Factors Influencing COVID-19 Prevention Behavior: A Community-based Cross-sectional Study

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Abstract

BACKGROUND: The coronavirus disease-19 (COVID-19) pandemic in Indonesia forced the local community to live in a New Normal era with several rules and health protocols that control the community's behavior on COVID-19 prevention and control. This policy enabled several districts in Indonesia to reopen their travel and tourism sectors including Banyuwangi. Although the Banyuwangi Government already taking action in the implementation of the New Normal in the travel and tourism sectors, the COVID-19 trend in Banyuwangi was significantly increased. This suggest that the violation to health protocols and new normal policy could exist in Banyuwangi.

AIM: This study aimed to identify the predisposition, enabling, and reinforcing factors in the COVID-19 prevention and control behavior and analyze factors that associated with the COVID-19 prevention and control behavior in Banyuwangi district local community.

MATERIALS AND METHODS: A cross-sectional study design was conducted. The data were obtained through online survey that was disseminated to Banyuwangi district local community. A descriptive, linear regression, and logistic regression analysis was applied.

RESULTS: The knowledge and attitude on COVID-19 preventive behavior of the 352 respondents in this study were poor and adequate, respectively. The predisposition factors associated with the COVID-19 prevention and control behavior in this study were sex ($p = 0.005$), level of education ($p = 0.028$), knowledge ($p = 0.015$), and attitude ($p \leq 0.01$). The reinforcing factor associated with the behavior was support from family ($p \leq 0.01$), key opinion leader ($p = 0.02$), and health worker ($p = 0.05$). Health facility and infrastructure were also found to be associated with the behavior ($p \leq 0.01$).

CONCLUSION: Several approaches and commitments from the policymakers to strengthen those factors are required to improve the behavior on COVID-19 prevention and control.

Introduction

The global pandemic, coronavirus disease-19 (COVID-19), has been the world's greatest threat since the end of December 2019. The first case of COVID-19 was found in Indonesia in 2020 causing the Indonesian government to declare an emergency disaster from February 29 to 29 May 2020 [1]. However, until now, the pandemic has not come to an end. COVID-19 is caused by the SARS-CoV-2 virus that attacks human respiratory system causing fever, dry coughing, dyspnea, headache, sore throat, rhinorrhea, and sometimes hemoptysis [2], [3]. The main route of COVID-19 is direct contact with people suffering from this disease [4].

On March 27, 2020, The Indonesian government took action in preventing and controlling the transmission of COVID-19 by announcing the health protocol where one of the components was the restriction to physical contact or physical distancing and social restriction. In Indonesia, the big-scale of social restriction was implemented to control the disease. The

social restriction was done by restricting local community activity in one area such as school, workplace, restricting religious activity, and restricting activity and events done in public places. This regulation aimed to prevent widening transmission in the area and was done by asking the local community to stay at home. Encouraging the community to implement individual-level prevention by taking care of their personal hygiene, increasing their immunity, and controlling comorbid was also part of the health protocol [5], [6].

However, the large-scale social restrictions had a big impact on Indonesian because they became unproductive and affected the public health, politics, and economic sector. In response to that, the government announced New Normal on June 1, 2020 by releasing Health Protocol in Public Places and Guidelines in Preventing and Controlling COVID-19 in the workplace and industry to support the business continuity during the pandemic. However, this became a boomerang since the COVID-19 cases in Indonesia was greatly increased after the New Normal. The East Java province was the second province with the highest COVID-19 cases in Indonesia after the New Normal

regulation was implemented. Banyuwangi district is located in East Java province and its cases were increasing each month. Banyuwangi district is the third most wanted holiday destination by Indonesian tourists. The New Normal regulation had been a breath of fresh air for the travel and tourism sector in Banyuwangi causing the government to open their travel and tourism but still hold on to the New Normal regulation. Although the Banyuwangi Government already taking action in the implementation of the New Normal in the travel and tourism sectors, the COVID-19 trend in Banyuwangi was significantly increased from April to October 2020 approximately 30–90% each month. A previous study in Ethiopia showed that the Ethiopian knowledge on COVID-19 prevention was good but the practice of COVID-19 behavior was still poor [7]. Thus, the violence of COVID-19 prevention and control regulation in Ethiopia could exist in Indonesia especially in Banyuwangi District.

