Determinants and Adoption of Coronavirus Prevention Measures among Residents of Addis Ababa: A Health Belief Model

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Abstract

Given the significance of addressing the knowledge gaps in the prevention and control of the disease, this study examined the knowledge, perceptions, and behaviour of individuals about COVID-19 in Addis Ababa. A cross-sectional survey was conducted between March and May 2020 via internet-based and face-to-face surveys using a health belief model (HBM)-informed questionnaire. A purposively sampled of 250 individuals from all sub-cities, aged18 and above took part in the study. Both descriptive and inferential statistics were employed to analyse the data. The findings showed that a large majority of respondents had appropriate knowledge about the symptoms and transmission mechanisms of COVID-19. Only around half of the people surveyed thought they were unlikely to acquire the disease. The majority of those surveyed said that taking preventative measures (proper hand washing, keeping physical distance, and staying at home) was critical in combating the disease. A large majority of the respondents reported difficulty in implementing the recommended preventive actions and a significant positive correlation was found between educational level and adoption of preventive actions. There was a discrepancy between respondents' level of knowledge of the importance of taking coronavirus transmission prevention measures and the reported actual practice. Failing to translate knowledge about sickness symptoms and transmission pathways into behavioural action/change might obstruct measures to virus-combating. The study concluded that lack of knowledge or shortage of information among the population is not a prominent challenge, but resistance and negligence to adhere to COVID-19 preventive measures are. Hence, policy measures should be targeted at dealing with resistance and negligence.

Keywords: COVID-19; prevention; behavioural change; adoption; health belief model; Addis Ababa

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1. Introduction

A new COVID-19, SARS-CoV-2, that sparked a respiratory disease outbreak in Wuhan, China, has been creating chaos around the world. The COVID-19 disease 2019 (hereafter referred to as COVID-19) outbreak was reported in December 2019, and the World Health Organization (WHO) declared it a pandemic on 11 March 2020 (Ensheng, Hongru, Gardner 2020; World Health Organization 2020). Perhaps the world is going through one of the most difficult times in its history. The rapidly growing casualties, the continued outbreak of new cases and variants, the ongoing exponential transmission raise public concern; the disease has caused social anxiety around the world. The disease has affected several countries posing major health, social and economic risks. In particular, poor people are likely to be exposed to the virus (World Economic Forum 2020; United Nations 2020).

The popular knowledge in the literature is that the disease is much more than biological matters as people's behaviour, cultures, lifestyle as well as economic and political life have a profound influence on their level of exposure to it. The best way to prevent and slow down the transmission of the COVID-19 is to be well informed about it and implement preventive measures, which has much to do with people's behaviour and culture (World Health Organization 2020). Enhancing the capacity of clinics and hospitals, testing, strict quarantine of infected patients, social distancing, campaigns for hand washing, and cough etiquette have been commonly used (World Health Organization 2020). As the disease spread in many countries around the globe, Ethiopia reported its first COVID-19 case on the 13th of March 2020 (Ethiopian Ministry of Health & Ethiopian Public Health Institute, 2020). The disease has had a considerable social and economic impact on the country (Alemayehu 2020). A recent study underlined that, among other things, the growing urbanization and interaction with countries around the world, poor preparedness will pose challenges to the country's response to the pandemic (Yayehyirad and Mirgissa 2020). Despite these challenges, the country has stepped up prevention measures to combat the outbreak of COVID-19. Several precautionary measures have been implemented to deal with the potential consequences of the disease. Efforts have been made to raise awareness about the disease and promote

preventive measures via media outlets, religious institutions, and health education campaigns.

A prior study noted that providing mass education and awareness building at all levels could be one of the optimal interventions to prevent and control pandemics (YayehYirad and Mirgissa 2018). Nevertheless, informal observation and media reports have revealed that people are not taking the warning seriously or are unable to properly implement them. As the COVID-19 pandemic continues to be a threat in Ethiopia, there is a pressing need to implement optimal strategies for promoting healthy behaviour among the public. Adopting a healthy behaviour can help prevent diseases, decrease morbidities, improve the quality of life, and decrease healthcare costs (Phoenix and Winnie, 2010). Developing and strengthening strategies that target controlling COVID-19 require a substantial and long-term commitment of human and material resources. Such strategies would be successful if shaped by theories and research which provide them with tools to understand the nature of the problem.

Several health behaviour theories have been employed to investigate factors that are associated with preventive health, such as the Theory of Planned Behavior (Ajzen 1991), the Transtheoretical Model (Prochaska, DiClemente and Norcross 1992), and the Health Belief Model (Rosenstock 1966). However, the Health Belief Model (HBM), developed in the 1950s to investigate why people fail to undertake preventive health measures, remains one of the most widely employed theories in the design and evaluation of health behaviour interventions (Glanz, Rimer and Lewis 2002; Champion and Skinner 2008).

The HBM encompasses four dimensions: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Perceived susceptibility posits that the more an individual perceives the risk of developing a disease, the more likely he or she will be to engage in behaviours that reduce the risk of developing the disease. Perceived severity includes the negative consequences an individual associate with a certain condition. The third dimension, perceived benefits, refers to individuals' evaluation of adopting new behaviour to minimize the risk of developing diseases. The fourth

dimension, perceived barriers, is the most powerful dimension of HBM. This refers to an individual's assessment of the obstacles to behaviour change (Janz and Becker 1984; Glanz *et al.* 2002).

Individual-level factors that substantially affect level of engagement of individuals in health-protective behaviours include risk perception of the pandemic, perceived effectiveness of the recommended containing strategies, self-efficacy of engaging in health-protective behaviours and emotional experiences during the pandemic (Abdelrahman, 2020; Broomel *et al.* 2020). Health risk communication strategies views individuals' perception of the disease as a persuasive drive for behaviour change which may help explain public reactions to COVID-19 (WHO, 2017).

Although recently published studies (Nana *et al,* 2022, Addis *et al.* 2022, Hailemichael *et al.* 2022, Mohammed and Mehd, 2021) have investigated individuals' understanding and perceptions of COVID-19. The complex and ever changing nature of human health behaviour warrants a thorough and additional investigations about public awareness and practices related to COVID-19 in Ethiopia. The benefit of accurate perception about diseases and encouraging preventive health is supported by past studies on behaviours during pandemics. Studies conducted in Japan (Takahashi et al. 2017), USA (Freiman *et al.* 2011) and Pakistan (Khowaja *et al.* 2011) have shown that having an accurate understanding of disease and early adoption of preventive strategies i.e., avoiding large gatherings and keeping personal hygiene could lower the adverse consequences of pandemics.

