Preferences of Medical Technology Students on COVID-19 Personal Preventive Behaviors and University Safety Protocols: A Conjoint Analysis

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ABSTRACT

The increase in coronavirus disease (COVID-19) cases in the Philippines has created an alarming issue in high-density public places, such as schools and universities. Personal preventive behaviors that the students exercise play a big part in whether such behaviors prevent or only predispose them even more to contracting the virus. Several factors may influence the personal preventive behaviors of an individual. These include attitude, awareness, personal beliefs, and culture concerning the disease. Through outlining these several factors, the researchers aim to identify the main attributes that determine students' preferred COVID-19 personal preventive behavior and implemented precautionary measures.

The researchers used a two-part survey: socioeconomic and demographic followed by an orthogonal plan. The safety protocols implemented by the university were found to be the most important factor, followed by knowledge about the disease, communication channels, attitude, and social construct of the family. Thus, this follows that based on the attribute's importance value, the students prefer safety protocols that are most implemented by the university while social construct of the family is the least preferred. These findings suggest that the safety protocols implemented by the university are the most important factor, hence, policy implementation and strengthening should be observed by the university.

Keywords COVID-19, preventive behavior, knowledge, perception, attitude

INTRODUCTION

The world has never faced a crisis comparable to COVID-19, which tested the world's willingness and capacity to collaborate on a common problem. With an estimated 601 million cases worldwide,[1] the pandemic affected the nations' economies, trade, public health, educational system, and other aspects into disarray.[2] In August 2020, a Catholic university in the Philippines employed its online learning through a "Cloud Campus" combining both synchronous and asynchronous classes to guarantee flexible

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and accessible education. After 2 years of having enriched virtual mode or online learning, the country is expected to return to normalcy as the government ramped up its vaccination drive through the expansion of vaccine rollout to different priority groups.

The following guidelines should be implemented to reduce the risk of COVID-19 transmission to assist schools in reopening and remaining safe and secure. These guidelines include maintaining a distance of at least one meter, practicing good hand hygiene, wearing facemask, covering coughs and sneezes when not wearing a mask, opening windows and doors for proper ventilation, vaccination, and staying at home when feeling unwell (WHO, n.d). In the Philippines, a Catholic university adopted limited face-to-face classes that gave priority to hands-on practice for skill-based courses with program-intended learning outcomes (PILO) that cannot be fully attained through the Enriched Virtual Mode (EVM).

Several factors may affect the personal preventive behaviors of a person;[3] these are their knowledge, attitude, culture, and personal beliefs about the disease. According to research,[4] the main sources of information about the COVID-19 virus are television, radio, and social media.[5] Most of their respondents know how the virus can be transmitted. For that matter, this study aims to determine the main attributes that contribute to their preferred COVID-19 personal preventive behavior and their knowledge of implemented safety protocols. Additionally, the study identified possible combinations of precautionary measures to identify possible safety protocols to be applied based on their preferences. This study would further determine five attributes that would serve as the basis in selecting what possible combinations of attributes the respondents deem to be the most significant. These five attributes are knowledge, attitude, communication channels, social construct of family, and safety protocols implemented by the university.

FIVE ATTRIBUTES OF PERSONAL PREVENTIVE BEHAVIORS

1. Knowledge

Disease knowledge is a primary facet of health literacy. It is the foundation of health management and the key to change one's health behaviors. [6] General knowledge of the disease and its symptoms are associated with preventive behavior. [7] Therefore, we hypothesize:

H1: Access to information is vital for students in determining preventive behaviors.

2. Attitude

Attitude toward a particular behavior demonstrates the perception of a person regarding whether the mentioned behavior is valued positively or negatively.[8] Research shows that promoting a positive attitude toward precautionary behaviors leads to greater adherence among college students. [9] Hence, we hypothesize:

H1: Adherence to health protocols is essential in a student's preference for preventive behaviors.

