THE EFFECT OF HEALTH E-BOOK MEDIA TOWARD HEALTH BELIEF MODEL (HBM) ON BEHAVIOR PREVENTION NEW VARIANTS OF COVID-19

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Abstract. **Introduction**: The United States federal agency recommends preventing work-related injury and illness, including infection of COVID-19 in the workplace. This study aims to identify and determine the effect of the Health E-Book media on the Health Belief Model (HBM) on New Varian COVID-19 prevention behavior.
Methods: The design study was a quasi-experiment with a control group. The sampling technique used was accidental sampling, and the sample was divided into two groups: the experimental group (exposed to Health E-books media) and the control group (Not exposed to E-books). Data was collected online. Processed data using the SPPS and analyzed using the chi-square test at 5% (α= 0,05) with a 95% confidence interval (CI)
Results: The study's findings were the effect of Health E-books on perceptions of barriers (p-value: 0.03, OR 3.16) and on perceptions of the benefits of preventing COVID-19 (P-value: 0.03, OR: 2.29). Moreover, the intervention group's results reveal a substantial influence of HBM on COVID-19 prevention behavior post-intervention E-books: Perception of self-efficacy (P-value: 0.01, OR: 8.21), Perceived barriers (P-value:0.006, OR: 4.38), perceived benefits (p-value:0.01, OR: 16.4) and cues to action (p-value:0.001, OR: 12.15).
Conclusion: The health e-books affect having positive HBM and are more positive in the perception of barriers and perceptions of the benefits of preventing COVID-19 and having a better effect on new variants of COVID-19 prevention behaviour. Furthermore, this study can be developed using digital health media to achieve the SDG 2030 for welfare employees.

Keyword: Effect, E-Books, Health Belief Model (HBM), Covid-19

BACKGROUND

Indonesia is a developing country that competes in the global industrial world. Every year, the number of workers continues to increase. In line with this, the number of work-related accidents and work-related illnesses continues to grow and occurs frequently. Cases of occupational injuries among workers in several industries are pretty high, even though preventive measures have been implemented[1]. Preventing illness in workers is one of the pillars of the 2030 Agenda for Sustainable Development (SDGs).

Today, the world has been shocked by the outbreak of SARS-CoV-2, which has spread rapidly in many countries, causing severe disease and ongoing human-to-human transmission, making it an alarming and serious public health threat[2]. United States federal agency recommends preventing work-related injuries and illnesses, including infection of COVID-19 in the workplace. The cost of the epidemic is not limited to the medical aspect, as the virus has caused significant sociological, psychological, and economic effects globally[3].

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The spread of COVID-19 has increased in groups or clusters of workers, reaching 272 cases with 20 clusters[4]. The working community significantly contributes to breaking the chain of transmission due to a large working population and mobility, as well as population interaction generally due to work activities[5].
Several alternative efforts to improve health through preventing illness in female workers have been carried out quite a lot, both by the Company by implementing health protocols and various efforts to improve nutrition and rest hours. Still, multiple causes, such as infectious diseases, namely illness due to COVID-19, continue to increase in company clusters.

The approach to certain information and education media shows significant differences[6]. A practical and target-focused educational approach through social media E-Books is expected to have a case-reducing effect. This approach uses technology, so empirical support for the affordability approach of adult information communication technology makes it an effective approach[7]. The study results show that providing education through E-books with the HBM approach can increase their knowledge regarding nutritional adequacy[8]. The Health Belief Educational approach can improve learning, attitudes, and behaviour. In addition, education or training and counselling based on the Health Belief Model can increase information, motivation, and skills for several women. Even though they work and are active in social and household activities, they still have free time and a high desire or interest in reading. The results of a preliminary study conducted through a survey showed that from 10 respondents, 70% of female workers have a high interest in reading, with 50% stating that they have free time to read and agree that there is a module (E-book) in electronic form which is delivered online. Therefore, these study aims were identified, and the effect of the Health E-Book media on the Health Belief Model (HBM) and its effect on COVID-19 prevention behaviour in manufacturing women employees was determined.

