

BMJ Open Exploring COVID-19 circuit breaker (CB) restrictions at a migrant worker dormitory in Singapore: a case study and nested mixed-method analysis of stress management and mental health

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ABSTRACT

Introduction Measures to mitigate the COVID-19 outbreak in the migrant worker dormitories in Singapore included lockdown and isolation of residents for prolonged periods. In this paper, we explore efforts to ease tensions and support mental health under these conditions.

Methods Case study of dormitory residents under lockdown from April to August 2020 comprises a nested mixed-method approach using an online questionnaire (n=175) and semistructured interviews (n=23) of migrant workers sampled from the survey (August to September 2020). Logistic regression models were used to analyse survey data. Semistructured interviews were analysed using applied thematic analysis.

Results Survey and interview data showed that mental health was largely protected despite initial rising tensions over restrictions during lockdown. Sources of tension negatively affecting low stress responses included job related worries, OR=0.07 (95% CI 0.03 to 0.18, p<0.001), poor communication with employers, OR=0.12 (95% CI 0.03 to 0.44, p<0.001) and loneliness, OR=0.24 (95% CI 0.10 to 0.55, p<0.001). Interview narratives concurrently revealed themes around job insecurity and the effects of the lockdown 'not being good for mind and body', the imposition of new rules and regulations compounded by the most emphasised concern—worry about family back home.

Interviewees shared how their adaptive capability played a pivotal protective role alongside social support and solidarity; aided by regular use of messaging applications, which supported mental health, OR=4.81 (95% CI 1.54 to 15.21, p<0.01). Employers were described as central to alleviating tensions, providing feedback loops to improve dorm conditions. Employees feeling their employers cared about their health and well-being was especially protective to mental health, OR=17.24 (95% CI 4.00 to 85.74, p<0.001). Gratitude and trust in government and healthcare provision was widely acknowledged. Concurrently, related attitudes such as believing in the timeliness and appropriateness of the lockdown also

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The strength of this study comes from the in-depth mixed-method triangulation and focusing down on the effects of a single phenomenon (COVID-19 Lockdown Measures) on a specific group.
- ⇒ Nevertheless, we only collected data from one dormitory and our findings are not reflective of experiences of residents housed in other types of dormitories, private accommodations or housed in treatment centres over the lockdown.
- ⇒ Subsequent studies should, therefore, assess the transferability of our findings to other Singapore-based lockdown quarantining facilities for migrant workers, and other nationalities (ours were Bangladeshi and Indian only), and may also aim to compare across international settings.

protected mental health, OR 2.85 (95% CI 1.08 to 7.39, p=0.03).

Conclusion Tensions are mapped to protective solutions informing guidelines for future outbreak stress management response.

INTRODUCTION

The migrant worker dormitory lockdowns were part of a wider set of community initiatives termed the 'circuit breaker' (CB) announced on 7 April 2020 to mitigate transmission of COVID-19 in Singapore. Migrant workers living in dormitories were subjected to prolonged movement restrictions from April to August 2020. All 43 purpose-built dormitories, accommodating approximately 300 000 foreign migrant workers, were gazetted and separated from the larger community during this time. Movement restrictions and safe management measures

were strictly enforced while health authorities identified, segregated and managed COVID-19 cases. Infected residents were either isolated in designated areas within the dormitories or relocated to government restructured hospitals or community care facilities for treatment and recovery before returning to their place of residence.

The mammoth task of providing for the basic needs of dormitory residents under lockdown depended on the network of collaborative stakeholders: Forward Assurance and Support Teams, or 'FAST' teams, comprising officers from the Ministry of Manpower, Singapore Armed Forces and the Singapore Police Force working with dorm operators and non-government organisation (NGOs) and employers).¹⁻⁴ These groups worked together to ensure the conveyance of information, food and necessities, hygiene, safety, and regulating security within the dormitories. The Ministry of Manpower engaged with employers to pay workers a basic salary during the lockdown and provided remittance services so that they could channel monies back to their loved ones.⁵ Healthcare providers from the public and private sector were involved in the second prong of outbreak mitigation by testing, identifying infection, isolating and segregating healthy from infected dormitory residents.⁶

PCR and Serological studies have estimated that about 47% of the total dormitory population of 320 000 foreign migrant workers in Singapore⁷ were infected with COVID-19 by the end of 2020. The vast majority of them suffered mild illnesses with minimal deaths. Dormitories were declared cleared of infection by August 2020, though movement restrictions remained in place, limiting residents to moving between dormitories and worksites, with occasional respites in purpose-built recreational centres.

