Exploring perspectives on COVID-19 risk, protective behavior and control measures

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ABSTRACT
Public perceptions and behaviors in relation to COVID-19 have been at the forefront of public health policy to mitigate the transmission of the infection and reduce the burden on healthcare infrastructure. This study assesses people’s perspectives towards COVID-19, especially concerning disease risk, adherence to protective measures, and the effectiveness of the imposed prevention and control measures. An explorative study based on Q-method was conducted in Erbil, the Kurdistan Region. The study involved a purposively selected sample of 40 persons representing different educational, social, and economic levels. 41 statements were extracted that covered various aspects of the impact of COVID-19 on the lives of people and their perspectives about these experiences, using 41 statements answerable with a nine-point Likert scale, with responses ranging from ‘least agree’ to ‘most agree’. Data analysis involved a by-person factor analysis using PQMethod 2.35. Three distinct viewpoints and one consensus perspective were identified. Viewpoint 1, confidence and adherence to protective measures, centers on compliance with the main protective measures, the seriousness of COVID-19, and the effectiveness of the public health preventive measures. Viewpoint 2, apprehensiveness and noncompliance, focuses on extreme apprehension from the disease and concerns about the public health policies against COVID-19. Viewpoint 3, inattentive, emphasizes the lack of awareness and adherence to protective measures by the people and the ineffectiveness of the public health preventive measures. The primary aspects distinguishing the three viewpoints included risk perception, protective behavioral response, and public health preventive measures. Risk perception can potentially guide appropriate protective behavior. To strengthen preventive measures and comply with protective behaviors, different approaches that can address the needs of different groups of people are required. The focus should be on increasing risk awareness, reducing anxiety, and explaining the justification and effectiveness of public health policy preventive measures.

Introduction
The novel coronavirus disease [SARS-CoV-2], COVID-19, was first reported in China in December 2019. By March 2021, it had spread rapidly throughout the world, being declared an official public health emergency in many countries (Chan et al. 2020). While COVID-19 infection may be...
asymptomatic, it commonly produces conventional respiratory virus symptoms, most notably difficulty breathing. Most infected people recover without the need for any medical intervention or treatment, but it can be more serious for patients with other underlying conditions and the elderly and infirm. Person-to-person spread is the main way of getting infected. The disease mostly spreads when an affected person sneezes or coughs, through nasal discharge and the saliva droplets (WHO 2020a).

At the beginning of a pandemic, when no vaccine was available, avoiding exposure was universally considered the most suitable way to avoid infection. Public health authorities worldwide issued common advice on the need to follow personal protective measures, like avoiding close contact with sick people, social distancing, frequent hand washing, respiratory hygiene (e.g. covering the mouth and nose while coughing and sneezing, staying home when possible, and frequently cleaning and disinfecting touched surfaces). In most countries, this came to be formalized in numerous rules and regulations, such as the requirement to wear a face mask in enclosed spaces (or in public in general) in many countries (Centers for Disease Control and Prevention (CDC) 2020a).

Human behavioral responses to perceived risk and public health policy are crucial ingredients in predicting the progress and fate of outbreaks, but it has always been difficult to study due to the lack of available empirical examples (Funk et al. 2009). Risk perception-related behavioral responses are of great importance to public health, given that social distancing between individuals can have a great impact on preventing the spread of respiratory infections (Halloran et al. 2008).

Most health behavior theories include components about potential harm beliefs, which comprise the essence of risk perception. However, the closeness of the association between perception and behavior is still unclear. A better understanding of this association can guide the development of the prevention programs, especially in the management of epidemics (Brewer et al. 2007). It is crucial to assess people’s responses to the overall situation and conclude how the perceived risk of disease is associated with engagement in protective behaviors. However, there is limited evidence in previous outbreaks on how people react in the early stages of the outbreak when following preventative measures is very crucial (Bish and Michie 2010). Studies have also revealed that the highly perceived risk of the disease, and the risk of spreading the disease to family members and friends, may motivate engagement in social distancing (Kappes et al. 2018).

