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Short communication

Anxiety and public responses to covid-19: Early data from Thailand

Robin Goodwin^a, Juthatip Wiwattanapantuwong^{b,*}, Arunya Tuicomepee^b,
Panrapee Suttiwan^b, Rewadee Watakakosol^b

^a Psychology, University of Warwick, Coventry, UK

^b Psychology, Chulalongkorn University, Bangkok, Thailand



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ABSTRACT

Any new pandemic has the potential to arouse considerable anxiety, with this anxiety associated in previous work with economic disruption and societal disruption. We examined anxiety, symptom awareness, trust and associated behavioural responses in the first three weeks of the SARS-CoV-2 (covid-19) outbreak in Thailand. We collected data on-street at randomly selected locations in Bangkok. Of 274 potential respondents, 203 (74.7%) responded. A four-item measure assessed anxiety, with open-ended questions assessing knowledge of symptoms, trusted information sources and measures taken to avoid infection. Respondents reported good awareness of the prime symptoms of the Coronavirus. Binary logistic regressions controlling for sex and age found the more anxious avoided the Chinese, people who were coughing, crowded places and public transport or flying. Younger respondents reported greater trust in foreign media and older populations information from national government. Trust in doctors online was positively associated with avoidance of coughing people and keeping fit; trust in national government with avoiding coughing people, keeping fit, and avoiding public transport. We conclude that anxiety can motivate both desirable and undesirable behaviours during pandemic outbreaks. Effective and targeted communication by trusted sources is needed to motivate preventive actions but also to limit unnecessary or disruptive behaviours.

1. Introduction

Anxiety, risk perceptions and behavioural responses can change rapidly during the course of a pandemic (Bults et al., 2011). As the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) continues to spread worldwide, effecting more and more countries, it is important to get indications of the early psychological sequelae of the outbreak, and their consequences for behaviour (Michie, 2020). As home to the world's most visited city, and a leading destination for Chinese tourists (WTTC, 2019), Thailand reported the first novel coronavirus case outside of China (on January 13th, 2020). The pandemic has had a significant economic effect, leading to a marked decline in the Thai economy (Stevenson, 2020).

In this paper we consider several key factors significant in framing responses to a developing pandemic. First, we gathered knowledge about awareness of core symptoms as the virus emerged. Second, we consider levels of anxiety. Data from China suggest the outbreak is also associated with elevated levels of psychological distress (Qiu et al., 2020). We analyse changes in this anxiety over a two-week time period

three to five weeks after the first reported Thai case. Third, we consider the spread of information in the emerging epidemic. Close social networks (Goodwin et al., 2011), as well as the wider mass media, are likely to play a crucial role in informing responses to substantial disease outbreaks. Finally, we combine the above to examine associations between anxiety, trust and preventive behaviours. Findings from previous pandemics shows that those with the greater trust towards governmental communications are more likely to take recommended precautionary behaviours (Bults et al., 2011; Bish and Michie, 2010). In common with other coronavirus outbreaks including SARS (Washer, 2004), and influenza strain H1N1 ('swine flu') (Goodwin et al., 2011), anxiety associated with the virus has contributed towards societal disruption in Thailand, as community relations become strained, and groups associated with the epidemic suffer discrimination (Boovert, 2020; Green et al., 2010). We examine the above through street interviews conducted in the early weeks of the outbreak on the streets of Bangkok.

* Corresponding author. Psychology, Chulalongkorn University, Bangkok, Thailand.

E-mail addresses: robin.goodwin@warwick.ac.uk (R. Goodwin), Juthatip.W@chula.ac.th (J. Wiwattanapantuwong).

