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Research Article:

Dimensions of COVID-19 Pandemic Preventive Behaviour Among High School Students in Leyte and Biliran Province, the Philippines

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ABSTRACT

The onset of COVID-19 pandemic has greatly affected all sectors of the society including the education sector. Schools at all levels were forced to adopt measures that allow for continuity of the educational process while maintaining health safety. Considering the scope and impact of COVID-19 pandemic, a collective behaviour may be necessary to effectively and efficiently curb and reduce its impact. This paper reports on findings of a study that explored the antecedents to COVID-19 pandemic preventive behaviours among high school students. This study is imperative because conditions in high schools and classrooms, specifically, result in elevated vulnerability for COVID-19 transmission among students and teachers. Following the survey research design, the study was divided into two phases: Phase 1 (exploration phase) participated by 300 students; and Phase 2 (confirmation phase) participated by 300 students between grades 7 to 12. Data collected in Phase 1 underwent exploratory factor analysis using SPSS while data collected in Phase 2 underwent confirmatory factor analysis using SPSS Amos. Results revealed seven dimensions of COVID-19 pandemic preventive behaviours including (a) direct preventive behaviours, (b) healthy habits and lifestyle, (c) limited physical social contact, (d) COVID-19 curiosity, and (e) COVID-19 support. Findings of this study may be informative to policymakers in developing strategic response to COVID-19 pandemic not only in schools but also other relevant sectors. In addition, these findings may also be informative to other researchers conducting related studies on COVID-19 pandemic preventive behaviour such as those exploring antecedents to COVID-19 pandemic preventive behaviours among others.

Keywords: COVID-19 pandemic preventive behaviour, COVID-19 pandemic, exploratory factor analysis, confirmatory factor analysis, transformative teaching

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INTRODUCTION

The onset of COVID-19 pandemic has greatly affected all the sectors of the society at all levels including the education sector. Schools at all levels were forced to adopt measures that allow continuity of the educational process while maintaining health safety. Minimum health safety protocols were recommended here and there including personal protocols that could reduce risk of contracting COVID-19. Nevertheless, a collective behaviour that is proactive and responsive may be necessary to effectively and efficiently curve and reduce, as well as completely stop a pandemic such as COVID-19 pandemic (Khan et al., 2020). Considering the current scope and scale of the COVID-19 pandemic impact, a collective action may be necessary to succeed in slowing down and preventing the spread of COVID-19, referred to as "COVID-19 pandemic preventive behaviour" in this study. This is extremely important at this stage so that the medical sector is not overwhelmed beyond their regular capacity in dealing and handling COVID-19 patients considering the limited access to vaccine and many unknown facets including specific medication and treatment for the said disease (as of writing). Moreover, the proactive practice of COVID-19 pandemic preventive behaviour may also be a determinant of the extent to which the economy and society may function with minimal disruptions including schools' operations.

Revisiting the experience during the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 from the accounts of Heymann and Rodier (2004), on one hand, it resulted to social disruption and economic loses as many basic services were closed, borders were closed, thousands of people placed in quarantine dropping about 50%–70% of international travels and 60% of hotel occupancy therefore failing tourism businesses and closure of large production utilities. On the other hand, it raised the profile of public health to new heights, sprung high level of political commitment, and attracted higher level of media attention that was instrumental in changing public and political perception (Heymann & Rodier, 2004). In that, it is important to carefully and strategically solicit relevant behaviours (actions) from the public to minimise the negative impact considering the stakes at different levels in the different sectors of the society.

Guided by the recommendations of the World Health Organization (WHO) on response towards COVID-19 pandemic (WHO, 2020a; 2020d; 2020e; 2020f; 2020g), different governments including the Philippines have developed and implemented various measures to address and contain the rapid spread of the COVID-19. This include enhanced national quarantine, 14 days mandatory quarantine of exposed people, enhanced community quarantine, legislations towards limited movement of people, and social distancing among others (Republic of the Philippines, 2020a, 2020b, 2020c, 2020d).

In the last few months, several studies have been launched and published towards understanding the COVID-19 including its prevention and management (WHO, 2020b). As of writing, Wuhan, China, believed to be the origin of COVID-19, have reported no new cases of local transmission (*BBC News*, 2020), hence giving hope to most if not all governments in curving down and completely stopping the COVID-19 pandemic. The differential actions taken by the different governments have revealed explicitly the

differences in the results of containing the spread and prevention of COVID-19 pandemic. From draconian measures of complete lockdown and shutting down of borders, mandatory quarantine and limited movement of population, rapid and mass testing, and active tracing, the world has witnessed how government actions in general together with the support of people determines the success of the outcome (Bicker, 2020; Republic of the Philippines, 2020a, 2020b). Literature showed and emphasized the importance of frequent handwashing, wearing face masks, strengthening immune system with proper nutrition, drinking lukewarm water, social distancing and staying home among others may result to slowing down and preventing the spread of COVID-19 (WHO, 2020c). However, considering the bulk of information that is publicly available, both legitimate and fake, COVID-19 pandemic in general has caused public panic, anxiety, fear, and uncertainty among people of all ages including high school students (grades 7–12) which approximately represent 10% of the Philippine population (Philippine Statistics Authority, 2016).

Considering the most recent experience in dealing with COVID-19 and the possibility of COVID-19 reinfection (Shi et al., 2020), this may result to unprecedented paradigm shift in most if not all sectors of society at all levels including the existing behavioural standards in relation to health, sanitation, hygiene and lifestyle in general. Anticipating the role of schools towards preparedness, response and prevention of COVID-19, this paper presents an emergent finding of a study that attempted to explore and model the antecedents to COVID-19 pandemic preventive behaviour from among high school students (i.e., grades 7 to 12) in the Philippines. Specifically, it reports the dimensions of COVID-19 pandemic preventive behaviour as synthesised from the factor analyses of recommended behaviours/actions against COVID-19 pandemic made available by the WHO and Philippines' Department of Health.

Identifying the dimensions of COVID-19 pandemic preventive behaviour among high school students may be an important initial step towards developing specific protocols for health safety in schools. It may also serve as an input towards integration and teaching of specific themes pertaining to COVID-19 pandemic awareness and safety practices in formal (i.e., in existing school curricula), informal, and extracurricular instruction. Moreover, this study may provide insights and inputs not only to schools (i.e., education leaders and teachers), but also other relevant sectors, policymakers and practitioners in developing interventions against COVID-19 pandemic preparedness, response, prevention, and recovery. In addition, the dimensions of COVID-19 pandemic preventive behaviour reported in this paper may be used in further understanding and modelling antecedents to COVID-19 pandemic preventive behaviour among others.

Pandemic Behaviour

Knowledge and understanding of how individuals behave (respond) to a pandemic or a threat of an outbreak is critical considering that any abrupt changes in behaviour among people may result to disproportionate economic impact (Smith, 2006), fear and anxiety among people, mass panic the least, and may affect the ways such a pandemic or an outbreak is contained.

There are a few studies that attempted to model how individual behaviour may affect the spread and containment of a pandemic. One is the work of Poletti et al. (2012) who made use of game theory to show that uncoordinated human behavioural responses can affect the spread of an emerging epidemic outbreak. Similarly, the work of Aleman et al. (2009) on modelling the spread of pandemic influenza by accounting individual behaviour. Their study revealed that the outbreak is less severe if individuals stay at home. Among the individual behaviours accounted for in their study include close and casual contacts such as between family members and in public transportation, as well as an individual sneezing in his or her hand, touching objects and talking to healthy individuals after (Aleman et al., 2009).