According to the 1980 Lawrence Green theory, human's behavior was coming from their health level. Their health level was influenced by two main factors that are behavior causes and non-behavior causes. The behavior causes were manifested from predisposition, enabling, and reinforcing factors [8]. Predisposition factors were factors that manifested as attitude, belief, value, and sociodemography factors such as age, sex, education, and occupation [9]. The reinforcing factors were factors that manifested as physical environment and the availability of health facility and infrastructure. Finally, the enabling factors were factors that manifested as the attitude of health worker or others that become the reference group. Those factors could relate to the implementation of COVID-19 health protocol especially the behavior in the prevention and control of COVID-19 disease. This study aimed to identify the predisposition, enabling, and reinforcing factors in the COVID-19 prevention and control behavior and analyze factors that are associated with the COVID-19 prevention and control behavior.

Materials and Methods

This was observational analytic research conducted in November 2020 using a cross-sectional study design. The population of this study was the local community of Banyuwangi district. According to the population data of Banyuwangi district, the population in the district was 1,745,675 [10]. The inclusion criteria of this study were productive-aged (15–64 years old) residents who agreed to join this study by signing the informed consent. The sample size in this study was 318 and counted using the proportion-estimation formula [11]. To avoid dropouts and incomplete questionnaires filled by respondents, 10% were added to the result. Therefore, the total sample in this study

was 350 respondents. At the end of this study, there were 352 respondents. The inclusion criteria in this study were the respondents should be the citizen of Banyuwangi District, in the productive age group (18–64-years-old) when filling the questionnaire, and willing to join this study by agreeing the informed consent. Random sampling technique was applied in this study.

The instrument used in this study to collect the data was a questionnaire. The questionnaire distributed using various social media such as WhatsApp, Line, and Instagram by inserting the link that will be directed to Google Form. There were 29 questions in the questionnaire that has been tested using the validity and reliability test. Pearson-correlation test was used to test the validity of the questionnaire and the result was p = 0.278 showing that the questions were valid. The independent variables in this study were predisposition factors including the socio-demographic (age, sex, level of education, and occupation), knowledge, and attitude on COVID-19 prevention and control, the enabling factors (health facilities and infrastructure), and the reinforcing factors (family support, key opinion leader support, and health workers support). The dependent variable in this study was individual behavior in the prevention and control of the COVID-19 disease and the individual behavior in the prevention and control of COVID-19 disease in public spaces. In questions related to knowledge, respondent was asked to answer a multiple-choice question. For each right answer, the respondent was given 1 point and when they answered wrong answered the point given was 0. All points were accumulated and the mean score was counted.

The result of the mean score was categorized as follows: (a) <0.45 = very poor; (b) 0.45–0.59 = poor; (c) 0.60–0.74 = adequate; and (d) 0.75–1.00 = good. Questions related to other variables were scored in Likert scale: 1 = Never; 2 = Sometimes; 3 = Frequent; and 4 = Always. All scores were accumulated and the mean score was counted. The result of the mean score was categorized as follows: (a) 1–1.75 = very poor; (b) 1.76–2.50 = poor; (c) 2.51–3.25 = adequate; and (d) 3.26–4.00 = good.

Statistical analyses that were used in this study were descriptive, logistic regression, and linear regression. The logistic regression was used to analyze the association between the sociodemographic factors toward the perception of health risks. The linear regression analysis was used to analyze the association between predisposition factors such as knowledge and attitude, reinforcing factors, and enabling factors towards the behavior on COVID-19 prevention and control by local-community in Banyuwangi district.

The study protocol was approved by the institutional review board (IRB) of Universitas Airlangga faculty of dental medicine (No. 493-HRECC. FODM/XI/2020). Informed consent was confirmed by the IRB.

Results

In this study, the number of respondents recruited was 352. Most of the respondents were male (67.4%) and in the age category of young adult (18–25 years old) (68.6%). Most of the respondents were graduated from higher education (46.0%). In this study, most of the respondents were students (48.3%) and a few were honorary (3.1%) (Table 1).

Table 1: Characteristic of respondent

Variable	n (%)
Sex	
Female	115 (32.6)
Male	237 (67.4)
Age group (year old)	
Young adult (18–25)	241 (68.6)
Adult (26–45)	81 (22.9)
Older (> 45)	30 (8.5)
Educaton level	
Junior high school	9 (2.6)
Senior high school	117 (33.2)
Diploma	64 (18.2)
Higher (Bachelor, Master, Doctor)	162 (46.0)
Occupation	
Students	170 (48.3)
Private-sector employee	43 (12.2)
Factory worker	14 (4.0)
Honorary	11 (3.1)
Government employee	7 (2.0)
Housewives	86 (24.4)
Not working	13 (3.7)

Table 2 showed the score of each variable answered by the respondents. The mean composite score for knowledge was 0.47. This showed that the respondent's knowledge in this study was categorized as poor. The respondent's attitude means composite score in this study was 3.16. In this category, the cutoff category was different from the category used in the knowledge variable. Thus, the attitude of the respondents toward COVID-19 prevention and control behavior was categorized as adequate (Table 2).