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2. Materials and methods

2.1. Participants

Research was conducted in accordance with the World Medical Association Declaration of Helsinki. Following ethical approval from Chulalongkorn University (COA No. 052/2020), we collected data between the two weeks beginning 7th–13th February 2020 and 15th–21st February. During this time official cases of SARS-Cov-2 in Thailand increased from 25 to 35. Of the 50 districts of Bangkok seven areas within six districts were randomly selected (Supplementary Table 1). Trained researcher assistants approached 1 in 5 pedestrians passing a randomly pre-determined point on regional shopping streets or near regional bus stations. Vulnerable participants, including people appearing to be younger than 18 years old or visibly pregnant, were not approached. Of 272 approached, 203 (74.7%) gave their oral consent to the researcher and answered all questions. Questionnaires totaled 17 items and took on average 6 min to complete. Researchers conducted interviews during non-rush hour times to avoid crowds and to guarantee that street noise did not prove a problem during the interviews. Participants ranged from 18 to over 70, with 73 (36%) male. Participants were subsequently grouped into <> 40, the age at which the death rate increases (Worldometer, 2020) (Ns 131 (64.5%), 72 respectively). At the end of the interview all participants were provided with the latest WHO recommendations on avoiding catching or spreading the virus.

2.2. Measures

Alongside demographics (age in deciles, sex, occupation) we asked open-ended questions aimed at assessing awareness of symptoms, avoidance behaviours and trust in different information sources, drawing on previous work on highly pathogenic zoonoses H1N1 (‘swine flu’) (Goodwin et al., 2011), and avian influenza H7N9 (Goodwin and Sun, 2014). For each question participants could give multiple answers. Anxiety drew on the same previous literature on zoonoses and was assessed using the mean of 4, three-item scales (individual concern, concern expressed by family and friends (both *not at all concerned* to *very concerned*), personal sense of risk (*very low* to *high*), and perception of control over infection (*none* to *a great deal*, scale α .69). For those wearing a face mask at the time of interview (N = 150) we enquired about their motives for doing so.

3. Results

3.1. Awareness of symptoms

Participants were most likely to correctly report the most frequent symptoms associated with the new coronavirus (fever, cough, problems breathing) (Table 1).

3.2. Anxiety

Anxiety overall increased between the weeks (item Ms 1.97 vs. 1.80 t (199) = 2.11 P < .04). There were no sex differences in anxiety, but anxiety was higher in the younger age group (Ms 1.90 vs. 1.67, F(1, 201)

= 12.50 P = .001). Personal concern was significantly associated with the perceived concern of friends/family (r (201) = 0.48 P < .001).

3.3. Behaviour, risk and trust

Table 1 shows the most common responses to open-ended questions on symptoms, preventive behaviours, and trust in information sources. Participants were more likely to be wearing masks when approached in the second week of the study (71% in week 1, 86% in week 2: χ^2 (1) = 4.00 P = .045). 126 mentioned they wore masks due to pollution, 122 because of the virus; pollution as a motive was mentioned by a similar proportion in both weeks (61%, 66% respectively), but the virus motivated more mask wearing in week 2 vs. week 1 ((56.5%, (week 1) vs. 77.1% (week 2) reported wearing masks for fear of the coronavirus (χ^2 (1) = 5.12 P < .02)).

3.4. Anxiety, trust and preventive behaviours

Seven binary logistic regressions, controlling for the False Discovery Rate (Benjamini and Hochberg, 1995), examined associations between each avoidance behaviour and anxiety (Table 2). Controlling for sex and age grouping those most anxious were more likely to avoid crowds, Chinese people, those coughing, and public transport/flying. When public transport use was separated from flying only the association with flying was significant (OR 4.95 P = .007 (flying) vs. OR 2.65 P = .06 (public transport)). There were no significant associations with mask wearing or hand washing and anxiety when controlling for age and sex. Twenty-four further binary logistic regressions, controlling for age and sex and applying a conservative sequential Holm-Bonferroni correction (Abdi, 2010), found that those who trusted doctors writing on social media were more likely to report avoidance of coughing people, and keeping fit to avoid the coronavirus. Those who most trusted the national government reported avoiding coughing people and public transport, and reported keeping fit to reduce their risk of infection (Supplementary Table 2).

4. Discussion

As SARS-CoV-2 has become established in most countries around the world it is important to understand the likely economic and societal implications of this spread. In this paper we conducted on-street interviews during the early spread of covid-19 in Thailand. We report data on awareness of symptoms, anxiety, trust and associated behavioural responses three to five weeks into the epidemic in this country.