METHODS

Study setting and design

This study used a quasi-experimental design with a control group. In the experimental group, workers were given E-Books about improving and preventing COVID-19, while in the control group, they were not given E-Books.
Research time starts in March 2021, with locations in Manufacturing Companies. The research sample was employee workers because many company employees use women's services.

Study population and sampling procedure

The research sample was employee workers because many company employees use women's services. Determination of sample size using large for experimental testing:

$$n_c = \frac{2\left[Z_{1-\alpha} + Z_{1-\beta}\right]^2 \sigma^2}{(\mu_c - \mu_t)^2}$$

σ^2 = variance of the difference of 2 pairs mean = 1.72
Z1-α = z value at confidence interval 1-α = 1.64
z1-β = z value on the test power (power) 1-b = 80 % (2.84)
1 = estimated mean before intervention = 11.1
e estimate intervention = 13.31= $\frac{2[1,64+2,84]^2 \ 1,72^2}{(11,1-13,31)^2}$ = 64,5 (65)

The number of samples is at least 65 per group, so the total sample is at least 130.

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The sampling technique was purposive sampling with inclusion criteria: willing to be a respondent and work actively in a manufacturing company. The measure variables in a Google form application questionnaire consist of demographic variables, six HBM variables, and COVID-19 prevention behaviour. E-books ISBN 9786 2393 42869 were used for intervention. As for the results of the measuring variables, both the HBM variable and COVID-19 prevention behaviour, after testing the validity and reliability of 30 respondents who met the same characteristics as the research respondents, the results all showed valid (value > 0.365) and reliable. Method of measurement.

Data Collection and Variable measurement

Questionnaires were delivered through social media to respondents at the beginning of the study and after three months of intervention. Scoring uses a questionnaire that has been tested for validity and reliability by Soo-Foon Moey (2020), which includes the Health Belief Model (HBM) component proposed by Champion and Skinner (in Glanz, 2008). Likert scale is used to reveal the dimensions of Self-efficacy, perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and cues to action. The statements in the scale are favourable, na,mely statements that support the HBM variable object with a weighted value of Strongly agree = 5, Agree = 4, Neutral = 3, Disagree = 2, and Strongly Disagree,e = 1 and unfavourable, namely anti-object statements. attitude with a weighted value Strongly agree = 1 Agree = 2, Neutral = 3, Disagree = 4, and Strongly Disagree = 5 specifically for the perceived barrier variable. Behavioural Scoring: The number of statements to measure respondent behaviour in preventing COVID-19 disease is ten questions, with a scoring category of Always = 5, Often = 4, Sometimes = 3, ever = 2, and never = 1. The highest score for behaviour is 50, and the lowest is 5.

The scoring category for both HBM and behaviour variables uses a cut-off point average value. If the value is above average, then the HBM variable and the COVID-19 sample prevention behaviour are good, and if the value is below average, then the preventive behaviour is terrible.

Descriptive data analysis: univariately by measuring the Mean and Standard Deviation (SD) data for numerical data and frequency distribution for categorical data. Inferential analysis was conducted to examine the proportion difference between the independent and dependent variables in each group. The test used in this research is the chi-square test because the data are categorical, both independent and dependent variables, with the degree of significance used being 0.05 and the level of confidence being .%..

Ethic Consideration

The studies involving human participants were reviewed and approved by the Research Ethic Committee from Poltekkes Kemenkes Bandung (No. No. 78/EC/II/2022). The participants provided their written informed consent to participate in this study.

RESULT AND DISCUSSION

Socio-demographic Characteristics.

The number of the samples is 130 employees. The age group is 20-35 years (80%), while the level of education in Junior High School is 47.7%. The majority of marital statuses are married (62.3%). The highest parity was multipara (42.7%). Most, 75.4%, have received the Regional Minimum Wage (UMR: IDR. IDR 4,798,312). The majority of the length of work is 1 – 5 years (40.8%). The working time is mostly (96.2%) <= 8 hours each working day. Most (85 respondents) received an overtime policy, with the most overtime being 2-4 hours/overtime (62.4 %) (see Table 1).

