feeling depressed or hopeless because COVID-19, difficulty in falling asleep, keeping sleep, or sleeping too much, losing interest or pleasure in work or leisure activities, not having an appetite or overeating, and other symptoms. Furthermore, Vannucci et al. (2017) discovered that “more time spent on social media usage was substantially associated with increased symptoms of dispositional anxiety” in a research of 563 emerging adults in the United States (p. 163). Furthermore, in the study of Shensa et al. (2018), American respondents aged 19 to 32 years old who were regarded “wired” (Abstract section, para. 1) and “connected” (Abstract section, para. 1) with their social media use had an increased risk of heightened depression and anxiety symptoms.

Interestingly, Table 4 shows that exposure and knowledge have a positive relationship, whereas exposure has a negative relationship with

anxiety. It could then be inferred that people with high level of knowledge are not always emotionally upset by COVID-19

This is an obvious contradiction to the theory of cultivation that underpins this study. Thus, it is argued that the respondents have yet to reach the required level of exposure (very high) for cultivation to take place, increasing their anxiety of COVID-19.

With respect to the respondents' cultural background, the tight-knit Ilokano community exemplifies strong ties with one another, as demonstrated by their fiesta celebrations, production of native delicacies such as *empanada* (fried turnover with papaya, beans, and meat) and *chichacorn* (deep fried corn snack), and participation in indigenous games (Galeon, 2020). As a result of their concern for their family, friends, and other community members during the COVID-19 epidemic, people may exhibit symptoms of anxiety such as being worried or afraid, feeling out of control, unsteadiness, inability to relax, and others. . This is supported by the study conducted by Mertens et al. (2020) in which threats to loved ones, health-care system overload, and economic effects proved to be the key predictors of fear of the COVID-19 pandemic.

The nature of social media as the medium of communication should also be examined to elaborate on the insights of the study. The interactivity of social media, as well as its emphasis on user-generated content, offer users with numerous opportunities to express their thoughts and viewpoints. The interpretation of public sentiments from comments on the Facebook pages of government units (respondents' primary source of COVID-19 information) would reflect some of the skepticism of Ilokanos about COVID-19. These contradicting ideas may have contributed to Ilokanos' uncertainty and anxiety regarding COVID-19, impacting them emotionally.

Adherence to COVID-19 Health Protocols

As shown in Table 6, this study did not see an overall statistically significant relationship between the respondents' level of exposure to COVID-19 information on social media and their adherence to protocols.

Table 6. Correlations between exposure and adherence to COVID-19 health protocols of the respondents

Adherence	Exposure Level
I avoided going out of my home	-0.222**
I avoided unnecessary vacations	-0.424**
I avoided consuming outdoor food	-0.068
I avoided handshaking, hugging, and kissing	-0.414**

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I avoided public transportations (tricycle, jeep, bus, plane, etc.)	-0.253**
I avoided going to school	-0.428**
I frequently washed my hands	-0.263**
I paid more attention to my personal hygiene than usual	-0.267**
I used disinfectant and solutions	-0.338**
I used herbal products and traditional medicine	0.493**
I took vitamin supplements	-0.122
I used face mask only	-0.188**
I used both face mask and face shield	-0.396**
I removed my face mask when in public	0.757**
I practiced physical distancing when outside my home	-0.362**
Overall Adherence	-0.137

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Despite this, 11 out of 15 indicators registered significant negative relationships with exposure level. The respondents were less likely to avoid going out of their homes (-0.222), take unnecessary vacations (-0.424), shake hands, hug, and kiss other people (-0.414), use public transportation (-0.253), go to school (-0.428), frequently wash their hands (-0.263), pay more attention to hygiene (-0.267), use disinfectant solutions (-0.338), and use both face mask and face shield (-0.396) or the former only (-0.188), and practice physical distancing (-0.362). Interestingly, the indicators *I used herbal products and traditional medicine* (correlation coefficient: 0.493; strength: weak) and *I removed my face mask when in public* (correlation coefficient: 0.757; strength: strong) have a direct relationship with exposure to COVID-19 information. As their exposure increased, the respondents' reliance on traditional and alternative medicine also increased, as did their willingness to remove their face mask in public. Because the vaccination is now unavailable to non-frontline employees, respondents are more likely to rely on herbal medicines and traditional treatment. As a result of taking these alternatives, respondents believe they have already safeguarded themselves against the virus. They are more likely to be lenient in following the health protocols, and remove their face mask, as shown on Table 6. These two indicators support the tendencies of the respondents to be complacent as exemplified by the negative relationship of aforementioned indicators to exposure level.

