RESEARCH ARTICLE

Effects of health supplement self-medication learning media on health student behaviours during the COVID-19 pandemic

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Abstract

Background: Since the spread of the coronavirus disease (COVID-19), the misuse of health supplements during the pandemic has been very high. Knowledge and actions of supplement self-medication educational media ensure that students provide information on appropriate supplements to the larger community.   **Aim:** To determine the effects of various uses of health supplement self-medication learning media on the behaviour of health students based on the Health Belief Model.   **Method:** This quasi-experimental study used a pre-test and post-test control group design and enrolled 225 respondents selected by stratified random sampling. The statistical analysis used paired sample *t*-test.   **Results:** There was a significant relationship between learning educational media and increased knowledge ($p = 0.037$). Educational media also greatly influenced perceived self-medication behaviour, namely susceptibility ($p = 0.029$), benefits ($p = 0.014$), and barriers ($p = 0.028$).   **Conclusion:** Health and life science students, including the bachelor of pharmacy students, developed other self-medication educational media that are applied and beneficial to the community.

Introduction

The World Health Organization (WHO) is the international health agency under the United Nations that has declared a health emergency for coronavirus disease (COVID-19) (World Health Organization, 2021). In early 2021, COVID-19 cases in the capital city began to surge, with a total of 1,070 new COVID-19 cases or 51% of the findings. Of the additional 12,667 COVID-19 cases, 13.9% were children aged 0-18 years old (1,331 cases) and 6-18 years old (424 cases) (World Health Organization, 2021). In general, clinical symptoms among school adolescents were mild to severe. Additionally, most infections in children came from family groups or infected adults (Li *et al.,* 2021). With the high incidence of the disease, and since adults can potentially infect adolescents, adolescents are thus obliged to comply with health protocols and acquire self-medication knowledge (Ubi *et al.*, 2021).

Supplements for productive teenagers are needed for workers and students studying at home under high-stress levels during the pandemic (Sharma *et al.,* 2014). In the United States, 40% of productive adolescent girls and 30% of boys have used health supplements during COVID-19 (Helal, 2017). A study has reported that most teenagers consumed supplements either to maintain health or to increase stamina (49.4%), with about 40.6% of these supplements being used to treat obesity, prevent wrinkles (ageing process), and smooth rough skin (Klein *et al.*, 2011). Learning about supplementation is necessary to help students obtain the appropriate and correct information (Okyay & Erdoğan, 2017).

A practical step is to provide additional knowledge during the COVID-19 pandemic with multiple audiovisual media, such as animated videos, leaflets, or booklets. A total of 1.5 billion audiovisual media active users of animated videos and WhatsApp messenger

spread across 180 countries. Most audiovisual media application users are productive teenagers aged below 18, among whom an average WhatsApp user can check the application more than 23 times per day (Shqaidef *et al.,* 2021). In developing countries, the use of Zoom meetings has increased by 32% every year, with the population spending an average of four hours and 34 minutes on educational media per day (Sobaih, Hasanein & Abu Elnasr, 2020). Learning to self-medicate with health supplements during a pandemic is key to changing and improving student behaviour. This research aims to explore student behaviour with supplement self-medication based on the Health Belief Model (HBM), a cognitive model that explains healthy behaviour, focusing on perceived attitudes and beliefs of individuals (Ahadzadeh *et al.*, 2015).

Methods

Design

This online quasi-experimental study used a pre-test and post-test control group design to determine knowledge, perceptions, and attitudes of supplement self-medication based on the Health Belief Model (HBM). Knowledge was assessed with true/false questions and attitudes, while attitudes regarding self-medication with supplements were evaluated with items rated on a Likert scale. Prior to data collection, the questionnaire was piloted on 20 non-students to ensure validity and reliability. The validity coefficient of the questionnaire was 0.40, and the test-retest reliability was adequate (Cronbach's alpha = 0.92).