3. Communication Channels

The identification of communication channels is important through which the channel offers more authoritative information, credibility, reliability, and accessibility. Social media reaches a much wider audience because of the availability and convenience of mobile phones. According to an article,[10] although social media is a channel for people to stay informed, updated, and connected, it can serve as a source of misinformation, jeopardize viral transmission control and mitigation, and lessen the impact of global response. Therefore, we hypothesize:

H1: Social media is the preferred communication channel for acquiring health knowledge and literacy and thus, has the most significant impact on the delivery and transmission of information on COVID-19.

4. Social Construct of Family

Family beliefs may affect an individual's preferences when complying with COVID-19 preventive measures. A supportive family promotes a healthy lifestyle, preventive behaviors, and compliance with treatment (if needed).[11] Social construct, as determined by kinship, face-to-face interactions, social closeness, and commitments within a certain system, also affects the behaviors of its constituents. Furthermore, social construction of the virus allows people to cope with the unpredictability and

uncertainty of the pandemic - organizing and directing behavior and interpersonal communication. [12] Therefore, we hypothesize:

H1: Family preference and beliefs are preferred sources of preventive behaviors and precautionary measures of students.

5. Safety Protocols Implemented by the University

The safety protocols implemented by the university are very essential in minimizing spread of the virus, especially for students who are attending their face-to-face classes. Masks should be used as part of a comprehensive strategy of precautionary measures to prevent the spread of COVID-19 since the disease can be transmitted through droplets of various sizes. [13] Proper hand sanitation such as sanitizing one's hands with alcohol and practicing proper hand washing with soap and water are some effective and easy ways to stop the spread of the virus.[14] Therefore, we hypothesize:

H1: Wearing a face mask and proper hand sanitation are preferred precautionary measures for the prevention of COVID-19.

The general population, especially students and various institutions could benefit from the study. These institutions include: 1) the Commission on Higher Education (CHED) and Universities' Administration as the findings could aid in providing data with reference to individual preferences of students and their adherence to health protocols as well as 2) the Department of Health, since the study along with other research on similar topics could help identify the portion of the current state-wide COVID-19 preventive actions that need to be improved. Furthermore, the findings of the study could serve as a groundwork for improving health standards and be utilized to refine the implemented guidelines set by various institutions.

As this study aims to provide information on the relationship between preferences on different attributes and personal preventive behavior, the students can utilize new knowledge they could gain to inform other people regarding the topic, resulting in a possible reduced transmission of infection at a community level. Ultimately, the general population could also greatly benefit from the knowledge imparted by this study as the collective participation of each individual in the prevention of COVID-19 transmission can contribute to decreasing the morbidity and mortality rate of the disease.

METHODS

The research design of this study was a quantitative-based cross-sectional design wherein data were used to generate statistical inferences about the target population at a single point in time. Conjoint analysis is a form of statistical analysis that focuses on market research to examine how different elements and attributes of a company's product are valued. [15] In the health-related context, preferences in personal preventive behaviors were broken down into attributes and were scored by respondents based on what they thought was the "best". The conjoint analysis was used in this study to examine students' preferences for COVID-19 preventive behaviors by ranking precautionary measures and factors that may influence these. Moreover, the results are expected to help researchers in evaluating how the attributes significantly affect these behaviors and provide recommendations to involved beneficiaries such as the general public.

The participants are those who met the inclusion criteria and voluntarily took part in this study. In this study, the population group was selected from a Catholic university in the Philippines in which the Medical Technology program was the focus of the study, particularly at the third-year level.

The total population was 336 students. The sample size was computed by utilizing the Raosoft calculator. Based on a 95% confidence level, 5% margin of error, and 0.80 effect size, the sample size was a total of 180 students from eight blocks. The inclusion criteria for this study required that the participant must be (1) at least 18 years old, (2) enrolled in the chosen university for the academic year 2022-2023, (3) a regular third-year Medical Technology student, and (4) attended the limited face-to-face classes.