The mental health effects of prolonged lockdown on migrant workers in Singapore have been documented in recent literature. A study of infected migrant workers in recovery in a mass quarantine facility in Singapore showed that major stressors were the inability to continue providing for families and feeling susceptible to infection in crowded dorms.⁸ Another study examining the mental health burden of migrant workers involved in movement restrictions between June and October 2020 via online and in-person surveys showed that the overall level of mental health was on par with the rest of the community.⁹

Migrant worker communities are known to suffer from systemic inequalities—debt burden and job insecurity,¹⁰ healthcare access^{11 12} and poor accommodation.¹³ These issues were pervasive before the pandemic, since COVID-19 movement restrictions and uncertainty of the future have further exacerbated existing anxieties. To help address this concern among other and ongoing services, HealthServe the major NGO serving migrant workers in Singapore, helped to provide information and telephone helplines to migrant workers during the lockdown.¹⁴ This work has been further developed through a joint task force (Project DAWN) involving the Ministry of Manpower and the Institute of Mental Health.¹⁵

This multistakeholder taskforce was assembled to strengthen the mental health support ecosystem for migrant workers. Their intervention approach is multifaceted. Including developing culturally appropriate resources, distributed via digital applications commonly used by the migrant community and directly within dorms. In addition, the task force sought to improve knowledge of basic psychological first aid among frontline FAST officers, medical providers, employers and through training of peer support leadership. Buddy systems to strengthen social networks among dorm residents and co-workers were also established via dorm operators and employer channels.

AIM AND OBJECTIVES

The current case study aims to further inform such initiatives by documenting the lived experiences of migrant workers living in a single purpose-built dormitory that was locked down from April to August 2020 to mitigate cases of COVID-19. Our objectives are to better understand, within a purposively sampled group of Indians and Bangladeshi dormitory-dwelling migrants in Singapore:

1. Sources of tension associated with levels of stress and mental health.
2. And, related protective solutions (implemented measures and adaptations).

METHODS

Context and study design

We undertook a case study of one dorm using multiple data sources and a nested mixed-methods design¹⁶ to explore mental health-related outcomes and experiences of migrant workers during the CB restrictions triggered by the first wave of COVID-19 in Singapore. Since the study population was restricted to a single dormitory, this research is classified as a 'within-site' case study.¹⁷

Data collection included an online self-administered survey followed by telephone interviews, subsampled from the survey (see figure 1). The survey included only purposively selected construction workers from neighbouring countries Indian and Bangladesh. For the interviews, maximum variation was aimed for by sample for diversity in age and income distribution of both nationalities (see online supplemental figure 1). Quantitative and qualitative data were collected and analysed concurrently.

Patient and public involvement

Regrettably, it was not possible to involve participants—patients or other, nor the public—in designing the study research questions, outcome measures or plan for dissemination. This was due to limitations on outreach during lockdown, concerns over fully anonymising in the midst of a highly charged period of political realignment and related ethical considerations which prevented multiple follow-up touch points, as did the time-sensitive nature of the study.