Moving on, there are existing studies that attempted to explore and understand pandemic behaviour and its corresponding effects to many tenets of the society. This include behaviours attributed to pandemic influenza (Aleman et al., 2009; Brewer et al., 2004; 2007; Flowers et al., 2016; Kok et al., 2010; Markel et al., 2007; Sadique et al., 2007), SARS (Heymann & Rodier, 2004; Hong & Collins, 2006; Vartti et al., 2009), A(H1N1) flu (Cowling et al., 2010; Zhang et al., 2014), anthrax, West Nile virus and small pox (Fischhoff et al., 2003) among others (Poletti et al., 2012). These studies have illustrated and revealed how behaviour impacted the prevention and control of the pandemic, as well as the related economic and social impacts (Heymann & Rodier, 2004).

Along this line, there are several theories and models that attempted to explain attributes to health behaviour such as those that relates to risk perceptions (De Zwart et al., 2009; Siu, 2008), Protection-Motivation theory (Maddux & Rogers, 1983; Rogers, 1975), Health-Belief model (Champion & Skinner, 2008), Extended Parallel Process model (Witte, 1992), and Precaution Adoption Process model (Weinstein, 1988) among others.

In relation to pandemic preventive behaviour, Markel and colleagues (2007) in their study of the 1918–1919 influenza pandemic noted that at the time of pandemic schools were closed, gatherings in public places were banned, execution of isolation and quarantine, schedule alterations, transportation restrictions and wearing of face masks among others. These interventions resulted to slowing down and control of the pandemic. Similarly, Sadique et al. (2007) identified that among the precautionary behaviour against influenza pandemic includes staying indoors, staying away from places of entertainment, and evading public transportation. Flowers et al. (2016) identified the following pandemic influenza behaviours: extra cleanliness, getting updates from the government, bringing and using hand sanitizers, washing hands frequently, staying at home, avoiding sick people, quarantine, not going to work and school, and taking care of the family.

Meanwhile, with SARS, the following behaviours were recorded in literature: wearing face mask, washing hands frequently, having enough sleep, consulting a doctor when potential symptoms are present (e.g. coughing), avoiding travels to affected areas, avoiding to eat in restaurants and food courts, avoiding shaking of hands, extra cleanliness, avoiding to take airplanes, taxis, and subways, avoiding to go to gatherings, work, and

school, and taking herbal supplements (Vartti et al., 2009). The SARS outbreak also increased influenza vaccinations in South Korea (Hong & Collins, 2006). In addition, literature has also recorded behaviours toward the A(H1N1) flu outbreak in 2009 that included use of mask, frequent handwashing, vaccination, and other avoidance practices and health-seeking behaviour (Zhang et al., 2014), as well as preventive behaviour including adoption of hygiene measures, using face masks, and social distancing (Cowling et al., 2010) among others. However, despite recommendations and prescribed preventive behaviour during a pandemic, there is a possibility of maladaptive behaviour especially if response and self-efficacy is low as indicated in the study of Fischhoff et al. (2003) on behaviours toward anthrax, West Nile virus and smallpox in which people explicitly considered fleeing.

In connection to this study, COVID-19 pandemic preventive behaviour refers to behaviours (actions) that an individual take against COVID-19 pandemic. There is rich information in literature and other media forms and sources that enumerates recommended preventive behaviour (action) in general (WHO, 2020c) that is similar to that of pandemic influenza (Aleman et al., 2009; Brewer et al., 2004, 2007; Flowers et al., 2016; Kok et al., 2010; Markel et al., 2007; Sadique et al., 2007), SARS (Heymann & Rodier, 2004; Hong & Collins, 2006; Vartti et al., 2009), A(H1N1) flu (Cowling et al., 2010; Zhang et al., 2014), however, there is a deficit in literature that attempted to characterize and classify these behaviours empirically.

A study of Lin and Chen (2021) on the role of self-esteem towards disease prevention behaviour during the COVID-19 pandemic adapted four items from the work of Cooper and colleagues (2010) which initially were anchored to skin cancer prevention and preventive dental care behaviours. There is also the work of Breakwell and colleagues (2021) that attempted to measure the COVID-19 preventive behaviour index among 470 English participants aged between 18–72 years old (used 10 items), the work of Barakat and Kasemy (2020) that assessed the preventive health behaviours during COVID-19 pandemic of 182 Egyptian participants aged between 18–67 years old (used eight items), and the work of Gutu et al. (2021) that attempted to assess preventive behaviour and associated factors towards COVID-19 among 634 Ethiopian participants whose mean age is 30.79 years old (used eight items). Nevertheless, these studies simply adapted items as recommended by their respective health ministries or the WHO. None of the studies attempted to determine the factor structure or the dimensions of the COVID-19 pandemic preventive behaviour. Although it must be noted that in the past, there were studies that attempted to determine dimensions of health behaviour in general such as the work of Vickers et al. (1990) that attempted to determine the dimension/s of 40 health behaviours. Their study revealed two big clusters, preventive and risk-taking behaviours. Preventive behaviours include wellness maintenance and accident control behaviours while risk-taking behaviours include traffic-related and exposure to hazardous substance among others (Vickers et al., 1990). A more recent study of Shiloh and Nudelman (2020) revealed four dimensions of health behaviours including importance (i.e., how significant is it in terms of what can be gained by adapting it),

negative experience (i.e., how much distress is expected to be experienced when carrying it out), ease (i.e., how much difficult or easy it is to perform), and others. That being so, this may be the first study that attempted determine the dimensions of COVID-19 pandemic preventive behaviour.

In this study reported, the characterisation and classification of COVID-19 pandemic preventive behaviour may be the first step necessary to inform and guide relevant sectors, policymakers, and practitioners to strategise and develop specific interventions along COVID-19 preparedness, response, and prevention such as the schools, education leaders, and teachers for example.

Schools and the COVID-19 Pandemic

Public schools at all levels in the Philippines has experience an elevated level of vulnerability towards COVID-19 pandemic. This is because of its inherent conditions that limits the implementation of rules and regulations pertaining to physical distancing at all times as a consequence of large class sizes. The Department of Education (DepEd) allows class size ranging from 15 to 60 students per class from grades 5 to high school (Department of Education (DepEd), 2012) as represented by the locale of this study. In addition, while most if not all public-school classrooms (except computer laboratories) have open air ventilation, still there continues to exist high risk of airborne viral transmission specifically for large class sizes.

Along this line, understanding the dimensions of COVID-19 pandemic preventive behaviour among high school students may be the first initial step towards developing and implementing an effective, efficient, and responsive strategy(ies) for added protocols in schools at all levels to ensure health safety of learners and teachers. Moreover, this study may also be an input towards transformative teaching practice which is imperative as part of the post COVID-19 pandemic response that may allow the continuity of the former educational processes (i.e., students and teachers coming to school and having face-to-face classes).

METHODOLOGY

The foregoing study follows the survey research design (Fowler, 2009) that is divided in two phases, Phase 1 (exploration phase) to explore the dimensions while Phase 2 (confirmation phase) to confirm the dimensions.

