

On the Use of Theories in Study of Personal Health Behavior During Epidemics/Pandemics

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1. Abstract

Communicable diseases pass all the geographical and political boundaries as a result of globalization, population movement, and international trade regime. Every year, the WHO publishes a long list of new disease outbreaks. Thus, COVID-19 is not the last and the only disease that requires adjustment in health behavior and public participation. During an epidemic/pandemic, different countries design new and different public health measures to protect their own population. However, people may choose to follow these new policies or ignore them. Choosing to ignore them jeopardizes the effect of new public health policies and counteracts all the efforts of healthcare providers. This theoretical paper attempts to provide a theoretical foundation for personal health behaviors during an epidemic/pandemic by providing evidence from the current COVID-19 outbreak. This paper covers the main theoretical aspects from the epidemiological transition decision-making process, health belief model, optimism bias, conspiracy theory and trust, stigmatization and super-spreader, and social determinates of health in three levels (from individual level to social and contextual level), which can allow us to understand personal health behavior during epidemics/pandemics.

2. Introduction

Emerging and re-emerging diseases are always considered as one of the main global health threats, for which there is generally no treatment or vaccination [1]. Almost 1,500 new human pathogens have been discovered in the last 50 years, with the majority of them being of animal origin [1]. These have resulted in 1,483 epidemic events just from 2011 to 2018 in 172 countries [2]. Diseases are not only spreading faster geographically, but new diseases are also emerging more rapidly, passing the national boundaries and becoming of concern for the global health security [3]. On March 2020, the WHO announced the Corona Virus Disease (COVID-19) outbreak as a pandemic for which all countries should take responsibility to prevent or slow down the spread of the disease. This pandemic has affected the lifestyle of many people around the world, resulting in the need to practice new policies such as social distancing, travel restrictions, cancellation of public gatherings, and quarantine on a very big scale, which has never

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been experienced before in contemporary history. Despite the fact that many countries adopted different intervention plans and policies in response to this pandemic, these policies have either not necessarily been followed by the general public or have resulted in very harsh restrictions and lockdown of cities and countries. Individuals are also acting differently within societies, where some followed the public health recommendations, and others persist in not implementing any changes in their health behaviors during this emergency. To be able to adopt and apply any sufficient health policy, it is essential to predict public health behaviors, which are mainly based on individuals' socio-economic status, values and beliefs, trust in their political or health care leaders. This paper attempts to provide a theoretical foundation on health behaviors of individuals during epidemics/pandemics.

3. Epidemiologic Transition

Epidemiologic transition theory was first addressed by Omran (1971), describing the changes in the patterns of diseases from communicable/infectious diseases to more non-communicable and man-made diseases. According to Omran (1971), this transition includes three main stages. The first stage is the "Age of Pestilence and Famine," which is the period of infectious disease when there are no modern medical treatments, vaccinations, and medicines available. Stage two is when the peak of the pandemic is declining due to the introduction of basic public health policies (hygiene and public vaccination); thus, it is called the "Age of Receding Pandemics." The third stage is the "Age of Degenerative and Man-Made Diseases," which is the period of non-communicable diseases (such as cardiovascular diseases) and health problems related to the lifestyle and health behavior, as well as diseases related to the aging of the society and degenerative disease [4]. Although more stages were added later on to this theoretical model by other scholars, the basis remains the same. It is important to note that COVID-19 does not add any additional stage to Omran's model; however, COVID-19 mainly

shows the parallel transition in different parts of the world. Although some countries still suffer from poverty and malnutrition and their main health problem is infectious diseases, in other parts of the world people benefit from advanced medical technologies. Nevertheless, although people live longer, they suffer from diseases related to inactivity, obesity, and lifestyle related stress. COVID-19, and its very fast spread around the world, clearly indicates how inequality and globalization (in terms of rapid mobility by the population) can work hand in hand and create a catastrophic situation. Although COVID-19 is considered as a communicable disease, and the theoretical model suggests that it belongs to the first stage of the epidemiological transition, social scientists and public health professionals, looking at the causes, can easily link it to the third stage of the epidemiologic transition. COVID-19 is a man-made disease, which is infectious in origin. It is a man-made disease since it is related to animal-human interface, ecological changes, or accidental release of infectious agents. Communicable diseases can pass all political and geographical borders due to its rapid public mobility and emerging and re-emerging communicable diseases in poor areas (stage 1) to developed countries (stage 3). Hence, to be able to understand the pattern of disease spread, it is important to consider the role of social, economic, and health inequalities in epidemiologic transition theory. Epidemiologic transition theory is a very useful model to understand the complex nature of disease patterns before studying health behavior during times of epidemics or pandemics.