The mean composite score for the health facility and infrastructure variable was 3.20 (Table 2). This showed that the support from the health facility toward the COVID-19 prevention and control behavior was categorized as adequate. Most of the respondents who the past 3 months attended hospital, public health center, independent doctor's practice, and clinic already implementing the COVID-19 prevention and control behavior since their mean score was between 3.26 and 4.00.

Family support was one of the reinforcing factors on one's behavior because the family was the first place where perception, attitude, and behavior were created as family's culture. In this study, support from family on one's behavior especially on COVID-19 prevention and control was categorized as adequate. In Table 2, more than half (53.98%) of the respondents have good support from the family on implementing the COVID-19 prevention and control behavior. Key opinion leader in the local community has a big role in decision-making. Table 2 showed that the mean composite score of support from key opinion leaders was 2.30. This showed that the support from key opinion

Table 2: Mean composite score of the questionnaire and frequency distribution of the respondent's score

Variable	n (%)	Mean composite score
Respondent's knowledge level toward the COVID-19 prevention and control behavior		0.47[a]
Very poor	95 (26.99)	
Poor	136 (38.64)	
Adequate	70 (19.89)	
Good	51 (14.49)	
Respondent's attitude toward the COVID-19 prevention and control behavior		3.16[b]
Very poor	2 (0.57)	
Poor	22 (6.25)	
Adequate	192 (54.55)	
Good	136 (38.64)	
Health facility and infrastructure toward the COVID-19 prevention and control behavior		3.39[b]
Very poor	1 (0.28)	
Poor	26 (7.39)	
Adequate	220 (62.50)	
Good	105 (29.83)	
Family support toward the COVID-19 prevention and control behavior		3.20[b]
Very poor	1 (0.28)	
Poor	27 (7.67)	
Adequate	134 (38.07)	
Good	190 (53.98)	
Key opinion leaders support toward the COVID-19 prevention and control behavior		2.30[b]
Very poor	85 (24.15)	
Poor	167 (47.44)	
Adequate	53 (15.06)	
Good	47 (13.35)	
Health workers support toward the COVID-19 prevention and control behavior		2.09[b]
Very poor	143 (40.63)	
Poor	125 (35.51)	
Adequate	52 (14.77)	
Good	32 (9.09)	
Individual behavior in the prevention and control of the COVID-19 disease		3.11[b]
Very poor	0	
Poor	25 (7.10)	
Adequate	202 (57.39)	
Good	125 (35.51)	

[a]The mean composite score's cut-offs: < 0.45 = Very poor; 0.45–0.59 = Poor; 0.60–0.74 = Adequate; 0.75–1.00 = Good, [b]The mean composite score's cut-offs: 1–1.75 = Very poor; 1.76–2.50 = Poor; 2.51-3.25 = Adequate; 3.26–4.00 = Good.

leaders in the community on COVID-19 prevention and control was poor. Health workers' support on COVID-19 prevention and control behavior was needed especially in socialization, education, and early detection of COVID-19. In this study, the mean composite score on support from health workers was 2.09. Thus, it showed that the support from health workers was poor.

More than 80% of the respondents in this study were not people at high risk of COVID-19 and not smoking inside their house. The mean composite of behavior in the prevention and control of the COVID-19 disease was 3.11. This showed that the behavior in the prevention and control of COVID-19 disease in the Banyuwangi's local community was adequate. In this study, respondents with good behavior were 35.51% meanwhile 64.49% have not been able to implement the health protocol, and none of the respondents was categorized as poor.

According to the result of the T-partial test, predisposition factors that were found to be associated with the individual behavior in the prevention and control of the COVID-19 disease were sex ($p = 0.005$), level of education ($p = 0.028$), knowledge (0.015), and attitude (<0.001) (Table 3). The results of the Influence test showed that the value of R squared was 0.206. This

Table 3: The results of T-partial test on the association of predisposition factors on the individual behavior in the prevention and control of the COVID-19 disease

Predisposition factors	p
Sex	0.005
Age group	0.182
Level of education	0.028
Occupation	0.113
Knowledge	0.015
Attitude	< 0.001

*p < 0.05.

showed that the relationship between the independent and dependent variables was weak due to the value being closer to 0 and the diversity of the independent variable only explains 20.6% of the dependent variable. The analysis of variance (ANOVA) test result showed that p < 0.001 thus this showed simultaneously that each independent variable was giving influence to the dependent variable.