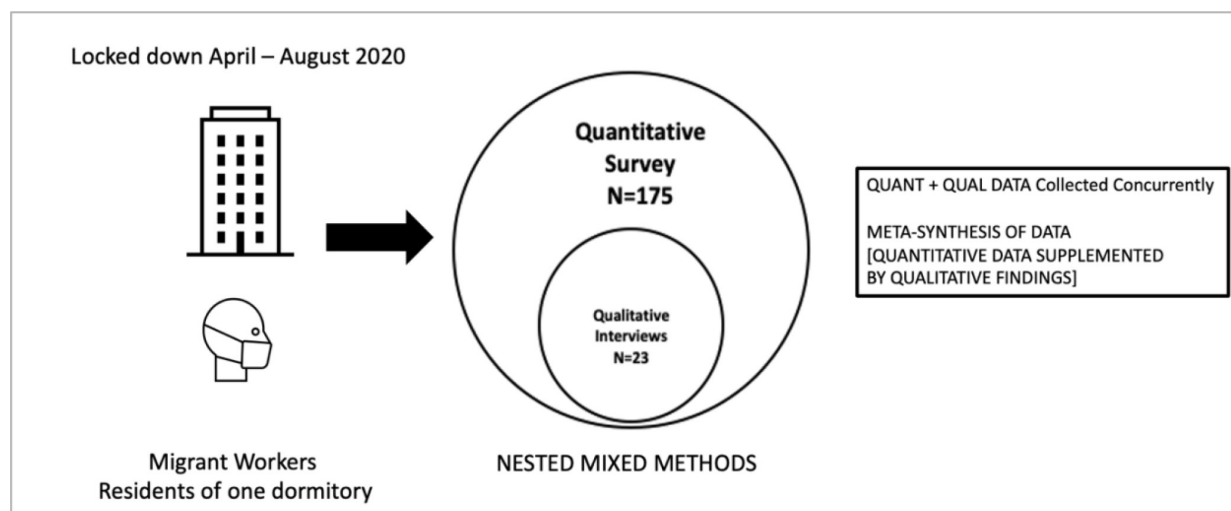


Figure 1 Mixed-methods nested study design sampling.

Online survey

An online survey was administered from 3 August 2020 to 25 September 2020. A link to a cross-sectional survey anonymously administered through REDCap was made available in English and also translated to Bengali and Tamil. It was powered through the 'KNOW' application, a migrant worker online engagement platform. A participant information sheet was included at the beginning of the e-survey outlining participants' rights. The survey was designed to take 20 min to complete.

Key outcome measures were self-reported stress and mental health, collected on a four-point scale, dichotomised to reflect low stress and good mental health. Low stress was recorded if the participant disagreed or strongly disagreed with: 'I often feel stressed from non-work-related

causes'. Good mental health was recorded if they agreed or strongly agreed to 'I feel like I am in a good state of mental health.'

Covariates of interest included measures grouped under sources of tension, including: having work-related stress, not being able to comfortably communicate with employer, loneliness in the current situation and number of financial dependents. For solutions we examined: Protective attitudes, trust in mitigation initiatives and communication about the virus, types of social support and role of technology. Measures are summarised in [figure 2](#).

Logistic regression was used to examine predictors of self-reported low stress and good mental health as outcomes. Regression models were adjusted for age,

