The psychological effects of quarantine and factors influencing its compliance during the COVID-19 pandemic: A cross sectional study from Nuh, Haryana (India)

Abhishek Singh, Vikas Gupta, Pawan Kumar Goel

Submitted to: JMIR Public Health and Surveillance
on: May 29, 2020

Table of Contents

The psychological effects of quarantine and factors influencing its compliance during the COVID-19 pandemic: A cross sectional study from Nuh, Haryana (India)

Abhishek Singh[1*] MD; Vikas Gupta[2*] MD; Pawan Kumar Goel[1] MD

[1]SHKM Government Medical College, Nalhar Nuh IN
[2]Government Medical College, Shahdol Shahdol IN
[*]these authors contributed equally

Corresponding Author:
Vikas Gupta MD
Government Medical College, Shahdol
F3/6, GMC Campus, Shahdol
Shahdol
IN

Abstract

Background: COVID-19 has caused pandemic during 2019-2020 which results in illnesses ranging from the usual flu to serious respiratory problems even leading to mortality. Recent literatures have suggested that the health (psychological) impact of quarantine is wide-ranging, substantial, and can be long lasting.

Objective: The purpose of this study was to assess mental health status (psychological distress) of experienced quarantine and compliance to quarantine during the outbreak of COVID-19.

Methods: The study included 543 subjects (adults aged 18 years or more) sent on quarantine at home or state-run facilities which included 'Flu corner' screened patient and health care staff working in COVID-19 outpatient and wards. Psychological impact was assessed using Kessler Psychological Distress Scale (K10). Categorical data were presented as percentages (%) and bivariable logistic regression was applied to find out association and it was considered significant if the p value was less than 0.05.

Results: The doctors and nursing staff were among two fifth of the subjects (40.1%), and only 11.6% of quarantined subjects were complaint with all protective measures. The mean score obtained on Kessler Psychological Distress Scale (K10) subjects was 18.69±4.88, whereas 152 subjects (27.9%) had score 20 or more and it has significant association with the elderly age group, female gender and workplace as exposure setting ($p<0.05$).

Conclusions: Given the developing situation with coronavirus, policy makers urgently need evidence synthesis to produce guidance for the public. Thus, outcomes of this study will definitely help authorities, administrators and policy makers to put quarantine measures in a better way.

(JMIR Preprints 29/05/2020:20806)
DOI: https://doi.org/10.2196/preprints.20806

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?
Please make my preprint PDF available to anyone at any time (recommended).
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
✓ **No, I do not wish to publish my submitted manuscript as a preprint.**
2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?
✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

The psychological effects of quarantine and factors influencing its compliance during the COVID-19 pandemic: A cross sectional study from Nuh, Haryana (India)

ABSTRACT

Background

COVID-19 has caused pandemic during 2019-2020 and has presented with illnesses ranging from the usual mild flu to serious respiratory problems/complications even leading to considerable mortality. Recent literatures have suggested that the health (especially psychological) impacts of quarantine are substantial, and can be long lasting.

Objectives

The purpose of this study was to assess the mental health status (psychological distress) of experienced quarantine and compliance to quarantine during the outbreak of COVID-19 in Nuh district.

Methods

The study included 543 subjects (adults aged 18 years or more) who were sent for quarantine at home or state-run facilities and included ‘Flu corner’ screened patient and health care staff working in COVID-19 outpatient and wards. The psychological impact was assessed using the Kessler Psychological Distress Scale (K10). Categorical data were presented as percentages (%) and bivariable logistic regression was applied to find out the association and it was considered significant if the p value was less than .05.

Results

The doctors and nursing staff were among two fifth of the subjects (217/543, 40.1%), and only 11.6% of quarantined subjects (63/543) were compliant with all protective measures. The mean score obtained on Kessler Psychological Distress Scale (K10) subjects was 18.69±4.88, whereas out of 543 subjects, 152 (27.9%) had a score of 20 or more and it has a significant association with the elderly age group, female gender and workplace as exposure setting ($p<.05$).

Conclusions

Given the developing situation with coronavirus pandemic, policy makers urgently need evidence synthesis to produce guidance for the public. Thus, the outcomes of this study will positively help authorities, administrators and policy makers to apply quarantine measures in a better way.