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Table 1. Frequency distribution of respondents' socio-demographic characteristics

Socio-demographic Characteristics	Frequency distribution	
	f (%)	Mean(±SD)
Age		28.56(5.9)
-< 20 years old	7(5.4)	
- 20 – 35 years old	104(80)	
- > 35 years old	19(14,6)	
Level Education		
Junior High School	62(47.7)	
Senior High School	56(43.1)	
College	12(9.2)	
Merced status		
Married	81(62.3)	
No Merred	49(37.7)	
Paritas		1.34(1.0)
Nulipara	11(13.4)	
Primipara	36(43.9)	
Multipara	35(42.7)	
Pekerjaan		
-Bagian produksi	20(20.8)	
-Staf adminsitrasi	27(15.4)	
Supervisor	3(2.3)	
-Leader	4(3.1)	
-Quality control	2(1.5)	
Lainnya	74(56.9)	
Wage		Rp. 3.792.287 (Rp.1.674.198)
< RMW*	32(24.6)	
>= RMW*	98(75.4)	
Work experience		4.16(328)
< 1 year old	42(32.5)	
1 – 5 years old	53(40.8)	
> 5 years old	35(26.9)	
Job time		7.945(0.854)
<= 8 ours	125(96.2)	
> 8 ours	5(3.8)	

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Effect of E-Books on the Health Belief Model (HBM)

The effect of E-Books on the Health Belief Model (HBM) is described in Table 2. Based on the research, it appears that there is an effect of e-books on perceived barriers in preventing COVID-19 behaviour with a p-value of 0.03 and an Odds Ratio (OR) value of 3.16, which indicates that those who receive e-books have a change in perception of barriers to behaviour. In preventing COVID-19 by 3.16 times compared to those who did not get E-books. Research findings also show that there is an effect of e-books on increasing the perception of benefits in preventing COVID-19, with a calculated p-value of 0.03 and an OR of 2.29, which means that those who receive e-books have a risk of risk as much as 2.29 times more likely to perceive it's better to take the benefits of preventing COVID-19.

Table 2. Effect of E-Books on the Health Belief Model (HBM).

Intervention	Health Belief Model (HBM)											
	Self Efficacy		perceived barrier		perceived susceptibility		perceived severity		perceived benefits		Cues to action	
	Good	Not good	good	Not good	Good	Not good	good	Not good	good	Not good	good	Not good
	f(%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
-E-Books	30 (46.2)	35 (53.8)	45(69.2)	20(30.8)	33(50.8)	32(49.2)	29(44.6)	36(55.4)	34(52.3)	31(47.7)	28(43.1)	37(56.9)
-Non E-Book	32 (49.2)	33 (50.8)	27(41.5)	38(58.5)	27(41.5)	38(58.5)	32(49.2)	33(50.8)	21(32.3)	44(67.7)	17(26.2)	48(73.8)
p-value	0,86		0.03		0.35		0.72		0.03		0.06	
OR	0.86		3.16(1.5-6.5)		1.45(0.72-2.90)		0.83(0.41-1.65)		2.29(1.12-4.68)		2.13(1.04-4.47)	

OR=Odds Ratio adjusted

Effect of E-Books based on HBM on COVID-19 prevention behaviour

Those who received E-books had good self-efficacy with COVID-19 prevention behaviour; the percentage obtained was a p-value of 0.001 and an OR value of 8.21 as well as the effect of e-books on the Perceived Barrier in preventing COVID -19 who were good with their behaviour also showed that the highest percentage was significantly in the intervention group (74.1%) with a p-value of 0.006 and an OR value of 4.38. In addition, the effect of e-books based on HBM in the perception of the benefits of preventing COVID-19 is good with good behaviour; the percentage is very different (significant) in the intervention group, whereas in this group, 90.5% of the perception is good compared to the control group with a p-value of 0.001 with an OR value of 16.4. The influence of e-books based on HBM also occurs in the presence of signs to take reasonable actions in taking preventive measures for COVID-19; it appears that the percentage of good behaviour is more significant in the intervention group (88.2%) with a p-value of 0.001 and an OR of 12.15. (see Table 3).