Locale and Participants

Participants of the study include high school students (grades 7–12) studying in public high schools in Leyte and Biliran Province, the Philippines. Considering the limited mobility during the conduct of the study brought by the implementation of national and local quarantine, convenience sampling was done. Participants were reached and recruited through existing online platforms (e.g., Facebook messenger, WhatsApp, Viber). The rule of thumb in determining the minimum number of participants for factor analysis includes (a) five times as many observations as variables, (b) minimum absolute number of participants should be 50, and (c) participants must be more than the variables (Hair, Black et al., 2014, p. 100). Data were collected from 300 participants for Phase 1 and another 300 participants for Phase 2. Table 1 shows the summary of important demographic profile of the participants

Table 1. Demographic profile of participants

Phase	Age (mean)	Gender	Frequency	Grade level	Frequency
Phase 1	15.60	Male	120	7	37
				8	43
				9	49
		Female	180	10	38
				11	70
				12	63
Phase 2	15.66	Male	133	7	35
				8	48
				9	41
		Female	167	10	47
				11	62
				12	67

Item Development and Selection

The total of 29 items were drawn from the recommended guidelines of World Health Organization (WHO, 2021) and Department of Health (Department of Health, 2020a, 2020b, 2020c, 2020d, 2020e, 2020f) including some general items pertaining to disaster risk reduction (refer to the Appendix for complete list of items). The items underwent content validation of six experts following Polit and Beck's (2006) guidelines in calculating item- and scale-content validity index. These experts are medical doctors who have been working with the local government leadership in coordination COVID-19 pandemic response. Along this line, calculated item-content validity index (I-CVI) ranged from 0.83 to 1.00 while scale-content validity index was S-CVI is 0.98. Notably, none of the items were removed at this stage.

Collection and Analysis of Data

All data for Phases 1 and 2 were collected through Google survey. Table 2 shows the summary of total participants sent with the survey link, total participants who responded to the survey, total number of participants whose responses underwent analysis in Phases 1 and 2.

Table 2. Distribution of participants sent with link, responded to survey, responses that underwent analysis

Phases	No. of participants		
	sent with link	responded to survey	responses underwent analysis
1	350	320	300
2	348	323	300

Data collected for Phase 1 underwent exploratory factor analysis specifically common factor analysis using Statistical Package for the Social Sciences (SPSS) 2.0 considering that the primary objective of the study was to identify the latent dimension/s of COVID-19 pandemic preventive behaviour and since none or little is known about the amount of specific error variance (Hair, Hult et al., 2014, p. 106), and it assess the sources of common variation which are more generalizable when used for confirmatory factor analysis (Carpenter, 2018, p. 36) later. Related thereto, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were measured to determine the appropriateness of the data analysis procedure. Likewise, total variance was explained and Scree test were obtained to determine the number of dimensions (factors). Lastly, through PROMAX rotation, pattern matrix that suggest the grouping of items according to dimensions was extracted and examined. It has been argued that the said rotation is more robust because it starts with orthogonal solution, then transforms the same into oblique solution (Carpenter, 2018, p. 39). Factors with eigenvalues of ≥ 1.0 were considered while items with loading value of < 0.50 and items with cross loadings were excluded (Tabachnick & Fidell, 2019).

Moving on, data collected in Phase 2 underwent confirmatory factor analysis using the maximum likelihood method through SPSS Amos. This part of the study allowed the confirmation of the dimensions and item composition of each dimension established in Phase 1 (Anderson & Gerbing, 1988). The correlated model was used whereby separate dimensions were specified of which the variance may be accounted for each of the dimensions with correlations between the dimensions constrained to zero and correlation exist between and among the dimensions. In this regard, model fit parameters examined include Chi-square (χ^2) (the smaller the better), degrees of freedom (df), p-value, χ^2/df (< χ^2/df <10), incremental fit index (IFI) (≥ .95), Tucker-Lewis index (TLI) (≥ 0.90), comparative fit index CFI (≥ 0.95), goodness-of-fit (GFI) (≥ 0.90), adjusted goodness-of-fit index (AGFI) (≥ 0.90), standardised root-mean square residual (SRMR) (≤ .08), and root-mean square error of approximation (RMSEA) (< 0.06) (Hu & Bentler, 1999).

In addition, outer loadings, average variance extracted (AVE), variances and correlations between the dimensions to ascertain convergent and discriminant validity were also examined and reported.

Ethics

Prior to study, the research protocol was reviewed and granted approval by the ethics research board of Universiti Sains Malaysia, application number USM/JEPeM/COVID19-09.

RESULTS

Phase 1 (Exploration Phase)

To determine the appropriateness of exploratory factor analysis in analysing the data collected, KMO measure of sampling adequacy and Bartlett's test of sphericity were calculated and measured. Results in Table 3 showed that KMO = 0.785 and Bartlett's test of sphericity < 0.001 indicates that sampling adequacy was middling (Kaiser, 1974) and correlation matrix is different from the identity matrix suggesting that the correlation between the dimensions is zero. That being so, the use of EFA is appropriate (Pallant, 2000; Tabachnick & Fidell, 2019).

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.785
Bartlett's Test of Sphericity	Approx. χ^2	3848.314
	df	406
	Sig.	0.000

Table 4 shows the summary of exploratory factor analysis results during Phase 1. Note that all loadings were > 0.50 and Cronbach's alpha values > 0.70 confirming item and construct reliability respectively (Hair, Hult et al., 2014).

In this study, the number of dimensions was determined through total variance explained and Scree plot. The latent root criterion indicated that only factors having latent root or eigenvalues ≥ 1.00 are considered significant while the Scree test criterion indicates that the point at which the curve begins to straighten out is considered to indicate the maximum number of factors extracted (Hair, Hult et al., 2014, p. 107–108). Table 4 shows that six dimensions possess eigenvalue that is >1.00 as confirmed in the Scree plot illustrated in Figure 1 following the earlier mentioned criteria.

Table 4. Summary of results of exploratory factor analysis

Dimensions and items	Descriptive statistics		Factors						Cronbach's alpha	Eigenvalue	Variance explained (%)
	Mean	SD	1	2	3	4	5	6			
PPBa									0.822	6.611	22.796
PB1	3.8467	1.00658	.560								
PB2	4.3300	.76794	.620								
PB3	3.9733	.97423	.917								
PB4	4.0567	.90712	.787								
PB5	4.3967	.57773	.632								
PPBb									0.793	1.658	5.717
PB6	4.4533	.64488		.863							
PB7	4.2967	.68573		.742							
PB8	4.2667	.73304		.536							
PPBc									0.795	2.172	7.490
PB11	3.7033	.91549			.819						
PB12	3.7333	.88591			.795						
PB14	2.9433	.98150			.696						
PPBd									0.810	2.238	7.717
PB16	3.8467	.96934				.501					
PB17	4.2500	.69458				.533					
PB18	4.3500	.67007				.869					
PB19	4.3000	.73834				.871					
PB20	4.1600	.80200				.757					

(*Continued on next page*)

Table 4. (*Continued*)