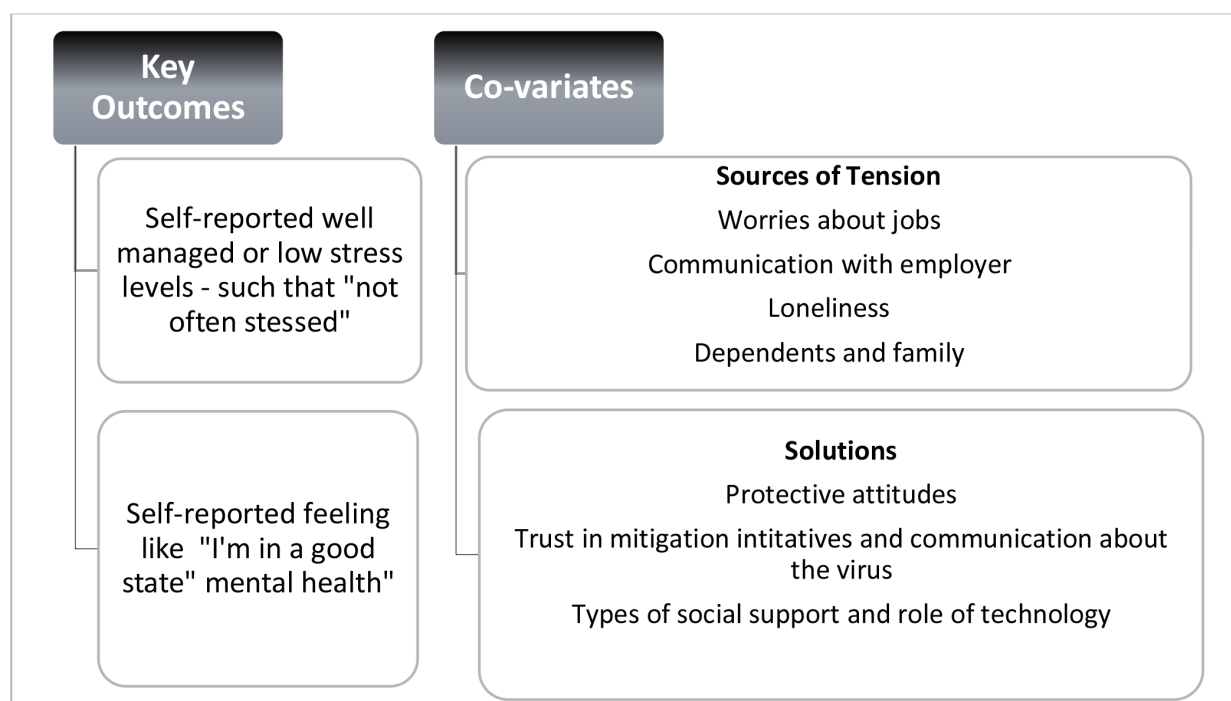


Figure 2 Summary of key outcomes (dependant variables) and types of covariates (independent variables).

income, education, time spent in Singapore and nationality. Data were analysed in R.

Semistructured interviews

Qualitative methods are reported following the Consolidated criteria for Reporting Qualitative research.¹⁸ Interviews were carried out in participants' native languages. Our methodological orientation is framed through the lens of phenomenology,¹⁹ by which we mean we set out to explore the lived experience within a specified group facing a shared event.

Research team and reflexivity

The qualitative work was led by ZJ-LH, a senior postdoctoral sociologist with advanced qualitative and mixed-method expertise. Five graduate researchers (MCPW, MTH, NK, CP and ST) trained in qualitative methods carried out the study. ST acted as the key contact person for interview recruitment and supported the interviews. CP conducted interviews in Tamil, while NK and MTH undertook interviews in Bengali. Recruitment was supported by ST. MCPW, ZJ-LH and NK were involved in the thematic analysis of transcripts.

Two of the interviewers were female, and one was male, all were in their late twenties to mid-thirties and of Indian or Bangladeshi descent. The first point of contact for recruitment was a middle-aged female. There was no prior existing relationship with data collectors and interviewees. Opportunity for rapport-building was seized while arranging the interviews over the phone; carrying out the research and exploring questions in the interviewees' mother tongue was deemed necessary for trust-building. In addition, complete anonymity of participants was emphasised, including that the dorm itself would not be named. Interviewers shared their background and reasons for the study during recruitment, all were social scientists with interests in health inequalities. All necessary ethical approvals for collection of deidentified data were gained, details are given in closing declarations statement.

Interview design

The interviews were semistructured, recorded on external digital recorders, and carried out in one session, unless the call was interrupted or dropped. Topics explored daily life in the dorm, trust and social support, sources of tension, coping with these, as well as the biggest worries about the virus. Topic guides were not formally piloted, however, their content was discussed and phrasings/translations refined in consultation with the team during the first sets of interviews. Interviews lasted between 20 min and an hour.

Interview data extraction and analysis

Audiorecordings and interview field notes were transcribed/assembled into structured expanded notes,²⁰ summarising content and tagging these to verbatim quotes within 24 hours using audiorecordings. Data were analysed using applied thematic analysis.²¹ The team

began by familiarising themselves with the expanded notes, thereafter they developed a framework for the analysis which was used consistently to code across the dataset. The framework was applied to track: Dorm, government and own solutions in contrast to sources of tension which were open coded. Data were coded using Atlas.ti to aid data management. The researchers met periodically to discuss the emerging themes among themselves to reach a consensus on the meaning of the data. Thematic saturation was achieved for both objectives at least two-thirds of the way through coding.

Participant characteristics

The survey participant sociodemographic characteristics are summarised in online supplemental table 1. A total of 175 dormitory residents of our case dormitory responded to the e-survey between the 3 August 2020 and 25 September 2020. By Nationality, 106 (60.6%) were Indian, and 69 (39.4%) were Bangladeshi. All participants worked in the construction and related skilled or semi-skilled labour sectors. The mean age in our survey sample was 30, and ranged from 21 to 47. Half of the participants were below the age of 30. Income distribution was equally distributed into <US\$500, US\$500–US\$749 and >US\$750 wage brackets. There was near equal distribution between married (55%) and unmarried (45%) respondents as well as education levels (47% had tertiary education and above). Most respondents (80.5%) had been working in Singapore for more than 2 years.

