

The psychological determinants of public compliance to recommended protective measures during the COVID-19 outbreak in the Netherlands: a repeated surveys study

Introduction

Since December 2019, the world is facing a new and severe threat to public health. The novel coronavirus (SARS-CoV-2), which causes mild to severe respiratory illness (COVID-19), was first found in humans in the city of Wuhan, China [1]. The virus spread rapidly over the world, and on 11 March 2020, the WHO declared the COVID-19 pandemic. [2] By [date], the COVID-19 pandemic counted [...] confirmed cases and [...] deaths in [...] countries (Ref WHO).

During this pandemic, countries all over the world adopted various measures to counter the spread of the virus. In the initial stage, containment measures were taken, aiming at identifying and isolating new cases and their contacts. As the amount of cases started to rise rapidly and the hospitals became overwhelmed, countries undertook additional measures. While countries differed in the amount and stringency of measures [3], all measures departed from the concept of social distancing, aiming at reducing the frequency and intensity of contact among people in order to delay or stop the transmission of the virus. In the Netherlands, the first COVID-19 case was identified on 27 February 2020 [4]. In the weeks that followed, the number of confirmed cases increased rapidly and the government issued new measures and advice every couple of days [5, 6]. An overview of these measures and the epi curve of COVID-19 in the Netherlands is shown in Figure 1.

Figure 1.

[figuur epicurve en maatregelen op tijdlijn]

The success or failure of the measures aimed at hampering the spread of the corona virus depends largely on the public's compliance with the measures. A number of studies have provided some first insights into the levels and determinants of public compliance with COVID-19 measures [7-9] but more research is needed. This because of the differences in measures between countries and the uniqueness of this pandemic. In addition, most studies on compliance with COVID-19 measures that currently have been undertaken, are cross-sectional studies. Repeated studies that provide insights into the dynamics of compliance to COVID-19 measures, as well as into the dynamics of determinants of compliance, are required for two reasons. First, as the measures that countries undertake change frequently, so does the meaning of compliance to these measures. IAnd second, as the COVID-19 pandemic continues for an indefinite period of time, the compliance with the measures might become subject to decreased patience of the public. Close monitoring of COVID-19 compliance and reasons for (non) compliance is therefore essential. Omdat dit kan helpen om inzicht te krijgen hoe je dan bijv. compliance weer kan verbeteren?

Compliance is known to be influenced by various factors. The Theory of Planned Behavior [10], the Health Belief Model [11] and the Protection Motivation Theory [12] have identified psychological factors that influence the adoption of protective health behavior. Following these models and theories, determinants of protective behavior are the perceived risks of the disease/outbreak, perceived efficacy of the recommended measures, perceived self-efficacy in adopting the recommended behavior, perceived subjective norms regarding the recommended behavior (i.e.

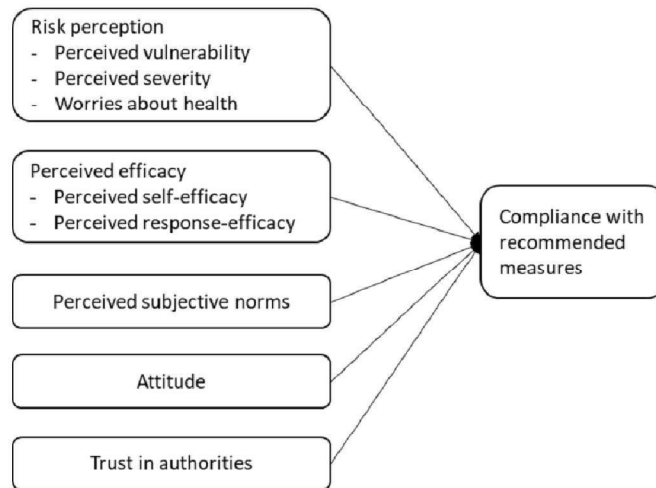
what do others think and do), and attitudes towards the recommended behavior. A literature study of determinants of protective behavior during the H1N1 pandemic found especially evidence for the influence of perceived risk, in terms of perceived vulnerability, perceived severity and worries/anxiety, and of perceived efficacy of the measures [13]. Another factor, which has shown to be of major influence on compliance of advised protective measures during the H1N1 pandemic, is trust in authorities [13, 14]. During large outbreaks and pandemics, people depend on authorities for behavioral advice, and this advice is far more likely to be followed if people trust the sender. Based on the Theory of Planned Behavior [10], the Health Belief Model [11], the Protection Motivation Theory [12] and literature on the determinants of compliance during the H1N1 pandemic, we developed an integrated theoretical model with the psychological determinants of compliance to recommended behavior during outbreaks. This model is shown in Figure 2.