Dimensions and items	Descriptive statistics		Factors						Cronbach's alpha	Eigenvalue	Variance explained (%)
	Mean	SD	1	2	3	4	5	6			
PPBe									0.846	2.754	9.495
PB21	4.0933	.68765					.622				
PB22	4.1500	.69458					.788				
PB23	4.4133	.65619					.741				
PB24	4.3333	.69076					.734				
PB25	4.1233	.77251					.752				
PPBf									0.819	1.869	6.440
PB26	4.1733	.70114						.731			
PB27	4.0700	.73501						.990			
PB28	4.0867	.76667						.642			

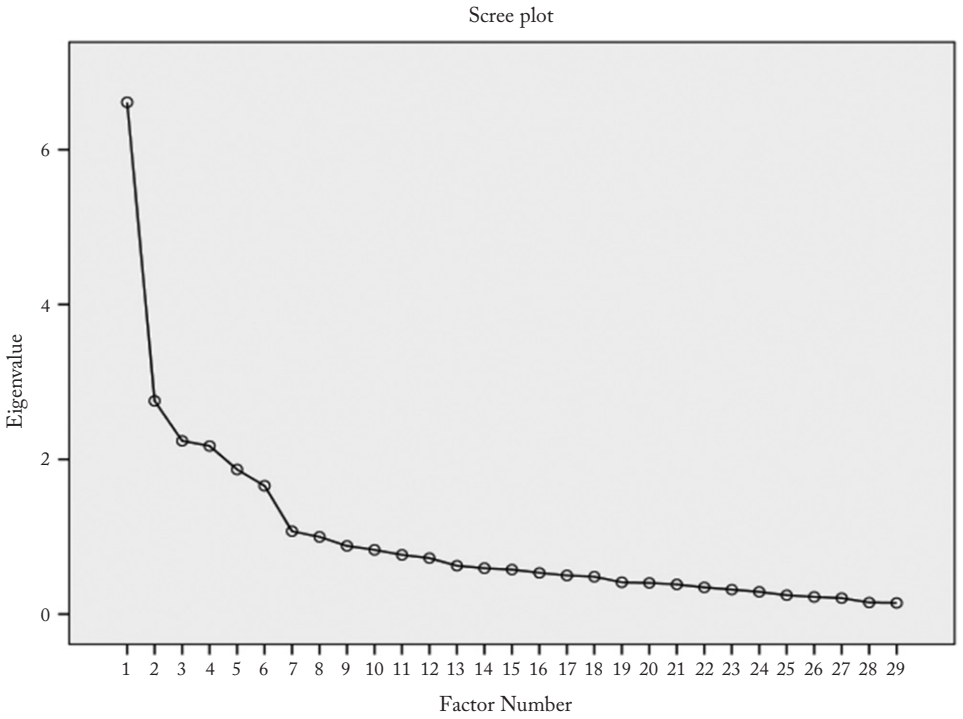

Figure 1. Scree test

Table 5 shows the factor correlations between and among the extracted dimensions. Examining closely, the highest correlation established was 0.386 between Dimensions 1 and 4. Nevertheless, the said correlations were significantly low, implying that the dimensions were discriminant of each other.

Table 5. Factor correlation matrix

Dimensions	1	2	3	4	5	6
1	1.000	.273	.295	.386	.259	.383
2	.273	1.000	.348	.185	.275	.316
3	.295	.348	1.000	.316	.230	.355
4	.386	.185	.316	1.000	.289	.227
5	.259	.275	.230	.289	1.000	.283
6	.383	.316	.355	.227	.283	1.000

In Phase 1, five items were eliminated as summarised in Table 6 due to one or a combination of the following reasons: (a) eigenvalue of dimension < 1.00, and (b) loading value of < 0.50 (Tabachnick & Fidell, 2019).

Table 6. Items eliminated in Phase 1

Code	Items
PPB9	I take vitamin C rich food every day.
PPB10	I take food supplements every day.
PPB13	I drink plenty of water every day.
PPB15	I consult the doctor immediately once I manifest the symptoms of the COVID-19.
PPB29	I am ready to support non-government organisations that works in preventing the spread of COVID-19 pandemic.

Phase 2 (Confirmation Phase)

Figure 2 shows the model specification used for Phase 2. Results of the confirmatory factor analysis revealed that minimum required thresholds for the model specified was achieved: χ^2 = 188.106 (the smaller the better), df = 138, p-value =0.003, and χ^2/df = 1.1.363 (< χ^2/df <10) (Hu & Bentler, 1999). Note that the initial specification included six dimensions, however the dimension labelled PPBb composed of three items (PB6, PB7, and PB8) were eliminated considering that the item loadings were low, and they possess cross loadings at the same time. In addition, items PB24 and PB25 of dimension labelled PPBe were also removed because of very low loadings. Table 7 illustrates the convergent validity of the final model specification. AVE of all the five retained dimensions were within the threshold of > 0.50 (Hair, Hult et al., 2014), as well as the composite reliability threshold of 0.70 (Fornell & Larcker, 1981), therefore ascertaining convergent validity.

Table 7. Outer loading, AVE and variances of dimensions and items retained

Dimensions and items	Outer loading	AVE	Composite reliability	Variances		
				Estimate	S.E.	C.R.
PPBa		0.535	0.848	0.134	0.022	5.974
PB1	0.508					
PB2	0.734					
PB3	0.828					
PB4	0.888					
PB5	0.636					
PPBc		0.575	0.801	0.414	0.072	5.792
PB11	0.832					
PB12	0.775					
PB14	0.657					
PPBd		0.541	0.849	0.387	0.054	7.194
PB16	0.471					
PB17	0.603					

(*Continued on next page*)

Table 7. (*Continued*)

Dimensions and items	Outer loading	AVE	Composite reliability	Variances		
				Estimate	S.E.	C.R.
PB18	0.884					
PB19	0.858					
PB20	0.777					
PPBe		0.584	0.800	0.461	0.050	9.236
PB21	0.629					
PB22	0.979					
PB23	0.630					
PPBf		0.636	0.836	0.242	0.042	5.813
PB26	0.745					
PB27	0.970					
PB28	0.642					

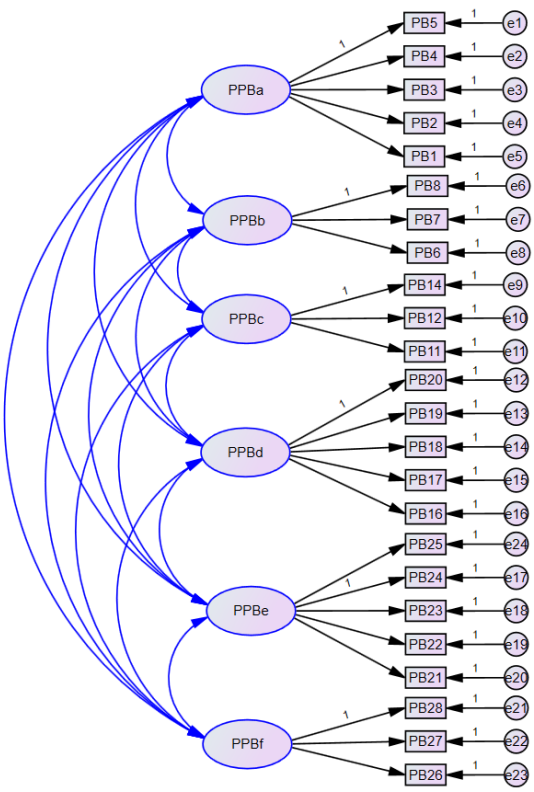

Figure 2. Model specification

Table 8 shows the correlation that exist between and among the dimensions that gives an overview of how the five dimensions were discriminant of each other. The highest correlation was 0.303 between PPBa and PPBc which is still significantly small, therefore ascertaining discriminant validity.

