

Holistic approach supporting mental wellbeing of people in enforced quarantine in South Australia during the COVID-19 pandemic

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The first Australian case of COVID-19 was detected on 25 January 2020,¹ and since then there have been 28,898 confirmed infections (as of 14 February 2021²) with 22.6% of all infections being acquired overseas. Australia enacted a ban on Australians travelling overseas on 25 March 2020 under the *Biosecurity Act 2015*.³ In parallel, for all arrivals to Australia, a period of mandatory quarantine of 14 days was required at a designated facility (such as a hotel), at the first port of entry into Australia.⁴ A mainstay of reducing the risk of transmission of COVID-19 is the identification of cases through testing, isolation of cases and quarantine of known contacts. There are, however, concerns about negative mental health impacts of the COVID-19 pandemic, including those associated with actions to contain the outbreak, particularly quarantine. There is evidence of the need for increased mental health care for the population, in particular for those with co-morbid mental illness,⁵ as increased psychological distress⁶ and mood disorders in both the short and long term have been found to be directly related to imposed quarantine.⁷

During the COVID-19 pandemic, reviews and studies were conducted on the mental health impacts of quarantine. These studies found a number of factors associated with a higher risk of psychological distress (including post-traumatic stress disorder, depressive

Abstract

Objectives: To report the experience of quarantine for international arrivals to South Australia requiring quarantine in a medi-hotel setting during the COVID-19 pandemic and to describe the range of evidence-based support services to mitigate the mental health impacts of quarantine.

Methods: A range of services targeted at physical and mental wellbeing were provided. Data from 533 adult respondents out of 721 passengers were included. The Kessler 10 was used to measure psychological distress at two time points.

Results: About 7.1% of respondents reported psychological distress at time one, reduced to 2.4% at time two. There was no significant difference in psychological distress by gender at either time point. The mean K10 score at time one was 13.6 (standard deviation=5.2) and the mean score at time two was 11.5 (standard deviation=3.1), with a significant reduction in mean scores ($p<0.001$) between the two time points.

Conclusions: The level of psychological stress in repatriated Australians was low at arrival and improved further at the time of release from quarantine.

Implications for public health: A collaborative multi-sector approach to provide support services for individuals in quarantine can mitigate risks to mental wellbeing.

Key words: international arrivals, quarantine, mental wellbeing, COVID-19, South Australia

symptoms and anxiety) following quarantine, such as longer duration of quarantine (more than 10 days), feeling isolated, inadequate supplies of basic necessities and inadequate information.^{8,9} A further concern is the risk of suicide being exacerbated by imposed quarantine.¹⁰ While quarantine is a critical part of the containment of COVID-19, consideration must be given to the potential negative mental health effects of quarantine, and these effects should be mitigated as much as possible.⁹

Coping behaviours like physical exercise, access to psychological intervention services and wellness resources improved psychological wellbeing by building resilience in those in quarantine.^{11,12} Provision of basic needs, i.e. food, water and medications, access to information, regular monitoring of health status and practical support have been shown to mitigate mental health impacts of quarantine.^{8,9}

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The main aim of this paper was to document the level of psychological distress experienced by international travellers arriving in Australia and requiring quarantine in a medi-hotel setting during the COVID-19 pandemic. In addition, it describes the range of support services that were put in place to mitigate the mental health impact of quarantine based on existing evidence in South Australia.

Methods

Two international arrival planes arrived in Adelaide on 20 and 21 April 2020, with the majority of the 721 passengers being residents of other Australian jurisdictions: Victoria and New South Wales. A comprehensive nurse-led medi-hotel model of healthcare, with an additional focus on welfare and wellbeing, was established across two hotel sites in Adelaide prior to the travellers' arrival. The model was designed

based on evidence from the literature on enforced quarantine and also from the experience of other jurisdictions. The model included a baseline general health screen and COVID-19 swab on the travellers' arrival, daily phone calls to travellers in quarantine that included COVID-19 symptom checks, early identification of any deterioration of physical health and mental health, and social welfare and security checks. Clear escalation pathways to primary and tertiary care, as well as mental health services, were established.