Bij zo'n model verwacht ik dan eigenlijk ook hypothesen, dus Hoe meer trust, hoe meer compliance bijvoorbeeld.

The current study provides insights into the public's compliance with the recommended behavior to counter the spread of COVID-19 in the Netherlands, and the role of psychological factors on this compliance. As the COVID-19 outbreak unfolded and the advised measures changed rapidly over time, we hypothesize that the public's perceptions of and their response to the situation fluctuated over time. Previous studies about the H1N1 pandemic have also shown considerable changes in a short time frame in, among other things, perceptions of risk, trust in authorities, and (intentions to perform) protective behavior [15-20]. In this study we therefore do not only investigate the relation between these psychological determinants and compliance with recommended behavior to "flatten the curve", we also look into the dynamics of both the behavior and the determinants.

Ik vind het ook wel mooi om een paar concrete onderzoeksvragen te hebben (ipv alleen een aim).

Figure 2. Integrated theoretical model explaining compliance with recommended measures during an outbreak by psychological factors.



Methods

Study population and procedure

Six repeated online surveys were sent to panel members from a panel population of Dutch residents. This panel population consists of a population of [number] active members, who have been invited to the panel based on a random sample from the Dutch population (aged 18+) (ref Nivel). This panel is frequently renewed to ensure the representativity of the panel population. Due to ..., the mean age of the panel population is ... Active consent for participation and data sharing was provided by the panel members before joining the panel population.

The online surveys were sent between 24 February 2020 and 17 May 2020, in the weeks 9 (in this week, the first case of COVID-19 was confirmed in the Netherlands), 12, 14, 16, 18 and 20. The survey was added to a weekly monitor of flu symptoms (ref). The invitation to the first online survey was sent to all [...] active panel members.

The data were analyzed anonymously, and processed according to the privacy policy of the Dutch Healthcare Consumer Panel, which complies with the General Data Protection Regulation (GDPR). In addition, respondents were informed about the purpose and content of the survey and could skip questions or stop participation at any time. Survey completion, including the questions about flu symptoms, took on average [...] minutes. According to Dutch legislation, there is no legal requirement either to obtain informed consent, nor gain approval by a medical ethics committee, for conducting research through the panel [21].

Measures

The first two online surveys consisted of nine questions about risk perception, support for governmental measures, evaluation of information about COVID-19, and adopted protective measures. Some of these questions have been adopted from previous studies on public responses to H1N1 [20] and Ebola [22] in order to allow for comparison with previous crises. After the second survey – at that time the government had implemented various new measures – seven questions were added to the survey to adequately address the rapid developments of the COVID-19 outbreak. These concerned questions in line with the theoretical model shown in figure 2, about trust in authorities, self-efficacy, response-efficacy and attitude with regard to the recommended measures, and compliance with these recommended measures. An overview of the measurements discussed in this paper is provided in Table 1. The full survey (including the adaptations following wave 2) is shown in the appendix.

Analyses

Descriptive statistics are shown for each measurement from each wave (shown in Table 1). To study changes in the adopted protective measures and in the psychological determinants, multiple linear (for measures with a five-point Likert scale) and logistic (for measures with two answer categories) GEE analyses were done. We performed GEE analyses for each measure from Table 1 as dependent variable, with time as a dummy independent variable, and controlled for age, sex, and education level. To observe all changes between the subsequent waves, we repeated all multilevel analyses three times with different reference groups for time (T2, T4 and T6). Prior to these analyses, we recoded the measure ‘compliance to recommended measures’ (Do you follow the guidelines advised by the government to limit further spread of the new coronavirus?). The answer categories ‘partly’, ‘no’ and ‘don’t know’ were merged into one single value (from now on referred to as ‘noncompliance’) next to the value ‘yes’ (from now on referred to as ‘compliance’)¹.