In the initial stages of the COVID-19 pandemic, it was hardly known how people’s perceived risk was associated with the protective behaviors adopted by them. Also, there is little related data for the current pandemic situation of COVID-19, which would be of crucial value to the health community and government policymakers at the global level, considering the high impact of the COVID-19 pandemic (Wise et al. 2020). Responses to the COVID-19 outbreak focused on containment measures, considering case identification and management, isolation of positively tested individuals, tracing and quarantining surrounding close contacts, and encouraging precautionary behaviors among the general population. In alignment with these strategies, most governments adopted lockdown strategies, including closing schools and non-essential workplaces, introducing curfews and restrictions on normal activities, and introducing furlough payment schemes and extended public holidays in some cases. The unprecedented expansion of government powers in responding to a pandemic was accompanied by great uncertainty and fear, with people facing a deluge of confusing information from global media about the newly emerging viral infection. However, people’s adherence to preventive and control measures is greatly affected by the level of knowledge, attitude, and practices towards COVID-19 (Ajilore, Atakiti, and Onyenankeya 2017). At the same time, following from the experience of the SARS outbreak in 2003, knowledge and attitudes of epidemics might coincide with a certain level of anxiety or stress among people that might have negative consequences on the prevention and control of the outbreak (Person et al. 2004).
Iraq and the Kurdistan Region also experienced an increasing number of COVID-19, with over 200 confirmed cases by the first week of April 2020, including two deaths. The Kurdistan Regional Government (KRG) implemented restrictive measures in order to contain the outbreak. For example, by the end of February, the government decided to suspend all flights, limit cross-border activities, and suspend all schools and universities in the region. This was followed by declaring a public holiday for the rest of the government entities, except for some sectors such as health and law enforcement departments. Simultaneously, all religious and public gatherings were suspended, and lockdown across the region was declared (Kurdistan Regional Government (KRG) 2020). In addition, the KRG followed the strategy of quarantine for those who had a history of travel from outside Iraq, quarantining all contacts of the infected people, and community screening, especially in areas where COVID-19 cases were discovered (Kurdistan Regional Government (KRG) 2020).

The efforts to mitigate the transmission of infectious diseases or epidemics are more effective at the early stage of the outbreak. Understanding the nature of the interaction between the perceived risk and protective behavior can help design and apply appropriate and effective prevention strategies in this and other similar settings. Therefore, this study aimed to assess people’s perspectives towards the COVID-19, especially concerning the seriousness of the disease, adherence to protective measures, the effectiveness of the imposed government measures, and people’s ability to avoid the infection.

**Methods**

**Design**

Q-method combines both qualitative and quantitative methods to provide a scientific base for systematically studying subjectivity and preference. The method characterizes shared perspectives of different groups of individuals (van Exel and de Graaf 2005; Shinebourne and Adams 2007). The method involves preparing a set of statements about a topic that are rank-ordered by respondents on a quasi-normal distribution based on their viewpoints; the individual viewpoints (or rankings) are then subjected to factor analysis (Smith 2001; van Exel and de Graaf 2005).

**Setting and participants**

This study was conducted in Erbil, in Kurdistan region of Iraq. In Q-method studies, the selection of participants should be based on maximizing the representation of a wide range of views (Cross 2005). Therefore, a purposive sample is usually selected rather than a randomized one. In selecting the participants, we aimed to involve individuals from different educational, social, and economic backgrounds, with insights about the study topic. Thus, the researchers tried to build a list of potential participants from the surrounding community in Erbil city who were identified through consultation with a number of key informants in the community. The main characteristics of the potential participants and their phone numbers were obtained from the key informants and were included in the list. These potential participants were not directly known or related to the researchers. A sample of 40 participants was selected from the list purposively and included males and females, single and married, from different age groups and educational, social, and economic levels. Given that the perspectives, protective behaviors, and responses to the COVID-19 related pandemic and lockdown might change according to social, cultural, and demographic factors, we decided to include participants with different socio-demographic characteristics.
A comprehensive review of literature, media reports, and social media posts was conducted to identify the main aspects and the issues pertaining to COVID-19 in the Kurdistan Region. As a result, 67 statements related to COVID-19 were extracted. These statements were initially distributed into nine different categories, according to their contents in relation to different aspects of the impact of COVID-19 on people’s lives and people’s perspectives about it.