Rapid access to primary care was facilitated by the COVID-19 General Practice (GP) Liaison at SA Health, in conjunction with the South Australian Indian Medical Association (SAIMA). SAIMA brought together a team of 23 GPs, who collectively spoke nine Indian languages. Medical care delivered in a primary language reduced the need for interpreters, allowing for quality healthcare to be delivered through a positive relationship between the clinician and the traveller.¹³ Care that was provided included general and specialised health assessments such as antenatal care, mental health services, pathology test requests and pharmacy medication prescriptions. SAIMA GPs undertook 231 consultations with travellers during the 14-day quarantine period. The medi-hotel nursing support, which involved daily calls and assessments, built rapport between the clinicians and the travellers, allowing for early identification of any medical and mental health concerns that required escalation. The social and wellbeing supports provided included in-room exercise classes and mother-baby classes including baby massage. Services were offered to all people in the medi-hotel throughout the 14-day quarantine period, as detailed in Table 1.

Table 1: List of identified psychological stressors and planned interventions implemented in South Australia to mitigate adverse effects on mental health.

Potential Psychological Stressors	Planned Intervention
Inadequate information ^{8,9}	<ul style="list-style-type: none"> Information package on arrival with information on Covid-19 Helpline Provision of telephone in hotel rooms Provision of timely Information from emergency management team at State Control Centre Support from State Control to organise local SIM cards for passengers Provision of internet connection at hotel Provision of regular communication regarding quarantine, supports and ongoing traveler plans
Fear of infection ⁸	<ul style="list-style-type: none"> Arrangement of COVID-19 test within 72hours of arrival Infection control arrangements from airport to hotel travel Infection control arrangements within the hotel Regular checks for infection control compliance Protocol for repeat COVID-19 test on development of COVID-19 compatible symptoms
Boredom ⁸ and loneliness ¹⁴	<ul style="list-style-type: none"> Social media groups: WhatsApp group and Facebook group pages for the hotel guests Provision of TV in all hotel rooms Milestone Celebration– Birthdays, Wedding Anniversaries, Anzac Day Solo concerts at Hotel lobby Celebrity "Hans" concert¹⁵ a night before exit from quarantine in front of hotel 'Final night dinner' of 3 courses for all guests
Clinical and Mental Health needs ⁸	<ul style="list-style-type: none"> Daily on-site health checks and vulnerable person(s) rounds this included 'solo' travelers, elderly travelers, travelers with high K-10 scores or identified by the mental health team requiring additional support Regular mental health assessment including screening with K-10 Referral to General Practitioners, specialists and hospital pathway in place for high risk clinical needs Mental Health Helpline Antenatal care and mother craft support Provision of telehealth scripts and medicines from pharmacy Provision of Nicotine Replacement Therapy (NRT) for tobacco dependence under clinical guidance Escalation pathways for clinical care and mental health support
Financial concerns ⁹	<ul style="list-style-type: none"> Accommodation and food expenses covered by SA Govt. during quarantine period Support from Department of Housing, SA Govt. for individuals with financial difficulties
Physical exercise needs ¹⁶	<ul style="list-style-type: none"> Zumba and Yoga classes Provision of rented exercise bikes in hotel room Majority of rooms with opening window and/or balcony
Daily care needs ⁸	<ul style="list-style-type: none"> Pharmacy delivering toiletries and over the counter medications, including simple analgesia
Families with young children ¹⁷	<ul style="list-style-type: none"> Larger families grouped together in bigger or adjacent rooms Backpacks for kids with colouring activity books, puzzles and stationery Nappies for infants on arrival Baby bath for infants Baby massage classes
Cultural needs ¹³	<ul style="list-style-type: none"> Clinical care provided by multilingual General Practitioners Provision of cultural food preferences at hotel Use of Translation and Interpreting Services (TIS)
Outbound travel concerns	<ul style="list-style-type: none"> Provision of certificate of quarantine clearance Medical clearance for onward domestic travel, if required Support for outbound travel arrangements
Stigma ⁸ and security ^{18,19}	<ul style="list-style-type: none"> South Australian Police and hotel private security 24x7 onsite