As for the interviews, a total of 23 telephone interviews were conducted between 6 August 2020 and 28 September 2020 (see online supplemental figure 1). Of the 23 interview participants, 12 were Bangladeshi nationals, while 11 were Indian. Ideally, we would have sampled evenly for these but faced some issues getting sign-up from the Indian group, which ended up somewhat under sampled for those in the 30–35 year old age band. Participants tended to be married (n=16); more than half (n=15) reported their education level as junior high or below compared with those who had vocational or undergraduate education; respondents mostly earned US\$500 and US\$1499 a month, a few earned under US\$500. Only three interview participants had been in Singapore for less than 2 years.

Method of reporting

We report results of quantitative data, which are integrated with and expanded by the thematic analysis using a narrative reporting style. Pseudonyms, indexed to aggregate descriptive data in online supplemental figure 1, are tagged to quotes to preserve anonymity.

RESULTS

Objective (1): sources of tension affecting levels of stress and mental health

Descriptive analyses and adjusted regression are summarised in table 1. Most respondents' self-reported

Table 1 Sources of tension and effects on self-reported stress and mental health, n=175

	Frequencies		Not often stressed			Good mental health		
		N (%)	% within not often stressed	OR (95% CI)†	P value	% within good mental health	OR (95% CI)†	P value
Stressed by work-related worries	Yes	31 (17.7)	38.7	0.07 (0.03 to 0.18)	<0.001***	74.2	0.47 (0.17 to 1.43)	0.17
	No	144 (82.3)	88.2			88.2		
Not able to comfortably communicate with employer	Yes	11 (6.3)	36.4	0.12 (0.03 to 0.44)	<0.001***	81.8	0.35 (0.07 to 2.61)	0.24
	No	164 (93.7)	82.3			86.0		
Feeling lonely in the current situation	Yes	40 (22.9)	60.0	0.24 (0.10 to 0.55)	<0.001**	80.0	0.66 (0.24 to 1.88)	0.42
	No	135 (77.1)	85.2			87.4		
Having five or more dependents	Yes	72 (41.1)	87.5	2.73 (1.17 to 6.36)	0.02*	87.5	1.40 (0.56 to 3.70)	0.48
	No	103 (58.9)	73.8			84.5		

*P<0.05; **p<0.01; ***p<0.001.

†Each row presents the ORs from logistic regression models adjusted for age, income, education, time spent away from home country and nationality; reference group is 'No'.

both low stress (79.4%) as well as good mental health (85.7%). These findings are supported by qualitative analysis, which reported a period of initial fear about the situation and fear of getting sick; in addition, most interviewees spoke of being on lockdown as not good for the mind or body. However, this unrest subsided quickly for reasons described under objective 2.

Lockdown effect: from initial fear to realising that lockdown 'isn't good for mind nor body'

Relating to initial fears, many of those interviewed reported that they were aware of the emergence of the virus as an outbreak in Wuhan, China. They kept themselves informed through watching the news, observed government mitigation efforts and the high death rates in Europe with great concern. The fear at the back of their minds was that the likelihood that this infection would significantly impact their lives if it reached Singapore. The initial fears revolved around the transmission of the virus; many spoke of fearing catching the virus through close contacts with roommates and contaminated surfaces, fearing dying in a foreign land:

We knew about the virus in January-February, but never thought that it would become so widespread. I used to follow the daily updates, especially after China locked down Wuhan. Everyone was scared. We prayed and hoped that Singapore wouldn't be affected. But when it did, we panicked. I felt, this is it, I am dying in an alien land. Rony, younger Bangladeshi

Many residents were left uninformed at first about the length of lockdown, care provision, work suspension and pay. These uncertainties were significant sources of stress, which was alleviated as more information filtered through. Despite these initial fears and some initial unrest over being on enforced lockdown, the quantitative

analysis did not reveal any significant associations with self-reported mental health.