The adoption of recommended preventive measures could be influenced by individuals' perceptions about pandemics (Lin et al. 2014). Due to the continued threat posed by the pandemic, vaccine hesitance and limited access to vaccination for COVID-19 at this juncture, there has been a great focus on the social-behavioural interventions to encourage preventive actions which require understanding people's knowledge, perception, and adherence to some of the recommended actions. In Ethiopia, much was not known about the level of preventive awareness and/or about the most adopted preventive practices in relation to COVID-19 and associated factors, which made this study compelling. This study examined

individuals' knowledge, perceptions, and behaviour towards COVID-19 and associated factors. This study was conducted in Addis Ababa with the financial support of Addis Ababa University.

2. Methods

2.1. Study Setting

The study was conducted between March and May 2020 in Addis Ababa (AA). With 4 million estimated dwellers in 2017, AA is the largest city in Ethiopia and home to about a quarter of the country's urban population. The population density was 5,165 people per square kilometre (Word Population Review, 2020). A significant portion of the population of the city lives in crowded and substandard housing, has limited access to water, and uses crowded public transit every day. Most of the country's restaurants, bars, and entertainment places are found in the city. Informal observation reveals that people appeared to be reluctant to wear facemasks and maintain social distancing in such locales; thereby making the places hotspots for transmission of the virus. Due to this, the city could be greatly affected by the disease. Most of the confirmed cases before the commencement of this study were from Addis Ababa. A report has shown that out of the 68,820 total cases, 37,826 (55%) were from Addis Ababa (Ethiopian Public Health Institute, 2020).

2.2. Study design, population and sampling

To address the aim of the research a cross-sectional survey was conducted. Employing survey method was helpful to capture widely held understandings, perceptions as well as behaviour against COVID-19. Data were collected between March and May 2020 via internet based survey and face-to-face individual interviews. All residents of Addis Ababa above the age of 18 were eligible to take part in the study. About 165 individuals were first contacted through email, phone, and in-person and asked to complete the internet survey. The overwhelming majority (160) were willing to participate in the internet survey. Because conducting numerous face-to-face structured interviews during COVID-19 proved problematic, the internet survey was the recommended choice. However, many people in the city do not have internet access. Using an internet survey as the main means of data

collection may result in bias and underrepresentation of residents who do not have access to the internet. As a result, 90 more face-to-face interviews with people who agreed to participate in the survey were done.

2.3. Instrument and measures

The research adopted a health belief model (HBM) questionnaire in the context of COVID-19 (Champion 1993). The questionnaire consisted of 31 items divided into three sections addressing HBM's dimensions and socio-demographic status. The first section explored the demographic characteristics of respondents and the second section focused on evaluating respondents' knowledge and perceptions of COVID-19. The third section assessed the major preventive actions adopted by the respondents. The questionnaire was initially developed in English and was translated into Amharic before being checked for accuracy and back translated into English. To test the validity of the items, we tested the survey with 5 individuals, two of which were experts. These individuals were not included in the main survey. The pilot indicated that the questionnaire was unacceptably long, and some items could be confusing for respondents. We then corrected the survey questionnaire in a manner that eliminated those limitations. Google form was used to design the questionnaire for the internet survey. We then sent out a link to the form via emails, text messages, and Facebook. Three data collectors, who have completed college-level education and who had previous experience of doing surveys, conducted face-to-face interviews with individuals at their workplaces and residents. Necessary precaution such as wearing facemask and washing hands between interviews were taken to avoid COVID-19 risk.

2.4. Measures

Dependent Variable

Preventive actions: This was measured using nine indicators of people's adoption of preventive measures such as avoiding handshaking and practicing proper handwashing. Respondents were asked to indicate how often they have been practicing the recommended preventive measures as "never", "sometimes" and "always". "Never" responses were given 0 point, each "sometimes" category was assigned 1 point and "always" responses were given 2 points. The scale showed good consistency (Cronbach's

alpha= 0.74). Nevertheless, Shapiro-Wilk test proved that scores were not normally distributed across the population (W=0.87p=.00). Thus, the data were collapsed into two dichotomized variables. Scores below the median (4-15) were labelled as "less likely to adopt preventive actions (0), while those scores above the median (scores 16-18) were labelled as "more likely to adopt preventive actions (1).

Independent variables

Perceived seriousness: This refers to a person's perception of the seriousness of contracting an COVID-19. The respondents were asked to rate the seriousness of COVID-19 and other diseases such as TB and HIV/AIDS on a scale of 1 to 5 where 1 indicates "not serious" and 5 indicates "extremely serious".

Self-efficacy: This refers to the level of a person's confidence in his or her ability to successfully perform preventive actions against COVID-19. A four-point Likert-type scale was used to assess respondents' confidence in preventing oneself from contracting COVID-19, TB, common cold, and HIV/AIDS, using the scale "not confident", "somehow confident", "quite confident", and "very confident".

Perceived susceptibility: This refers to a person's subjective perception of the risk of acquiring COVID-19. A four-point Likert-type scale was used to examine respondents' opinions regarding developing COVID-19   and other diseases such as TB and HIV/AIDS in the coming six months, using the scale, "very unlikely", "unlikely", "likely" and "unlikely".

Perceived benefit of preventive actions: This refers to a person's perception of the effectiveness of various actions available to reduce the risk of developing COVID-19. A four-point Likert-type scale was used to assess the level of agreement with recommended preventive actions (e.g., Proper hand washing is a good way to prevent COVID-19), using the scale "strongly disagree", "disagree", "agree", and "strongly agree".

*Barriers to action***:** This concerns the obstacles individuals perceive regarding their participation in recommended preventive behaviours against

COVID-19. A four-point Likert-type scale was used to assess the level of agreement with statements (i.e. I don't stay at home as often as I would like to because of work), using the scale "strongly disagree", "disagree", "agree" and "strongly agree".

***Knowledge about transmission methods*:** This refers to individuals' understanding about COVID-19. Knowledge about transmission mechanisms was based on five questions. Respondents were asked to answer to each statement as "true,", "false" or "I don't know" (e.g., You may contract COVID-19 from touching a surface or object the virus is on, then touching your mouth, nose). Each accurate response was assigned one point and then added to get a total score.