Further, the results of this study corroborate the findings of Shekarappa et al. (2020). The respondents recorded good knowledge (66.4%) of COVID-19 however their attitude (54.1%) and practices (53.8%) in mitigating the risk and spread of the disease were lower than their knowledge. Shekarappa et al. (2020) attributed these results to the occupation of the respondents noting that professionals had the the highest knowledge and attitude scores, while unskilled workers had the least knowledge and attitude scores. Furthermore, semi-professionals received higher scores for adhering to health regulations, followed by professionals and unskilled workers.

Contextualizing the results of the study to the values and characteristics of Ilokano people, their preference for herbal products and traditional medicine could be attributed to their forced resourcefulness as a result of their land's infertility. Ilokanos are compelled to make the best out of their considerably lesser natural resources compared to the South of the Philippines (Galeon, 2020). This explains Ilokano people's propensity in using herbal products and traditional medicine as protection against the possibility of contracting COVID-19. Also, the high inclination of Ilokanos to save their money which is misinterpreted by non-Ilokanos as being tightwad or *kuripot* (Ingel, 2006), could also be another reason why they would prefer traditional medicine over paying exorbitant medical fees and hospitalization costs. Inverse anxiety and inconclusive non-adherence to health protocols could also be attributed to low risk perception of Ilokanos. Anecdotes from elderly Ilokanos would tell their pride in being able to clean their backyard before daylight. Ilokanos could have a more positive attitude in combating the development of COVID by maintaining cleanliness in their surroundings and good personal hygiene, thus being lax in following good health practices in minimizing the spread of COVID-19.

With social media's feature of interactivity among its users, certain dissenting opinions about COVID-1 could be seen in the comments and replies of Ilokanos to the updates made by local government units. Given the tight-knit Ilokano community, these differing ideologies could have been influenced the respondents which resulted to non-compliance to health protocols

Following the framework for analysis of the study, exposure can only lead to adherence to protocols of respondents if the information they were exposed to resulted to an increase in knowledge and anxiety. The mediating variables (knowledge and anxiety) in the study have differing relationships with exposure. On one hand, exposure and knowledge had a significant positive relationship, and there was an increase of knowledge in the respondents (Table 4). On the other hand, there was a significant negative relationship established between exposure and anxiety. These resulted to

the inconclusive relationship between exposure and adherence. Thus, this study concludes that MMSU students have yet to reach the required level of exposure (very high) for them to follow COVID-19 health protocols. Similarly, this study stresses the importance of cultural considerations in the planning, implementation, and assessment of health communication strategies to adapt and address positive and problematic cultural beliefs and practices of local communities.

Conclusion

This study found a high level of exposure of respondents to COVID-19 information available on social media in Quarters 1 and 2, but a decrease to moderate level in Quarter 3. They admitted to purposefully reading or watching COVID-19 content and feeling uneasy when they were unable to do so. As a result, the respondents took the initiative to educate themselves about COVID-19, and they set aside time in their day to do so. It is thus stated that social media, along with intentionality and frequency of exposure, play a significant influence in the spread of COVID-19 news and updates.

Correlations carried out between exposure and knowledge point to a positive significant relationship. The high focus exerted by the respondents when reading and/or watching COVID-19 news and updates appeared to be the main reason why they are familiar with COVID-19 symptoms, how it is transmitted, preventive measures, provincial quarantine guidelines, and other important information that will help them avoid contracting COVID-19. This study then concludes that deliberate, planned, and focused consumption of information related to COVID-19 helps in the familiarization and retention of information of the respondents.

This study saw a significant negative relationship between exposure and anxiety of the respondents. Some physiological and mental signs of anxiety tended to lessen as exposure increased, and vice versa. Future studies should investigate factors such as respondents' social and geographical proximity to COVID-19 cases, as well as economic, educational, and familial disruptions, as sources of concern.

With exposure and adherence, the study did not establish a statistically significant relationship between the variables. Therefore, further inquiries should be made to explore other possible reasons why and how knowledge may or may not translate to observable practices in mitigating the spread of COVID-19 and other health risks. Too much information may have caused confusion that left users to ponder on what needs to be done. Perhaps, more scientists and medical doctors should be encouraged to contribute to public policy discussions to better address COVID-19. It is highly recommended that the cultural background of the target audience for health

risk communication efforts be considered in formulating, implementing, and assessing compliance to protocols.

In general, the results of correlation made between exposure (independent variable) and adherence (dependent variable), with knowledge and anxiety as mediating variables, do not indicate cultivation. According to the findings of this study, the respondents' amount of exposure fell short of what was required for cultivation to take place. Given the cultural context of health communication in this study, Ilokano values and characteristics such as frugality, ingenuity, and having a close-knit community, combined with their local health remedies and adaptation mechanism, may have influenced how they respond to health risks such as the current COVID-19 pandemic, as revealed by their knowledge, inverse anxiety, and inconclusive (non-) adherence to health protocols. Ilokano social media users may have been confused as a result of the abundance of information available; therefore, scientists and medical doctors should be encouraged to contribute to policy discussions in order to improve public knowledge of present and future health concerns. Furthermore, the cultural background of the target audience of health communication activities should be considered in their development, execution, and evaluation.