Two researchers reviewed these 67 statements for similarities and differences. They discarded the repeated statements, merged those with close similarities, and deleted those with polar opposite views. In the end, 41 statements were selected, with efforts to include a representative number of statements from all nine categories. These categories included: knowledge and awareness (4 statements); health-seeking behavior (4 statements); access to information and role of media (4 statements); availability of diagnostic and treatment facilities (3 statements); governmental preventive measures (5 statements); risk perception, worry, and fear (5 statements); religious aspects and effect (3 statements); self-protective behaviors (10 statements); and others’ protective behavior (3 statements). The number of statements selected from each category was based on how much the topic was emphasized and repeated in the initial set of statements and the original posts (i.e., literature, media reports, and social media posts).

The 41 selected statements were then translated into the Kurdish language. A native Kurdish speaker fluent in the English language validated the translation by back-translation of the Kurdish statements into the English language. We numbered the 41 statements in the Kurdish language randomly.

**Data collection**

A quasi-normal distribution with nine piles and 41 cells (Q-grid) was created (Figure 1). The study’s final data collection tools included the list of the 41 statements randomly distributed, the Q-grid, and a number of questions about the participants’ socio-demographic characteristics.

Data for this study were collected in late March 2020. The participants were contacted by phone, and the purpose of the study was explained to them before providing participation consent. Six participants did not agree to participate in the study; thus, six alternative participants with similar characteristics were selected for the study. A remote email approach was used for data collection due to the ongoing complete lockdown during the data collection period and to
ensure social distancing was maintained. The survey tool was sent to the participants by email, with clear instructions to each participant explained by email and by phone (phone contact was only used for clarification of the instructions).

We asked the participants to sort the statements into the Q-grid with nine piles, ranging from $-4$ (least agree) to $+4$ (most agree), to determine their viewpoints towards different aspects of COVID-19. The participants read the statements and distributed them to the Q-grid cells. The completed survey tool was returned to the researcher by email. The Research Ethics Committee of Hawler Medical University reviewed and approved this study.

**Data analysis**

We used the PQMethod 2.35 program for data analysis (Schmolck 2014). Extracting the prominent common viewpoints was based on centroid factor extraction and varimax rotation. We used centroid factor extraction because of our experience and familiarity with this method. While there is debate among Q-method scholars on the relative merits of principal component analysis and centroid methods, both are widely used, and their results do not differ substantially. Varimax rotation is commonly used in Q-studies, while different manual rotations in each repetition can raise concerns of incomparability (Zabala and Pascual 2016).

We extracted the viewpoints representing at least two defining sorts with eigenvalues larger than one (Shinebourne 2009). We adopted a conservative significance level ($P < 0.01$) for factor loading. A factor loading of $0.403 (2.58 \times \sqrt{n}$, where $n =$ the number of statements) or above on a given viewpoint constituted significant loading (Stainton Rogers 1995). We tested different viewpoint solutions to get the most meaningful, consistent, and coherent viewpoints.

The viewpoints obtained represent the sorts made by the participants who have responded in a potentially similar way. We interpreted each viewpoint subjectively by examining the characterizing and distinguishing statements. The consensus viewpoint was based on examining the consensus statements. Characterizing statements include the statements with a rank value of $+4$, $+3$, $-3$, or $-4$. On the other hand, distinguishing statements include the statements with a score on a viewpoint significantly different from their score on the other viewpoints. Consensus statements are the statements that do not distinguish between any of the viewpoints (van Exel and de Graaf 2005). The last step involved developing a conceptual interpretation to define and summarize the endorsed viewpoints.

**Results**

The mean $\pm$ SD age of the 40 respondents was $39.9 \pm 15.9$ years (range 17-68). Most of the respondents were females (65%), married (65%), employed (70%), and had a college degree (50%). Participants’ socio-demographic characteristics are shown in Table 1.

Analysis of the respondents’ Qsorts resulted in three distinct viewpoints (a three-factor solution), accounting for 38% of the variance. Table 2 shows the statement scores for each viewpoint. Of the 41 statements included in the set, 27 statements were ranked statistically significantly differently ($P < 0.01$) between the three viewpoints, and seven statements were ranked similarly in the three viewpoints. The remaining seven statements ranked differently among the three viewpoints, but not to a statistically significant level.

The three viewpoints were defined by 30 respondents (75%), whereas six respondents did not load significantly on any of the viewpoints, and four respondents were confounded by loading significantly on both viewpoints.