However, one important source of tension was feeling lonely, OR=0.24 (95% CI 0.10 to 0.55, p<0.001). Interviews also echoed these feelings. Indeed, the qualitative data revealed that some participants felt cut-off from family, friends, and loved ones. This was exacerbated by the travel restrictions making it difficult for workers to return home for significant family events or to attend to loved ones who were taken ill, as expressed below:

I'm living away from my family, and I wonder when I would be able to go back home to my parents and my hometown to spend some time with them. These types of tensions are always going around in my head. Manik, middle age-band Bangladeshi

Workers spoke of feeling torn between returning home or sticking it through the lockdown, hoping to return to some semblance of normality. In rare instances, some were said to resort to threats of self-harm to force a way back home, as described:

I heard this from someone; last week, one of the Bangladeshi employees from my company had some issues at home. He directly went to security and told them that he wanted to get a ticket to fly back home before evening or else he would jump from the building. No one knew about this in his room. They immediately sent him home. Mani, older Indian

The effects of prolonged confinement in their rooms, which were often shared with ten or more dormmates, eventually took a toll on the mental and physical well-being of the residents. Many reported susceptibility to eyestrain from prolonged mobile device use, musculo-skeletal aches and weakness, insomnia, boredom, and feeling trapped in a cage:

Sitting indoors for 4–5 months is not healthy for the mind and body. Habib, younger Bangladeshi

We used to work long works, almost full day and suddenly they locked us up and told us that we have to be in room full time. It was very irritating initially. We were roaming around freely, and suddenly it felt like a bird trapped in a cage. Ganesh, younger Indian

Worry about family, loneliness and feeling cut-off

Worry about family was the most dominant theme, unanimous among those interviewed, when asked about sources of tension. The initial fears of the unknown and rapidly spreading virus also led to worries about its possible effects on their loved ones at home and the consequences if they, as breadwinners, were to become infected with the virus:

Everyone has family, especially those who have families living far away, some have children and other family members... They always think about their families, and this was their biggest tension. Shurid, middle age-band Bangladeshi

Comparisons between Singapore's and their home country's handling of the pandemic were reported by participants; many had a sense of guilt that they were probably receiving better care than their family back home:

It would be great if only my family had access to these facilities here. I would feel much more comfortable then. Sakib, middle age-band Bangladeshi

Initially, it appeared surprising that our analysis demonstrated that respondents 'having five or more dependents' was positively associated, OR=2.73 (95% CI 1.17 to 6.36, $p=0.02$), with less stress, indicating stress reduction. We were puzzled because many of these workers came to Singapore with the sole purpose of working and earning money for remittance back home. Concurrently, with concerns about providing for family and job security being strong themes we hypothesised that the more dependants, the more to provide for, hence the more to worry about.

However, it seems larger family units had a protective effect, either helping to ease loneliness by digital communication or because these other family members may also be in situations where they can still work despite looming COVID-19 restrictions.

Concerns over job security and deportation, not alleviated by employer

The issue of job security and the threat of loss of income was a pervasive concern for migrant workers. The survey data confirmed that work-related worry had a potent negative effect on overall stress levels, OR=0.07 (95% CI 0.03 to 0.18, $p<0.001$). During the initial phases of the lockdown, work projects were suspended, and many residents were paid basic or reduced salaries. Not feeling able to comfortably communicate with employer was a significant cause of tension, OR=0.12 (95% CI 0.03 to

0.44, $p<0.001$). Relatedly being paid a reduced wage was described as insufficient for some to remit home:

The salary was becoming an issue as I received the basic pay of \$350 in April and received \$200 the subsequent months as I was told that our company was financially breaking down. Murugan, younger Indian

Many were concerned that prolonged work suspension may eventually result in work permit terminations. Being deported home was expressed as a grave concern by many of those interviewed.

Adapting to new rules and regulations

Since the lockdown, many of the workers expressed tension with adapting to the new rules and regulations imposed in their dormitory. Safe distancing and mask-wearing were to be adhered to along with movement restrictions prohibiting loitering in corridors and shared spaces unless they were allowed to do so during allotted times. Breaking these rules and regulations could result in progressive punitive measures, including reprimands, warnings and fines.