Other independent variables: We also included selected socio-demographic characteristics such as gender, age, and educational level.

2.5. Data Analysis

The survey data were entered into Statistical Package for Social Scientists (SPSS) version 20 software by trained programmers after coding some open-ended responses. Univariate analysis was conducted to assess the most common accurate understandings and adopted preventive strategies among the respondents. Pearson's correlation test was also conducted to see the association between demographic variables, perceived efficacy, susceptibility, severity, benefit and barriers, and preventive actions towards COVID-19. We also ran logistic regression to predict the likelihood of adopting preventive actions for respondents with different levels of knowledge, educational background, and perceptions.

2.6. Ethical considerations

Addis Ababa University and other relevant organizations granted permission to conduct research in Addis Ababa. Furthermore, after providing information and clearly describing the study's purpose to each respondent, verbal agreement was gained from the study participants. They were informed that participation was completely voluntary, that they may withdraw at any moment, and that they could decline to answer any questions if they so desired. Confidentiality and anonymity were maintained

throughout the process. Participants' identities are not mentioned in this report. With regards to anonymity, personal identification information such as names, ID numbers, phone numbers, house numbers etc. are not collected in this study.

3. Results

A total of 250 residents of Addis Ababa took part in the survey, of whom 46.8% were females and 64% had college or university education. Over half (51.2%) of the individuals were single/never married and about 43% reported to be head of their respective households. The mean age of the study participants was 31.49 with a standard deviation of 9.72 (Table 1).

Table 1. Demographic and social characteristics of the study participants

		N (250)	%
Gender	Female	117	46.8%
	Male	133	53.2%
Level of education	No formal schooling	42	16.8%
	Grades 1-6	19	7.6%
	Grades 7-12	24	9.6%
	Vocational/Technical	5	2.0%
	College/university	160	64.0%
Marital status	Single/never married	128	51.2%
	Married	107	42.8%
	Divorced	9	3.6%
	Separated	5	2.0%
	Widowed	1	0.4%
Position in the household	Head	107	42.8%
	Head's spouse	38	15.2%
	Child	81	32.4%
	Relative	12	4.8%
	Employee	5	2.0%
	Other	7	2.8%
Age	Mean age	31.49 (*SD= 9.72*)	

3.1. Knowledge about symptoms and transmission ways of COVID-19

One of the objectives of the study was to find out the level of respondents' knowledge of the symptoms and transmission paths of COVID-19. The

analysis showed that a significant majority of the respondents could identify most of the symptoms of COVID-19; about 95% of the respondents identified fever, 92% identified dry cough and 91.6% recognized shortness of breath to be a symptom of COVID-19. This is of little surprise as information about the disease was widely communicated through awareness-raising campaigns. Respondents with no formal education were found to have lower knowledge about symptoms of COVID-19 compared to respondents with formal education. For example, an overwhelming majority (96.8%) of the respondents with formal education recognized shortness of breath could be a symptom of the virus compared to 72.3% of the respondents with no-formal education ($\chi2$ (1) = 26.58p = .000). Similarly, about 80% of the respondents identified fatigue as a symptom of COVID-19 compared with 47.6 % of the respondents with no-formal education ($\chi2$ (2) = 10.08p = .002).

Table 2. Knowledge about symptoms of COVID-19, by educational level

	Fever	Dry cough	Shortness of breath	Fatigue
Accurate response N (%)	213(85.2%)	208 (83.2 %)	206 (82.4%)	171 (68.4%)
No-formal education[*]N (%)	29 (69.0%)	26(61.9%)	23 (54.8%)	20 (47.6%)
Formal Education N[*] (%)	184 (88.5%)	182(87.5%)	183 (88.0%)	151 (72.6%)

*Significant at p<0.001

The study further analysed respondents' knowledge about transmission routes of COVID-19. Encouragingly, an overwhelming majority (96%) of the respondents were cognizant that COVID-19 is a communicable disease. Moreover, almost all respondents (99.6%) reported that the disease can be contracted by touching a surface or an object that has the virus on it, then touching one's mouth, nose, or eyes. On the other hand, the study observed that there was some disparity between respondents with and without formal education in recognizing other transmission methods. About 72% of the respondents with formal education believed that COVID-19 can be transmitted in any climate condition including hot climates compared with 21.4% of the respondents without formal education ($\chi2$ (1) = 37.87p = .000). Similarly, only 16.7% of the respondents with no-formal education believed that shaking hands with people without symptoms of the disease can

transmit the virus compared to almost 80% of the respondents with formal education, who had the same notion ($\chi2$ (1) = 62.50p = .000). We found no correlation between age and gender and knowledge about transmission methods of COVID-19.

Table 3: Knowledge about transmission method, by educational level

	Accurate response (Total) N (%)	No-formal education N (%)	Formal education N (%)
COVID-19 is a communicable disease	240 (96.0 %)	42(100%)	198(95.2%)
COVID-19 can be transmitted in any climate condition including hot climates *	158 (63.2%)	9 (21.4%)	149(71.6%)
Somebody can have COVID-19 without having symptoms*	201(80.4%)	24(57.1%)	177(85.1%)
You may contract COVID-19 from touching a surface or object the virus is on, then touching your mouth, nose, or possibly your eyes	249 (99.6%)	41(97.6%)	208(100%)
Shaking hands with people without symptoms of COVID-19 can transmit the virus*	171 (68.4%)	7(16.7)	164(78.8%)

