

Theory of planned behavior in creating disease prevention behavior

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Article Info

Article history:

Received Mar 17, 2023

Revised Aug 27, 2023

Accepted Sep 8, 2023

Keywords:

COVID-19 preventive behavior

Disease prevention behavior

Systematic review

Theory of planned behavior

ABSTRACT

Human behavior, in dealing with pandemic, becomes one of the key factors during the speed of an outbreak. In this way, individual and social responsibility are needed to determine behaviors, end the pandemic, and anticipate for the next outbreak. The purpose of this systematic review is to provide structured information about the results of applying the theory of planned behavior (TPB) in concern to create COVID-19 preventive behavior (CPB) as the case example. This systematic review was compiled by searching articles using the keywords "theory of planned behavior"[MeSH] AND COVID-19 preventive behavior. ("theory of planned behavior"[MeSH]) AND "hand disinfection"[MeSH]. "Theory of planned behavior" AND "social distancing." "Theory of planned behavior" AND "wearing mask." The search was obtained from PUBMED and Google Scholar. The 13 articles met the requirements to be reviewed qualitatively on the implementation of TPB. The results showed that TPB was effective to bring about the prevention behavior of infectious disease, such as COVID-19. Other significant aspects are intentions, norms, and behavioral control. The TPB model can be applied for health promotion in creating prevention behavior of infectious disease.

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1. INTRODUCTION

Since COVID-19, modern people are now realizing that the threat of pandemic may come at any time. The spread of COVID-19 has made experts and national leaders continue discussing and reach an agreement that the habits and behavior in dealing with pandemic becomes one of the key factors during the speed of outbreaks [1], [2]. In this way, individual and social responsibility is needed to determine behaviors, end the pandemic, and anticipate for the next outbreak.

This awareness turns everyone to realize the importance of being involved for prevention behavior of infectious disease and implement it for now on, even for the next generation [3]. While the world's governments continue on vaccinations for reaching herd immunity, actions and innovations in the public health sector must be conducted and taken to prevent, decelerate, and stop the spread of SARS-CoV2 [4].

The World Health Organization (WHO) has recommended protective behaviors since the beginning of the pandemic, namely the use of masks, 1 meter minimum of physical distancing, ethics when coughing and sneezing, self-isolation, hand hygiene of alcohol-based and disinfectants, and mini workouts to boost the body's immune system [5]–[8]. Growing and creating public health behavior that supports the prevention of infectious diseases is not an easy thing. The experts from various fields such as sociologists, psychologists,

and public health professionals return to comprehend what leads to successful behavior implementation. Thereby, several general behavioral theories have been used and re-examined [9].

The theory of planned behavior (TPB) still widely used to predict various health behaviors [10]–[12]. TPB hypothesizes a harmonious and positive relationship among 3 social-cognitive factors (attitudes, subjective norms, and perceived behavioral control), intentions, and finally an individual is willing to be involved and accustomed to applying good health behaviors [13]. TPB has been assessed that it is capable to explain the level of creation of individual behavior and intention in preventing infectious diseases before the COVID-19 [14], [15]. Even during the outbreak of SARS-CoV TPB was previously used to understand involvement in prevention acts such as wearing masks and washing hands [10].

Many studies have emerged regarding the preventive behaviors of COVID-19 with the TPB model to explain why individuals conduct preventive acts that support the prevention of disease transmission such as self-isolation at home, social distancing, mask-wearing, and handwashing [16]–[18].

However, the varied results and what factors influence the success of implementation of this theory still need to be studied. The purpose of this systematic review is to provide structured information about the results of applying TPB in concern to create prevention behaviors of infectious disease with COVID-19 as the case example.

2. METHOD

2.1. Search strategy

This systematic review has been compiled based on the preferred reporting items for systematic reviews and meta-analyses (PRISMA) [19]. The keywords used were "theory of planned behavior"[MeSH] AND COVID preventive behavior. ("Theory of planned behavior"[MeSH]) AND "hand disinfection"[MeSH]. "Theory of planned behavior" AND "social distancing". "Theory of planned behavior" AND "wearing mask". The search was obtained from PUBMED and Google Scholar.