The results of the T-Partial test showed that family support (p ≤ 0.001), key opinion leader support (p = 0.02), and health worker support (p = 0.05) were associated with individual behavior in the prevention and control of COVID-19 disease (Table 4). Test on the influence of independent variables toward the dependent variables was applied in the model showing that the value of R was 0.585 and the R squared in this study was 0.342. The result showed a weak relationship between the reinforcing factors and the individual's behavior since the value is closer to 0 and the diversity of the independent variable was only explained by 34.2% of the dependent variable and the rest was explained by other factors. The enabling factor that was studied in this study was the health facility and infrastructure. The results of the ANOVA test showed that there was an association between the health facility and infrastructure and COVID-19 behaviors (p ≤ 0.001).

Table 4: The results of T-partial test on the association of reinforcing factors on the individual behavior in the prevention and control of the COVID-19 disease

Reinforcing factors	p
Family support	< 0.001*
Key opinion leader support	0.02*
Health worker support	0.05*

*p < 0.05.

However, the results of the ANOVA test in this study showed that, simultaneously, each independent variable was associated with a dependent variable due to the result of p < 0.001. Thus, reinforcing factors in this study were influencing the individual's behavior in the prevention and control of COVID-19 disease.

Discussion

Predisposition factors are categorized as internal factors. In this study, the predisposition factors that influence the COVID-19 prevention and control behavior were sex, knowledge, and attitude. Most of the respondents in this study were female. A previous study showed that women were easier to express their fear and more vulnerable to anxiety on their health risk compared to men [12]. Moreover, most of the respondents in this study were 12–25 years old and working as students. At that age, the respondent was suspected to be very productive and have high curiosity to pay attention on social issues such as COVID-19. The previous study in other country also supported our finding that female is more likely to use the COVID-19 prevention actions compared to men [13], [14]. This could be happened because women were having more active response than man do since women are more vulnerable to crises and more sensitive to risk.

In this study, knowledge was also found to be associated with the individual behavior in the prevention and control of the COVID-19 disease. The community knowledge especially in preventing the transmission of the Sars-Cov-2 virus was very useful in suppressing the transmission of the virus [15]. By having better knowledge, someone would have the ability to choose and decide on how to overcome this problem [16]. In this study, the mean composite score of the local community in Banyuwangi was 0.452 showing that they had poor knowledge on the prevention and control behavior of COVID-19 disease. However, this study was inconsistent with the other study in different areas in Indonesia, Jakarta, where 83% of respondents had better knowledge on the prevention of COVID-19 [17]. This could be due to the weighing of the questions and the researchers in this study were giving questions that led to one right or wrong answer. Meanwhile, in this study, the respondent was expected to choose the right answer from the options provided. According to the distribution of the answer, most of the respondents was having poor knowledge of the incubation period of COVID-19 and the duration of washing their hands. However, most of the respondents already had better knowledge on understanding on preventing the transmission of COVID-19, implementation of coughing and sneezing ethics, social distancing, and becoming physically active in the pandemic era. The previous study in Australia found that health literacy was associated with knowledge on COVID-19 disease so people with lower health literacy were facing difficulty in finding information and understanding the government messaging about COVID-19 [18]. Therefore, when they could not understand the information, it is possible that they have negative prevention behavior in COVID-19 disease. Thus, it is important for the government to regularly evaluate the information's accessibility and understandability.

Reinforcing factors are factors that strengthen the behavior including the worker's attitude, reference group, and key opinion leader. In this study, reinforcing factors that were significantly associated with the COVID-19 prevention and control behavior were support from family, health workers, and key opinion leaders. The previous study in Thailand also shared

the same result that supportive family was associated with two times better COVID-19 prevention behavior because family support was associated with improved well-being [14]. In this study, the support of family in the COVID-19 prevention and control behavior was categorized as adequate because most of the respondents answered that they live in a place where no one smoking inside the house, hand washing facility is available, eating a balanced diet, and each of the family members were reminding each other to follow the health protocol outside the house. The family could be implied as a primary social context to promote health and prevent diseases [19]. The function of a family could be a very important principle since the family is the basic unit in implementing healthcare toward the member [20]. Moreover, Friedman describes one of the health-related functions in the family as the health-care function. This function is intended to protect and maintain the health condition of the family member because the family could give prevention-type of healthcare to take care of the sick family member [21].