*Significant at p<0.001

3.2. Perceptions related to COVID-19

3.2.1. Perceived seriousness

Perceived seriousness of an illness, which can be based on the consequences of the disease or individuals' perceptions about lack of effective treatment for the illness, can influence taking preventive actions. Figure 1 depicts that the majority of respondents perceived COVID-19 to be either a very serious (26.8%) or an extremely serious condition (57.6%). This is a higher figure

compared to the perceived extreme seriousness of HIV/AIDS (54%) and TB (38.4%). Hence, the results show that individuals indeed perceived the pandemic as being serious, leading to the observation that lack of perception of seriousness was not a major issue in the fight against the pandemic.
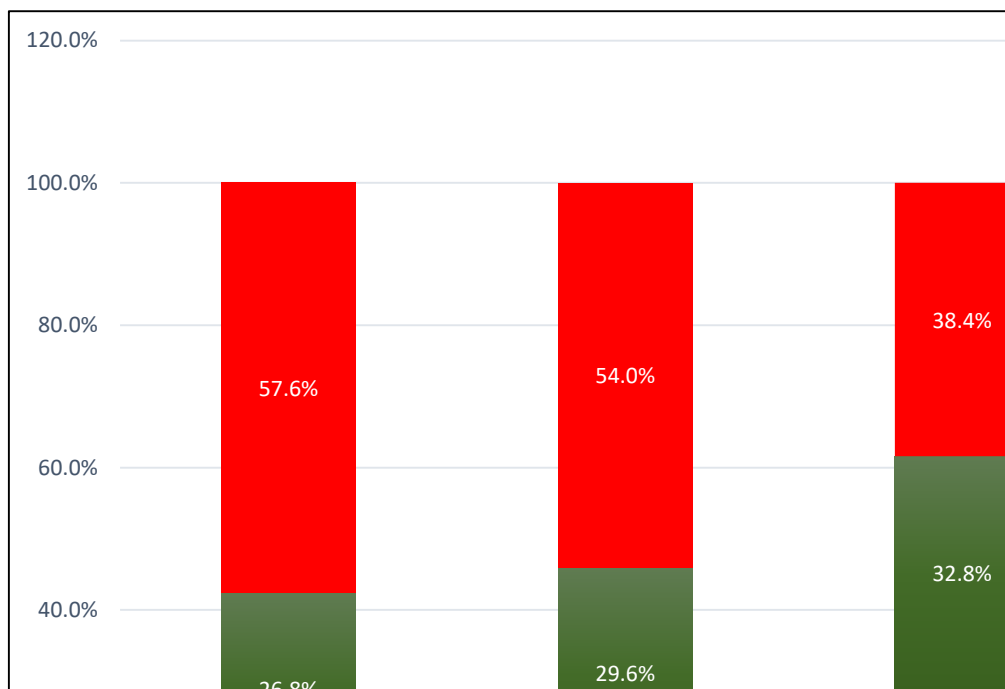

Figure 1. Perceived Seriousness of COVID-19 and other diseases

3.2.2. Perceived susceptibility

The study further assessed respondents' perceived susceptibility to COVID-19. Figure 2 shows that 43.2% of the respondents believed that they are unlikely to acquire the disease. On the contrary, 39.2% of the respondents believed that they are likely to contract COVID-19 The analysis also shows that about 90% and 76.8% of the respondents had a subjective belief that they are unlikely to contract HIV/AIDS and TB, respectively.
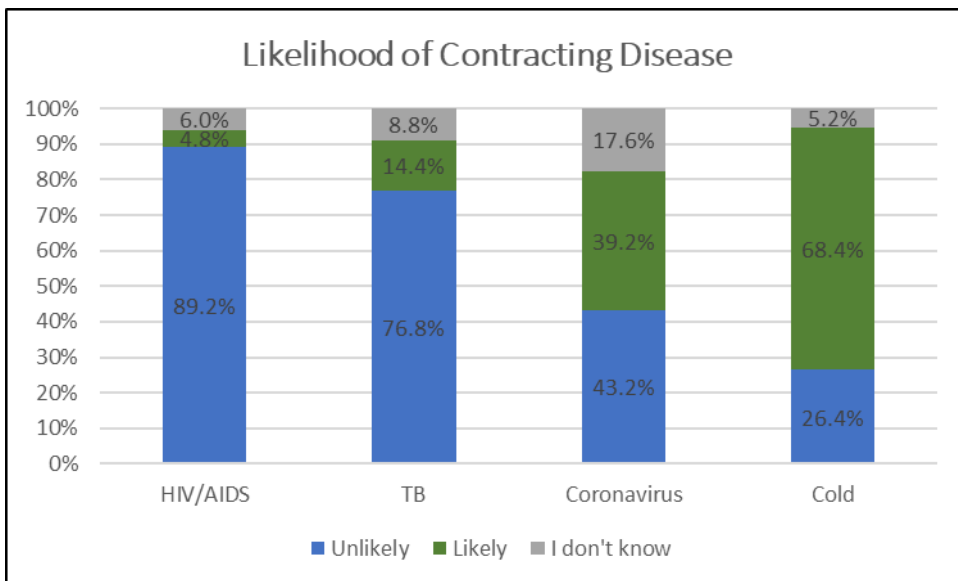
Figure 2. Perceived susceptibility to COVID-19 and other diseases

3.2.3. Perceived Self-efficacy

The study also assessed respondents' self-belief in protecting themselves from COVID-19. The analysis reveals that 35.6% of the respondents stated that they are not confident in themselves to prevent getting infected with COVID-19 while only 6.8% of them found to be very confident. The table also shows that 20% of the respondents were very confident in protecting themselves from TB.

Table 4. Confidence in one's ability to prevent contracting COVID-19 and other diseases

	Not confident	Somewhat confident	Quite confident	Very confident
COVID-19	35.6%	43.6%	14.0%	6.8%
Common cold	33.2%	35.6%	19.6%	11.6%
HIV/AIDS	12.8%	8.4%	34.8%	44.0%
Tuberculosis (TB)	18.8%	34.8%	26.4%	20.0%

3.2.4. Perceived benefit of preventive actions

The HBM posits that the more individuals perceive preventive actions to be beneficial, the more likely they are to adopt them. Table 5 shows that the majority of the respondents believed that the recommended preventive

actions are important to reduce the risk of developing COVID-19. Nearly half of the respondents (47.6%) strongly believed that staying home is a good way to prevent getting COVID-19. In addition, about 46% of the respondents strongly agreed with the statement that says proper hand washing is a good way to prevent COVID-19.