To study the determinants of compliance with the recommended protective measures, we performed a logistic GEE analysis based on a forward selection procedure. In this analysis the recoded measurement ‘compliance to recommended measures’ was the dependent variable, and the independent variables were, next to time, the measures for risk perception (perception of already being infected with the new coronavirus, perceived vulnerability to COVID-19, perceived severity of COVID-19, and worries about COVID-19), trust in involved authorities, perceived response-efficacy of the measures, self-efficacy regarding the measures, subjective norms regarding the measures and attitude towards the measures. To prevent multicollinearity, scales were constructed for the variable ‘trust in involved authorities’ (based on the mean of the variables trust in the government and trust in the National Institution for public health and environment (RIVM); Cronbach alpha:...), and for the variable ‘worries about COVID-19’ (based on the mean of the items ‘worries about own health’ and ‘worries about health of family members’; Cronbach alpha: ...). This analysis was also controlled for age, sex, and education level.

Table 1. An overview of the measures

Measure	Survey question (and items)	Answer categories
Adopted measures		
- Open answers adopted	Have you taken measures to protect yourself or	no

¹ We chose to merge these answer categories because of low response frequencies to the categories ‘no’ and ‘don’t know’.

measures	your family members from the new coronavirus?	2. yes, namely ...
- Compliance recommended measures*	Do you follow the guidelines advised by the government to limit further spread of the new coronavirus?	1. yes 2. partly 3. no 4. don't know
Risk perceptions		
- Already infected with new corona virus*	Do you think you are/have been infected with the new corona virus?	1. certainly not 2. probably not 3. don't know 4. probably yes 5. certainly yes
- Perceived vulnerability to COVID-19	In your opinion, how likely is it that you will become ill due to the new corona virus in the next 12 months?	1. very unlikely – 5. very likely
- Perceived severity of COVID-19	How severe would it be to you if you develop one of the following diseases in the next 12 months? <i>(flu)</i> <i>(disease due to the novel corona virus)</i> <i>(ebola)*</i>	1. not severe at all 2. not severe 3. neutral 4. severe 5. very severe
- Worries about COVID-19	Are you worried due to the new coronavirus <i>(about your own health?)</i> <i>(about the health of your family members?)</i>	1. not at all worried 2. not worried 3. not worried nor not worried 4. worried 5. very worried
Trust in authorities		
- Support for measures government	Do you think that the Netherlands is currently taking sufficient measures to limit further spread of the new coronavirus?***	1. certainly yes – 5. certainly not
- Trust in the government*	How much confidence do you have in the measures that the government is taking to limit the further spread of the new corona virus?	1. no confidence – 5. a lot of confidence
- Trust in the National Institute for Public Health and the Environment (RIVM)*	How much confidence do you have in the information from the National Institute for Public Health and the Environment (RIVM) about the new coronavirus?	1. no confidence – 5. a lot of confidence
Perceived response efficacy*	Below there are a number of statements about the measures advised by the government to limit the further spread of the corona virus. Please state what you think about these statements. <i>(I think the recommended measures help to limit the spread of the coronavirus.)</i>	1. certainly not – 5. certainly yes
Perceived self-efficacy*	<i>(I find it difficult to adhere to the recommended measures.)</i>	
Perceived subjective norms*	<i>(Most people close to me adhere to the recommended measures.)</i>	
Attitude*	<i>(I think people should adhere to the recommended measures.)</i>	

- * *These measures were added to the surveys of waves 3-6 and were therefore not assessed in waves 1 and 2.*
- ** *Respondents were also asked about their perceived severity of diabetes, heart attack and HIV/AIDS. We only report on the perceived severity of the flu and Ebola in this paper because these diseases are best comparable with the coronavirus in terms of transmissibility.*
- *** *This measure has been differently formulated in wave 1 and 2, namely as “Do you think that the Netherlands is currently taking sufficient measures to prevent the spread of the new coronavirus?”*

Results

Study population

[Tabel met demographics]