In this study, key opinion leader was associated with COVID-19 prevention behavior. Key opinion leader in this study was described as the head of the neighborhood association and religious leader. The study in China found that the earlier opinion leader participates, the faster the information on COVID-19 become popular [22]. The support from key opinion leaders in COVID-19 prevention and control behavior was poor among the local community of Banyuwangi. Education and socialization of COVID-19 prevention were low. Education could increase the local community's knowledge especially on the prevention and controlling action of COVID-19. Moreover, most of the respondents in the religious talk did not get the topic on COVID-19 prevention and control. Socialization using the religious talk approach could be one of the options to increase the respondent's knowledge. The circulated rumor, hoax, and conspiracies about COVID-19 could affects public's trust toward the government that may lead to negative effects on the preventive behavior thus, key opinion leader held an importance role as a local voice that can amplify the public health messages and help to build trust that needed to spur the prevention behavior toward COVID-19 [23]. Thus, key opinion leader should not treated only as information carriers but partnership between government and opinion leader to framing directive strategy that could work for them is encouraged [24].

The support from the health worker was found to be associated with the behavior in preventing and controlling the COVID-19 disease. The mean composite score in this study showed that the support from healthcare workers was poor. According to the Indonesia Health Protocol, the support that should have been given by the healthcare worker toward the society is by helping the neighborhood association leader to analyze the health status of the neighborhood members, partnering with the neighborhood association in the detection of COVID-19 cases, giving inputs to the neighborhood association leader to give education to the member on COVID-19, health and hygiene behavior, and healthy community movement [6]. Health worker could support the preventive behavior by giving adequate amount of information especially those who susceptible and it is important for the health worker to be equal, showing empathy, becoming better listener, and correctly explaining to build better behavior [25].

The enabling factor in this study was health facility and infrastructure. Our result showed that health facility and infrastructure was associated with COVID-19 prevention behavior. Most of our respondents agreed that health-care services were more accessible when the duration was faster and the distance was shorter. The previous study showed the same result that when the distance was increased, the rate of the utilization of health service was decreased [26]. Health facility served as a gold standard in implementing the health protocol on the prevention and control of COVID-19. This could be a learning experience on the COVID-19 preventive behavior for those who came to health facility. One of the health protocols is social distancing. This should be implemented too in health-care service as the preventive behavior toward COVID-19. Thus, telemedicine should be more popularized to maintain avoid large crowds [27].

In line with the results of this study, the recommendation that could be suggested to the Banyuwangi-district government was to set up regulation to sub-district and associated agencies to increase the knowledge, attitude, support from family, key opinion leaders, and health workers to enhance the COVID-19 prevention and control behavior in Banyuwangi-district area. The Banyuwangi governments should create a partnership with key opinion leader to shape the right strategy that could be implemented by the local-community. Implementation of these regulations requires substantial engagement from the local community. Moreover, socialization and implementation on the use of telemedicine to avoid large crowd in health facility was needed.

Conclusion

Factors associated with the COVID-19 prevention and control behavior were sex, education level, knowledge, attitude, health facility and infrastructure, support from family, key opinion leaders, and health workers. The knowledge level of the local community, support from key opinion leaders, and health workers in this study were poor. Thus, several approaches and commitments to strengthen those factors should be done by the policymakers. According

to our knowledge, this is the first study using Lawrence Green's theory in analyzing the COVID-10 prevention and control behavior. The sample size in this study was exceeding the requirements. However, there were several limitations in this study such as only using one factor in describing the enabling factor. Moreover, in this study, we were employing multiple choice questions for measuring knowledge. Thus, the limitation was the respondents could luckily guess and get credit for correct answers. It could look like they knew something when actually they did not. Hence, there was a possibility that the result might be biased. Thus, the future research could anticipate the biases by employing more advanced questionnaire to avoid lucky-guess and assess the cultural custom and sociocultural factors on their influence in the establishment of COVID-19 prevention and control behavior [28].

Ethics Approval and Consent to Participate

This study was approved by the Institutional Review Board of Universitas Airlangga Faculty of Dental Medicine (No. 493-HRECC.FODM/XI/2020) and performed in accordance with the principles of the Declaration of Helsinki.

Availability of Data and Materials

The datasets are not publicly available due to the respondent's privacy and ethical consideration but are available from the corresponding author on reasonable request.

Authors' Contributions

Conceptualization: E and NBD; Formal analysis: NBD; Methodology: E and NBD; Project administration: NBD; Resources: NBD; Supervision: E; Writing–original draft: E and NBD; and Writing-review and editing: all authors.

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