Table 5. Perceived benefit of preventive actions against COVID-19

	Strongly disagree	Disagree	Agree	Strongly agree
Proper hand washing	9.2%	1.6%	42.8%	46.4%
Keeping physical distance	10.4%	2.0%	43.6%	44.0%
Staying home	10.4%	6.8%	35.2%	47.6%

3.2.5. Barriers to take preventive measures

Understanding the barriers to preventive actions is important to fully grasp why individuals behave the way they do in the context of a pandemic like COVID-19. The study further assessed respondents' opinion regarding the difficulty of adopting recommended preventive measures. Figure 3 reveals that 64.8% and 62.8 % of the respondents don't stay at home as often as they want as they need to go out to buy stuff and due to their work, respectively. Additionally, nearly half of the respondents reported that they do not keep personal distance as often as they would like because of a lack of sufficient spaces in public places.
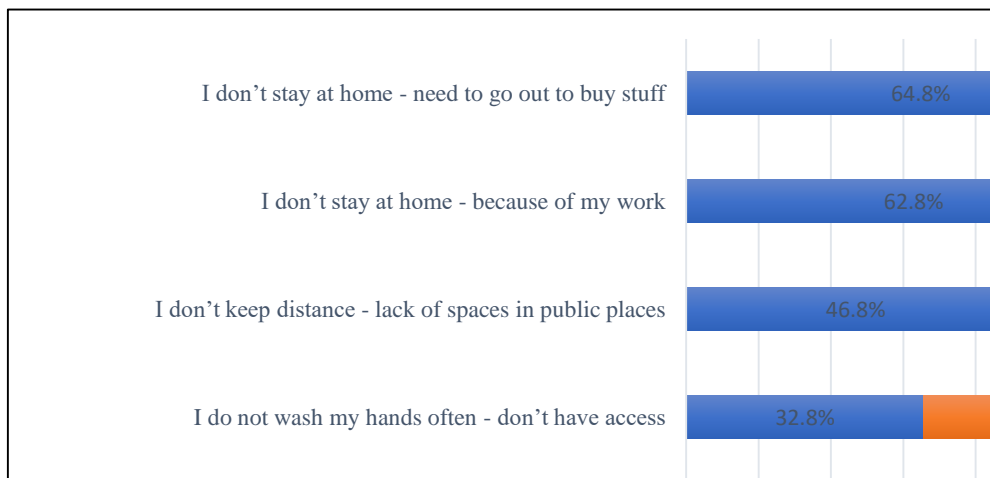

Figure 3. Barriers to preventive actions

3.3. Reported Preventive Practices

The analysis shows that the significant majority (89.6%) of the respondents reported they wash their hands properly. Over 54% of the respondents further reported that they implement physical/social distancing as a preventive strategy while almost half of the respondents said that they clean hands using sanitizer/alcohol.

Table 6. Reported preventive actions

Reported preventive Actions	%
Washing hands properly	89.6%
Physical/Social distancing	54.4%
Cleaning hands using sanitizer/alcohol	49.2%
Staying at home	44.8%
Wearing masks	24.8%
Keeping hands away from your eyes, nose, and mouth	16.8%
Staying away from people who are coughing	7.2%
Using religious preventive medicine	6.0%
Taking traditional preventive medicine	5.6%
Avoid going to hospitals for visiting	1.2%
Avoid going to hospitals for treatment	0.4%

3.4. Factors associated with the implementation of preventive actions

Overall, 54.4% of the respondents were found to be more likely to adopt preventive actions. We ran Pearson's correlation test to examine the association between adoption to preventive actions and socio-demographic variables and elements of the HBM. There was no significant association between gender and age and adherence to preventive actions. However, there was a significant positive correlation between educational level and adoption to preventive actions (r=0.32 $p<0.001$). We also found a modest positive correlation (r= 0.20$p<0.001$) between adoption to preventive actions and knowledge about transmission methods. Furthermore, there was a moderate positive correlation (r=0.28, $p<0.001$) between adoption of preventive actions and perceived benefit of preventive methods. Likewise, there was a statistically significant association between self-efficacy and adoption of preventive methods (r=0.22, $p<0.001$). Paradoxically, the association between adoption of preventive actions and perceived severity and susceptibility was not statistically significant.

Table 7. Correlation between preventive actions and variables of HBM and educational level

Variables	1	2	3	4	5	6	7	8	9	10
1. Preventive actions	-									
2. Perceived severity	.00	-								
3. Perceived susceptibility	-.03	0	-							
4. Knowledge of transmission routes	.20**	-.01	-.09	-						
5. Perceived benefits of preventive actions	.28**	-.08	.04	.21**	-					
6. Barriers	-.29**	.04	.04	-.15*	.16**	-				
7. Self-efficacy	.22**	.00	-.13*	-.02	.09	-.30**	-			
8. Educational level	.32**	-.27**	-.02	.48**	.15*	-.12*	.04	-		
9. Gender	-.04	-0.02	.04	.03	-.06	.09	-.09	-.01	-	
10. Age	.06	0.05	.12*	-.08	.00	.01	.06	-.03	.15*	-
M	15.03	4.32	.58	4.08	6.74	8.04	.92	.83	.52	31.49
SD	2.7	1.0	1.02	1.0	0.7	3.7	0.8	0.3	0.5	9.7
Range	4-18	1-5	0-4	2-5	1-7	0-18	0-3	0-1	0-1	18-67

*** Significant at p< 0.01; *Significant at p< 0.05*

The variables found to be significant in bivariate analyses were tested in multivariate logistic regression to predict the adoption of preventive strategies against COVID-19. Having some formal education, inability to employ some preventive methods, self-efficacy, and perceived benefit of preventive actions were significantly associated with a higher likelihood of implementing preventive measures. Respondents who had attended formal schooling had 3.8 times the odds of (95% CI: 1.58 ±9.44) adopting more preventive actions as those without formal education. For each unit increase in the perceived benefit of preventive action score, the odds of adoption to preventive actions increased by a factor of 2.5 times (95% CI: 1.36 ±5.64). Similarly, for each unit increase in self-efficacy, the odds of adopting preventive methods increased by a factor of 1. 4 ((95% CI: 1.03 ±2.08).

Table 8. Multivariable logistic regression models testing factors associated with the implementation of preventive actions

Independent variables	Implementing preventive actions		
	B	OR	p-value
Constant	-7.06	0.01	0.005
Formal education (reference no-formal education)	1.352	3.86	0.003
Barriers	-.01	0.88	0.002
Perceived benefits of preventive actions	1.02	2.77	0.005
Knowledge about transmission methods	-.03	0.96	0.819
Self-efficacy	0.38	1.47	0.005

Model chi square: 288.73 p<0.05, Pseudo R2=.20, N=250

4. Discussion

The present study shows that linking health communication campaigns and other preventive measures to health beliefs may be beneficial, and that HBM may be a useful method for assessing COVID-related health behaviours.