Data Instrumentation

Data gathering was done in a two-part survey. The first part focused on getting the demographic profiles of the respondents. The second part, an orthogonal plan was deployed to measure the

respondents' framework preferences or combination of factor levels in personal preventive behavior with the determined five attributes: personal preventive behavior preferences include knowledge, attitudes, communication channels, the social construct of family, and safety protocols implemented by the university. Each of the attributes was derived from different literature on health communication and public health which are hypothesized to determine the preferences of students on COVID-19 personal preventive behaviors and precautionary measures.

Of the 720 bundles produced by the orthogonal plan (4x3x4x3x5=720), only 22 cards were obtained including four additional choice bundles for reliability purposes.

In this study, the researchers utilized the Generate Orthogonal Design procedure (ORTHOPLAN) using Statistical Package for the Social Sciences (SPSS) to generate an orthogonal array. This component determined a reduced set of profiles and combinations that are small enough to include in the survey while maintaining efficiency in assessing the relative importance of each attribute.

The participants who consented to be a part of the study answered a two-part questionnaire consisting of questions about their demographic profile and their preferences on personal preventive behaviors. In order to improve the reliability and validity of the process, the researchers used the appropriate sample method which is purposive sampling, in which the chosen respondents were third year Medical Technology students since they were the first batch to conduct limited face-to-face classes.

Data Analysis

The study is a conjoint analysis that establishes an orthogonal design with the use of SPSS version 26. Combinations of different attributes identified in the study and rankings were produced. The variables were attributes and the sub-variables were rankings ascribed to the attributes. SPSS was utilized to identify the leading attributes and preferences on COVID-19 personal preventive behaviors and precautionary measures set by the university, which are both individually selected by the respondents. Descriptive analysis through frequency distribution determined the demographic profile of respondents in terms of age, educational attainment, and academic institution they belonged to. Mean values and standard deviation determined the relative importance of different preferences on personal protective behaviors. Cross-tabulations generated a comparison of mean values per attribute, namely knowledge, attitudes, communication channels, social construct of family, and safety protocols implemented by the university.

Ethical Considerations

The document was submitted to the Ethics Review Committee for approval before the study was conducted. Data encryption of their personal information was used to ensure participants' anonymity. Prior to the survey itself, participants signed consent papers stating that they received all necessary information about the study, could comprehend it, and had the option of participating or not.

RESULTS

The demographic characteristics of respondents using frequency distribution and measures of central tendency shows that most respondents were females, with a mean age of 20-21 years old, and Roman Catholic. The monthly family income is mostly from Php 100,000 to Php 250,000.

DISCUSSION

Table 1 displays the importance of attributes and part-worth of the levels of preferences of Medical Technology students on COVID-19 personal preventive behaviors and university precautionary measures using conjoint analysis. Among the attributes preferred by the respondents, the safety protocols implemented by the university were found to be the most important factor having 28.766%. The knowledge about the disease follows this at 21.377%, and communication channels played a vital role in the delivery and transmission of information on COVID-19 at 20.717%. Moreover, the social construct of the family at 13.707% is the least priority that may affect an individual's preferences when complying with COVID-19 preventive measures.

Regarding part worth knowing about the disease, the perceived capability to comply with preventive measures against COVID-19 transmission

Table 1: Summary of the Importance of Attributes and Part-worth of the Preferences of Medical Technology Students on COVID-19 Personal Preventive Behaviors and University Precautionary Measures (n=76)