Keywords: Quarantine, Compliance, Kessler Psychological Distress Scale (K10), Health care worker

INTRODUCTION

Background

COVID-19 has caused pandemic during 2019-2020 and has presented with illnesses ranging from the usual mild flu to serious respiratory problems/complications even leading to considerable mortality [1]. The origin of COVID-19 being zoonosis yet the transmission from animals to humans or humans to humans is observed either through droplets or directly contacts and period of incubation ranges from 2 to 14 days [2,3]. The history has recorded occurrence of plenty of previous pandemics, including SARS (2002) resulted in eight hundred mortality; and MERS-CoV (2012) resulted in 860 mortality and just after eight years of MERS-CoV, COVID-19 gave its worldwide

representation [3,4].

The index case was reported from Wuhan (China) during the month of December 2019 and after that its dissemination speeded in a very rapid manner and reached several countries in very short duration of time, causing a lot of fatalities. After such disastrous situation, the World Health Organization (WHO) came into action, realized its impact and decided to declare COVID-19 as a public health emergency of international concern (PHEIC) on 30th January 2020 [5]. Startling there was global reporting of catastrophic counts of newer cases during the start of March, so subsequently on the 11th of March 2020, the WHO has declared the COVID-19 to be a pandemic. On 24 March 2020, Government of India (GoI) took a strong initiative to contain the spread of this virus and from the 25 March 2020 onwards the closure of nearly all offices, industries, hotels, commercial and private establishments, shops, malls, others were ordered to bring the life to stand still [6].

Reporting of COVID-19 cases as of on 22 April 2020 was more than 2475699 among 213 countries and territories, and it resulted in around 169134 deaths, whereas in India the actives case counted 15859, 3960 cured and 652 deaths [2,7]. At that time, Nuh was the worst affected district among all 22 districts of Haryana state with maximum number of positive cases. A large number of COVID 19 positive persons and their contacts were sent to quarantine [8]. Many countries ask people who have potentially come into contact with the infection to isolate themselves in a dedicated quarantine facility or at home. This outbreak has seen a large number of people placed under quarantine, initially at the state-run facilities, but later guidelines allowed self-isolation at home also. Asymptomatic persons with a travel or contact history, visiting the COVID 19 Screening health center or ‘Flu corner’ were sent on home quarantine. Doctors and health care staff discharging duties in close contact with COVID 19 positive patients were placed under quarantine at home/hostel, or in state-run facilities. The district administration had taken over a number of colleges as quarantine centers in the district [9].

Objectives

Recent literatures have suggested that the health (especially psychological) impacts of quarantine are substantial, and can be long lasting [10,11,12,13]. As quarantine at such large scale was not undertaken since last century, there is a need to know the psychological impact of quarantine as well as the factors influencing its compliance during the COVID-19 pandemic. The purpose of this study was to assess the mental health status (psychological distress) of experienced quarantine and barriers and facilitators for compliance to quarantine during the outbreak of COVID-19 in Nuh district.

METHODS

Study setting and design

The present quantitative study was cross-sectional in design, conducted at SHKM Government Medical College (GMC), Nalhar situated in district Nuh, Haryana during the third week of April 2020.

Study population and sample size

The study subjects included subjects sent on home quarantine (adults aged 18 years or more) by ‘Flu corner’ or ‘COVID 19 screening health center’ run under the ages of department of Community Medicine, SHKM GMC; and doctors and health care staff placed under quarantine at home/hostels or in state-run facilities after discharging duties in close contact with COVID 19 positive patients; and it counted to 568 eligible subjects.

Study tool

A 21-elements structured questionnaire with both open and close ended responses was developed which covered the domains of subject’s characteristics; understanding the rationale, compliance, difficulties associated with quarantine; psychological impact; and barriers and facilitators among