Table 8. Correlation

	PPBa	PPBc	PPBd	PPBe	PPBf
PPBa	1.000	0.303	0.223	0.259	0.192
PPBc		1.000	0.238	0.158	0.193
PPBd			1.000	0.267	0.142
PPBe				1.000	0.144
PPBf					1.000

Meanwhile, Table 9 enumerates the values of the model fit parameters in tandem with the acceptable thresholds from literature. Results show that the specified model possesses relatively good fit considering that all the calculated values were within the acceptable model fit thresholds.

Table 9. Model fit

Parameters	Acceptable fit thresholds	Model fit results
Incremental fit index (IFI)	≥ 0.95	0.979
Tucker-Lewis index (TLI)	≥ 0.90	0.974
Comparative fit index (CFI)	≥ 0.95	0.979
Goodness-of-fit index (GFI)		0.939
Adjusted Goodness-of-fit index (AGFI)	≥ 0.90	0.915
Standardized Root-mean square residual (SRMR)	≤ 0.08	0.031
Root-mean square error of approximation (RMSEA)	< 0.06	0.035

Lastly, Tables 10 and shows the items eliminated and the items retained during the Phase 2 of the study due to one or a combination of the following reasons: (a) low loadings and (b) with cross loadings (Hair et al., 2017).

Table 10. Items eliminated in Phase 2

Code	Items
PPB6	I take effort to protect my family from catching the COVID-19.
PPB7	I take effort to protect other people from catching the COVID-19.
PPB8	I eat health food everyday
PPB24	I always try to protect my family against COVID-19.
PPB25	I always try to protect other people in the community against the COVID-19.

DISCUSSIONS AND IMPLICATIONS

Data analysis revealed that there are five dimensions of COVID-19 pandemic preventive behaviour (see Table 11). These include the following: (a) direct preventive behaviour, (b) healthy habits and lifestyle, (c) limited physical social contact, (d) COVID-19 curiosity, and (e) COVID-19 support.

Table 11. Specific items representing the identified themes

Dimension	Items
Direct preventive behaviour	I wear face mask every time I am outdoors.
	I wash my hands frequently.
	I bring with me hand sanitizer/alcohol all the time.
	I use hand sanitizer/alcohol from time to time.
	I take effort to protect myself from catching the COVID-19. (1-5)
Healthy habits and lifestyle	I engage myself with physical exercise regularly.
	I get enough sleep every day.
	I consult the doctor regularly.
Limited physical social contact	I put myself to quarantine after being in a place with COVID-19 outbreak.
	I cooperate with the government authorities with their standard operating procedures for preventing the spread of COVID-19.
	I avoid travelling during the COVID-19 pandemic.
	I avoid going outdoor during the COVID-19 pandemic.
	I maintain social distancing during the COVID-19 pandemic. (16-20)
COVID-19 curiosity	I explore effective ways to prevent the spreading of COVID-19 pandemic.
	I explore new ways to prevent the spreading of COVID-19 pandemic.
	I take time to get news updates of the COVID-19 pandemic. (21-23)
COVID-19 support	I make myself available to help the best that I can in preventing the spread of COVID-19 pandemic.
	I am ready to contribute any resources that I have to help prevent the spread of COVID-19 pandemic.
	I am ready to support the local government in preventing the spread of COVID-19 pandemic. (26-28)

Direct Preventive Behaviour

Direct preventive behaviour includes wearing face mask when outdoor and washing of hands frequently. It also includes frequent bringing and using hand sanitizer and alcohol, as well as other direct preventive efforts to protect oneself from getting COVID-19. This is exactly similar to the findings of Sadique et al. (2007) on precautionary behaviour against pandemic influenza although such behaviour was neither mentioned on the studies reviewed on SARS (Heymann & Rodier, 2004; Hong & Collins, 2006; Vartti et al., 2009) and studies reviewed on A(H1N1) flu (Cowling et al., 2010; Zhang et al., 2014).

Healthy Habits and Lifestyle

Participants in the study recognised that healthy habits and lifestyle significantly contribute in preventing COVID-19 pandemic as proven by the theme generated from the items in one of the dimensions. It includes engaging in physical exercise regularly, getting enough sleep every day, and consulting the doctor regularly. Surprisingly, none of the reviewed studies related thereto explicitly accounted or at least mentioned healthy habits and lifestyle as described in this study. Given the importance of healthy habits and lifestyle in disease prevention in general, this may imply the importance of reinforcing the giving of emphasis on the role of practicing healthy habits and lifestyle in preventing COVID-19 and other related diseases especially during the quarantine or lockdown periods when everyone stays at home.

Limited Physical Social Interaction

Limited physical social interaction is another theme generated deduced from the items in one of the generated dimensions. Specifically, items in the questionnaire related thereto include putting self to quarantine after visiting a place with COVID-19 outbreak, avoiding travels, avoiding staying outdoors, social distancing and cooperation with the government authorities with the standard operating procedures for preventing the spread of COVID-19. This preventive behaviour is similar to the studies reviewed on pandemic influenza (Sadique et al., 2007) and SARS (Vartti et al., 2009) that reported people staying indoors, avoiding public places such as attending gatherings, work, and school, going to restaurants and food courts, and staying away from places of entertainment, as well as avoiding to travel in affected areas. This findings may have some serious immediate and or long term implications to daily social and economic activities as reported and pointed out by Heymann and Rodier (2004) during the SARS outbreak in 2003.

COVID-19 Curiosity

Another theme generated from the items in one of the dimensions relates to COVID-19 curiosity. This includes items on exploring effective and new ways to prevent COVID-19 pandemic, getting news updates on COVID-19 pandemic, always trying to protect family and other people in the community against COVID-19. This findings may

somewhat relate to the study of Flower et al. (2016) that reported the getting updates from government as one of the pandemic influenza behaviours. Having the participants explicitly manifested COVID-19 curiosity as described in this study, it may have implications on information literacy, specifically those that relates to COVID-19 pandemic. With the advancement of Internet technology and presence of social media, it may be necessary that the public in general develop functional capability to decipher relevant, important, and legitimate news and information from illegitimate and fake news and misinformation as the same may cause unnecessary fear, panic, and fatal decisions and actions such as the incident in Iran whereby a group of people died for consuming too much alcohol in a belief that it will prevent them from getting COVID-19 as spread though social media (Associated Press, 2020; Scarlet & Associated Press, 2020).

COVID-19 Support

Another remarkable theme generated from the items representing one of the dimensions relates to support for government and other organisations working with COVID-19 response and prevention labelled as COVID-19 support. It includes making oneself available to help in preventing the spread of COVID-19, readiness to contribute any available resources, and readiness to support the local government units in preventing the spread of COVID-19. None of the related studies reviewed on pandemic influenza, SARS and A(H1N1) has explicitly reported and mentioned the said behaviour. Be that as it may, the said findings may generally imply the possibility for the government and other organisations to solicit support from people with regards to the fight against COVID-19 pandemic. Although, it may be necessary to specify in detail the kind and needed support from the public. This is important considering that health disasters such as COVID-19 pandemic may require utmost support from people to make all the efforts in response to COVID-19 pandemic effective.