Developments in protective behavior and psychological determinants over time

[met figuren zoals in het meningokokken dynamics artikel: Grafieken met een lijn tussen de gemiddelden op opeenvolgende metingen en met * aangegeven of de verandering over tijd significant is]

Psychological determinants of compliance with recommended measures

[Tabel met resultaten van de verklarende logistische multilevel analyse met de belangrijkste (significante) determinanten van compliance]

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Appendix

Survey wave 3-6:

C Coronavirus

De volgende vragen gaan over het nieuwe coronavirus. Dit virus is in december 2019 uitgebroken in China. Inmiddels zijn er in andere landen ook uitbraken van het coronavirus, waaronder ook in Nederland. Wij willen graag weten hoe u denkt over het coronavirus, over de informatievoorziening en over de reactie op het virus in Nederland.

10. Wat vindt u van de berichtgeving over het nieuwe coronavirus?

- | | | | | | | |
|---------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
| Onduidelijk | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Duidelijk |
| Onbetrouwbaar | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Betrouwbaar |
| Beperkt | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Overdreven |

11. Zou u meer informatie willen over het nieuwe coronavirus?

- Nee
- Ja, namelijk over:.....

12. Hoeveel vertrouwen heeft u in de informatie van het Rijksinstituut voor Volksgezondheid en Milieu (RIVM) over het nieuwe coronavirus?

- Geen vertrouwen Veel vertrouwen

13. Hoeveel vertrouwen heeft u in de maatregelen die de overheid neemt om verdere verspreiding van het nieuwe coronavirus te beperken?

- Geen vertrouwen Veel vertrouwen

14. Denkt u dat Nederland op dit moment voldoende maatregelen neemt om verdere verspreiding van het nieuwe coronavirus te beperken?

- Zeker niet Zeker wel

15. Hoe waarschijnlijk is het volgens u dat u in de komende 12 maanden ziek wordt door het nieuwe coronavirus?

- Helemaal onwaarschijnlijk Heel waarschijnlijk

16. Hoe erg zou u het vinden als u in de komende 12 maanden zelf één van de volgende ziekten krijgt?

	<i>helemaal niet erg</i>	<i>niet erg</i>	<i>neutraal</i>	<i>erg</i>	<i>heel erg</i>
De griep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hartaanval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ziekte door het nieuwe coronavirus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HIV of AIDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ebola	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Maakt u zich zorgen door het nieuwe coronavirus...

	<i>helemaal niet bezorgd</i>	<i>niet bezorgd</i>	<i>niet bezorgd, niet onbezorgd</i>	<i>bezorgd</i>	<i>heel erg bezorgd</i>
over uw eigen gezondheid?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
over de gezondheid van uw familieleden?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. [als vraag 17a en/of b > 3] Waarom maakt u zich zorgen over het nieuwe coronavirus?

19. Heeft u maatregelen genomen om uzelf of uw familieleden te beschermen tegen het nieuwe coronavirus?

- Nee
 Ja, namelijk:.....

20. Houdt u zich aan de richtlijnen die worden geadviseerd door de overheid om verdere verspreiding van het nieuwe coronavirus te beperken?

- Ja
 Gedeeltelijk
 Nee

Weet ik niet

21. Kunt u uw antwoord op de vorige vraag toelichten?

22. Er volgen nu een aantal stellingen over de maatregelen die worden geadviseerd door de overheid om verdere verspreiding van het coronavirus te beperken. Wilt u voor elke van de onderstaande stellingen aangeven hoe u hierover denkt?

a. Ik denk dat de geadviseerde maatregelen helpen om de verspreiding van het coronavirus te beperken.

Zeker niet Zeker wel

b. Ik vind het moeilijk om mij te houden aan de geadviseerde maatregelen.

Zeker niet Zeker wel

c. De meeste mensen in mijn directe omgeving houden zich aan de geadviseerde maatregelen.

Zeker niet Zeker wel

d. Ik vind dat mensen zich moeten houden aan de geadviseerde maatregelen.

Zeker niet Zeker wel

23. Denkt u dat u besmet bent met het coronavirus?

Zeker niet

Waarschijnlijk niet

Weet ik niet

Waarschijnlijk wel

Zeker wel

24. Kunt u uw antwoord op de vorige vraag toelichten?