Data collection

All people in hotel quarantine were offered an assessment of psychological distress using the Kessler-10 measure (K10).²⁰ This well-validated measure assesses the prevalence of psychological distress and has been used extensively in epidemiological surveys. A copy of the K10 instrument and information on how it is scored is provided in Supplementary File 1. The K10 measure was used at two time points between 21 April 2020 and 19 May 2020, with an average of six days apart (range one to 11). The variation in timing between assessments one and two reflected the routine process of management in the medi-hotel. The respondents were

asked ten questions about symptoms during the four weeks before arrival; then asked again in the second week about symptoms in the previous three days. The K10 interview occurred over the telephone and was part of a larger assessment of the services needed.

Each answer was given a score between 1 and 5; the higher scores denoting a higher frequency of the negative feeling. The question scores were then summed to give an overall score between 10 and 50 and categorised into low (10–15), moderate (16–21), high (22–29), or very high (30–50) levels of psychological distress. A binary variable was then created by collapsing the low and moderate (0 to <22) into one category and the high and very high scores (≥ 22) into another to form the psychological distress variable for the analyses.

The data collection also included date of birth, sex and consent for data to be sent to SA Health.

Inclusion/exclusion criteria

The study included all adult participants for whom there was consent and complete data. Cases were excluded if they were aged less than 18 years, did not provide consent to use their K10 data, did not provide their age, or had incomplete data, such that they were missing a K10 score at time one or time two. There was an initial cohort of 640 cases for whom data were collected. A total of 107 cases were excluded from analysis for the above mentioned reasons, leaving 533 cases presented here.

Analysis

The data were de-identified for analysis. Descriptive analysis was undertaken, and tables were prepared using the binary psychological distress categorical variable. In addition, the total K10 scores were also analysed as a continuous variable and a paired t-test was used to test the equality of mean scores at the two time points. A multivariable logistic regression analysis was conducted to determine whether demographic data collected were associated with the risk of high psychological distress. Data preparation and all analyses were done using the IBM SPSS (Version 24) statistical package.

The work was undertaken and data directly related to the COVID-19 pandemic collected under the *Emergency Management Act* in South Australia. The information contained

within this report was collected for an urgent service response for the control of the pandemic and was evaluative in nature.

Results

Of the 533 respondents included in this paper, there were slightly fewer females (47.5%) compared to males (52.5%) and the majority were aged between 26 and 50 years (80.1%). Most belonged to the culturally and linguistically diverse (CALD) group (84.2%), see Table 2.

Treating the K10 scores as a continuous variable, the mean score at time one was 13.6 (SD=5.2) and the mean score at time two was 11.5 (SD=3.1). Using a paired t-test, there was a statistical difference reduction in mean scores ($p < 0.001$) between the two time points.

There was no significant difference in psychological distress by gender at either

time point. At time point one, people aged 75 years and over had significantly higher odds of reporting psychological distress; however, this should be interpreted with caution due to small numbers as shown in the wide confidence interval (Table 3).

About 7.1% of respondents reported psychological distress at time one and this reduced to 2.4% at time two (Table 4). The proportion of respondents reporting psychological distress among passengers returning to Australia and placed in quarantine in this cohort was considerably less than the proportion of South Australian adults who reported having high or very high psychological distress in 2019 (20.2%; SAPHS baseline report).

Four of 495 respondents who did not have psychological distress at time one developed psychological distress at time two. On the other hand, of the 38 respondents who had psychological distress at time one, 29 did not

Table 2: Characteristics of repatriated Australians placed in COVID-19 quarantine in Adelaide hotels, South Australia, age 18 years & over, n=533.