COVID-19 quarantine study subjects. A pilot study was done randomly among ten health care worker and ten hospital visitors and it took on an average 20 minutes for completing the questionnaire. The questionnaire was made precise, relevant, valid and acceptable by presenting it among 15 randomly selected faculty members. Prior to distributing the questionnaire to the study subjects further refining and organizing of the same was done to make it more comprehensive. The questionnaire had 4 divisions and consisted of total 21 elements. Division one consisted of five elements and gathered information regarding subjects' characteristics such as age, gender, exposure setting, exposure type, and quarantine type. Division two comprised of 4 elements and aimed to gather the subjects understanding the rationale, compliance with all community and household protective measures, difficulties associated with quarantine. Division three comprised of 10 elements and aimed to measure the psychological impact using the Kessler Psychological Distress Scale (K10) which was modified for 14 days from 30 days and it included statements related to the past 14 days, about how often did you feel "tired out for no good reason, nervous, so nervous that nothing could calm you down, hopeless, restless or fidgety, so restless you could not sit still, depressed, that everything was an effort, so sad that nothing could cheer you up and worthless" and the response to each element was based on a 5-point Likert scale pattern (all of the time=5, most of the time=4, some of the time=3, a little of the time=2 and none of the time=1) [14]. The K10 score ranged from 10 (minimum) to 50 (maximum). A score of 20 or more was considered as having a psychological impact on subjects during 14 day quarantine period. Division four comprised of 2 elements and aimed to extract the barriers and facilitators among COVID-19 quarantine study subjects.

Data collection

A complete list of subjects sent on home quarantine (adults aged 18 years or more) by 'Flu corner' was obtained and their address and contact numbers were noted down. On the similar basis, a list of doctors, health care staff and housekeeping placed under quarantine at home/hostel or in state-run facilities was obtained from the Office of Medical Superintendent along with their contact details.

Just after completion of their 14 days of quarantine period, they were contacted telephonically for their availability to conduct this study. They were explained about purpose of this study and were requested to participate. Out of 568 subjects, only 543 subjects provided their written consent after understanding the study objectives and were included in the study. The questionnaire for subjects was administered by the investigator himself by face-to-face interview. Also, the filled questionnaires were then checked for the completeness. The subjects suspected of having a psychological impact on Kessler Psychological Distress Scale (K10) were directed to the nearest health facility and the information pertaining to subjects was kept anonymous and confidential. Being elective and not requite, were the properties for participating in the study. The study was initiated after obtaining the ethical approval from the Institutional Ethical Committee (IEC), SHKM Government Medical College, Nalhar (Letter No. SHKM/IEC/2020/40, Date: 24 April, 2020).

Data Analysis

Collected data were entered into the MS Excel spreadsheet, coded appropriately and later cleaned for any possible errors. Analysis was carried out using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp. Armonk, NY, USA). During data cleaning, more variables were created so as to facilitate the association of variables. Clear values for various outcomes were determined before running frequency tests. Categorical data were presented as percentages (%), whereas continuous data were presented as mean and standard deviation. Bivariable logistic regression had been done to find out the strength of association between dependent variable (Kessler Psychological Distress Scale (K10) $\geq$ 20) and independent variables (age group, gender, exposure setting, exposure type, quarantine type, compliant with all protective measures and understanding of all rationale for quarantine). All tests were performed at a 5% level of significance; thus, an association was significant if the p value was less than .05.

RESULTS

Baseline study participant characteristics

Total 543 subjects were involved in the present study. The doctors and nursing staff were among two fifth of the subjects (217/543, 40.1%) and more than one tenth of subjects (81/543, 14.9%) were housekeeping staff. The mean age group of the study subjects was 42.3±14.4 years and nearly half of the study subjects (262/543, 48.3%) were below age of 40 years. The male subjects were around two third (334/543, 61.5%) of total subjects. The travel history was noticed among more than one tenth of study subjects (89/543, 16.4%) with 95 % CI as 13.3-19.5. The home quarantine was mostly adopted among quarantine type as nearly two third study subjects (326/543, 60.1%) were sent for home quarantine (Table 1).

Table 1. Baseline characteristics of COVID-19 quarantine study subjects (N=543).

Characteristics	Number (%)/Mean±SD
Age group	
19-39 years	262 (48.3%)
40-59 years	185 (34.1%)
60 or more	96 (17.7%)
Mean age (in years)	42.3±14.4
Gender	
Male	334 (61.5%)
Female	209 (38.5%)
Exposure setting	
Workplace	298 (54.9%)
Travel	89 (16.4%)
Hospital visit	156 (28.7%)
Exposure type	
Health care workers	217 (40.1%)
Patients	139 (25.6%)
Housekeeping staff	81 (14.9%)
Health care facility visitors	56 (10.3%)
Households	23 (4.2%)
Co-worker	27 (4.9%)
Quarantine type	
Home	326 (60.1%)
Work/Hostel	158 (29.1%)
Facility	59 (10.9%)