Respondents were generally aware of the key symptoms of COVID-19 (fever and cough), suggesting the general efficacy of public communication campaigns. Anxiety levels indicated low to moderate concern (mean item scores of 1.82/3, where 3 indicates highly concerned), although anxiety did increase significantly between those sampled in the two-week periods of the study. Anxiety may quickly spread through social networks via a process of ‘emotional contagion’, in which people ‘catch’ the worry of others (Hatfield et al., 1994). As with previous pandemic threats, personal concern was strongly correlated with normative expectations particularly from friends and family (Goodwin et al., 2011). Younger respondents exhibited more anxiety, consistent

Table 1
Most common open-ended responses: treatment, preventative behaviours, vulnerability and trust.

Question	Most frequent responses				
Symptoms	Fever (185)	Cough (151)	Breathing difficulties (90)	Headache (54)	
Preventative behaviours	Wearing a mask (187)	Hand washing (159)	Avoiding crowds (130)	Avoiding Chinese people (96)	Avoiding those coughing/sneezing (86)
Most trusted media	Doctors on social media (111)	General social media (67)	Foreign countries (66)	Government (56)	Close friends/family (25)

Respondents could provide multiple answers.

Table 2
Associations between avoidance behaviours and anxiety, controlling for age and sex (Wald, OR (95% CI) for each behaviour, P value).

	Wearing Masks (187)	Handwashing (159)	Avoid crowds (130)	Avoid Chinese (96)	Avoiding those coughing (86)	Keep fit (72)	Avoid public transport and flying (41)
Sex (female)	2.56 .40 (1.13–1.23) .11	2.70 .56 (.28–1.12) .10	.02 .96 (.52–1.78) .90	1.86 .63 (.32–1.23) .17	4.24 .52 (.28–.97) .04	.13, 1.12 (.61–2.07) .72	1.16, 1.54 (.70–3.38) .28
Age (<40)	.65 .56 (.16–2.01) .37	.82, 1.40 (.68–2.89) .37	.49, 1.26 (.67–2.37) .48	1.27, 1.49 (.74–3.00) .26	1.22 1.43 (.76–2.71) .27	5.54, .47 (.25–.88) .02	.02, .94 (.40–2.20) .89
Anxiety	2.17, 2.86 (.71–11.62)	2.20, 2.07 (.90–4.75) .09	7.65, 2.82 (1.35–5.87)	10.35 3.49 (1.63–7.48)	11.07, 3.41 (1.67–7.02)	.17, .86 (.43–1.73) .68	7.47, 3.59 (1.44–8.96) .006
	.14		.006	.001	.001		

(Bold are significant at $P < .14$ or less with statistical correction for False Discovery Rate: $p < .014$ (Benjamani and Hochberg, 1995), controlling for week of study did not significantly affect findings).

with early findings from this pandemic in China (Qiu et al., 2020). This has been attributed to the greater sourcing of online information for younger populations, both in China (Qiu et al., 2020) and following mass trauma elsewhere (Goodwin et al., 2015; Garfin et al., 2020).

The spread and perceived trustworthiness of information is key in framing responses to a novel threat. A post-doc MANOVA analysis, using Bonferroni correction with the five most frequently cited sources as the dependent variables, showed a significant effect for age group on the source of information most trusted. In our sample it was online doctors ($F(1, 201) = 16.16 P = .001$), and overseas governments ($F(1, 201) = 4.10 P = .044$), that were the most trusted amongst younger respondents. This may reflect the more limited use of internet amongst older Thais (Loipha, 2014), as well as a greater trust in governmental communications amongst older populations reported during the H1N1 ('swine flu') pandemic (Bults et al., 2011). Anxiety and trust towards different information sources were associated with preventive health and economic behaviours. Although public anxiety may stimulate some positive actions (e.g. the avoidance of those with symptoms), it is also likely to carry costs, both economic and social, as particular communities are blamed and rejected. Avoidance of transport/flying or commercial centers was not public policy at the time of our survey. In our study anxiety about infection was associated with non-recommended economic activities, with a potential significant impact on individual livelihoods and national resources at a time of need. People from China were seen as posing particular threat by those who were most anxious. While avoidance of people from a group associated with the outbreak at a time of complexity and ambiguity may appear understandable, focusing on the risk posed by any one particular group can lead to a false sense of security and reduce precautionary behaviour (Goodwin et al., 2011). Effective and targeted communication is therefore needed to motivate efficient preventive actions. Controlling for age and sex, there were differences in preventive behaviours in those that trusted different media outlets. This reinforces past research suggesting that media plays a major role in influencing behaviour during pandemics (Garfin et al., 2020).