4. Personal Decision-Making Process During Epidemics/Pandemics

Personal decision-making behavior during pandemics as a global health emergency is very complex and depends on many factors that can vary from the personal level to the socio-economic and political context. Personal decision-making is a process of making a right choice from several alternative courses of action or possibilities, which mainly requires

identification of problem-opportunity, cost-benefit, and risk-reward alternatives [5]. Decision-making process is multifarious, and making decisions under risk, ignorance, and uncertainty may result in different outcomes in the form of opinion or action [6]. All of these factors are present during the COVID-19 pandemic as the risk of getting the disease is high, there is no available treatment or vaccination, there is ignorance or lack of information/awareness related to the disease, there is no efficient method of disease prevention, and there are uncertainties about the risk or benefit as well as the future of the pandemic. The result is living with uncertainty. However, making decisions based on ignorance is more difficult to evaluate since it is not based on information/awareness of different right choices [6]. Behavioral decision-making theory explores the process and rationale behind making decisions. This process is grounded on beliefs and desires of individuals [6]. Four main scenarios of health decision-making during the COVID-19 pandemic are: a-Uncertainty, b-Ignorance, c-Risk, and d-Certainty.

a. Uncertainty: Refers to any decision to follow/not follow public health advice or change one's health behavior for disease prevention but with doubts about the possible optimal outcomes. When a new disease is emerging, usually there is no clear information about the cause, treatment method, and intervention plan [7, 8]. This may create a very confusing situation about how individuals should protect themselves. In the case of COVID-19, initially, the main recommendations were to wash hands and avoid touching one's face; subsequently, it was changed to wear a mask and practice social distancing. Studies reveal that the majority of people are willing to follow public health recommendations; however, uncertainties related to the new situation of COVID-19 as a highly contagious disease may have an effect on people's attitudes toward the method of protection and prevention [9, 10].

b. Ignorance: Refers to any decision to follow/not

follow public health advice or change one's health behavior for disease prevention but with lack of sufficient information and awareness about the highly contagious disease, method of preventions, and possible optimal outcomes. Lack of knowledge, information, awareness, and trust may lead to a decision to ignore the public health recommendations. Ignorance may result in decisions that may jeopardize the health and quality of life of individuals and the surrounding society [11]. During the epidemic/pandemic, ignorance simply means risking the life of others by not taking any action.

c. Risk: Refers to any decision to follow/not follow public health advice or change one's health behavior for disease prevention by considering risks related to the probability of loss or gaining a poor outcome. In health behavior theories, a high-risk perception increases the likelihood of more protective behavior or more safe health behavior in general [12]. Risk perception and related significant protective behavior during a pandemic are associated with information and awareness about the probability of getting the disease (and dying as a result), social norms [13], socio-demographic characteristic of individuals such as sex/age [14], occupation [15], and underlying medical condition [16, 17]. Another factor that can have an effect on health behavior is the duration of the pandemic or epidemic and the perception that the risk of infection can decrease over time [18].

d. Certainty: The person is aware of the different alternative conditions associated with optimal outcomes. In this case, individuals collect all the information about the problem and the action alternatives, predict the probability of possible risks or consequences associated with each alternative, and choose the best possible option accordingly [19]. However, in real situations, usually individuals' limited information or lack of knowledge can reduce the chances of reaching a high level of certainty.

When it comes to health behavior, there is a great similarity between behavioral decision-making theory and Health Belief Model (HBM), which

explores the influence of beliefs in health behavior. If people believe that they are not at risk of a disease and do not perceive the benefit of any prevention action, they are more likely to not make a right healthy decision [20]. Thus, some of the main factors related to beliefs that have an effect on health decision behaviors are “perceived susceptibility or vulnerability to a particular condition,” “perception of the severity of consequences of contracting the illness,” and “barriers or costs of the proposed action” (Ibid, p. 22). It needs to be considered that the decision-making process is context-specific, and people may not make the same type of decision in different socio- cultural contexts [19]. The optimism bias is one of the main variables that can highly influence one’s personal health behavior, which is also associated with socio-demographic variables such as gender and age.

Optimism bias is a cognitive bias, which influences the process of decision-making and judgment by underestimating the future negative consequences of the current action [21]. Optimistic bias is associated with risk perception, where the person evaluates that the potential risk of any negative incidents happening to him or her is minimal compared to others. Therefore, in this case, people may think that the risk of getting infected during the pandemic is much less compared to other people in the same situation [22, 23]. During the time of a public health emergency, the preventive behaviors or public health recommendations may not be followed by people who underestimate the risk of getting an infection [24]. These people are not necessary changing their health behavior, and protecting themselves and others, since they have a cognitive bias; thus, they cannot find any justification or rational for any health protective behavior.