2.2. Inclusion criteria

The free full text or open access published articles used English or Indonesian. The study design was cross-sectional, the statistical results were multivariate (adjusted RR or B), SE, and confidence interval (SE and adjusted B are mandatory). Research used path analysis design. The research subjects were 12 years old or older. The articles published from 2019 - January 2023. The instrument for assessing TPB and COVID-19 preventive behavior (CPB) had to be valid and reliable. The preventive measures included various activities recommended by WHO in anticipating the spread of the virus and administering vaccines.

2.3. Exclusion criteria

The published articles used Chinese, Japanese, Spanish and Arabic. Subjects aged less than 19 years. The articles were quasi-experimental case study designs, randomized controlled trial (RCT), observational, case reports, and case controls.

2.4. Quality assessment strategy and data synthesis

All full text versions from inclusion studies were independently assessed by all authors for relevance. The discussion forum was chosen to resolve differences of opinion between authors. The filtered data are presented in a flow table according to preferred items of systematic review and meta-analysis (PRISMA) items [20].

3. RESULTS AND DISCUSSION

Based on the results of the data search carried out in Figure 1, in the initial stage of the search 455 were obtained. However, after applying various inclusion and exclusion criteria, in the final process the results of 13 studies were obtained which will be discussed qualitatively in this review and presented in Table 1 (see Appendix) [21]–[30].

The results of our systematic review show that TPB is effectively applied to create prevention behavior of infectious disease, especially in the case of COVID-19. Some significant aspects include intention, subjective norms, and behavioral control. The reviewed studies have been conducted in various countries and populations so that the conclusions are more general and reliable.

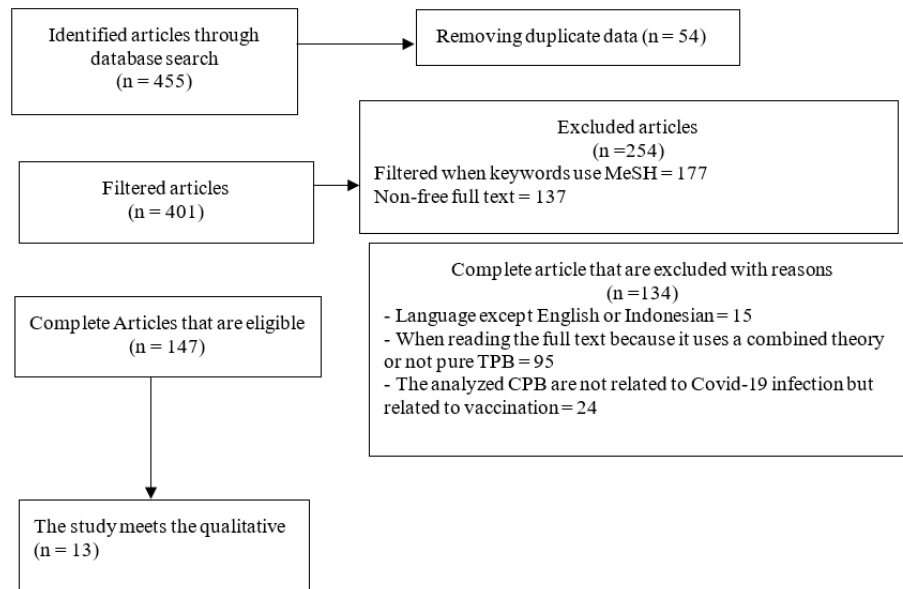


Figure 1. PRISMA flow diagram of literature search

Previous studies that stated the same results have also reported that the TPB is a health model that is capable and established to predict various health behaviors [31]. The relationship among attitude, subjective norms, and intention in health behavior has been proven positive and supportive mutually [32]. Other studies have also found a positive influence between the core construction of TPB and the intention to take preventive action such as social-distancing, even the influence of the construction TPB model can be expanded to involve driving factors such as perceived risk [33].

The influence of various components of TPB related to COVID-19 prevention behavior has also been predicted previously, namely 27% for behavior and 39% for intention [34]. Intention is also reported to be a significant factor in determining CPB, someone with the intention to disobey the CPB will be lower in obedience with CPB. On the other hand, strong intention to prevent infection will be more obedient for social-distancing, hand-washing, working from home, and mask-wearing [35].