Table 3. Frequency distribution of the Effect of Health Belief Model (HBM) post Intervention E-Books on new variants COVID-19 prevention behaviour.

Health Belief Model (HBM)	Control group				Intervention group			
	good	Not good	*p-value*	OR	Good	Not good	*P-value*	OR(Odds Ratio)
	f (%)	f (%)			f (%)	f (%)		
Self Efficacy								
Good	Not good	14(46.7)	0.28	1.67 (0.64-4.59)	25(78.1)	7(21.9)	0.01*	8.21(2.68-25.16)
Not good		21(60)			10(30.3)	23(69.7)		

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Perceived Barrier								
Baik	20(44.4)	25(55.6)	0.67	0.80(0.27-2.29)	20(74.1)	7(25.9)	0.006	4.38(1.48-12.88)
Kurang baik	10(50)	10(50)			15(39.5)	23(60.5)		
Perceived susceptibility								
Good	14(42.4)	19(57.6)	0.54	0.73(0.27-1.96)	17(63)	10(37)	0.21	1.88(0.69-5.17)
Not good	16(50)	16(50)			18(47.4)	20(52.6)		
perceived severity								
Good	11(37.9)	18(62.1)	0.23	0.54(0.20-1.47)	18(56.3)	14(43.7)	0.70	1.21(0.45-3.21)
Not good	19(52.8)	17(47.2)			17(51.5)	16(48.5)		
perceived Benefit								
Good	16(47.1)	18(52.9)	0.87	1.07(0.40-2.86)	19(90.5)	2(9.5)	0.001	16.4(3.42-80.81)
Not good	14(45.2)	17(54.8)			16(36.4)	28(63.6)		
Cues to Action								
Good	14(50)	14(50)	0.58	1.31(0.49-3.51)	15(88.2)	2(11.8)	0.001	12.15(51.1-0.50)
Not good	16(43.2)	21(56.4)			20(41.7)	28(58.3)		

*Chi-square

DISCUSSION

Socio-demographic of respondents

Several research results show that there are obedient attitudes and behaviours in the prevention of COVID-19, especially those related to socioeconomic as stated in a study that socioeconomic influences obedience in COVID-19 prevention behavior.[11]. These results are in line with research that shows that individual characteristics can influence the use of masks which are included as a political policy in the company such as overtime, the obligation to implement health protocols is something that must be obeyed by employees, where this policy is used as a decision making[12]. The results of other studies show that female gender, perceived barriers, perceived self-efficacy, fatalistic beliefs, perceived interest, and living in the city significantly influence COVID-19 prevention behaviour and also[13]. Compliance with preventive behaviour is strongly influenced by socio-economic, territorial, political, and individual factors in critical health situations[14].

Effect of E-books on the Health Belief Model (HBM)

E-books contain knowledge about how to prevent the spread of COVID-19 and improve health so that you have the body's strength to resist COVID-19 disease. This need is in line with the statement stating the need for proactive rather than reactive behaviour to adopt information[15]. The study results stated a significant difference in the value of knowledge, including beliefs and perceptions, between the intervention group and the control group[16]. Besides that, social media, such as E-books, can be used to get more targeted outreach during the pandemic[17]. The perceived severity of the impact of the COVID-19 disease has a significant positive effect on creating subjective norms[18]. A person exposed to related information will affect the perception, as concluded by the research results that the information collected will affect the perception and behavior[19]. E-books are social media, which is a collection of information that is used differently based on the characteristics and motivations of users[20]. In addition, media exposure has a positive effect on emergency preparedness behaviour and also on the perception of risk[21]. E-books are an effective medium that can be used at any time according to the reader's time, as well as a person's limited acceptance of media exposure due to his status as a worker. Information is not binding on time, duration, and place, which is very flexible for the recipient. Prolonged use of social media (more than 4 hours per day) is significantly associated with poor