Goodness of fit: Pearson's R = 0.830, p<0.000, Kendall's tau = 0.628, p<0.00

Attribute	Level	Utility Estimate	Std. Error	Importance Value	Rank
Knowledge	A. Access to information	-0.758	0.346	21.377	2nd
	B. Assessed susceptibility to acquiring COVID-19 vaccinated or unvaccinated	-0.026	0.389		
	C. Assessed severity of COVID-19 transmission within classroom settings vaccinated or unvaccinated	0.300	0.437		
	D. **Perceived capability to comply with preventive measures against COVID-19 transmission**	**0.484**	0.389		
Attitude	A. Keeping up-to-date with information regarding prevention	-0.274	0.298	15.434	4th
	B. **Adherence to health protocols imposed by DOH and CHED**	**0.143**	0.314		
	C. Fear of contracting COVID-19 and/or exposing others to COVID-19	0.130	0.343		
Communication Channels	A. Traditional media	0.301	0.346	20.717	3rd
	B. Social media	0.064	0.389		
	C. Web-based information	-0.940	0.437		
	D. **Interpersonal communication**	**0.575**	0.389		
Social Construct of Family	A. **Family preferences and beliefs**	**0.165**	0.330	13.707	5th
	B. Religious norm	-0.151	0.292		
	C. Social construct	-0.014	0.343		
Safety Protocols Implemented	A. Wearing face mask and hand sanitation	0.227	0.455	28.766	1st
	B. Physical distancing and cyclical cohort	-0.399	0.412		
	C. **Contact tracing and reporting**	**0.921**	0.465		
	D. Ventilation	-0.386	0.465		
	E. Disinfection of facilities	-0.363	0.412		

was prioritized over vaccination, COVID-19 transmission, and information. As for the attitude toward precautionary behaviors, the respondents preferred adherence to health protocols imposed by DOH and CHED. Interpersonal communication was the most preferred in creating awareness. Moreover, following the safety protocols implemented, contact tracing, and reporting are essential in minimizing the spread of the virus. Furthermore, family preferences and beliefs are the sources of social support.

In this study, the "safety protocols implemented by the university" was ranked highest by students in terms of importance among the different attributes of preventive behaviors. Formulating effective policies for the prevention, treatment, and control of harmful diseases are necessary since it is a human right to have the highest attainable standard of health.[16] Implemented safety protocols are essential to prevent the potential spread of infection, especially when face-to-face classes are already being implemented. An institution that values prevention would promote a positive attitude toward preventive behaviors. [17] Among the implemented safety protocols, the respondents preferred contact tracing and reporting instead of wearing face masks and hand sanitation, physical distancing and cyclical cohort, ventilation, and disinfection of facilities. Wearing face masks was significant while the least effective measures included disinfection, case detection, and contact tracing.[18] However, in this study, the respondents preferred contact tracing more than wearing face masks because contact tracing slows the spread of infection by quickly identifying cases, isolating the people involved, and providing clinical care to

those affected.[19] Despite the challenges of contact tracing, such as delayed processing and reporting dates, it was an effective intervention that slowed progression of a pandemic.[20]

The second priority is knowledge about the disease and its preventive measures. Knowing appropriate information about the disease and infection could be related to an individual's response about it and make individuals recognize COVID-19 as a threatening disease so that people would comply with preventive measures which may be associated with the study's findings[21] in which individuals who have knowledge about etiology, transmission, and preventive measures would participate in preventing the spread of infection. Results revealed that knowledge and awareness were significant factors that affect the level of compliance.[22] In contrast to our hypothesis about the "knowledge" attribute, the result of part-worth values shows that the perceived capability to comply with preventive measures against COVID-19 transmission was valued by individuals in determining the preference for preventive measures. It was prioritized over access to information, susceptibility to infection, and severity of transmission. This may be because individuals who have better knowledge related to COVID-19 tend to comply with mitigation protocols. [23]

The third priority of the respondents was communication channels such as traditional media, social media, web-based information, and interpersonal communication. Another role played by education in terms of pursuing health literacy was effective health education and communication activities. Similarly, focusing on the social media framework, new posts on social media enhanced perceived knowledge more when compared to a gain in factual knowledge.[24] In terms of public health, massive communication campaigns play an important role in informing citizens about risk and prevention strategies. However, in this study, interpersonal communication was found to be the most preferred in creating awareness, as any information regarding COVID-19 could be directly delivered to the receiver face-to-face.[25] While interpersonal communication was efficient in providing people with social support and social media in providing quick updates, people may consider television media to be the best media for obtaining information-associated news, since television news provide comprehensive news topics which are intensively explored and discussed by experts to the public.[26].