Besides one's internal factors, external influences such as print or digital media exposure have been reported to significantly change perceived risk, attitude and subjective norms [36], [37]. Moreover, the review and implementation program should consider the differences in demographic characteristics such as gender, age, and area of living. The age difference in the research results shows that younger respondents have a stronger influence of the media and perceived risk [38], [39]. But a negative relationship related to the media is actually reported for people living in rural areas [40]. TPB can be applied to maintain preventive behavior in the prevention of COVID-19. In this way, they will support and comply with all calls for action that can prevent transmission or exacerbation of infections such as social distancing and wearing masks [41]. Full compliance is necessary because research has shown that compliance will decrease if someone knows someone else is violating [42].

The combined effect of social media exposure and location of residence has also been reported in research by Chen and Chen [43] rural residents who tend to experience gaps in implementing infectious disease prevention behaviors. People in rural areas have various limitations of information, geography, health facilities, economics and habits in carrying out daily lives [44]. For example, people in rural areas do not implement preventive behaviors such as social distancing, wearing mask, and even washing hands. In addition, studies in America and China report that rural residents rarely consume multivitamins, vegetables, and fruit [45]. This can increase their pain rate [46].

Another problem that arises in the community, especially in rural areas, is the low capture and understanding of information related to infectious diseases [47]. This is because the information conveyed by the media related to COVID and infectious diseases is more in urban areas, so rural people are not motivated to carry out prevention or covid preventive behavior [48].

One of the strategy that can be provide information and education in accordance with the needs and culture of the community as explained by TPB [49]. In addition, the selection of personnel in providing education is very important, such as in urban areas a strong role of media is needed but in rural areas the role of local health workers is still more trusted than social media. This is necessary so that information is conveyed properly [50].

4. CONCLUSION

TPB as a behavioral model can also be applied to maintain preventive behavior by maximizing the role of substance in behavioral control, social/subjective norms, and the effectiveness of intentions. Social or subjective norms become important factors because if individual has high subjective norms, they will assume that COVID-19 Prevention Behavior will benefit and matter for other people, the environment, and society. In this way, they will support and comply with social-distancing and mask-wearing as they find out that other people conduct it too. On the contrary, obedience decreases as individual finds out others violating.

APPENDIX

Table 1. Summary source from previous research

Study	Location	Subjects	Preventive behavior assessment	Results
[21]	2 hospitals in Konso region and 6 hospitals in Gamo region Country: Ethiopia	806 adults	Assessment of preventive measures uses questionnaire containing seven questions assessing personal prevention methods such as hand-washing (soap, water/alcohol, or both), avoiding eyes, nose, and mouth contact before washing hands, self-isolation, good etiquette when coughing, sneezing and mask-wearing when traveling.	Based on the TPB of this study, it is shown that subjective norm (SN) can influence prevention almost 5 times can influence intention to take preventive action 4 times, both factors are significant. In this way, that health care workers must try to build positive subjective norms and enhance people's self-confidence to control preventive behavior.
[22]	Public hospital in Hong Kong	122 nurses	Seven aspects of the questionnaire related to hand-washing behavior based on TPB, namely: 14 questions related to attitude beliefs, 8 question related to attitudes, 1 question related to subjective norms, 5 questions related to behavioral control, 2 question related to perceived behavior and 5 items related to intentions. Hand hygiene assessment is carried out by interviews and questionnaires related to hand hygiene knowledge.	The findings reveal that all indicator from TPB are significantly and positively related to hands hygiene behavior through intention. However, attitude has no effect on hand hygiene through intention and behavior in this study.
[10]	Quebec, Canada	3,183 people up to 18 years old	Measurements and TPB questionnaires are based on attitudes construction from all indicators of TPB.	The TPB construction is positively related to intention to follow social distancing program. The association among fear of COVID-19, discrimination against patients of COVID-19 the planned behavior construction.
[10]	Quebec, Canada	3,183 people up to 18 years old	Measurements and TPB questionnaires are based on attitudes construction from all indicators of TPB.	The TPB construction is positively related to intention to follow social distancing program. The association among fear of COVID-19, discrimination against patients of COVID-19 the planned behavior construction.
[1]	Italy	403 adults	The first questionnaire includes demographic questions and TPB'S measurements, intention, and perceived risk. The second questionnaire includes measures of target behavior. Each measure is assessed twice, once in relation to frequent hand-washing and another in relation to social distancing.	The findings show that all indicators in the theory are significantly related to hand-washing and social distancing through intention.
[4]	Indonesia	1,870 respondents	The questionnaire from seven point of TPB variables are measured, and 7 items related to the use of social media.	Two factors that influence the intention to do the social distancing are norms and control. Media exposure is found to determine attitudes, subjective norms, and perceived risk. The role of family and religious leaders is reported for being capable to increase and control people's behavior.
[23]	Belgium and French	1,060 French and 3,744 Belgian	The measured health behaviors are hand-washing, social-distancing, attitude, and intentions to assess the central dimension of planned behaviour theory.	The results show that social norm have a positive correlation with attitudes, control, and intentions for adherence to hand-washing and maintenance people distancing.
[24]	China	524 Students	Measurement with a questionnaire on hand hygiene and hygiene during sleep. TPB measurements include: Intentions, social norms, attitudes, perceived control, self-efficacy, action planning, and coping planning.	Positive attitudes, greater social norms, increasing perceived control and adherence to hand-washing and social-distancing, the TPB model is likely to implemented across countries.