5. Conspiracy Theory and Trust

A conspiracy theory is a set of beliefs that associate occurrences of an unexplained situation or event to a secret plan and decisions made behind the scenes by powerful people [25]. In the medical field, conspiracy

theories relating to harmfulness of the vaccination, cure of cancer, alternative medicine, fluoridation as a way of poisoning [26], COVID-19 as a tool to decrease the world’s population, COVID-19 as a bioweapon, have been identified as public health concerns [27]. Due to the nature of pandemics/epidemics, conspiracy theories may spread quickly because of its influence on a large number of people and the uncertain situation.

Medical conspiracy beliefs have an effect on the health decision-making process and increase the likelihood of not following public health recommendations for health preventative behaviors by individuals [28-30]. Conspiracy theory is linked to many psychosocial factors such as the level of trust in information, trust in science, clarity of provided information, and the level of confidence in political leaders and policy makers [29, 31]. In general, a higher level of trust in others is positively associated with a higher level of preventive behavior during a pandemic, decreasing the risk of people believing in conspiracy theories [32]. Following public health recommendations requires minimal trust and confidence in policy makers and political leaders in emergency situations. Political polarization is considered to be one of the main risk factors, which can break the trust relationship between political leaders and group/s of the population. In this case, conspiracy theories may arise and spread within the population initiated by political parties to blame others to get public attention during elections or justify their own action in critical situations. Consequently, persons affiliated with different political parties may interpret and practice preventive health behavior differently [33, 34], based on their trust in recommendations or the behavior patterns of their political leaders. In such circumstances, to understand personal decision-making in health behavior, it is essential to study the historical context and the political system.

6. Keeping it Secret and Super-Spreaders

Health protective behaviors after being diagnosed

with an infectious disease or showing symptoms may vary from one person to another based on different factors such as social stigma, and necessity of going to work. Social stigma associated with health status can create a discriminating or isolating environment or may lead to job loss. Social stigma related to health status separates people based on their illness and increases the fear of being judged or rejected by others [35]. Stigma related to COVID-19 may not only be experienced by people who have COVID-19 or recovered from it but also by health care workers from their own family or community [36, 37]. Therefore, people may hide their illness from others in order to avoid the risk of being judged [38, 39]. Hiding the disease and keeping it secretive is an important health decision-making behavior, which can reduce the risk of stigmatization but may have public health consequences during an epidemic/pandemic. Hiding that you have the disease can jeopardize public health prevention and containment, specifically when it comes to airborne diseases such as the COVID-19 outbreak, which can easily be transmitted from one person to another. Besides people who hide their disease because of fear of stigmatization and job loss, there are some that refuse to test themselves or register themselves for the screening test, because they believe that they are not infected or they have a fear of getting a positive test result [40]. These individuals who are known as super-spreaders are more likely to act as normal, use public transportation, and attend public gatherings, thus spreading the disease much faster during an epidemic/pandemic [40].

7. Social Determinants of Health

Social determinates of health are conditions that influence the health status, health behavior, and health outcomes of individuals in relation to socio-demographic status, social and public policies, and social/historical context [41]. Social determination of health effects on personal health decision-making and health behaviors during an epidemic/pandemic occurs in three levels.

[a: Socio-demographic status \(individual level\)](#)

The first level of the social determinates of health is individual's socio-demographic factors such as age, gender, education, income, household and neighborhood characteristics, ethnicity, migration background, and underlying medical condition. Although the elderly population has been identified during COVID-19 as one of the most vulnerable populations, it does not necessarily mean that they safeguard their health more than others and change their protective health behavior [42]. Nonetheless, if they receive sufficient and clear information from reliable resources, they are more likely to consider the public health recommendations during the pandemic [43]. In general, older people and females are more likely to follow public health recommendations due to having a higher risk perception compared to young males [44-46]. In addition to age and gender, there is a positive association between education and health protective behavior [47]. Education increases the likelihood of accessing health information, and adopting health-protective behaviors [48]. In uncertain situations and emergencies, there is always a risk of misinformation and unverified information regarding the epidemic [49-51]. Therefore, education plays a very important role in health information-seeking behavior. Health information-seeking behavior is the first step for health-promotion and health-protective activities [52].