There were rumours that those who broke newly established rules of law or dormitory safety protocols were to be deported back home. Fear of reprisals may have had the unintentional effect of residents being afraid to ask for aid from their dorm managers, as was explained by one interviewee who kept quiet despite having faulty Wi-Fi services as he was previously fined the week before:

There was fear of a hefty fine and the threat of deportation if someone violated any of the safety laws. Rony, younger Bangladeshi

One of the most important sources of tension was the police residing in the dorm. The 24/7 presence of police inside the dorm and the feeling that we were being watched and were under constant surveillance was very scary. Rana, younger Bangladeshi

Some workers in essential services were gradually returning to work projects. This was also under specific conditions, with workers needing permits to leave dormitories and having to practise safe distancing. All these measures meant that daily tasks took longer to complete than previously. They were also to eat separately from each other and being told not to communicate, which for some contributed to the sense of loneliness, as earlier described.

Objective (2): solutions supporting low levels of stress and mental health

Descriptive analysis and adjusted regression for solutions are summarised in [table 2](#). Findings confirm that mental health in particular was protected, though tensions were felt. Protective attitudes toward catching the virus, trust in mitigation initiatives (eg, the enforced Circuit Breaker), support from employers and social networks were positively associated with self-reported good mental health. Our qualitative findings showed solutions often came

Table 2 Solutions and effects on self-reported stress and mental health, n=175

	Frequencies		Not often stressed			Good mental health		
		N (%)	% within not often stressed	OR (95% CI)†	P value	% within good mental health	OR (95% CI)†	P value
Attitudes towards catching the virus								
The feeling of having control over catching COVID-19	Yes	144 (82.3)	77.1	0.32 (0.07 to 1.02)	0.08	88.2	3.21 (1.09 to 9.40)	0.03*
	No	31 (17.7)	90.3			74.2		
Doesn't fear of dying if infected with COVID-19	Yes	154 (88.0)	81.2	2.71 (0.90 to 7.80)	0.07	87.8	5.32 (1.47 to 19.33)	0.01*
	No	21 (12.0)	66.7			71.4		
Trust in mitigation initiatives and communication about the virus								
Believes in timeliness and appropriateness of circuit breaker	Yes	137 (78.3)	82.5	1.80 (0.75 to 4.14)	0.18	89.8	2.85 (1.08 to 7.39)	0.03*
	No	38 (21.7)	68.4			71.7		
Trusts information shared by Singapore health agencies	Yes	167 (95.4)	79.0	0.36 (0.02 to 2.34)	0.36	86.8	2.80 (0.49 to 14.21)	0.22
	No	8 (4.6)	87.5			62.5		
Trusts information from healthcare providers in Singapore	Yes	170 (97.1)	80.0	2.47 (0.27 to 18.21)	0.38	87.1	26.06 (3.03 to 308.30)	<0.01**
	No	5 (2.9)	60.0			40.0		
Types of social support and the role of technology								
Feeling that my employer cares about my health and well-being	Yes	163 (93.1)	81.6	5.27 (1.49 to 18.77)	<0.01**	89.0	17.24 (4.00 to 85.74)	<0.001***
	No	12 (6.9)	50.0			41.7		
Having regular contact with friends/family or coworker	Yes	91 (52.0)	83.5	1.50 (0.68 to 3.32)	0.31	91.2	1.99 (0.77 to 5.44)	0.16
	No	84 (48.0)	74.4			79.3		
Regularly use of message apps (ie, WhatsApp, Messenger, Viber, Line)	Yes	145 (82.9)	79.3	1.08 (0.35 to 2.94)	0.89	89.0	4.81 (1.54 to 15.21)	<0.01**
	No	30 (17.1)	78.6			71.4		
P<0.05; **p<0.01; *p<0.001.								
†Each row presents the ORs from the regression models adjusted for age, income, education, time spent away from home country and nationality; reference group is 'No'.								

P<0.05; **p<0.01; *p<0.001.

†Each row presents the ORs from the regression models adjusted for age, income, education, time spent away from home country and nationality; reference group is 'No'.

from individual agency and self-motivated coping that enabled rapid adaptation. Social support networks, institutional as well as government trust and trust in health-care workers also played a protective role.