COVID-19 Pandemic Preventive Behaviour, Schools and Learning

Understanding the different dimensions of COVID-19 pandemic preventive behaviour among high school students is imperative. On one hand, it may be an important initial step towards developing a strategic, effective, efficient and responsive protocol/s for safety school operations at all level. This is necessary considering that schools experience an elevated level of vulnerability towards COVID-19 pandemic because of its inherent conditions relating to class size and ventilation among others that limits the implementation of physical distancing protocol. On the other hand, understanding the different dimensions of COVID-19 pandemic preventive behaviour may inform the directed integration of COVID-19 pandemic awareness and initiatives related thereto in the formal and informal teaching practice including extracurricular activities. This includes aggressive looking for integration and teaching opportunities in existing school curricula to:

1. Hasten the adoption and practice of direct preventive behaviour.
2. Increased advocacy for healthy habits and lifestyle.

3. Assist in the modification of existing norms that is unsafe (e.g., practices including traditions that requires physical contact or interaction).
4. Put more emphasis for the development of information literacy and scientific understanding pertaining to COVID-19 pandemic.
5. Encourage full cooperation, support, and volunteerism, among others.

While the data collected and analysed in this study is limited to Leyte and Biliran Province, the Philippines, it may have important implications towards the call for transformative teaching practice in general. The COVID-19 pandemic may not be over soon or perhaps we will be experiencing another pandemic of similar scale in the future. That being so, it is necessary to prepare and equip schools, teachers, and other important stakeholders, the knowledge and skills required to combat against COVID-19 pandemic and or similar instances. A collective behaviour such as COVID-19 pandemic preventive behaviour described in this study is necessary for a number of reasons:

1. To slowdown and limit disease transmission and therefore not overwhelmed the medical sectors with patients.
2. To allow scholars and experts to buy more time in understanding the disease, and therefore develop an effective and efficient cure and prevention of the disease.
3. To minimise the economic impact that may lead to collapse of some businesses (e.g., the tourism sector).
4. To minimise the social impact that may lead to mental health and wellbeing issues and concerns.

Reflections from Excluded Items

A total of 10 items, five in Phase 1 and five in Phase 2 (see Tables 6 and 10), were removed due to statistical reasons (e.g., eigenvalue of dimension < 1.00, loading < 0.50 during exploratory factor analysis; low loading, with cross loadings during the confirmatory factor analysis). Remarkably, many of these items corresponds to behaviours (actions) against COVID-19 pandemic advocated by WHO (e.g., taking vitamin C regularly, drinking plenty of water, consulting a doctor quickly once a symptom of COVID-19 is felt) (WHO, 2020b). It is also remarkable that behaviours connected to altruism such as protecting or taking effort to protect family and other people were also eliminated.

In this regard, factor analysis conducted on the data collected may not be enough to do a more in-depth interpretation of these excluded items and the results of this study may not be conclusive in general considering the limitations implied in the methodology section of this paper, however it may be necessary to develop an intervention to increase awareness and encourage the frequent acting out of these behaviours (actions). This is important considering that related studies and WHO have explicitly emphasised the importance of the said behaviours (actions) against COVID-19.

CONCLUSIONS AND RECOMMENDATIONS

This paper reported a study that explored the dimensions of COVID-19 pandemic preventive behaviour from among high school students (grades 7 to 12) in Leyte and Biliran Province, the Philippines. Following the survey research design, the study was divided in two phases: Phase 1 (exploration phase) and Phase 2 (confirmation phase). A total of 29 items were adapted from literature, as well as the recommended COVID-19 protocol from the WHO and Department of Health. Data collected from 300 participants in Phase 1 and another 300 participants in Phase 2 underwent exploratory and confirmatory analysis respectively. Results revealed five dimensions of COVID-19 pandemic preventive behaviour including (a) direct preventive behaviour, (b) healthy habits and lifestyle, (c) limited physical social distancing, (d) COVID-19 curiosity, and (e) COVID-19 support.

In anticipation of the role of schools towards preparedness, response, and prevention of COVID-19, these classification of preventive behaviour against COVID-19 pandemic may be important in developing specific interventions along teaching and learning. These finding may also inform and guide related sectors, policymakers and practitioners in developing and implementing interventions toward preparedness, response, and prevention of COVID-19 in general. Moreover, the dimensions of COVID-19 pandemic preventive behaviour established in this study, though emerging in nature, may be informative for other researchers trying to explore antecedents to COVID-19 pandemic preventive behaviour specifically those doing quantitative research designs.

Considering the methodological limitations in this reported study, it may be necessary to replicate the same study to a larger population using other relevant statistical approach and support the quantitative results though qualitative data that may be obtained through interviews. It may also be worthwhile exploring the influence of socio-demographic factors on, and the influence of existing health behavioural attributes reported in literature such as risk perception, attitudes, values, beliefs and norms specifically on COVID-19 pandemic preventive behaviour.

REFERENCES

Aleman, D. M., Wibisono, T. G., & Schwartz, B. (2009). Accounting for individual behaviors in a pandemic disease spread model. *Proceedings-Winter Simulation Conference*, 1977–1985. https://doi.org/10.1109/WSC.2009.5429727

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411–423. https://doi.org/10.1037/0033-2909.103.3.411

Associated Press. (2020, March 27). Over 300 killed in Iran after drinking industrial alcohol to save themselves from coronavirus. *News18*. https://www.news18.com/news/world/over-300-killed-in-iran-after-drinking-industrial-alcohol-to-save-themselves-from-coronavirus-2553437.html

Barakat, A. M., & Kasemy, Z. A. (2020). Preventive health behaviours during coronavirus disease 2019 pandemic based on health belief model among Egyptians. *Middle East Current Psychiatry*, *27*(1), 43. https://doi.org/10.1186/s43045-020-00051-y

BBC News (2020, March 24). Coronavirus: Wuhan to ease lockdown as world battles pandemic.

Bicker, L. (2020, March 12). Coronavirus in South Korea: How "trace, test and treat" may be saving lives. *BBC News.*

Breakwell, G. M., Fino, E., & Jaspal, R. (2021). The COVID-19 Preventive Behaviors Index: Development and validation in two samples from the United Kingdom. *Evaluation & The Health Professions*, *44*(1), 77–86. https://doi.org/10.1177/0163278720983416

Brewer, N. T., Chapman, G. B., Gibbons, F. X., Gerrard, M., McCaul, K. D., & Weinstein, N. D. (2007). Meta-analysis of the relationship between risk perception and health behavior: The example of vaccination. *Health Psychology*, *26*(2), 136–145. https://doi.org/10.1037/0278-6133.26.2.136

Brewer, N. T., Weinstein, N. D., Cuite, C. L., & Herrington, J. E. (2004). Risk perceptions and their relation to risk behavior. *Annals of Behavioral Medicine*, *27*(2), 125–130. https://doi.org/10.1207/s15324796abm2702_7

Carpenter, S. (2018). Ten steps in scale development and reporting: A guide for researchers. *Communication Methods and Measures*, *12*(1), 25–44. https://doi.org/10.1080/19312458.2017.1396583

Champion, V. L., & Skinner, C. S. (2008). The Health Belief Model. In *Health Behavior and Health Education: Theory, Research, and Practice*, 4th ed. (pp. 45–65). Jossey-Bass.