The three different viewpoints and one consensus viewpoint were identified (Table 2). Viewpoint 1 (V1) was labeled as confidence and adherence to protective measures; viewpoint 2
(V2) was labeled as *apprehensiveness and noncompliance*; and viewpoint 3 (V3) was labeled as *inattentive*.

**Viewpoint 1 (V1) – confidence and adherence to protective measures**

V1 accounted for 13% of the total variance. The Q sorts of 11 respondents defined this viewpoint. Exemplars of this viewpoint included eight females and three males; four singles and seven married; eight employed, two students, and one unemployed; two with secondary school education, seven with college degrees, and two with postgraduate degrees.

V1 respondents strongly emphasized their compliance with the main protective measures, including limitation of activities outside the home, avoiding crowded areas, reducing the number of contacts, avoiding people who cough/sneeze, eating healthier food, doing exercise to increase immunity, frequent hand hygiene, and telling the family members about the importance of frequent hand washing. They indicated seeking healthcare for any illness and were not hesitant to go to the hospital if feeling ill. These respondents stressed the seriousness of this disease. They trusted the media in emphasizing the importance of COVID-19, and indicated that they practiced spiritual activities more to avoid the disease.

This group of respondents strongly believed in the effectiveness of the government’s measures against the COVID-19 outbreak. They believed in the government’s ability to respond appropriately to prevent the spread of the infection. They also believed in the presence of well-prepared emergency services to contain the disease and proper control of borders for infected travelers. They emphasized the importance of closing borders as an effective measure to prevent the spread of the disease.

**Viewpoint 2 (V2) – apprehensiveness and noncompliance**

V2 accounted for 14% of the total variance. The Q sorts of 12 respondents defined this viewpoint. Exemplars of this viewpoint included ten females and two males; eight married and four singles; eight employed, two students, and two not employed; one with primary education, two with secondary school education, three with a diploma, and six with college education.

The respondents holding this viewpoint were extremely worried about the disease and had concerns about the government measures against COVID-19. They believed that this infection is serious, and they were anxious about getting this disease and dying from it. They believed that
relying on God would help in avoiding the disease. They were always following the news and social media in order to be updated about the disease. They did not think that the infection can be prevented easily. They were more worried about themselves than their relatives and families.

Table 2. Rank scores of statements for views on the COVID-19 risk, protective behavior and prevention measures.