The collection of public data during any fast-spreading virus poses a number of challenges for researchers, and we recognize a number of limitations to our study. Our sample was modest in size, and, as a possible consequence of the focus on Bangkok, generally well educated. Early Chinese data on SARS-CoV-2 reports an association between higher levels of education and psychological distress (Qiu et al., 2020). Our respondents were mainly aged under 40, and although the population of Bangkok is relatively young (68.5% are aged under 40 (National Statistics of Thailand, 2020)), older respondents could potentially be limiting their outdoor activities due to wariness of the virus. We asked only a limited number of questions, and respondents varied in number of free responses provided. We developed our own short measure of anxiety, meaning that we could not readily compare our findings against previous established measures. This measure of anxiety had a relatively modest alpha (.69). Data was obtained over a short period of time within Bangkok; our anxiety and mask usage data reinforce the message that perceptions and behavioural motivations change rapidly as a threat emerges (Bults et al., 2011; Fetzer et al., 2020). We were not able to question the same people over time, meaning that our data lacked the additional insights that could be provided by repeated measures. At the time of data collection Bangkok was the region most affected by the outbreak and lower levels of anxiety and behavioural response might have been present elsewhere.

5. Conclusions

In the first days of a pandemic there is considerable uncertainty about spread within a specific setting, as well as continuing debate over infection routes and mortality (Bults et al., 2011). We believe that our early findings have an important message for those working in public health. New motivations can emerge for established behaviours (such as

the wearing of facemasks), suggesting rapid changes in risk perception. Social networks, alongside broader mass media, inform individuals about both effective and less efficacious preventive behaviours. At this critical point it is vital to communicate effectively about what has already been confirmed and recognize ongoing uncertainties, while managing anxiety in a positive, motivating way. This may entail new strategies aimed at tracking associations between public health messaging and behavioural change (Holmes et al., 2020). Media outlets need to be particularly careful to provide clear messaging, with social media also able to connect individuals to trusted resources for psychological support to address anxiety (Galea et al., 2020). It is only through doing so that societies will be able to successfully promote effective precautionary behaviour and avoid economic and societal disruption as the novel zoonosis continues to spread.

Statement of ethics

Research complied with the ethical standards set out in the [World Medical Association Declaration of Helsinki](#). Participants, all of whom were aged over 18, gave oral consent at the time of interview, in line with normal procedures for on-street interviews. The study protocol was approved by the ethics committee (Chulalongkorn Research Committee).

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Author contributions

RG, JW, RW and AT provided the concept and study design. JW, AT, RW acquired the data. RG and JW conducted and interpreted the statistical analysis. JW, AT, RW and PS obtained funding. All authors contributed to drafting and critical revision of the manuscript for intellectual content.

Declaration of competing interest

The authors have no conflicts of interest to declare.

CRediT authorship contribution statement

Robin Goodwin: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Writing - original draft, Writing - review & editing, Supervision. **Juthatip Wiwattanapantuwong:** Conceptualization, Methodology, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Arunya Tuicomepee:** Conceptualization, Methodology, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Panrapee Suttiwan:** Conceptualization, Methodology, Writing - review & editing, Project administration, Funding acquisition. **Rewadee Watakakosol:** Conceptualization, Methodology, Writing - review & editing, Project administration, Funding acquisition.

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Appendix A. Supplementary data

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