Compliance to quarantine

Table 2. shows that the rationale of quarantine was completely and correctly understood by only 17.3% of subjects (94/543), whereas 87.1% subjects (473/543) believed that quarantine is mainly for the benefit of the community. Astonishingly, only 11.6% of quarantine subjects (63/543) were compliant with all protective measures with 95 % CI as 9.0-14.4, whereas compliance with all community and household protective measures were 45.9% (249/543) and 28.2% (153/543) respectively. The most common difficulty faced by subjects during quarantine was inability to go out of house "to socialize (397/543, 73.1%) or on errands (372/543, 68.5%)".

Table 2. Distribution of understanding the rationale, compliance and difficulties associated with quarantine among COVID-19 study subjects (N=543).

Variables	Number (%)	95% CI
Understanding of rationale for quarantine[a]		
Quarantine protects self	291 (53.6%)	49.4-57.6
Quarantine protects household	176 (32.4%)	28.5-36.1
Quarantine protects community	473 (87.1%)	84.3-89.9
All correct	94 (17.3%)	14.2-20.4
Compliance		
Compliant with all household protective measures[a]	153 (28.2%)	24.3-31.9
Used separate towels	333 (61.3%)	57.1-65.4
Used separate cutlery	325 (59.9%)	55.6-63.9
Slept in separate room by themselves	307 (56.5%)	52.3-60.6
Used mask when household member present	218 (40.1%)	36.1-44.0
Compliant with all community protective measures[a]	249 (45.9%)	41.8-49.9
Did not go out of house to socialize	431 (79.4%)	75.7-82.7
Did not attend important events	397 (73.1%)	69.4-76.8
Did not go on vacation	477 (87.8%)	84.9-90.4
Used mask for home or health-care visits	496 (91.3%)	89.1-93.4
Did not run errands outside of home	409 (75.3%)	71.5-78.8
Used mask when answer door	324 (59.7%)	55.4-63.7
Did not allow visitors into home	312 (57.5%)	53.2-61.5
Used mask outdoors when others present	435 (80.1%)	76.6-83.2
Did not go for a drive	476 (87.7%)	84.7-90.2
Compliant with all protective measures	63 (11.6%)	9.0-14.4
Most common difficulties[a]		
Not going out of house to socialize	397 (73.1%)	69.4-76.8
Not going out of house on errands	372 (68.5%)	64.6-72.4
Using mask when household member present	171 (31.5%)	27.8-35.4
Taking care of children (if in household)	135 (24.9%)	21.2-28.7
Staying in room by self with door closed	257 (47.3%)	42.9-51.7

[a]Multiple response questions

Kessler Psychological Distress Scale (K10)

The mean score obtained on Kessler Psychological Distress Scale (K10) to evaluate the psychological impact associated with quarantine among COVID-19 study subjects was 18.69±4.88, whereas out of 543 subjects, 152 (27.9%) had score of 20 or more, i.e. having a psychological impact or distress among subjects during 14 days quarantine (Table 3).

Table 3. Psychological impact using Kessler Psychological Distress Scale (K10) associated with quarantine among COVID-19 study subjects (N=543).

Variables	Number (%) or Mean±SD				
	All of the time	Most of the time	Some of the time	A little of the time	None of the time
In the past 14 days, about how often did you feel tired out for no good reason?	22 (4.1%)	10 (1.8%)	14 (2.6%)	33 (6.1%)	464 (85.4%)
In the past 14 days, about how often did you feel nervous?	145 (26.7%)	55 (10.2%)	105 (19.4%)	76 (13.9%)	162 (29.8%)
In the past 14 days, about how often did you feel so nervous that nothing could calm you down?	86 (15.8%)	92 (16.9%)	134 (24.7%)	93 (17.2%)	138 (25.4%)
In the past 14 days, about how often did you feel hopeless?	15 (2.8%)	30 (5.5%)	27 (4.7%)	29 (5.3%)	422 (77.7%)
In the past 14 days, about how often did you feel restless or fidgety?	27 (4.9%)	14 (2.6%)	61 (11.3%)	100 (18.4%)	341 (62.8%)
In the past 14 days, about how often did you feel so restless you could not sit still?	46 (8.5%)	103 (18.9%)	182 (33.6%)	149 (27.4%)	63 (11.6%)
In the past 14 days, about how often did you feel depressed?	67 (12.3%)	30 (5.5%)	61 (11.2%)	110 (20.4%)	275 (50.6%)
In the past 14 days, about how often did you feel that everything was an effort?	8 (1.5%)	7 (1.3%)	54 (9.9%)	90 (16.6%)	384 (70.7%)
In the past 14 days, about how often did you feel so sad that nothing could cheer you up?	14 (2.6%)	12 (2.2%)	19 (3.5%)	16 (2.8%)	482 (8.9%)
In the past 14 days, about how often did you feel worthless?	17 (3.1%)	22 (4.1%)	10 (1.8%)	21 (3.9%)	473 (87.1%)
Total score	18.69±4.88				