Cooper, D. P., Goldenberg, J. L., & Arndt, J. (2010). Examining the Terror Management Health Model: The interactive effect of conscious death thought and health-coping variables on decisions in potentially fatal health domains. *Personality and Social Psychology Bulletin*, *36*(7), 937–946. https://doi.org/10.1177/0146167210370694

Cowling, B. J., Ng, D. M. W., Ip, D. K. M., Liao, Q., Lam, W. W. T., Wu, J. T., Lau, J. T. F., Griffiths, S. M., & Fielding, R. (2010). Community psychological and behavioral responses through the first wave of the 2009 influenza A(H1N1) pandemic in Hong Kong. *The Journal of Infectious Diseases*, *202*(6), 867–876. https://doi.org/10.1086/655811

De Zwart, O., Veldhuijzen, I. K., Elam, G., Aro, A. R., Abraham, T., Bishop, G. D., Voeten, H. A. C. M., Richardus, J. H., & Brug, J. (2009). Perceived threat, risk perception, and efficacy beliefs related to SARS and other (emerging) infectious diseases: Results of an international survey. *International Journal of Behavioral Medicine*, *16*(1), 30–40. https://doi.org/10.1007/s12529-008-9008-2

Department of Education (DepEd.) (2012). Revised guidelines on the opening of classes amended by: DO 41, s.2021, 24 May.

Department of Health. (2020a). *Guidance on misting or spraying for COVID-19: DM 2020-0172*, 9 April. Retrieved from https://doh.gov.ph/sites/default/files/health-update/dc2020-0172.pdf

Department of Health. (2020b). *Interim guidelines on the preparedness and response to novel coronavirus (2019-nCoV) from Wuhan, China (as of Jan 21, 2020): DM 2020-0034*, 21 January. Retrieved from https://doh.gov.ph/sites/default/files/health-update/DM-2020-0034-Interim-Guidelines-on-the-Preparedness-and-Response-to-2019-nCoV_0.pdf

Department of Health. (2020c). *Reiteration of the interim guidelines on 2019 novel coronavirus acute respiratory disease (2019-nCoV ARD) response in hotels and other similar establishments: DM 2020-0057*, 3 February. Retrieved from https://doh.gov.ph/sites/default/files/health-update/DC2020-0043-Reiteration-of-DM2020-0057-Interim-Guidelines-on-2019-nCoV-ARD-Response-in-Hotels-Other-Similar-Establishments.pdf

Department of Health. (2020d). *Reiteration of the interim guidelines on 2019 novel coronavirus acute respiratory disease (2019-nCoV ARD) response in residential communities: DM 2020-0059*, 3 February. Retrieved from https://doh.gov.ph/sites/default/files/health-update/DC2020-0041-Reiteration-of-DM2020-0059-Interim-Guidelines-on-2019-nCoV-ARD-Response-in-Residential-Communities.pdf

Department of Health. (2020e). *Reiteration of the interim guidelines on 2019 novel coronavirus acute respiratory disease (2019-nCoV ARD) response in schools and higher education institutions: DM 2020-0055*, 3 February. Retrieved from https://doh.gov.ph/sites/default/files/health-update/DC2020-0042-Reiteration-of-DM2020-0055-Interim-Guidelines-on-2019-nCoV-ARD-Response-in-Schools-Higher-Education-Institutions.pdf

Department of Health. (2020f). *Reiteration of the interim guidelines on 2019 novel coronavirus acute respiratory disease (2019-nCoV ARD) response in the workplace: DM 2020-0056*, 3 February. Retrieved from https://doh.gov.ph/sites/default/files/health-update/DC2020-0039-Reiteration-of-DM2020-056-Interim-Guidelines-on-2019-nCoV-ARD-Response-in-the-Workplace.pdf

Fischhoff, B., Gonzalez, R. M., Small, D. A., & Lerner, J. S. (2003). Evaluating the success of terror risk communications. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, *1*(4), 255–258. https://doi.org/10.1089/153871303771861450

Flowers, P., Davis, M., Lohm, D., Waller, E., & Stephenson, N. (2016). Understanding pandemic influenza behaviour: An exploratory biopsychosocial study. *Journal of Health Psychology*, *21*(5), 759–769. https://doi.org/10.1177/1359105314537542

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39. https://doi.org/10.2307/3151312

Fowler, F. (2009). *Survey Research Methods (4th ed.)*. https://doi.org/10.4135/9781452230184

Gutu, B., Legese, G., Fikadu, N., Kumela, B., Shuma, F., Mosisa, W., Regassa, Z., Shiferaw, Y., Tesfaye, L., Yohannes, B., Palanimuthu, K., Birhanu, Z., & Shiferaw, D. (2021). Assessment of preventive behavior and associated factors towards COVID-19 in Qellam Wallaga Zone, Oromia, Ethiopia: A community-based cross-sectional study. *PLOS ONE*, *16*(4), e0251062. https://doi.org/10.1371/journal.pone.0251062

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis* (7th ed.). Pearson Education Limited.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).* SAGE Publications Inc.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). SAGE Publications Inc.

Heymann, D. L., & Rodier, G. (2004). *SARS: Lessons from a new disease*. In K. S, M. A, & L. S (Eds.), Institute of Medicine (US) Forum on Microbial Threats. National Academies Press (US).

Hong, S., & Collins, A. (2006). Societal responses to familiar versus unfamiliar risk: Comparisons of influenza and SARS in Korea. *Risk Analysis*, *26*(5), 1247–1257. https://doi.org/10.1111/j.1539-6924.2006.00812.x

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, *39*(1), 31–36. https://doi.org/10.1007/BF02291575

Khan, M., Kazmi, S., Bashir, A., & Siddique, N. (2020). COVID-19 infection: origin, transmission, and characteristics of human coronaviruses. *Journal of Advanced Research*, *24*, 91–98. https://doi.org/10.1016/j.jare.2020.03.005

Kok, G., Jonkers, R., Gelissen, R., Meertens, R., De Zwart, O., & Schealma, H. (2010). Behavioural intentions in response to an influenza pandemic. *BMC Public Health*, *10*(1), 174. https://doi.org/10.1186/1471-2458-10-174

Lin, H. C., & Chen, C. C. (2021). Disease prevention behavior during the COVID-19 pandemic and the role of self-esteem: An Extended Parallel Process Model. *Psychology Research and Behavior Management*, *14*, 123–135. https://doi.org/10.2147/PRBM.S291300

Maddux, J. E., & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology*, *19*(5), 469–479. https://doi.org/10.1016/0022-1031(83)90023-9

Markel, H., Lipman, H. B., Navarro, J. A., Sloan, A., Michalsen, J. R., Stern, A. M., & Cetron, M. S. (2007). Nonpharmaceutical interventions implemented by US cities during the 1918-1919 influenza pandemic. *Journal of the American Medical Association*, *298*(6), 644–654. https://doi.org/10.1001/jama.298.6.644