The fourth priority of the respondents was attitude. Attitude toward health protocols to contain transmission is highly associated with the level of knowledge about COVID-19 [27]. With higher levels of information garnered through various communication channels and education, attitudes toward COVID-19 preventive practices were improved.[28] The respondents preferred adherence to health protocols imposed by DOH and CHED. Compared to proper education, lack of awareness and low-risk perception of the disease resulted in poor or non-compliance with the protocols. Similarly, poor attitude and lack of knowledge also led to non-compliance.[29] However, this was not the case with health science students as they are profoundly taught about disease transmission and proper health protocols resulting in their strict observance with health protocols. Teenagers and young adults are known to engage in riskier conduct than adults in general, but Generation Z (Gen Z) overwhelmingly supports public health measures to help stop the spread of the disease.[30] This was demonstrated in the results as adherence to health protocols imposed by DOH and CHED was prioritized by students in the attitude attribute. In terms of personal values, evidence indicates that during the pandemic, members of Generation Z showed higher levels of adaptability, self-improvement, and self-transcendence than those of Generation X.

Lastly, data shows the social construct of the family as the fifth priority. The least emphasized factor is in congruence with the sample size as health science students prioritize their knowledge more in applying health protocols regardless of what their family believes in. Previous literature highlights that the social aspect of family influences positive attitudes toward social distancing. A recent study found that people would be more likely to engage in positive attitudes toward social distance if they knew that it would benefit their relatives and peers.[31] However, results showed that the social construct of a family is the least important factor. While parents are the primary teachers of a kid's values, beliefs, conventions, and behavior, parent-child relationships shift when a child enters late adolescence which might be the reason why familial influence comes the least.[32] As adolescents become older, they

start to rely less and less on the adults in their lives, including their parents, and prioritize their friends and acquaintances[33] as they assert greater autonomy, independence, and individuality.

CONCLUSION

This study aimed to show the preferred preventive measures for COVID-19 of third-year Medical Technology students through the use of conjoint analysis with an outlook of coming up with the best possible combinations of safety measures to be implemented. Among the attributes, safety protocols implemented by the university were their most preferred safety measures to minimize the spread of COVID-19. Contact tracing and reporting were identified as the most preferred protocols among others as the provision of healthcare in response to infection can be achieved through the identification and isolation of cases. The second preference was their knowledge about the disease and its preventive measures as this can be associated with their perceived capability to follow preventive measures. Furthermore, the social construct of the family has been identified as their fifth preference. With this, preventive measures concerning COVID-19 can be improved based on the preferences of students to mitigate the transmission of infection.

After assessing the whole study, the project heads recommend that the sample size be increased for further studies to decrease the margin of error. A sample size that includes people with more diverse religions must also be considered to correlate it with the attributes measured in the study. Moreover, the chosen institution follows certain policies that might have affected the preferences of respondents; therefore, this might be applicable only to institutions that have similar policies.