Characteristics		N	%	K10 Score at time 1		K10 Score at time 2	
				Mean	SD	Mean	SD
All		533	(100.0)	13.6	(5.2)	11.5	(3.1)
Gender	Female	253	(47.5)	13.6	(5.2)	11.5	(3.2)
	Male	280	(52.5)	13.5	(5.0)	11.5	(3.1)
Age Group	18 to 25	22	(4.1)	12.3	(2.9)	10.9	(2.0)
	26 to 35	220	(41.3)	13.3	(4.4)	11.3	(2.5)
	36 to 50	207	(38.8)	13.5	(5.1)	11.5	(3.5)
	51 to 65	53	(9.9)	14.4	(7.0)	11.6	(3.4)
	66 to 74	25	(4.7)	14.1	(6.6)	12.4	(4.6)
	75+	6	(1.1)	19.8	(10.6)	14.7	(4.5)
CALD status	Yes	449	(84.2)	13.1	(4.6)	11.3	(3.0)
	No	79	(14.8)	16.1	(7.3)	12.5	(3.5)
	Unknown	5	(0.9)	12.8	(2.8)	12.8	(5.7)

Note:
SD denotes the Standard deviation

Table 3: Proportion of passengers (18 years and over) returning to Australia and placed in quarantine reporting high or very high psychological distress and logistic regression model to predict psychological distress, South Australia n=533.

Variables	% (95%CI)	Time 1			Time 2			
		OR	95%CI	p-value	% (95%CI)	OR	95%CI	p-value
		Logistic Regression			Logistic Regression			
All	7.1 (5.2-9.5)				2.4 (1.4-4.0)			
Sex								
Female	7.1 (4.4-10.8)	Ref			2.4 (1.0-4.8)	Ref		
Male	7.1 (4.6-10.6)	0.98	0.50–1.91	0.943	2.5 (1.1-4.8)	0.97	0.32–2.94	0.955
Age group								
18 to 25	0.0 (0.0-0.0)				0.0 (0.0-0.0)			
26 to 35	5.9 (3.4-9.6)	Ref			1.4 (0.4-3.6)	Ref		
36 to 50	7.2 (4.3-11.4)	1.25	0.58–2.70	0.575	3.4 (1.5-6.5)	2.54	0.65–10.00	0.183
51 to 65	9.4 (3.7-19.4)	1.66	0.57–4.89	0.357	3.8 (0.8-11.6)	2.84	0.46–17.47	0.260
66 to 74	12.0 (3.5-28.7)	2.18	0.57–8.26	0.252	4.0 (0.4-17.2)	3.03	0.30–30.38	0.347
75+	33.3 (7.7-71.4)	7.97	1.33–47.61	0.023	0.0 (0.0-0.0)	0.00	0.00	0.999

report symptoms of psychological distress at time two (the other nine respondents continued to experience psychological distress).

Discussion

The study describes the efforts taken by the South Australian Government to mitigate the risks of psychological stress in quarantine and insight into the mental wellbeing experience of the quarantined individuals. The level of psychological stress amongst this group during the quarantine period was considerably lower than reported in the Australian general population (12%) in a previous epidemic.²¹ Reviews of studies surveying quarantined individuals have reported a higher level of psychological stress with a prevalence of psychological symptoms and psychological disorders (e.g. depression,^{6,7,9} PTSD,⁷⁻⁹ low mood,⁷ irritability,⁷ emotional exhaustion or frustration,^{7,8} and anger^{7,8}) ranging from 9% to 73%.⁸ Successfully moving out of a region with a high number of COVID-19 cases may have eliminated a major psychological stress for this particular group as, by this time, Australia had contained COVID-19 to low levels.²² Counsellors administering the K10 reported that a number of people with high scores volunteered that this reflected their previous four weeks overseas and that they had felt an improvement in their wellbeing since arrival in Australia. Many respondents reported gratitude to have their emotional wellbeing acknowledged though the calls and for the additional supports they received at the hotel.