| #  | Statement                                                                 | View 1  | View 2  | View 3  |
|----|--------------------------------------------------------------------------|---------|---------|---------|
| 1  | Borders are poorly controlled as infected travelers with COVID-19 can get into Kurdistan without examination or quarantine. | -2*     | -1*     | +2*     |
| 2  | Emergency services are not well prepared to contain the disease.          | -1*     | +3*     | +2*     |
| 3  | Hand sanitizers should be made available in all public places freely.†    | +1      | +3      | +2      |
| 4  | Health education about the disease is provided adequately in places of work. | +1      | +2      | -3*     |
| 5  | I always cover my mouth and nose with my bent elbow or tissue.           | 0       | 0       | 3*      |
| 6  | If I feel ill, I will hesitate to go to hospital fearing of quarantine of myself and my family. | -1*     | 0       | -1      |
| 7  | I always follow the news and social media in order to be updated about the disease. | +1*     | +3*     | +3*     |
| 8  | It is easy for people to change behavior to follow preventive measures (avoid touching mouth, eyes, nose, avoid handshake, frequent handwashing) | 0*      | +3*     | -3*     |
| 9  | I am extremely worried of getting this disease and die from it.           | -2*     | +2*     | -4*     |
| 10 | It was a wise decision to suspend school during the outbreak.†             | +4      | +4      | +4      |
| 11 | People still cannot avoid spitting on the floor.                          | 0*      | -2*     | +4*     |
| 12 | Media makes the COVID-19 much bigger issue than as it is.                 | -3*     | +1      | +1      |
| 13 | Adequate necessary laboratory investigations are available at governmental hospitals. | -2      | -1*     | -2      |
| 14 | I still have not totally avoided traditional greetings such as hand shaking and kissing. | -3      | -2      | -3      |
| 15 | Ordinary people are not well aware of preventive measures.                | -1      | 0       | +3*     |
| 16 | Closing borders is not an effective measure to prevent the spread of the disease | -3*     | +1*     | -1*     |
| 17 | I bought enough masks to protect myself and others from the disease.†     | 0       | +1      | +1      |
| 18 | I am not with suspending all religious gatherings (Friday or Sunday prayers, paying condolences). | -4      | -2      | -4      |
| 19 | People do not take the disease seriously.                                | +1      | +1      | +2*     |
| 20 | I clean and wash my hands regularly.                                     | +2      | +2      | +3      |
| 21 | People seriously take and follow the preventive measures                  | 0*      | +1*     | -2*     |
| 22 | People follow well the curfew measures                                    | -2      | -1      | 1*      |
| 23 | I practice my worships more in order to avoid the disease.               | +3      | +2      | -1*     |
| 24 | People use face masks unnecessarily.†                                     | -1      | 0       | 0       |
| 25 | I started to eat healthier food and do exercise to increase immunity      | +1*     | -1      | 0       |
| 26 | Relying on God will help me to avoid the disease.                         | +2*     | +4*     | 0*      |
| 27 | I stay at home if I begin to feel unwell.                                | -1*     | 0       | +2*     |
| 28 | I have restricted visiting relatives and social gatherings.†               | -2      | -1      | -2      |
| 29 | I think the government can take appropriate measures to overcome the disease from spreading. | +3      | +1      | +1*     |
| 30 | We stored enough food to avoid food crisis.†                              | +1      | 0       | -1      |
| 31 | I think traveling within cities should not have been suspended.†           | -3      | -3      | -2      |
| 32 | If I get the disease, I try some home or natural remedies.                | -1*     | -4      | -3      |
| 33 | I think warm weather will stop the outbreak of COVID-19.                  | 0       | -2*     | 0       |
| 34 | I told my family about the importance of frequent hand washing.           | +3*     | +2      | +1      |
| 35 | I would avoid crowded areas.                                              | +3*     | 0       | +1      |
| 36 | I would be able to avoid the infection by proper and frequent hand hygiene. | +2*     | -1*     | 0*      |
| 37 | I would limit my activities outside such as dining at restaurants or cafés, going to picnics. | +4*     | -3*     | 0*      |
| 38 | I avoid people who cough/sneeze                                         | +2*     | -2*     | -1*     |
| 39 | I significantly reduced the number of contacts per day (less than 1 meter) | +2*     | -3*     | 0*      |
| 40 | I am very worried that my relative and family will get this disease       | 0*      | -4*     | -2*     |
| 41 | This infection is not a serious one and nothing more than common cold and influenza | -1      | -3*     | -1      |

*Distinguishing statement significant at <0.01.
†Consensus statement.
This group of respondents did not believe in the government’s ability and measures to prevent and contain the disease and emphasized the lack of necessary services and facilities related to COVID-19.

This group of respondents believed that it is easy for people to change behavior to follow preventive measures and that people seriously take and follow the preventive measures. However, on a personal level, they appeared not to be able to follow the preventive measures, with the inability to reduce the number of contacts, limiting activities outside the home, and avoiding people who cough/sneeze.

**Viewpoint 3 (V3) – inattentive**

V3 accounted for 11% of the total variance. The Q sorts of seven respondents defined this viewpoint. Exemplars of this viewpoint included five males and two females; five married and two singles; five employed, one student and one not employed; two with primary education, one with secondary education, two with a college education, and two with postgraduate education.

The participants holding this viewpoint emphasized the lack of awareness and adherence to protective measures by the people. They believed that people do not take the disease seriously and are not well aware of preventive measures, as they still cannot avoid risky behaviors. They were concerned about people’s inability to change behavior to follow preventive measures and the lack of adequate health education about the disease in workplaces. On a personal level, they indicated that they follow protective measures such as covering mouth and nose and staying at home if feeling unwell.

This group of participants had some concerns about the government’s inability to take appropriate measures to prevent the spread of the disease and control the borders appropriately against infected travelers.

They were not very worried about getting this disease and dying from it, and had not practiced more spiritual activities to avoid the disease. However, they revealed that they always followed the news and social media to be updated about COVID-19 issues.

**Consensus**

There was a general agreement among the three groups of respondents on a number of aspects of COVID-19. They firmly believed that suspending schools during the outbreak was wise. They also believed that hand sanitizers should be made available freely in all public places. There was also a consensus against suspending the travel among cities and restricting visits to relatives and social gatherings.