This study, like other studies, has limitations. The level of exposure to COVID-19 information on social media is solely dependent on the claims and self-report of the respondents. Furthermore, this study did not take into account how the messages were created. Finally, because the focus was solely on social media, extraneous variables like as exposure to other media were not taken into account. Despite this, the current findings provide a solid foundation for future media effects research.

REFERENCES

- Agness-Whittaker, C. F. & Macedo, L. (2016). Aging, culture, and health communication: Exploring personal cultural health beliefs and strategies to facilitate cross-cultural communication with older adults. *MedEdPORTAL*. https://doi.org/10.15766/mep_2374-8265.10374
- Beck Anxiety Inventory (n.d.). <https://www.gphealth.org/media/1087/anxiety.pdf>
- Centers for Disease Control and Prevention. (n.d.). Health literacy. <https://www.cdc.gov/healthliteracy/culture.html>

- Center for Strategic & International Studies. (2021). Southeast Asia COVID-19 Tracker. <https://www.csis.org/programs/southeast-asia-program/southeast-asia-covid-19-tracker-0>
- Choudhury, M., Monroy-Hernández, A., & Mark, G. (2014). “Narco” emotions: affect and desensitization in social media during the Mexican Drug War. <http://dx.doi.org/10.1145/2556288.2557197>
- Datareportal. (2021). Digital 2021: The Philippines. <https://datareportal.com/reports/digital-2021-philippines>
- Erfani, A., Shahriarirad, R., Ranjbar, K., Mirahmadizadeh, A., & Moghadami, M. (2020). Knowledge, attitude, and practices toward the Novel Coronavirus (COVID-19) outbreak: A population-based survey in Iran. https://www.who.int/bulletin/online_first/20-256651.pdf
- Gagalac, R. (2011). The Filipino youth and news: A study of news sources, choices and consumption (Master’s Thesis). Ateneo de Manila University, Quezon City.
- Gaidhani, S., Arora, D., & Sharma, B.K. (2019). Understanding the attitude of Generation Z towards workplace. https://www.researchgate.net/publication/331346456_UNDERSTANDING_THE_ATTITUDE_OF_GENERATION_Z_TOWARDS_WORKPLACE
- Galeon, K. A. (2020). A documentary film for Ilokano cultural preservation. *African Journal for Hospitality, Tourism and Leisure, GCBSS Special Edition* (2009). https://www.ajhtl.com/uploads/7/1/6/3/7163688/article_16_se_gbcss_2019.pdf
- Gerbner, G. (1998). Cultivation analysis: An overview. *Mass Communication & Society*, 1(3/4), 175–194.
- Global Web Index. (2020). How the outbreak has changed the way we use social media. <https://blog.globalwebindex.com/chart-of-the-week/social-media-amid-the-outbreak/>
- Greenberg, L., D’Andrea, G., & Lorence, D. (2003) Setting the public agenda for online health search: A white paper and action agenda. *Journal of Medical Internet Research* 6(2). <https://doi.org/10.2196/jmir.6.2.e18>
- Ingel, M. L. (2006). The Iloko. MMSU Library, MMSU, City of Batac, Ilocos Norte, Philippines.
- Institute of Medicine. (2002). *Speaking of Health: Assessing Health Communication Strategies for Diverse Populations*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/10018>
- Kreuter, M. W. & McClure, S. M. (2004). The role of culture in health communication. *Annual Review of Public Health* 25: 439-455. <https://doi.org/10.1146/annurev.publhealth.25.101802.123000>