A review of the impact on mental health in the general population due to the COVID-19 pandemic shows female gender, younger age (≤ 40 years) and presence of chronic/mental health condition as risk factors for a higher level of psychological stress.²³ Isolation can have a worsening effect on the mental health of older adults.²⁴ This study noted older adults reported a higher level of stress at time one. Co-morbid medical conditions, a lack of physical exercise opportunities,¹⁶ disruptions in their usual routines and greater fear of getting infected²⁵ are possible reasons for a high stress level among older people in the group.

The reduction of K10 scores at time two from 7.1% to 2.4% is a positive finding that – while it cannot be attributed directly to the services – suggests that, on average, the

Table 4: K10 score categorised into Low, moderate, high and very high levels of psychological distress, age 18 years and over measured during two time points, South Australia, n=533.

Kessler K10 score	Time 1		Time 2	
	n	%	n	%
Low (10 – 15)	427	80.1	488	91.6
Moderate (16 – 21)	68	12.8	32	6.0
High (22 – 29)	25	4.7	11	2.1
Very high (30 – 50)	13	2.4	2	0.4
Total	533	100.0	533	100.0

period of time in quarantine did not increase psychological distress. The interventions implemented to mitigate negative psychological impacts reflect a holistic approach that expanded beyond clinical and mental health assessments. For example, the individuals had an opportunity to attend and participate in solo concerts (maintaining infection control requirements) in the hotel lobby, which was a means of relieving boredom and loneliness. They had the option of attending Zumba and yoga classes to engage in physical exercise, and families with young children were offered activity packs, nappies and mother-baby classes.

Cultural considerations played a significant part in the repatriation endeavour, which can be seen through the engagement of multilingual general practitioners and translation/interpretation services (where needed) as well as the provision of cultural foods at the hotel. The general practitioners provided their services with no guarantee that there would be reimbursement or compensation, as many of the passengers did not have Medicare. A systematic review found better doctor–patient communication, patient satisfaction and outcomes, as well as less interpreter error when trained professional interpreters or bilingual providers were involved in the care of patients with limited English proficiency.⁹ One study investigating the mental health outcomes of patients with limited English proficiency found that these patients were more likely to report positive outcomes compared to their English-proficient counterpart, despite their providers believing the contrary.²⁶

The quarantine environment of the repatriated group is different to home quarantine or mass community quarantine. The hotel environment provided flexibility to implement desired interventions to reduce the stress arising out of quarantine itself. The closed quarantine environment

of the hotel could be monitored closely for participants' mental health needs, and further communication channels were well established to provide mental health services through phone calls; there were also regular updates in writing and social media groups.

Across both time periods, those in quarantine were less likely to report having high or very high psychological distress, compared to the overall South Australian population. Data collected in the South Australian Population Health Survey (SAPHS) in 2019 found that 20.2% of adults aged 18 years and over reported having psychological distress, and this tended to be higher among females and younger adults. The cases in quarantine do not necessarily represent a general population sample and so any comparison must be made with caution, as the SAPHS data are weighted to be representative of the South Australian population.

We were not able to study the effect of pre-existing mental health conditions on current psychological stress levels due to data not being available for this report. The study was unable to collect further qualitative information from those people who underwent the 14 days of quarantine; this limits the ability to understand on an individual level the psychological impact of quarantine.

Data were missing for important demographic factors, e.g. socioeconomic status, occupation, and literacy levels, which may have had a significant effect on the level of psychological stress during quarantine. The K10 data presented here, while indicative of low levels of psychological distress, were measured at the time of quarantine, but it may be that distress could develop over time, which would be missed by this study. Further, the short time interval (an average of six days) between repeat administrations of the K10 questionnaire may limit the capacity to assess significant change in mental health status during the quarantine. Although the reduction in psychological stress levels at the end of the quarantine period suggests the importance of the role of support services, causation cannot be implied.

The level of psychological stress in repatriated Australians was low at arrival and improved further at the time of release from quarantine. A collaborative multi-sector approach to provide support services for individuals in quarantine can mitigate risks to mental wellbeing.

Implications for public health

The authors of this article would like to re-iterate the importance of maintaining psychological health as part of public health planning in a pandemic situation.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Supplementary Table 1: K10 instrument.