The other important factor related to the spreading disease is household and neighborhood characteristics [48]. The disease spreads faster in crowded and large size households. Infection may circulate within a household and spread to other households and neighborhood areas [53]. However, age and sex play very important roles here as well. The risk of getting an infection within a household is higher among females, people under age 18, and people over age 65. This risk of getting an infection from outside and bringing it into the household is higher among males and the working age population [54]. The households with higher infection rates are mainly located in poor neighborhoods. People in poor neighborhoods are

facing multiple barriers to follow the public health recommendations such as living in crowded areas, compelled to go to work [55], and using public transportation [56]. The neighborhoods characterized as areas with crowded households are populated with people with low-income, migrants and ethnic minorities, or marginalized population [57]. Certain migrant groups and ethnic minorities are identified as vulnerable groups during the COVID-19 pandemic. This can be due to lack of awareness related to protective behavior due to the language barrier, living in low-income neighborhoods and its consequences, and limited access to information and hygiene items [58, 59]. However, it needs to be noted that migrants and ethnic minorities are not a homogeneous population and they may act differently during an emergency [59].

Another personal health protective behavior variable that needs to be taken into consideration during epidemics/pandemics is the risk factor that contributes to severity of illness. During the COVID-19 outbreak, people with underlying medical conditions were identified as one of the at-risk populations. For this specific population, public health recommendations related to social distancing may interfere with their continuity of getting regular treatment for their pre-existing medical condition, going to health care appointments, access to medicine and visiting health care providers [60]. Therefore, health decision-making becomes so complex for this group of people since they need to decide whether to follow the public health recommendation and stay at home or continue their treatment as usual and avoid the risk of getting more ill because of their pre-existing medical condition.

b: Policies and governmental rules and regulations (social level)

During a pandemic, countries take different actions and implement different policies to mitigate the spread of the disease and to protect public health. This pandemic affected the health behavior of many people around the world and resulted in the practice of new

policies such as social distancing, travel restrictions, cancellation of public gatherings, and quarantine. During COVID-19, the majority of the countries implemented harsh public health restrictions and quarantine to contain the COVID-19 outbreak, but a few countries like Sweden selected a different path [61]. This path is based on individuals' voluntary participation in prevention. After receiving information from the government, citizens are supposed to take responsibility to protect themselves and others from spreading the disease. Social distancing was introduced, and recommendations were in place for self-isolation especially for the elderly and the vulnerable population. This approach requires high trust and participation of the citizens. However, in either case of voluntary or compulsory approach for implementing new policies during the pandemic, trust in policy makers [62] plays a very important role in personal decision-making behavior. A high level of trust in governmental policies and regulations is positively associated with practicing the recommended health protective behavior such as social distancing, self-isolation, and personal hygiene [63].

c: Social and historical context (contextual level)

Inequality, history of discrimination, and racism are other contextual factors that influence health decision-making during epidemics/pandemics. Therefore, to study changes in health behavior, it is essential to consider the social and historical context. One of the main barriers that may prevent individuals from adapting their health behavior during COVID-19 is the existence of inequality in the society. People with a low-income who are daily-wage earners with minimum or no car insurance are so dependent on their work and simply cannot self-isolate themselves or work from home. This partially explains the high death rate from COVID-19 among lower wage earners [64]. Inequality has a greater negative health impact in countries with political systems that do not support universal health care coverage and insurance [48].

In countries with a history of racism, the risk of

discriminatory behavior toward specific populations may increase during the epidemic [65-67]. Feelings of discrimination and racism can marginalize at-risk populations and affect their protective health behavior [68]. As a consequence of the racist behavior, anti-racism protests and public demonstrations may arise [69]. Public gatherings, demonstrations, and violence in the streets (not necessarily as a result of the epidemic) endanger public health and may increase the risk of spreading the disease in a very critical moment of mitigating the spread of COVID-19 [70]. Personal health protective decision-making in this crucial time would be based on complex risk assessments between two alternatives: 1) risk of getting the disease during an anti-racism public gathering or 2) risk of staying silent/staying home and suffering from the long-lasting effects of discrimination, racism, and discriminatory behavior. In general, political instability, political polarization, influence of radical ideology, war and conflicts are factors that create significant barriers for individuals to adapt their health behavior during epidemics/pandemics.

8. Conclusion

This is a theoretical paper that provides a theoretical platform for understanding health behavior during epidemics/pandemics by providing evidence from the COVID-19 outbreak. These factors vary from personal risk assessment to psychosocial and socio-demographical factors to policies and contextual variables. Understanding the theoretical foundation of individual health decision-making in times of epidemics/pandemics is essential to be able to predict public health needs and accordingly design appropriate health promotion and disease prevention programs. Although the decision-making process is about selecting the right choice from the several available alternative risks, ignorance and uncertain/certain situations as well as several psychosocial factors contribute to this complex process. It needs to be acknowledged that in extreme situations of poverty and war, when people have very

limited or no access to safe water, food and shelter, electricity and information, following national and international public health recommendations is not an option for these citizens during an epidemic/pandemic. This paper only focuses on the personal health behavior and decision-making process; thus, the policy makers' decision-making process during the emergency period is not addressed in this paper.

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