The questionnaire consisted of four parts. The first one covered sociodemographic characteristics of respondents, e.g. code, age, gender, education level, address, phone number, hours of internet use/day, service type (accessed), and self-medication characteristics, such as supplement type, dosage form, and sources of information. The second part assessed knowledge about supplement self-medication with 15 questions with true/false options. Knowledge scores were divided into good (between 75 and 100) and fair (below 75). The third part assessed attitudes regarding supplement self-medication with items rated on a 4-point Likert scale from 1-4 (strongly agree, agree, disagree, strongly disagree). The total attitude score was calculated by summing the answers and dividing the total by 100. Positive attitude (70-100%) and negative attitude (70%) were determined by the attitude score (score less than 70 %).

Population

The Ministry of Health manages seven bachelor's degree programmes in health and life sciences: environmental health, pharmacy, radiology, electromedical, nutrition, and dental health engineering. Respondents in this study were male and female pharmacy and other students. Students who did not return the questionnaire with their family history of working in the health sector were excluded from this study.

The study used the stratified random sampling technique to enrol 225 participants who were divided into three groups of 75 participants, depending on the means of receiving the information: Group A (e-leaflet via WhatsApp messenger); Group B (animated video animations via virtual meetings); Group C (control) completed the questionnaire only. In the first, second and third months of the study, Android phones were used to provide continuous health education on self-medication with health supplements. After three months, intervention groups A and B were evaluated for the research object's consistency in following the study course.

Data analysis

Descriptive statistics were used to report respondent characteristics. The paired-samples *t*-test was used to compare the differences of pre-test and post-test behavioural scores between intervention and control groups. Bivariate analysis determined the strength of the relationship of the educational media influence on health supplement self-medication behaviour during the COVID-19 pandemic.

Ethics

This study was approved by the Institutional Review Board (LB 02.01/I/KE/39/206/2021).

Results

The online survey was sent to 780 students of Jakarta II Health polytechnic of the Ministry of Health, of whom 225 agreed to participate and completed the study course until data submission (28.84% response rate). Female students contributed more than males, with 150 respondents (66.67%). Most participants were 17-19 years old (53.33%), second-year students (54.23%), and majoring in environmental health (25.34%) (See Table I). Table II displays the results of pre-test and post-test knowledge about supplement self-medication and the characteristics of HBM perception.

Table I: Demographic characteristics and patterns of learning media use of respondents

Sociodemographic characteristics	e-leaflet & WhatsApp messenger		Learning video & zoom meeting		Control		Total	(%)
	n=75	%	n=75	%	n=75	%		
1. Gender								
• Female	60	26.68	52	23.12	38	16.90	150	66.67
• Male	15	6.67	23	10.21	37	16.41	75	33.33
2. Age (years)								
• 17-19	42	18.67	45	19.99	33	14.67	120	53.33
• 20-22	33	14.67	30	13.34	42	18.66	105	46.67
3. Year of entry								
• 2019	28	12.44	33	14.66	42	18.67	103	45.77
• 2020	47	20.89	42	18.67	33	14.67	122	54.23
4. Department								
• Environmental health	20	8.89	25	11.12	12	5.33	57	25.34
• Electromedical engineering	17	7.55	12	5.33	18	8.00	47	20.89
• Radiology engineering	13	5.78	15	6.67	16	7.10	44	19.55
• Pharmacy	12	5.33	13	5.78	15	6.67	40	17.78
• Dental engineering	13	5.78	14	6.22	10	4.44	37	16.44
5. Internet usage time/day (hours)								
• 0-3	10	4.44	19	8.45	18	8.00	47	20.89
• 4-7	24	10.67	28	12.44	16	7.11	68	30.22
• 8-12	22	9.78	14	6.22	24	10.67	60	26.67
• 13-15	7	3.12	5	2.22	10	4.45	22	9.78
• >15	12	5.33	9	4.00	7	3.11	28	12.44
6. Service type accessed								
• Social media	35	15.55	36	16.00	38	16.89	109	48.44
• Science	26	11.56	34	15.11	19	8.44	79	35.11
• Games	14	6.22	5	2.23	18	8.00	37	16.45