REFERENCES

1. World Health Organization. WHO COVID-19 dashboard [Internet]. World Health Organization. 2023. Available from: https://covid19.who.int/
2. Doctor MM. UST continues using online learning platform [Internet]. The Post. 2021. Available from: https://thepost.net.ph/news/campus/ust-continues-using-online-learning-platform/
3. Fattahi H, Seproo FG, Fattahi A. Effective factors in people's preventive behaviors during covid-19 pandemic: a systematic review and meta-synthesis. *BMC Public Health* [Internet]. 2022;22(1):1218. Available from: http://dx.doi.org/10.1186/s12889-022-13621-y
4. Communications NW. Sources of information influence COVID-19 knowledge, protective behaviors [Internet]. www.nyu.edu. Available from: https://www.nyu.edu/about/news-publications/news/2021/november/sources-of-information-influence-covid-19-knowledge-behaviors.html
5. Lau LL, Hung N, Go DJ, Ferma J, Choi M, Dodd W, et al. Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: A cross-sectional study. *J Glob Health* [Internet]. 2020;10(1):011007. Available from: http://dx.doi.org/10.7189/jogh.10.011007
6. Li X, Liu Q. Social media use, eHealth literacy, disease knowledge, and preventive behaviors in the COVID-19 pandemic: Cross-sectional study on Chinese netizens (preprint) [Internet]. *JMIR Preprints*. 2020. Available from: http://dx.doi.org/10.2196/preprints.19684
7. Aumala T, Cardenas M, Vergara D, Vasconez M, Palacios I, Terán E. Risk perception and knowledge, attitudes, and practices against COVID-19 in a hypertensive population from a semi-urban city of Ecuador. *Frontiers in Public Health*. 2021;9.
8. Aschwanden D, Strickhouser JE, Sesker AA, Lee JH, Luchetti M, Terracciano A. Preventive behaviors during the COVID-19 pandemic: associations with perceived behavioral control, attitudes, and subjective norm. *Frontiers in Public Health*. 2009.
9. Park JH, Chang SJ, Kim KS. Correlation between the preventive behaviors on Middle East respiratory syndrome and the knowledge, attitude, and compliance of medically inclined college students. *J Dent Hyg Sci* [Internet]. 2017;17(4):341–51. Available from: http://dx.doi.org/10.17135/jdhs.2017.17.4.341
10. World Health Organization. Social media & COVID-19: A global study of digital crisis interaction among gen Z and millennials [Internet]. World Health Organization. 2021 [cited 2024 Mar 12]. Available from: https://www.who.int/news-room/feature-stories/detail/social-media-covid-19-a-global-study-of-digital-crisis-interaction-among-gen-z-and-millennials
11. Paykani T, Zimet GD, Esmaeili R, Khajedaluee AR, Khajedaluee M. Perceived social support and compliance with stay-at-home orders during the COVID-19 outbreak: evidence from Iran. *BMC Public Health* [Internet]. 2020;20(1):1650. Available from: http://dx.doi.org/10.1186/s12889-020-09759-2
12. Pelletier P, Ferrandon E, Lefort C, Boespflug M, Popescu C, Launay Y, et al. COVID-19: From biological image to the social construction of a virus. In: The era of COVID-19 uncertainty: spillover effects of the global pandemic [Internet]. In: P. Pelletier & M. L. Emek (Eds.); 2022. p. 3–24. Available from: https://www.researchgate.net/publication/358672766_COVID-19_From_Biological_Image_to_the_Social_Construction_of_a_Virus
13. World Health Organization. Coronavirus disease (COVID-19): Masks [Internet]. Available from: www.who.int. 2020. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-masks
14. DepEd, DOH and UNICEF unite to bring clean hands for all this October 15 | Department of Health website [Internet]. doh.gov.ph. Available from: https://doh.gov.ph/press-release/DepEd-DOH-and-UNICEF-unite-to-bring-Clean-Hands-for-All-this-October-15#:~:text=Handwashing%20with%20soap%20is%20key
15. Stobierski T. What is conjoint analysis, and how can it be used? [Internet]. Business Insights - Blog. 2020. Available from: https://online.hbs.edu/blog/post/what-is-conjoint-analysis
16. Human Rights Watch. Human rights dimensions of COVID-19 response [Internet]. Human Rights Watch. 2020. Available from: https://www.hrw.org/news/2020/03/19/human-rights-dimensions-covid-19-response
17. Li J, Liu X, Zou Y, Deng Y, Zhang M, Yu M, et al. Factors affecting COVID-19 preventive behaviors among university students in Beijing, China: An empirical study based on the extended theory of planned behavior. *Int J Environ Res Public* Health [Internet]. 2021 [cited 2024 Mar 12];18(13):7009. Available from: https://pubmed.ncbi.nlm.nih.gov/34209072/
18. Haug N, Geyrhofer L, Londei A, Dervic E, Desvars-Larrive A, Loreto V, et al. Ranking the effectiveness of worldwide COVID-19 government interventions. *Nat Hum Behav* [Internet]. 2020;4(12):1303–12. Available from: http://dx.doi.org/10.1038/s41562-020-01009-0
19. Coronavirus disease (COVID-19): Contact tracing [Internet]. www.who.int. Available from: https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-contact-tracing#:~:text=Contact%20tracing%20can%20break%20the
20. Fetzer T, Graeber T. Measuring the scientific effectiveness of contact tracing: Evidence from a natural experiment. *Proc Natl Acad Sci U S A* [Internet]. 2021;118(33):e2100814118. Available from: http://dx.doi.org/10.1073/pnas.2100814118
21. Mya KS, Aye, Hlaing WA, Hlaing SS, Aung T, Lwin SMM, et al. Awareness, perceived risk and protective behaviours of Myanmar adults on COVID-19. *Int J Community Med Public Health* [Internet]. 2020 [cited 2020 Jun 17];7(5):1627. Available from: https://www.ijcmph.com/index.php/ijcmph/article/view/6308
22. Shon J-A, Yang Y, Park JH. Factors influencing compliance for influenza infection control by nurses. *J Korean Acad Fundam Nurs* [Internet]. 2016;23(2):161–71. Available from: http://dx.doi.org/10.7739/jkafn.2016.23.2.161
23. Mukhlis H, Widyastuti T, Harlianty RA, Susanti S, Kumalasari D. Study on awareness of COVID-19 and compliance with social distancing during COVID-19 pandemic in Indonesia. *J Community Psychol* [Internet]. 2022;50(3):1564–78. Available from: http://dx.doi.org/10.1002/jcop.22735
24. Schäfer S. Illusion of knowledge through Facebook news? Effects of snack news in a news feed on perceived knowledge, attitude strength, and willingness for discussions.