- Lau, L., Hung, N., Ferma, Choi, J., Dodd, W., & Wie, X. (2020). Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: A cross-sectional study. *Journal of Global Health* 10(1). <https://doi.org/10.7189/jogh.10.011007>
- Li, J., Conathan, D., & Hughes, C. (2017). Rethinking emotional desensitization to violence: Methodological and theoretical insights from social media. <http://dx.doi.org/10.1145/3097286.3097333>
- Mertens, G., Gerritsen, L., Duijndam, S., Saleminck, E., & Engelhard, I. M. (2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders* 74(2020). <https://doi.org/10.1016/j.janxdis.2020.102258>
- Mugas, J. M. (2021). Ilocos Norte logs over 500 new COVID-19 cases in one day. <https://newsinfo.inquirer.net/1473531/ilocos-norte-logs-over-500-new-covid-19-cases-in-one-day>
- NapoleonCat. (2021). Facebook users in Philippines. <https://napoleoncat.com/stats/facebook-users-in-philippines/2021/02>
- Norman, C. D., & Skinner, H. A. (2006). eHealth literacy: Essential skills for consumer health in a networked world. *Journal of Medical Internet Research* 8(2). <https://doi.org/10.2196/jmir.8.2.e9>
- Pasick, R., D'Onofrio, C., & Otero-Sabogal, R. (1996). Similarities and differences across cultures: Questions to inform a third generation for health promotion research. *Health Education & Behavior*. <https://doi.org/10.1177/10901981960230S101>
- Queirós, A., Faria, D. & Almeida, F. (2017). Strengths and limitations of qualitative and quantitative research methods. *European Journal of Education Studies* 3(9). <https://doi.org/10.5281/zenodo.887089>
- Ranada, P. (2021). PH Scores lowest among ASEAN countries in gov't pandemic response – survey. <https://www.rappler.com/nation/disapproval-government-response-covid-19-pandemic-strongest-philippines-asean>
- Ratzan, S. C., & Parker, R. M. (2000). Introduction. In: Selden, C. R., Zorn, M., Ratzan, S. C., & Parker, R. M. (eds). In *National Library of Medicine current bibliographies in medicine: Health literacy*. Bethesda, MD: National Institutes of Health. <https://www.ruhr-uni-bochum.de/healthliteracy/NIHhliteracy.pdf>
- Renny, O. R. (2012). The role of health in economic growth and development. https://www.academia.edu/1588300/THE_ROLE_OF_HEALTH_IN_ECONOMIC_GROWTH_AND_DEVELOPMENT

- Seah, S., Ha, H. T., Martinus, M., & Phuong Thao, P. T. (2021). The state of Southeast Asia: 2021. Singapore: ISEAS-Yusof Ishak Institute. <https://www.iseas.edu.sg/wp-content/uploads/2021/01/The-State-of-SEA-2021-v2.pdf>
- Shanahan, J. (2009). Cultivation theory. In Littlejohn, S. W., & Foss, K. A. (Eds.), *Encyclopedia of Communication Theory* (pp. 253-256). Sage Publication, Inc.
- Shanahan, J., & Morgan, M. (1999). Two decades of cultivation research: An appraisal and meta-analysis. *Communication Yearbook*, 20, 1-45.
- Shekarappa, H., Guttal, K., Iyer, V., Gupta, V., & Shetty, P. (2020). Knowledge, attitude, and preventive practices related to novel Coronavirus Infection (COVID-19) among patients attending dental hospital in Dharwad. *Asian Journal of Medical Sciences* 11(5).
- Shensa, A., Sidani, J. E., Dew, M. A., Escoba-Viera, C. G., & Primack, B. A. (2018). *American Journal of Health Behavior* 42(2), 116-128. <https://doi.org/10.5993/AJHB.42.2.11>
- Stacks, D., Cathy Li, Z., & Spaulding, C. (2015). Media Effects. In *International Encyclopedia of the Social & Behavioral Sciences: Second Edition* (pp. 29-34). Elsevier Inc.. <https://doi.org/10.1016/B978-0-08-097086-8.95045-1>
- Statista. (2020). Daily time spent using online media in the Philippines Q3 2020, by activity. Retrieved from <https://www.statista.com/statistics/803812/daily-time-spent-using-online-media-by-activity-philippines/>
- Tadesse, D., Gebrewahd, G., & Demoz, G. (2020). Knowledge, attitude, practice and psychological response toward COVID-19 outbreak in Northern Ethiopia. <https://doi.org/10.21203/rs.3.rs-26236/v1>
- Toribio, J. V. (2019). Cultivating desensitization: Exploring the effects of exposure to violence in televised news among the Ilokano youth (Master's thesis). Ateneo de Manila University, Quezon City.
- Vannucci, A., Flannery, K. M., & Ohannessian, C. M. (2017). Social media use and anxiety in emerging adults. *Journal of Affective Disorders* 207, 163-166. <https://doi.org/10.1016/j.jad.2016.08.040>
- Walsh-Childers, K., & Brown, J. (2008). Effects of media on personal and public health. Routledge, 3rd edition. <https://www.taylorfrancis.com/chapters/edit/10.4324/9780203877111-27/effects-media-personal-public-health-kim-walsh-childers-jane-brown>
- World Health Organization. (2021). Philippines. Retrieved from <https://covid19.who.int/region/wpro/country/ph>
- Yumrukuz, O. (2017). An inquiry on desensitization to violence and its relation with social media. <https://doi.org/10.17829/midr.20172833779>

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