Barriers and facilitators for quarantine

When subjects were enquired about the barriers with non-compliance to quarantine using open ended questions, the major barriers were duration of quarantine (376/543, 69.2%), fear of infection (357/543, 65.7%) and inadequate supply (395/543, 72.7%). Similarly, the enquired facilitators to make quarantine more compliant included keep it as short as possible, give people as much information as possible, provide adequate supplies and assessing pre-existing poor mental health (Table 4).

Table 4. Distribution of barriers and facilitators among COVID-19 quarantine study subjects (N=543).

Variables	Number (%)	95% CI
Barriers for quarantine		
Duration of quarantine	376 (69.2%)	65.4-73.1
Fears of infection	357 (65.7%)	61.7-69.8
Frustration and boredom	321 (59.1%)	55.1-63.3
Inadequate supplies	395 (72.7%)	68.9-76.6
Inadequate information	203 (37.4%)	33.1-41.8
Finances	327 (60.2%)	56.4-64.3
Stigma	249 (45.9%)	41.4-50.1
Facilitators for quarantine		
Keep it as short as possible	471 (86.7%)	83.8-89.5
Give people as much information as possible	456 (83.9%)	80.5-86.9
Provide adequate supplies	432 (79.6%)	75.7-83.1
Reduce the boredom and improve the communication	309 (56.9%)	52.9-61.1
Health-care workers deserve special attention	365 (67.2%)	63.2-71.3
Altruism is better than compulsion	388 (71.5%)	67.6-75.3
Assessing pre-existing poor mental health	424 (78.1%)	74.4-81.6

Bivariable logistic regression analysis

Table 5. shows the bivariate logistic regression analysis to find out the strength of association between dependent variables and psychological impact using Kessler Psychological Distress Scale (K10) score ≥20 and it was revealed that the elderly age group, female gender, workplace as exposure setting, inability to understand all rationale for quarantine and non-compliance with all protective measures were having statistically significant association with higher K10 score ($p<.05$).

Table 5. Comparison of COVID-19 quarantine study subjects by Psychological impact using Kessler Psychological Distress Scale (K10) score (N=543).

Variables	"Kessler Psychological Distress Scale (K10) score"	p-value

	≥20 (n=152)		
	Number (%)	**aOR (95% CI.)**	
Age group			
19-39 years (n=262)	36 (13.7%)	**Reference**	
40-59 years (n=185)	64 (34.6%)	2.23 (1.35-3.69)	.002
60 or more (n=96)	52 (54.2%)	7.41 (4.35-12.65)	<.001
Gender			
Male (n=334)	63 (18.8%)	**Reference**	
Female (n=209)	89 (42.5%)	3.19 (2.16-4.70)	<.001
Exposure setting			
Travel (n=89)	16 (17.9%)	**Reference**	
Workplace (n=298)	97 (32.6%)	2.20 (1.21-3.98)	.009
Hospital visit (n=156)	39 (25.0%)	1.44 (0.93-2.23)	.096
Exposure type			
Households (n=23)	5 (21.7%)	**Reference**	
Health care workers (n=217)	69 (31.8%)	1.16 (0.61-2.22)	.611
Patients (n=139)	27 (19.4%)	0.88 (0.51-1.51)	.514
Housekeeping staff (n=81)	28 (34.5%)	1.67 (0.59-4.70)	.325
Health care facility visitors (n=56)	16 (46.4%)	1.93 (1.16-3.21)	.011
Co-worker (n=27)	7 (25.9%)	1.33 (0.54-3.29)	.535
Quarantine type			
Home (n=326)	84 (25.7%)	**Reference**	
Work/Hostel (n=158)	47 (29.7%)	1.30 (0.88-2.86)	.409
Facility (n=59)	21 (35.6%)	1.59 (0.69-2.45)	.121
Understanding of all rationale for quarantine			
Yes (n=94)	18 (19.1%)	**Reference**	
No (n=449)	134 (29.8%)	1.79 (1.03-3.12)	.038
Compliant with all protective measures			
Yes (n=63)	9 (14.3%)	**Reference**	
No (n=480)	143 (29.7%)	2.54 (1.22-5.29)	.012