**Discussion**

The current study revealed various patterns of viewpoints regarding the COVID-19 outbreak in Kurdistan region. Individuals from different socio-demographic backgrounds participated in this study, to represent diverse experiences and perspectives. This explorative study identified three prevailing viewpoints reflecting distinctive perspectives of participants around different aspects of the COVID-19 disease and public health policy responses.

V1 reflected the perspective of accepting government measures as an effective strategy to control and overcome the disease. Respondents holding this viewpoint shared common beliefs and attitudes with people dealing with infectious respiratory diseases (Wang et al. 2020). Their educational background could explain why this group of respondents complied with protective measures, as all the respondents in this group graduated from secondary school and above. Several studies identified that individuals with higher education are more likely to adopt
protective measures and behaviors (Bish and Michie 2010; Zhan, Yang, and Fu 2020). V1 also reflected the seriousness of the disease and the importance of adhering to preventive measures. Many studies documented the relationship between the perceived risk and engagement in protective measures, demonstrating that increased risk perception is correlated with increased adherence to protective measures (Bish and Michie 2010; Rubin et al. 2009).

Respondents holding V1 showed dissimilarity to those in V2 and V3, in terms of believing in the effectiveness of government measures since they least agreed with the statement, ‘emergency services are not well prepared to contain the disease’. The KRG adopted a variety of restrictive control measures to mitigate and contain the spread of this disease, including the closure of all schools and universities, suspension of work in all public institutions, imposing a curfew, and quarantining all contacts among infected people (Kurdistan Regional Government (KRG)) 2020). These measures were taken in order to flatten the epidemic curve, slowing down transmissions to stagger demand for intensive care resources for severe cases (Anderson et al. 2020). Studies have shown that by using public health measures (isolation, tracing, and quarantine), such contagious outbreaks can be controlled (Fraser, Anderson, and Ferguson 2004; Hellewell et al. 2020; Keeling, Hollingsworth, and Read 2020). The KRG implementing these measures in the early stage of the disease was crucial, since the healthcare infrastructure in the region is insufficient and still developing. Without these measures, a catastrophe might have happened.

In addition, the findings indicate that respondents in this group (V1) would seek healthcare advice for any illness as they least agreed to the statement, ‘If I feel ill, I will hesitate to go to the hospital fearing of quarantine of myself and my family.’ They also thought that by practicing proper and frequent hand washing, they would be able to avoid the infection. The majority of health authorities worldwide recommend that frequent handwashing and social distancing can reduce the chance of getting COVID-19 infection (Centers for Disease Control and Prevention (CDC) 2020a; National Health Service (NHS)) 2020; WHO 2020b).

Although respondents holding V2 did not consider this infection a serious one, they were extremely worried about getting the disease and eventually dying. It was interesting to notice how respondents did not take appropriate preventive measures despite being worried about getting the disease, in terms of reduced number of contacts, limited activities outside the home, and avoiding people who cough or sneeze. Withdrawn behaviors can be perceived as potentially ostracizing in some cultures and communities, which could have undermined people’s compliance with recommended behavior. If governments apply invasive and restrictive measures on everyday life, they must be able to rely on popular compliance with and support for applying protective behaviors, in order to control the situation (Lau et al. 2010; Anderson et al. 2020).

Previous studies suggested that levels of worry or anxiety about previous pandemics such as influenza H1N1 (in 2009) were linked to compliance with government and health recommendations (Jones and Salathé 2009; Rubin et al. 2009). However, our findings from V2 respondents indicated that despite being extremely worried about getting the disease, they were not consistently adhering to protective measures. They also emphasized concerns about the lack of sufficient facilities to respond to the outbreak, and the lack of effective strategies to prevent the spread of the infection. However, previous studies indicated that confidence in the ability of the government’s measures to control the spread of the disease were related to health recommendation compliance (Tang and Wong 2003). Previous studies have indicated that those who have higher trust and confidence in the government’s strategy in handling the situation are more likely to comply with government recommendations (Rubin et al. 2009; Prati, Pietrantoni, and Zani 2011).