Table II: Comparison between average knowledge scores and Health Belief Model perception of self-medication before intervention and after three months of intervention

Variable perception	Group	Means score		t-value	p - value
		Before intervention	After intervention		
Knowledge	e-leaflet + WhatsApp messenger	69.76±17.34	87.90±8.87	-16.957	<0.001
	learning video + Zoom meeting	73.48±16.47	82.42±9.18	-8.214	<0.001
	control	62.04±15.29	62.28±14.59	-1.687	0.096
Susceptibility	e-leaflet + WhatsApp messenger	68.72±9.24	82.45±6.55	-9.598	<0.001
	learning video + Zoom meeting	67.52±9.26	78.03±6.81	-6.982	<0.001
	control	67.20±11.24	67.40±8.99	1.355	0.108
Benefit	e-leaflet + WhatsApp messenger	69.71±7.33	83.47±7.79	-9.539	<0.001
	learning video + Zoom meeting	69.20±9.33	80.42±9.43	-6.138	0.000
	control	65.01±10.46	65.73±8.96	-1.285	0.203
Barrier	e-leaflet + WhatsApp messenger	68.96±8.77	79.41±8.52	-7.035	<0.001
	learning video + Zoom meeting	56.90±12.87	82.24±9.39	-11.942	<0.001
	control	64.96±10.66	65.23±9.94	3.925	0.074
Cues to action	e-leaflet + WhatsApp messenger	72.32±7.86	82.88±6.20	-8.187	<0.001
	learning video + Zoom meeting	72.96±9.15	80.32±10.56	-5.103	<0.001
	control	67.98±8.97	65.89±9.70	1.942	0.056

Note: The p - value is less than the alpha level: $p < 0.05$.

It shows that during the pre-test, knowledge mean values were 69.76±17.34 for the e-leaflet intervention group, 73.48±16.47 for the video animation group, and 62.04±15.29 in the control group. In the post-test,

values were 87.90±8.87, 82.42±9.18, and 62.28±14.59, respectively. Knowledge scores did not improve in the control group but significantly increased post-test in the intervention groups.

Four main perceived characteristics influence individuals fighting their illness during pandemics, i.e.

susceptibility, severity, benefits received, and health motivation. Researchers included two additional factors, i.e. barriers to treatment and cues to action. Table III shows the results for the following perceived aspects: susceptibility, benefits received, barriers to treatment, and cues to action.

Table III: Distribution of knowledge and attitude scores in the control and intervention groups

Factors	Group	Statistics	Knowledge		Total (F)		OR[‡]	p - value
			Good (%)	Enough(%)	Good	Enough		
Knowledge	Normal control	F	17	58	130	95	7.19	0.037*
		%	7.55	25.77	57.78	42.22		
	Video learning	F	53	22				
		%	23.56	9.78				
	e-leaflet learning	F	60	15				
		%	26.67	6.67				
Susceptibility perception	Normal control	F	49	26	139	86	7.08	0.029*
		%	21.78	11.56	61.77	38.23		
	Video learning	F	38	37				
		%	16.89	16.44				
	e-leaflet learning	F	52	23				
		%	23.11	10.22				
Benefit perception	Normal control	F	54	21	183	42	8.61	0.014
		%	23.99	9.33	81.33	18.67		
	Video learning	F	68	7				
		%	30.23	3.11				
	e-leaflet learning	F	61	14				
		%	27.11	6.22				
Barrier perception	Normal control	F	18	57	121	104	2.71	0.064
		%	7.99	25.34	53.77	46.23		
	Video learning	F	47	28				
		%	20.89	12.44				
	e-leaflet learning	F	56	19				
		%	24.49	8.45				
Cues to action perception	Normal control	F	41	34	143	82	7.34	0.028*
		%	18.22	15.11	63.56	36.44		
	Video learning	F	56	19				
		%	24.89	8.44				
	e-leaflet learning	F	46	29				
		%	20.44	12.89				