Comput Human Behav [Internet]. 2020;103:1–12. Available from: http://dx.doi.org/10.1016/j.chb.2019.08.031
25. Ezeah G, Ogechi EO, Ohia NC, Celestine GV. Measuring the effect of interpersonal communication on awareness and knowledge of COVID-19 among rural communities in Eastern Nigeria. *Health Educ Res* [Internet]. 2020 [cited 2020 Dec 12];35(5):481–9. Available from: https://academic.oup.com/her/article/35/5/481/5935560
26. Li S-CS. Replacement or complement: A niche analysis of Yahoo news, television news, and electronic news. *Telemat Inform* [Internet]. 2017;34(4):261–73. Available from: http://dx.doi.org/10.1016/j.tele.2016.07.003
27. Zhong B-L, Luo W, Li H-M, Zhang Q-Q, Liu X-G, Li W-T, et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *Int J Biol Sci* [Internet]. 2020;16(10):1745–52. Available from: http://dx.doi.org/10.7150/ijbs.45221
28. Roy D, Tripathy S, Kar SK, Sharma N, Verma SK, Kaushal V. Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian J Psychiatr* [Internet]. 2020;51(102083):102083. Available from: http://dx.doi.org/10.1016/j.ajp.2020.102083
29. Ahmadi S, Jorjoran Shushtari Z, Shirazikhah M, Biglarian A, Irandoost SF, Paykani T, et al. Social determinants of adherence to COVID-19 preventive guidelines in Iran: A qualitative study. *Inquiry* [Internet]. 2022;59:469580221084185. Available from: http://dx.doi.org/10.1177/00469580221084185
30. Why Gen Z says it's taking the COVID-19 pandemic seriously [Internet]. Healthline. 2020. Available from: https://www.healthline.com/health-news/gen-z-is-taking-covid-19-pandemic-seriously-heres-why
31. Li S, Xu Q. Family support as a protective factor for attitudes toward social distancing and in preserving positive mental health during the COVID-19 pandemic. *J Health Psychol* [Internet]. 2022;27(4):858–67. Available from: http://dx.doi.org/10.1177/1359105320971697
32. Relationships with parents and families: pre-teens and teenagers [Internet]. Raising Children Network. 2021 [cited 2023 Jul 23]. Available from: https://raisingchildren.net.au/pre-teens/communicating-relationships/family-relationships/relationships-with-parents-teens
33. Stanford Medicine Children's Health. Teens: Relationship Development [Internet]. n.d. Available from. https://www.stanfordchildrens.org/en/topic/default?id=relationship-development-90-P01642