Respondents in V3 reflected adherence to protective measures and concerns about other people not being aware of and not adhering to such measures. In contrast to respondents’ perspectives in V2, they believed that people cannot avoid certain behaviors. Changing behavior is not straightforward, and it can be an unsteady process (Bouton 2014). Similar to respondents in V2, V3 respondents had some concerns regarding the government’s ability to take appropriate
preventive measures. However, they were not worried about getting the COVID-19 and dying from it. Compared with other respondents in V1 and V2, these respondents had the least agreement with relying on God and spiritual activities helping them avoid the disease. It is remarkable to notice such diverse perspectives and attitudes among this group of respondents, especially regarding people’s unawareness of and non-compliance with public health recommendations. This requires health authorities to apply different means to disseminate information and educate different populations segments about applying protective measures.

Interestingly, the respondents holding the three viewpoints had a general agreement around a number of aspects of the COVID-19 disease. There was a strong consensus regarding the concept of suspending schools during the outbreak as a wise decision. A review examining the various aspects of school closure as a public health policy identified that school closure is usually suggested for mitigating pandemics (Cauchemez et al. 2009). However, when such decisions have to be made, officials and authorities must plan to alleviate the undesirable features of the closure.

There was also a general consensus regarding the free availability of hand sanitizers in all public places. In fact, following the emergence of the outbreak in the Kurdistan Region, most public places like supermarkets and hospitals provided hand sanitizers for their consumers to reduce the spread of the infection.

There was also some agreement among the three groups of respondents about buying enough masks to protect themselves and others from the disease. However, they had a neutral view of the unnecessary use of face masks by the people. The recommendations about when and how to use a face mask are potentially conflicting; the WHO only recommended using face masks in specific cases; for instance, those who feel unwell having cough, fever, and difficulty breathing should wear a mask, or a healthy person taking care of a person with a suspected COVID-19 infection (WHO 2020b). Some provinces of China imposed a policy of compulsory face masks in public places, which was subsequently followed in many countries worldwide (Feng et al. 2020). The Centers for Disease Control and Prevention later recommended using cloth face masks to reduce the spread of COVID-19 in public areas where it is hard to adhere to social distancing (Centers for Disease Control and Prevention (CDC) 2020b).

Through its explorative nature, this study revealed a range of distinct perspectives of individuals residing in the Kurdistan Region toward the COVID-19. The variety of perspectives presented here in this study reflects the variety of views among people in the Kurdistan Region regarding the COVID-19. By applying Q-method, this study helped in understanding people’s views and attitudes in relation to different aspects of COVID-19. However, the study findings cannot be generalized, as the sample in Q-studies usually includes a small number of respondents (Shabila, Ahmed, and Yasin 2015). Thus, further research exploring people’s views about COVID-19 on a greater scale and in more in-depth ways might be necessary, especially to uncover the perspectives of those who are less compliant with protective measures.

While Q-studies are intended to study subjectivity, some of the statements of the current study were more about objective reports of doing or intending to do specific behaviors. The use of such statements might violate the principles of Q-studies. However, the particularities and the uncertainties related to the COVID-19 pandemic and the authors’ intention to understand the perspective and behaviors at the same time encouraged the use of the Q-method with the combination of both subjective and objective statements.

Another limitation of the current study is the relatively low percentage of explained variance or the shared meaning of the factor solution of the three viewpoints (38%). While the acceptable level of explained variance is generally considered to be 35-40% or above (McHugh et al. 2019), the percentage of this study is still low compared to most other Q-studies.

We did not carry out concurrent interviews of the participants due to the remote nature of the data collection and the difficult situation during the outbreak and lockdown, as such methods would have discouraged participation. Concurrent interviewing, which is common in Q-
studies, might have helped in better understanding the reasons for each viewpoint, particularly the reasons for V2 being apprehended but non-compliant with protective measures.

**Conclusion**

By determining disagreement and consensus among people, three different viewpoints on COVID-19 were uncovered. The primary aspects distinguishing the three viewpoints focus on risk perception, protective behavioral response, and public health preventive measures. The viewpoints were at both extremes of compliance and noncompliance, and confidence and apprehensiveness. Risk perception can guide appropriate protective behavior, but not always. To strengthen preventive measures and encourage compliance with protective behaviors, different approaches that can address the needs of different groups of people are required. The focus should be on increasing risk awareness, while at the same time reducing the stress and anxiety associated with COVID-19. Details of justification and effectiveness of the public health preventive measures should be explained to the people in the appropriate ways.

**Disclosure statement**

The authors report no potential conflict of interest.

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