The findings showed that many respondents had accurate knowledge about symptoms and transmission methods of COVID-19. Lack of formal schooling was associated with a lack of accurate understanding of the disease which is consistent with studies on other pandemics such as

HIV/AIDS (Ahmed et al. 2017; UNAIDS 2006). Lack of formal education could have limited individuals' access and ability to understand information about COVID-19. In addition, individuals with formal education are likely to be capable of translating and adapting to the information provided by peers, the media, and health education campaigns (UNAIDS, 2006). To reach out to those without formal education, awareness-raising efforts should take this into account and create a simplified approach with easy-to-understand messaging in different languages. The study contradicts studies (Alsan *et al.* 2020; Wise *et al.* 2020) that found differences in the use of preventive measures based on age, gender, and other socio-demographic factors. There was no link between age and gender and understanding of COVID-19 transmission mechanisms in the current study; indicating the two genders and different categories of people may have similar access to health information.

It is encouraging to find that many respondents believed COVID-19 to be a threatening condition. The HBM suggests that if individuals evaluate the consequence of getting a disease to be significant, they are likely to be motivated to take preventative actions. Scholars recommended employing vicarious reinforcement to change perceptions of individuals with the ultimate aim of improving the adoption of recommended preventive actions. Vicarious reinforcement highlights the learning by imitation model of learning. This theory suggests that people could learn the seriousness of disease by observing what has happened to people who have contracted a disease in mind (Orji, Vassileva and Mandryk, 2012). Patients' experiences should be depicted in health education messaging to assist people understand how terrible the condition could be with some variants. Ex-patients being invited to the media to discuss their experiences with the sickness might highlight the severity of the disease's ramifications. However, considering COVID-19 as a serious condition and developing fear alone may not always result in a positive outcome. Strong fear appeals are thought to generate the greatest behaviour change only when people believe they are effective in avoiding disease (Van Bavel *et al.* 2020). With changing variants and experience of having COVID-19, individuals may develop an assumption that the pandemic is not a concern anymore. Interventions should prepare new messages about new variants, about the

benefit of the vaccines and protective measures and using successful testimonials from experience of high-risk groups.

Sociologically speaking, the pandemic period is characterized by uncertainty and the risk of shaking up the existing social order, as storms of fear demand rapid response. There would be widespread perception that it is beyond the control of an individual. Such unusual situations pose substantial risks and have an impact on how society reacts to new diseases on both an individual and institutional level. To re-establish sufficient certainty for practical action, preventive interventions could examine locally viable resources and methods. Previous pandemic experiences, such as HIV in the 1980s and the Black Death in 14th-century Europe, demonstrated that new waves of fear, despair, contempt, and call - to - action can be contained with the use of suitable and contextually feasible scientific tools (Robert D. et al 2013).

Individuals' confidence in their capacity to succeed in doing an activity has been proven to impact people's behaviour in previous research, according to Jones and colleagues (2014). However, the majority of those surveyed felt they had a lesser risk of contracting COVID-19. If this assumption is based on a misunderstanding, it will have negative effects. People should be informed that they are susceptible to the COVID-19 and will stay so unless they take precautions. This affirms that adoption and implementation of preventative actions by residents was determined to be insufficient, necessitating a more comprehensive plan and engagement. Our research also found that more than half of respondents were confident in their ability to protect oneself from the COVID-19. The report also indicated that having higher confidence in one's skills might impact the adoption of preventative measures.

Individuals with poor self-esteem may question their capacity to prevent contracting COVID-19. This underlines the value of health behaviour intervention planners paying close attention to self-efficacy and designing treatments that prioritize self-efficacy. The majority of respondents in this study agreed that taking preventative measures had a good influence. Furthermore, the study found that the perceived advantage of taking

preventative measures encourages people to do them. Health education intervention can develop and transmit gain-framed messages that emphasis on the rewards that can be obtained by following to preventative activities such as keeping physical distance, wearing facemasks, and washing hands (Wansink and Pope, 2015). Most crucially, the survey revealed that for most respondents found, remaining at home due to work looks to be extremely difficult, if not impossible. It has been shown in the literature that most people in poor communities cannot afford to stop working or to stock up on food which would increase their exposure to the virus outside of their community (Geoffrey p. 2020).

Previous research highlights the importance of health-protective behaviours in response to pandemics of infectious diseases. Beliefs in the importance of preventive behaviours and constraints to adopt to preventive actions found to be important predictors of preventive health against COVID-19. Given the high infection rates of COVID-19 and that it may take much longer than expected to reach herd immunity through population-wide vaccination, engaging in health-protective behaviours, including wearing face masks while going out, washing hands effectively with sanitizers or soap more frequently, and social distancing in public places, is pivotal for reducing the transmission of the virus and containing the COVID-19 pandemic (Zahang, 2022). And this can be achieved, inter alia, via enhancing people's perception about preventive actions and reducing barriers.

As a result, a continuous effort to enhancing people's perception towards COVID-19 should be given due attention. Interventions shall cultivate preventive behaviour and mitigate disparities in /adoption of positive practices among people during COVID-19 pandemic. Enforcing regulations on physical distancing, washing hands, and wearing facemasks consistently could yield positive outcomes. It can be recalled that the government of Ethiopia issued a series of directives to contain the spread of COVID-19. The Ministry of Health and Ethiopian Public Health Institute, both federal institutions, have made key decisions in their effort to respond and contain the pandemic. Such key decisions made to counter and control spread of Covid-19 include; the state of emergency proclamation No 2/2020, the national ComBAT strategy (August 1-31/2020, the national EPHI directive

N<u>o</u> 30/2020 and the recent national EPHI directive N<u>o</u> 882/2022. The decisions, enacted based on the epidemiological changes concerning the pandemic, should be consistently reinforced to bring about behavioural change among the populace. Studies have confirmed that taking persistent measures to enforce social distancing, wearing a mask, practicing hygiene could effectively prevent the spread of COVID-19 (Chu *et al.,* 2020: Ong *et al.,* 2020; Matrajt and Leung, 2020).

In the period that followed this study, the scope and impact of the pandemic has varied, and along with-it individuals' behaviour and the state's response. Nonetheless, the findings of this study remain important since people's health belief is directly related their adoption of preventive measures that were made available at the later stages of the pandemic such as the various vaccines or measures that may become available in the future.