*‡ :Odds ratio of knowledge and attitudes; F% :Total frequency of knowledge and attitudes; *:The p value is less than the alpha level: p < 0.05*

Discussions

In this study, more than half of the students (64.7%) reported self-medication practices during the last three months during the COVID-19 Pandemic, confirming previous findings in 2019, where 70.4% of students practised self-medication (Bijani *et al*., 2019). Gender and age are some of the variables often associated with self-medication (Carrasco-Garrido *et al*., 2014). In this study, self-medication was higher in female students than in males, in line with previous findings (Mannasaheb *et al*., 2021).

Regarding knowledge, higher scores were obtained in both intervention groups. This finding is consistent with those of Alves (2021), showing adequate knowledge on self-medication (Alves *et al*., 2021). Another study from 2017 had reported that before the educational

intervention, levels of knowledge, sensitivity, intensity, and benefits of self-medication were the same in both intervention and control groups but increased for all components after the intervention (Kouhpayeh *et al*., 2017). In the control group, knowledge scores remained the same pre-test and post-test probably because most respondents majored in health and life science with different competencies (non-pharmaceutical expertise), so it was difficult for them to get information about supplement self-medication amidst the COVID-19 pandemic.

The health belief model (HBM) of supplement self-medication included four perceived behavioural values that increased significantly in the learning media groups, while it remained the same in the control group. As for the perceived susceptibility, there was a significant difference between respondents taking supplement self-medication before and after

intervention (p = 0.029; OR (Odds ratio of knowledge and attitudes) = 7,084). This finding is in line with that of Kouhpayeh and the authors (2017) on the effect of HBM-based educational interventions in the self-medication of housewives in Iran, showing a significant susceptibility to self-medication (Kouhpayeh *et al.,* 2017). A study in 2019 had reported that perceived susceptibility encouraged individuals but remained insufficient in determining actions to be taken, showing that the balance of benefits and costs is the driving force for someone to act (Bijani *et al.,* 2019).

After the intervention, perceived benefits (p = 0.014; OR = 8.607) and ability to act (p = 0.035; OR = 7.34) significantly increased in the learning media group. This result is consistent with previous findings showing an increase in both perceptions among Iranian medical students (Pirzadeh & Mostafavi, 2014). In this study, values of perceived benefits were slightly higher than the average in the three test groups before the intervention and significantly increased after the intervention in the e-leaflet and animated video learning media groups, eight times greater than the control group. Health education can be provided through media containing information on health supplement self-medication, such as leaflets, animated videos delivered via WhatsApp messenger, or Zoom meetings. Exposure to information in messages is conditioned by the Health Belief Model, resulting in changes in individual behaviour with increased knowledge. Learning media can help achieve the learning goals effectively and efficiently. Effectiveness in learning media achieves the desired learning objectives accurately and thoroughly. Effective learning media can convey information thoroughly to understand it well (Shang *et al.,* 2021).

Cues and actions are influenced by signals from external and internal factors, such as messages in the mass media, advice or suggestions from friends or other family members, sociodemographic aspects, such as education level, living environment, parental care and supervision, association with friends, religion, ethnicity, economic, social, and cultural circumstances, added to self-efficacy where people believe they can perform or display a certain behaviour (Kim *et al.,* 2012).

Several shortcomings and the need for more in-depth research appear to be acknowledged in this study, as it was conducted at only one health college, limiting the ability to generalise the findings. However, the results of this study were valid and representative due to the use of pre-validated questionnaires and an adequate sample size.

Conclusions

Self-medication socialisation activities through learning media are expected to change students' perspectives, especially behavioural attitudes based on the perceived value of the health belief model. In addition, the development and utilisation of media are not constrained by technology, geographical conditions, or communication networks. Thus, the media developed will be effectively used; therefore, health students, including pharmacy students, can design other self-medication educational media that are applicable and beneficial to the community.

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