Table 1. Summary source from previous research (*continue*)

Study	Location	Subjects	Preventive behavior assessment	Results
[25]	USA	507 adults	The TPB measurement and social-distancing are carried out by asking a series of questions related to opinions. Participants assess how far they agree with eight items assessing subjective norms, behavioral control and social distancing intentions.	Positive attitudes towards social-distancing increase at times. However, the subjective norms weaken and the perceived behavioral control (PBC) remains stable. Statistically, initial intention is significantly related to social-distancing behavior.
[26]	China	300 adults from Hongkong-Chinese ethnic	Social distancing is measured by asking questions based on 3 guidelines, namely: (NCPPI), (ASGS), and (PDPVS) (Ajzen 2019)	Positive attitude, behavioral control, and norms of subjective are associated with physical-distancing. The data show that the TPB generally supports the implementation of distancing in community to prevent COVID-19.
[27]	UK	300 adults	There are 17 preventive and precautionary behaviors assessed through a questionnaire on COVID-19 infection, namely: regular hand-washing, social-distancing, and mask-wearing. Moreover, there are online questionnaires regarding: (1) knowledge about the symptoms of COVID-19 (2) mental models of disease, (3) preventive behaviors.	General ability about cognitive and disease mechanism knowledge but not of the symptoms are predictors of adherence to preventive behavior in a pandemic.
[28]	USA	1,124 airline passengers fly into the United States	The questionnaire consists of demographics, travel experience and mask use, impact factors to wear a mask during flight, and willingness to pay more, as per previous research literature guidelines published by (Soroya <i>et al.</i> 2021). TPB is assessed by questionnaire.	Attitudes, descriptive norms, risk aversion, and information-seeking significantly influence tourists' intentions to wear masks. Further cohort analysis shows that these four factors influence the intention to wear a mask.
[29]	USA (Washington and Puerto Rico)	2,256 adults	Questionnaires are given to assess Preventive Behaviors including (washing hands, hand sanitizer, touching eyes, nose and mouth, physical-distancing with others, wearing a face mask, ethics when coughing and sneezing with elbow or tissue, and staying at home if sick). Each behavior is scored as yes =1 or no =0. Perceived Behavioral Control. Attitudes Towards Behavior Perceived Subjective Norms	The research proves that behavioral control, attitude, and subjective norms have significant independent associations to each preventive behavior. Moderation analysis reveals that for most behaviors, association with perceived behavioral control is stronger for older adults than for younger adults.
[30]	South Korea	545 adults	The survey questionnaires include Attitude (AT, 3 items), Subjective Norms (SN, 3 items), Perceived Behavioral Control (PBC, 3 items), and Intention (INT, 2 items), which are the factors in TPB, as well as 6 other items for demographic data and mask-wearing based on the regulation of Korean government.	The results of the study show that control influences the tendency to wear a mask. It is also important to simultaneously promote a positive attitude towards wearing masks so that the people believe that they can take full control of their own health.

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