DISCUSSION

Overview

Quarantine has been often an unpleasant experience for those who undergo it.

Separation from loved ones, the loss of freedom, uncertainty over disease status, boredom and economic loss can, on occasion, create dramatic effects. People are facing several problems during lockdown from basic survival to fake and endless information on the COVID-19 pandemic period.

The present study has made an attempt to evaluate the psychological impact on quarantined subjects and it was observed that during quarantine period, 26.7% of subjects felt nervous all the time, 15.8% were felt so nervous that nothing could calm them down all the time and 12.3% of subjects felt depressed all the time.

A recent study showed that 6.1 % individual were facing severe depression, 10.0 % faced severe anxiety level and 16.5 % had severe stress level [15]. The authors compared psychological outcomes during quarantine with later outcomes and found that during quarantine, 7% showed anxiety symptoms and 17% showed feelings of anger, whereas 4–6 months after quarantine these symptoms had reduced to 3% (anxiety) and 6% (anger) [16].

The authors also found that 28% of subjects quarantined in the study reported compared post-traumatic stress symptoms sufficient enough to warrant a diagnosis of a trauma-related mental health disorder, compared with 6% of subjects who were not quarantined [17]. A study included two groups' quarantined vs non-quarantined and it revealed that SRQ-20, GAD-7 and PHQ-9 scores were significantly higher among quarantined subjects when compared non quarantined ones. Also, it was observed that psychological impact was higher among home quarantined subjects (24.5%) when compared to facility-based quarantine (12.6%) which was in contrast to present study where psychological impact was higher among facility-based quarantine (35.6%) when

compared to home quarantined subjects (24.7%) [18].

The present study has raised concern as the psychological impact was significantly higher among health care workers (31.8%), housekeeping staff (46.4%) compared to the patients (19.4%) and their households (21.7%). Author studied hospital staff & examined symptoms of depression 3 years after quarantine and found that 9% of the whole sample reported high depressive symptoms. In the group with high depressive symptoms, nearly 60% had been quarantined but only 15% of the group with low depressive symptoms had been quarantined [19].

In a study among hospital staff who might have come into contact with SARS found that immediately after the quarantine period (9 days) ended, having been quarantined was the factor most predictive of symptoms of acute stress disorder. In the same study, quarantined staff were significantly more likely to report exhaustion, detachment from others, anxiety when dealing with febrile patients, irritability, insomnia, poor concentration and indecisiveness, deteriorating work performance, and reluctance to work or consideration of resignation [20].

Confinement, loss of usual routine, and reduced social and physical contact with others were frequently shown to cause boredom, frustration, and a sense of isolation from the rest of the world, which was distressing to subjects. This frustration was exacerbated by not being able to take part in usual day-to-day activities, such as shopping for basic necessities or taking part in social networking activities via the telephone or internet [21,22].

This study also revealed that only 11.6% of quarantine subjects were compliant with all protective measures, whereas compliance with all community and

household protective measures were 45.9% and 28.2% respectively. Author in United States during 2009 showed that students at with suspected mumps instructed to stay isolated and 75% stayed isolated for recommended number of days [23]. During swine flu outbreak (2011) in Australia, compliance observed in various studies had much variations among parents from households with children who were placed in quarantine during the outbreak, 84.5% reported full adherence at household level, parents who were employed from households with children who were placed in quarantine during the outbreak, half of all households fully adhered with quarantine recommendations and subjects tested for H1N1 and who were prescribed home quarantine for 7 days, among them 92.8% reported adherence to quarantine measures [24,25,26]. A study during 2006 showed that health care workers in charge of SARS epidemic control at health centers in Taiwan were advised home quarantine for 10-14 days and all nurses reported poor adherence from quarantined individuals [27].