5. Conclusion

Since the outbreak of the COVID-19 pandemic and the first case reported in Ethiopia, several interventions have been undertaken in Addis Ababa to enhance people's understanding of COVID-19. This study highlighted the presence of some encouraging outcomes in terms of peoples' understanding about the pandemic and preventive practices in face covering and hand hygiene. The study showed that lack of knowledge or shortage of information among the population is not a prominent challenge, but resistance and negligence to adhere to COVID-19 preventive measures are. The findings of this study suggest that people's health beliefs are helpful in motivating them to take preventative measures. Those who are aware of their health and pursue a healthy lifestyle are more likely to take preventative steps than those who are not.

This research has given a lot of information about how people react to preventive measures, as well as the elements that influence how they are implemented and adopted. Most notably, the study looked at health beliefs and preventative behaviours leveraging HBM's conceptual tools. Individual responses could consider how beliefs influence adoption to develop effective policy tools in the case of a pandemic. Noncompliance is prevalent, even though taking preventive measures can lessen and limit

people's risk of contracting COVID-19. Changing people's health behaviours is a long-term process, not a goal that can be achieved in a short period alone through public awareness efforts. Indeed, according to a sociological axiom, human health behaviour is influenced by a variety of individual, societal, demographic, technological, and political forces. This should be considered in any endeavour to improve health behaviour. The pandemic has taught us an important lesson that new diseases can generate disruption of regular activities and uncertainty among citizens. Understanding how individuals, groups and the social structure may and must evolve in response to changes in biological environments is thus a crucial component of policy and practice.

The study had some strengths including a high participation rate. In addition, the survey adopted and employed a HBM that has been validated over the years. However, the data were collected from 250 individuals who were not randomly selected. As a result, the findings may not be generalizable to all residents. Additionally, the study only focused on individual level factors of health behaviour. Modern interventions underline the importance of considering interpersonal and structural factors to understanding and improve people's health behaviour. Future studies should investigate and identify multi-layered of factors that influence people's health behaviour against COVID-19. This will assist to build a public that can better withstand pandemics through adoption of healthy behaviour.

Acknowledgments

Competing interests

The authors report no actual or potential conflicts of interest.

References

Abdelrahman M. 2020. Personality traits, risk perception, and protective behaviours of Arab residents of Qatar during the COVID-19 pandemic. *International journal of mental health and addiction*. pp 1-12.

Addis   Eyeberu, Adera Debella, Dechasa Adare and colleague. 2022. Perceived self-efficacy in implementing Covid-19 preventive measures among the residents of Harari regional state, Eastern Ethiopia: a community based cross-sectional study. *Frontiers in epidemiology.* Vol 2, Article 849015.

Ahmad Z, Sadiq S, Asghar M, and colleagues. 2017. Comparison of Knowledge, Attitudes, and Practices of Educated and Uneducated Adults Regarding Human Immunodeficiency Virus in Karachi, Pakistan. *Cureus,* V 9 N6, pp 1338.

Ajzen, I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 50(2): 179–211.

Alemayehu Geda. 2020. 'The Economic and Social Impact of COVID-19 and a Direction for Policy Response'. Unpublished manuscript, Department   of   Economics, Addis   Ababa   University.

Alsan, M., Stantcheva, S., Yang, D., and Cutler, D. 2020. Disparities in COVID-19 2019 reported incidence, knowledge, and behavior among US adults. *JAMA Network Open*.

Ayosanmi OS, Oden L, Ayosanmi T, Alli, B, Wen M, Johnson J. 2020. The role of health belief model in HIV screening decision among international students in the United States: a pilot study. *Int J Transl Med Res Public Health,* 4: 4–12.

Brooks, S., Webster, R., Smith, L., and colleagues. 2020. The Psychological Impact of Quarantine and How to Reduce it: Rapid Review of the Evidence, *The Lancet*, 395 (0227): 912-920.

Broomell SB, Chapman GB, Downs JS. 2020. Psychological predictors of prevention behaviors during the COVID-19 pandemic. *Behavioral Science & Policy,* 6 (2): 43-50.

Champion VL. 1993. Instrument refinement for breast cancer screening behaviors. *Nursing Research*. 42 (3):139-143.

Champion, V. and Skinner, C. 2008. The Health Belief Model, ***In***: Glanz K., Rimer, B and Viswanath, K. (Eds.), *Health behavior and health education theory, research, and practice* (4th Ed.), pp. 45-65, United States of America, HB publishing.

Chu, DK., Akl, EA., Duda, S., Solo, K., Yaacoub, S., Schunemann, HJ. 2020. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis, *The Lancet*, V 395, pp. 1973–87.

Dong, E, Du, H. and Gardner, L. 2020. An interactive web-based dashboard to track COVID-19 in real time, *Lancet Infect Diseases*, V 20, pp. 533-534.

Ethiopian Ministry of Health & Ethiopian Public Health Institute. 2020. *Notification Note on COVID-19 Situational Update*. Addis Ababa: Ethiopian Public Health Institute.

Ethiopian Ministry of Health. 2020. The national Combat strategy-Community Based Approach and Testing. Addis Ababa, Ethiopia.

Ethiopian Public Health Institute. 2020. *A Directive issued for the Prevention and Control of the COVID-19 Pandemic; No.30/2020*. Addis Ababa.

Ethiopian Public Health Institute. 2020. *A Directive issued for the Prevention and Control of the COVID-19 Pandemic;* No_882/2022. Addis Ababa.

Geoffrey P. 2020. A plea for global sociology in times of COVID-19. *ISA digital platform*

Glanz, K. Rimer, BK. and Lewis, FM. 2002. *Health Behavior and Health Education Theory, Research and Practice*. San Fransisco: Wiley and Sons.

Golden SD and Earp J. 2012. Social ecological approaches to individuals and their contexts: twenty years of health education &behaviour health promotion interventions. *Health education & behaviour*. V39, N 3, pp. 364-372.

Hailemichael Bizuneh, Shikur Mohammed, and Aman Yesuf. 2022. Covid-19 precautionary practices and associated factors among clients visiting tertiary hospital, Addis Ababa, Ethiopia. *PLoS ONE* 17(4): e0267000. https://doi.org/10.1371/journal.pone.0267000.

House of Peoples' Representatives of the FDRE. 2020. *State of Emergency Proclamation No. 3/2020; Regulation No 466/ 2020*. Addis Ababa: House of Peoples' Representatives of the FDRE.