Pallant, J. F. (2000). Development and validation of a scale to measure perceived control of internal states. *Journal of Personality Assessment*, *75*(2), 308–337. https://doi.org/10.1207/S15327752JPA7502_10

Philippine Statistics Authority. (2016). *2010 Census-based population projections in collaboration with the inter-agency working group on population projections.* https://psa.gov.ph/sites/default/files/attachments/hsd/pressrelease/Table4_9.pdf

Poletti, P., Ajelli, M., & Merler, S. (2012). Risk perception and effectiveness of uncoordinated behavioral responses in an emerging epidemic. *Mathematical Biosciences*, *238*(2), 80–89. https://doi.org/10.1016/j.mbs.2012.04.003

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing and Health*, *29*(5), 489–497. https://doi.org/10.1002/nur.20147

Republic of the Philippines. (2020a). *An act declaring the existence of a national emergency arising from the coronavirus disease 2019 (COVID-19) situation and a national policy in connection therewith, and authorizing the President of the Republic of the Philippines for a limited period and subject to restrictions, to exercise powers necessary and proper to carry out the declared national policy and for other purposes:* Republic Act 11469, 23 March. Retrieved from https://www.officialgazette.gov.ph/2020/03/24/republic-act-no-11469/

Republic of the Philippines. (2020b). *Memorandum from the Executive Secretary on Community Quarantine over the Entire Luzon and Further Guidelines for the Management of the Coronavirus Disease 2019 (COVID-19) Situation*, 16 March. Retrieved from https://www.officialgazette.gov.ph/2020/03/16/memorandum-from-the-executive-secretary-on-community-quarantine-over-the-entire-luzon-and-further-guidelines-for-the-management-of-the-coronavirus-disease-2019-covid-19-situation/

Republic of the Philippines. (2020c). *Memorandum from the Executive Secretary on Community Quarantine over the Entire Luzon and Management of the Coronavirus Disease 2019 (COVID-19) Situation*, 18 March. Retrieved from https://www.officialgazette.gov.ph/2020/03/16/memorandum-from-the-executive-secretary-on-community-quarantine-over-the-entire-luzon-and-further-guidelines-for-the-management-of-the-coronavirus-disease-2019-covid-19-situation/

Republic of the Philippines. (2020d). *Memorandum from the Executive Secretary on Stringent Social Distancing Measures and Further Guidelines for the Management of the Coronavirus Disease 2019 (Covid-19) Situation*, 13 March. Retrieved from https://www.officialgazette.gov.ph/2020/03/13/memorandum-from-the-executive-secretary-on-stringent-social-distancing-measures-and-further-guidelines-for-the-management-of-the-coronavirus-disease-2019-covid-19-situation/

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *The Journal of Psychology*, *91*(1), 93–114. https://doi.org/10.1080/00223980.1975.9915803

Sadique, M. Z., Edmunds, W. J., Smith, R. D., Meerding, W. J., De Zwart, O., Brug, J., & Beutels, P. (2007). Precautionary behavior in response to perceived threat of pandemic influenza. *Emerging Infectious Diseases*, *13*(9), 1307–1313. https://doi.org/10.3201/eid1309.070372

Scarlet, S., & Associated Press. (2020, March 29). 300 people die in Iran drinking methanol in mistaken belief it cures coronavirus. *Mail Online*. https://www.dailymail.co.uk/news/article-8165403/Drinking-methanol-leaves-300-people-dead-1-000-ill-Iran.html

Shi, Y., Wang, Y., Shao, C., Huang, J., Gan, J., Huang, X., Bucci, E., Piacentini, M., Ippolito, G., & Melino, G. (2020). COVID-19 infection: The perspectives on immune responses. *Cell Death and Differentiation*, *27*, 1451–1454. https://doi.org/10.1038/s41418-020-0530-3

Shiloh, S., & Nudelman, G. (2020). Exploring dimensions of health behaviors' representations. *Psychology & Health*, *35*(8), 1017–1032. https://doi.org/10.1080/08870446.2019.1707828

Siu, W. (2008). Extended parallel process model and H5N1 influenza virus. *Psychological Reports, 102*(2), 539–550. https://doi.org/10.2466/pr0.102.2.539-550

Smith, R. D. (2006). Responding to global infectious disease outbreaks: Lessons from SARS on the role of risk perception, communication and management. *Social Science and Medicine*, *63*(12), 3113–3123. https://doi.org/10.1016/j.socscimed.2006.08.004

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson Education, Inc.

Vartti, A. M., Oenema, A., Schreck, M., Uutela, A., De Zwart, O., Brug, J., & Aro, A. R. (2009). SARS knowledge, perceptions, and behaviors: A comparison between finns and the dutch during the SARS outbreak in 2003. *International Journal of Behavioral Medicine*, *16*(1), 41–48. https://doi.org/10.1007/s12529-008-9004-6

Vickers, R. R., Conway, T. L., & Hervig, L. K. (1990). Demonstration of replicable dimensions of health behaviors. *Preventive Medicine*, *19*(4), 377–401. https://doi.org/https://doi.org/10.1016/0091-7435(90)90037-K

Weinstein, N. D. (1988). The precaution adoption process. *Health Psychology*, *7*(4), 335–386. https://doi.org/10.1037/0278-6133.7.4.355

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs*, *59*(4), 329–349. https://doi.org/10.1080/03637759209376276

World Health Organization. (2020a). *Advice on the use of masks in the community, during home care, and in health care settings in the context of COVID-19-interim guidance*. Retrieved from https://apps.who.int/iris/handle/10665/331493

World Health Organization. (2020b). *Coronavirus disease (COVID-19) advice for the public. Coronavirus Disease 2019*. Retrieved from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

World Health Organization. (2020c). *COVID-19: Operational guidance for maintaining essential health services during an outbreak-interim guidance.* Retrieved from https://apps.who.int/iris/handle/10665/331561

World Health Organization. (2020d). *How to use WHO risk assessment and mitigation checklist for mass gatherings in the context of COVID-19 interim guidance.* Retrieved from https://www.who.int/publications/i/item/how-to-use-who-risk-assessment-and-mitigation-checklist-for-mass-gatherings-in-the-context-of-covid-19

World Health Organization. (2020e). *Modes of transmission of virus causing COVID-19: Implications for IPC precaution recommendations.* Retrieved from https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations

World Health Organization. (2020f). *Operational considerations for case management of COVID-19 in health facility and community interim guidance.* Retrieved from https://apps.who.int/iris/handle/10665/331492

World Health Organization. (2020g). *Risk Communication and Community Engagement (RCCE) action plan guidance COVID-19 preparedness and response.* Retrieved from https://www.who.int/publications/i/item/risk-communication-and-community-engagement-(rcce)-action-plan-guidance

World Health Organization. (2021). *Advice for the public: Coronavirus disease (COVID-19).* WHO. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

Zhang, L., Seale, H., Wu, S., Yang, P., Zheng, Y., Ma, C., MacIntyre, R., & Wang, Q. (2014). Post-pandemic assessment of public knowledge, behavior, and skill on influenza prevention among the general population of Beijing, China. *International Journal of Infectious Diseases*, *24*, 1–5. https://doi.org/10.1016/j.ijid.2014.01.003