The present study also attempted to obtain the opinion about the barriers with non-compliance to quarantine using open ended questions, the major barriers were duration of quarantine (69.2%), fear of infection (65.7%) and inadequate supply (72.7%). The studies by author cited the barriers for adherence with the quarantine as length of quarantine, fear of infection, practical issues like loss of income and need to work, needed to attend important events, and to seek medical care [28,29].

If the quarantine experience is negative, there can be long-term consequences that affect not just the people quarantined but also the health-care system that administered the quarantine and the politicians and public health officials who mandated it. Ever since the plague of Justinian, imposed quarantine has rightly

remained part of our public health arsenal. But as with every medical intervention, there are side effects that must be weighed in the balance and alternatives that must be considered. Voluntary quarantine, for example, may be associated with good compliance and less psychological impact, particularly when explained well and promoted as altruistic. Whether the uncertain epidemiological benefits of this new form of mandatory mass quarantine outweigh the uncertain psychological costs is a judgement that should not be made lightly [30].

Conclusions

Given the developing situation with the coronavirus, policy makers urgently need evidence synthesis to produce guidance for the public. Thus, the outcomes of this study will definitely help authorities, administrators and policy makers to apply quarantine measures in a better way. It shall also provide inputs to a health-care system that administer the quarantine and the public health officials who mandated it.

Recommendations

As governments update daily guidelines, the healthcare setups formulate new policies, and the general population practices either social distancing or strict quarantine, everyone seem to be proactively doing their bit to stop the physical spread of the disease. Tasks for public health leaders are to gather and utilize knowledge and expertise, monitor psychological effects, assist in resource identification, provision, operations, adaptability, and integration; and integrate public health efforts with behavioral health services and systems.

REFERENCES

1. Phan T, Genetic diversity and evolution of SARS-CoV-2. Infect Genet Evol 2020;81:104260. PMID: 32092483
2. World Health Organization. Novel coronavirus (COVID-19) situation. URL: https://experience.arcgis.com/experience/685d0ace521648f8a5beeeee1b9125cd
3. Zhou P, Yang XL, Wang XG, Zu B, Zhang L, Si HR et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 2020 Mar;579(7798):270-273. PMID: 32015507
4. Zhong NS, Zheng BJ, Li YM, Poon, Xie ZH, Chan KH, et al. Epidemiology and cause of severe acute respiratory syndrome (SARS) in Guangdong, People's Republic of China, in February, 2003. Lancet 2003 Oct 25;362(9393):1353-1358. PMID: 14585636
5. Eurosurveillance Editorial Team. Note from the editors: World Health Organization declares novel coronavirus (2019-nCoV) sixth public health emergency of international concern. Euro Surveill 2020 Jan 31;25(5):200131e. PMID: 32019636
6. Ministry of Home Affairs. Guidelines on the measures to be taken by Ministries/Department of Government of India, State/Union Territory Governments and State/Union Territory Authorities for the containment of COVID-19 epidemic in the country. URL: http://164.100.117.97/WriteReadData/userfiles/Guidelines.pdf
7. Ministry of Health and Family Welfare. COVID-19 India: Guidelines. URL:

https://www.mohfw.gov.in/pdf/Guidance%20document%20-%202019-nCoV.pdf

8. COVID-19 Dashboard. India Fights Corona COVID 19. URL: https://www.mygov.in/covid-19
9. State data. COVID-19 INDIA. Ministry of Health and Family Welfare. Government of India. URL: https://www.mohfw.gov.in/#
10. Barbisch D, Koenig KL, Shih FY. Is there a case for quarantine? Perspectives from SARS to Ebola. Disaster Med Public Health Prep 2015;9:547–553. PMID: 25797363
11. Kumar A, Nayar KR. COVID 19 and its mental health consequences. J Ment Health;2020:1-2. PMID: 32339041
12. Chatterjee SS, Barikar C M, Mukherjee A. Impact of COVID-19 pandemic on pre-existing mental health problems. Asian J Psychiatr 2020;51:102071. PMID: 32334407
13. Labana, R. The Public Mental Health While in a Community Quarantine Due to COVID-19 Pandemic: A Scoping Review of Literature Using Google Scholar. Preprints 2020, 2020050050. doi: 10.20944/preprints202005.0050.v1
14. Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, et al. Screening for serious mental illness in the general population. Arch Gen Psychiatry 2003 Feb 1;60(2):184-189. PMID: 12578436
15. Upadhyay R, Sweta, Singh B, Singh U. Psychological impact of quarantine period on asymptomatic individuals with COVID-19. SSHO-D-20-00469. URL: https://ssrn.com/abstract=3599773
16. Jeong H, Yim HW, Song Y-J, Ki M, Min J-A, Cho J, et al. Mental health status of people isolated due to Middle East respiratory syndrome. Epidemiol Health 2016;38:e2016048. PMID: 28196409
17. Sprang G, Silman M. Posttraumatic stress disorder in parents and youth after health-related disasters. Disaster Med Public Health Prep 2013;7:105–110. PMID: 24618142

18. Zhu S, Wu Y, Zhu CY, Hong WC, Yu ZX, Chen ZK, et al. The immediate mental health impacts of the COVID-19 pandemic among people with or without quarantine managements. Brain Behav Immun 2020;87:56-58. PMID: 32315758
19. Liu X, Kakade M, Fuller CJ, Fan B, Fang Y, Kong J, et al. Depression after exposure to stressful events: lessons learned from the severe acute respiratory syndrome epidemic. Compr Psychiatry 2012;53:15–23. PMID: 21489421
20. Bai Y, Lin C-C, Lin C-Y, Chen J-Y, Chue C-M, Chou P. Survey of stress reactions among health care workers involved with the SARS outbreak. Psychiatr Serv 2004;55:1055–1057. PMID: 15345768
21. Reynolds DL, Garay JR, Deamond SL, Moran MK, Gold W, Styra R. Understanding, compliance and psychological impact of the SARS quarantine experience. Epidemiol Infect 2008;136:997–1007. PMID: 17662167
22. Robertson E, Hershenfield K, Grace SL, Stewart DE. The psychosocial effects of being quarantined following exposure to SARS: a qualitative study of Toronto health care workers. Can J Psychiatry 2004;49:403–407. PMID: 15283537
23. Soud FA, Cortese MM, Curns AT, Edelson PJ, Bitsko RH, Jordan HT, et al. Isolation compliance among university students during a mumps outbreak, Kansas 2006. Epidemiol Infect 2009 May 1;137(1):30e7. PMID: 19445418
24. McVernon J, Mason K, Petrony S, Nathan P, LaMontagne AD, Bentley R, et al. Recommendations for and compliance with social restrictions during implementation of school closures in the early phase of the influenza A (H1N1) 2009 outbreak in Melbourne, Australia. BMC Infect Dis 2011;11:257. PMID: 21958428
25. Kavanagh AM, Mason KE, Bentley RJ, Studdert DM, McVernon J, Fielding JE, et al. Leave

entitlements, time off work and the household financial impacts of quarantine compliance during an H1N1 outbreak. BMC Infect Dis 2012;12:311. PMID: 23164090

26. Teh B, Olsen K, Black J, Cheng AC, Aboltins C, Bull K, et al. Impact of swine influenza and quarantine measures on patients and households during the H1N1/09 pandemic. Scand J Infect Dis 2012 Nov 22;44(4):289e96. PMID: 22106922
27. Hsu CC, Chen T, Chang M, Chang YK. Confidence in controlling a SARS outbreak: experiences of public health nurses in managing home quarantine measures in Taiwan. Am J Infect Control 2006 May 1;34(4):176e81. PMID: 16679173
28. DiGiovanni C, Conley J, Chiu D, Zaborski J. Factors influencing compliance with quarantine in Toronto during the 2003 SARS outbreak. Biosecur Bioterrorism Biodefense Strategy, Pract Sci 2004 Jan 1;2(4):265e72. PMID: 15650436
29. Pellecchia U, Crestani R, Decroo T, Van den BR, Al- Kourdi Y. Social consequences of Ebola containment measures in Liberia. PloS One 2015 Dec 9;10(12):e0143036. PMID: 26650630
30. Rubin GJ, Wessely S. The psychological effects of quarantining a city. BMJ 2020;368:m313. PMID: 31992552