Huang C., Wang Y., Li X., Ren L., Zhao J., Hu Y., et al. 2020. Clinical features of patients infected with 2019 novel COVID-19 in Wuhan, China. *Lancet.* V 395, pp. 497–506.

Janz, N. K., and Becker, M. H. 1984. The health belief model: A decade later, *Health Education Quarterly*, V 11, N 1, pp. 1–47.

Jeihooni AK, Rakhshani T. 2019. The effect of educational intervention based on health belief model and social support on promoting skin cancer preventive behaviors in a sample of Iranian farmers. *J Cancer Educ.* N 34, pp. 392–401.

Jones, CL, Jensen, JD., Scherr, C. *et al.* 2014. The Health Belief Model as an Explanatory Framework in Communication Research: Exploring Parallel, Serial, and Moderated Mediation. *Health Communication*, V 30, N6, pp. 566-576.

Khowaja, Z. A., Soomro, M. I., Pirzada, A. K., Yoosuf, M. A., and Kumar, V. 2011. Awareness of the Pandemic H1N1 Influenza Global Outbreak 2009 among Medical Students in Karachi, Pakistan, *Journal of Infection in Developing Countries*, V 5(3):151–155

Lin, L., Jung, M., McCloud, R. F., and Viswanath, K. 2014. Media Use and Communication Inequalities in a Public Health Emergency: A Case Study of 2009-2010 Pandemic Influenza a Virus Subtype H1N1, *Pub Health Reports Journal*, V 129, N 4, pp. 49–60.

Luquis RR, Kensinger WS. 2019. Applying the Health Belief Model to assess prevention services among young adults. *Int J Health Promotion Educ.* 57: 37–47.

Matrajt, L. and Leung T. 2020. Evaluating the effectiveness of social distancing interventions to delay or flatten the epidemic curve of COVID-19   disease, *Emerging Infect Diseases*, V26, N8, pp. 1740–1748.

Mirgissa Kaba and Yayehyirad Kitaw. 2020. Novel COVID-19 (2019-Ncov)–Reminiscent of Spanish Flu: A Challenge to Global Public Health Systems. *Ethiopian Journal of Health Development*, 34(1): 1-4.

Mohammed Yesuf and Mehd Abdu. 2021. Knowledge, attitude, prevention practice, and associated factors toward COVID-19 among preparatory school students in Southwest Ethiopia. *PLoS One,* 17(1): e0262907. doi: 10.1371/journal.pone.0262907. eCollection 2022.

Nana C. H., Akalewold Alemayehu, Rekiku Fikre, and Edilu Shona 3 . 2022. COVID-19 Prevention Practices Among Prisoners, in Southern Ethiopia**.** *Risk Management and Healthcare Policy. Dove press.* 2022 Mar 20;15:521-528. doi: 10.2147/RMHP.S350257. eCollection 2022.

Ong SWX, Tan YK, Chia PY, Lee TH, Ng OT, Wong MSY, Marimuthu K. 2020. Air, Surface Environmental, and Personal Protective Equipment

Contamination by Severe Acute Respiratory Syndrome COVID-19 2 (SARS-CoV-2) From a Symptomatic Patient. *The Journal of the American Medical Association,* V323:(16): pp.1610–1612.

Orji, R., Vassileva, J., and Mandryk, R. 2012. Towards an Effective Health Interventions Design: An Extension of the Health Belief Model. *Online Journal of Public Health Informatics*. 4(3). https://doi.org/10.5210/ojphi.v4i3.4321

Phoenix KH. Mo, W. S. Mak Winnie and Winnie W. S. Mak. 2010. The Influence of Health Promoting Practices on the Quality of Life of Community Adults in Hong Kong. *Social Indicators Research*, V 95, N 3. pp. 503-517.

Prochaska J., DiClemente, C. & Norcross J. 1992. In Search of How People Change Applications to Additive Behaviors, *American Psychologist*, V47, N9, pp. 1102–1114.

Robert D., Lily M., Karen S. 2013. Introduction: why sociology of pandemics? *Sociology of Health and Illness* Vol. 35 No. 2 pp.167–173

Rosenstock, IM. 1966. Why people use health services. *Milbank Memorial Fund Quarterly*, 44(3): Suppl: 94-127. PMID: 5967464.

Takahashi S, Sato K, Kusaka Y, Hagihara A. 2017. Public Preventive Awareness and Preventive Behaviors during a Major Influenza Epidemic in Fukui, Japan. *Journal of Infection and Public Health*, V 10, N 5, pp. 637-643.

UNAIDS. 2006. International Guidelines on HIV/AIDS and Human Rights. 2006 Consolidated version. Retrieved September 20, 2020 from http://www.ohchr.org/Documents/Publications/HIVAIDSGuidelinesen.pdf.

United Nations. 2010. *Impacts of COVID-19 Disproportionately Affect Poor and Vulnerable: UN Chief*. United Nations.

Van Bavel, Jay J., Paulo Boggio, Valerio Capraro, Aleksandra Cichocka, Mina Cikara, Molly Crockett, Alia Crum, et al. 2010. Using Social and Behavioral Science to Support COVID-19 Pandemic Response. *Nature Human Behavior*, N 4, pp. 460–471.

Wansink B, Pope L. 2015. When Do Gain-framed Health Messages Work Better Than Fear Appeals? *Nutrition Reviews*, N 73, pp. 1:4-1.

WHO. 2017. Joint external evaluation of IHR core capacities of the Kyrgyz Republic: mission report, 28 November-2 December 2016. World Health Organization

World Economic Forum. 2020. *The economic, geopolitical and health consequences of COVID-19*. Geneva: World Economic Forum.

World Health Organization. 2020. *COVID-19 disease 2019 (COVID-19). Situation Report –75*. Geneva: World Health Organization.

World Population Review. 2020. *Addis Ababa Population 2020*. Walnut CA: World Population Review

Yayehyirad K. and Mirgissa K. 2018. A Century after Yehedar Besheta (The Spanish Flu in Ethiopia): Are We Prepared for the Next Pandemic? *Ethiopian Journal of Health Development*, V 32, N1, pp. 68-71.

Zhang N and Yang S, Jia P. 2022. Cultivating Resilience During the COVID-19 Pandemic: A Socioecological Perspective. *Annual Review of Psychology* 73, N 1, pp. 575-598.