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emotional health and difficulty improving behavior[22]. The findings of this study are also with the results of research conducted on nursing students who showed that they had a good score in preventing COVID-19; media exposure had been carried out on the HBM such as the perception of perceived benefits having a score of 26.52 (SD 4.08) and perceived barriers of 15. .17 (SD5.88) and cues to act 3.30 (SD1.70), self-efficacy 17.68 (SD2.83), and behavioral intention 18.46 (SD2.33)[23]. E-books as a medium of information have significant implications that are more broadly geared towards increasing the values of trust and good perceptions in the Health Belief Model (HBM).

Effect of E-Books Based on HBM on COVID-19 Prevention Behavior

The increase in several HBM values , such as the dimensions of Self Efficacy, perceived barriers, perceived benefits, and cues to action, is the influence of e-books media, which also has implications for behaviour change, including efforts to prevent COVID-19 through the COVID-19 vaccine program. Significantly, the effect of media use is very influential on behaviour change[24]. Another implication of this research can also help develop education and information about COVID-19 as the results of the study show that HBM: cues to action and self-efficacy can be used as an effective health promotion strategy to increase behavioural intentions and prevent the spread of COVID-19 locally and globally[25]. E-books, as part of social media, can influence behaviour, whereas the influence of social media can promote environmentally responsible behavior[26]. The results of other studies prove that the process of health campaigns can change persistent behavior[27]. Media use on other channels would be preferable[28]. Perceived confidence regarding COVID-19, uncertainty, and prevalence of appropriate precautionary response behaviour among survey respondents was relatively high, and their relationship was examined during the early stages of the outbreak in China[29]. In the HBM, cue to action, self-efficacy, and knowledge are significant predictors of preventive health behaviour. In the context of the coronavirus disease pandemic in adolescents, the health belief model can provide a valuable framework for planners to develop educational programmes[31]; another suggestion is that some may believe that infection is unavoidable by taking into account concerns, increased perceived severity, and possible infection is associated with a decrease in perceived effectiveness[32].

A person who is too careful and worried about health makes an individual vulnerable to developing the belief of being infected by COVID-19[33]. This lack of perception of public health risks is more common among illiterate people than literate people, which is why the coronavirus is increasing rapidly in Pakistan[34]. The presence of a perceived health threat from COVID-19 and belief in conspiracy theories have a significant relationship to future Anxiety[35]. The impact of perceived vulnerability on implementing protective measures is more substantial than cues for action[36]. It is important to consider community self-efficacy, perceived benefits, perceived barriers, and perceived vulnerability to COVID-19 to increase community compliance with the recommended safety measures for COVID-19[37]. Variables in the Health Belief Model show a significant relationship with behavior change[38]. A higher level of perceived threat, perceived control, and knowledge of how to keep oneself and others safe from COVID-19 have a significance for higher levels of adherence to COVID-19 mitigation strategies ($p < .01$) [39]. Psychological support is needed to overcome perceived obstacles so that they can carry out activities during the COVID-19 pandemic[40].

CONCLUSION

There is an effect of e-book media on decreasing perceptions of barriers and increasing perceptions of the benefits of preventing COVID-19. Besides, e-book media is influenced by HBM: Self Efficacy, perceptions of obstacles, benefits, and cues to action on COVID-19 prevention behaviour. The findings of this study can be used as a policy step by company leaders to make special routine health promotions for employees delivered via social media such as WhatsApp, Instagram, Twitter, and Facebook. Furthermore, a digital application specifically for health information can improve health and prevent illness for all

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company employees who are routine and sustainable so that they can be involved in achieving the level of welfare as stated in the 2030 SDG.

COMPETING INTERESTS

All authors had none to declare.

AUTHOR'S CONTRIBUTION

Mamat conceived of the presented idea, data analysis, and writing manuscript; Rahayu Dwikathi. Lia Komalasari and Meti Lestariwas in charge of data collection and analysis; and drafting the manuscript. All authors contributed to the final manuscript.

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