Adaptive capability and the role of agency

Most interviewees spoke of quickly seeking ways to find comfort, fill time and falling into routines to counterbalance the effects of lock-down on mind and body. A few described a renewed focus on hygiene and self-care. Relatedly, quantitatively, the feeling of having control over catching COVID-19, OR=3.21 (95% CI 1.09 to 9.40, p=0.03) was protective of mental health. Establishing of new fitness regimes by doing exercises in the confines of their room was also often talked about as helping to avoid overthinking and build body strength. Most Bangladeshi residents found solace in prayer during this time; they spoke of praying together as an important bonding ritual as well as helping to alleviate tension.

A few individuals shared that they took the time in lockdown to upgrade their skillsets, for example, take

online courses, or watch YouTube videos to improve work-related skills. This ranged from learning about investing in the stock market, learning driving theory in preparation to take a driving test, and enhancing welding skills or improving English. Some found meaning in helping others by volunteering while isolated at a care facility, such as this participant:

When I was [warded for testing positive], I had nothing to do. It was really hard to spend time sleeping and doing nothing. So, when they asked for volunteers, I enlisted myself. I had to collect and deliver food to people three times a day, and it allowed me to stay busy, mitigate my boredom, and help others. I also met many new people. Some of them are still in contact with me. Rony, younger Bangladeshi

The role of social support and solidarity

Regularly using messaging apps was found to be positively associated with self-reported good mental health, OR=4.81 (95% CI 1.54 to 15.21, p<0.01). Yet, the survey

also showed that regular contact with friends and family did not significantly help to improve stress levels or mental health; our interview data showed otherwise. Most interviewees spoke about spending considerable time using their mobile devices to contact family and friends and access the internet for news, health information and entertainment:

I talked to everyone (friends) on the phone, and we strengthened our bonds. We asked after each other. There was no problem. I ask them how they are doing, what they are up to, what they have eaten etc. Just normal things. Hashem, older Bangladeshi

Digital channels were also used for essential functions such as online remittance, receiving notifications for swab results and electronic permits to start work once the lockdown measures were eased in August. Talking to infected friends who had recovered through Singapore's health-care system was also reported as a means of mitigating stress from the unknown:

When I had free time, I talked to my friends, especially those who were infected, about their situation, what is happening, what kind of treatment they are receiving etc. Discussing these things with them and hearing that they were making good recovery helped me and reduced my tension and fears. Ijaz, older Bangladeshi

A recurring subtheme was the sense of solidarity that many dormmates had during this time. This bond was often described as essential support:

We are like brothers. If one is sad or needs any help, the other ones look out for him and support him. In this faraway place, without us, who do we have? Omi, older Bangladeshi

Some workers rallied together to help chip in to provide finances for roommates in dire financial straits. Others crowdfunded monies to be sent home to families in Bangladesh affected by flooding.

The central role of the employer: and feedback loops to improve dorm conditions under imposed restrictions

The employers' role in managing the stress levels and mental health of their foreign worker employees was pivotal. While poor communication with employers added significant stress, feeling that they cared about the employees' health and well-being was incredibly important, both for managing stress, OR=5.27 (95% CI 1.49 to 18.77, $p<0.01$), as well as mental health, OR=17.24 (95% CI 4.00 to 85.74, $p\leq 0.001$). Interviews highlighted that employers who frequently engaged with their employees checking in on their well-being, passing on information, maintaining salary provision, and acting as a go-between helped immensely:

They [employers] regularly called us, assured us, and told us that if we needed anything, we should let

them know without any hesitation. This meant a lot. We never felt alone. Omi, older Bangladeshi

One happy thing was my boss gave us our full salary every month. We heard that they got less salary every month in our neighbouring rooms and at times only enough to meet their expenditures. That gave us a bit of happiness. Ramachandran, older Indian

Employers were said to play a central role of advocating for their staff, relaying complaints about the dorm and ensuring workers did not need to lodge these themselves; dorm conditions improved through these feedback loops.

Gratitude and trust in government efforts after the initial phase of uncertainty

The speed with which the dormitory lockdown was implemented caused initial confusion among the residents. However, when they came to know all the steps the government had taken to ensure their well-being and safety, they became amazed and relieved at the same time, solving most of their tensions. This sense of gratitude was expressed by many of those we interviewed.

The Singaporean government announced that we (the workers) would get all the facilities of a Singaporean citizen, and it meant a lot. I will never forget how they cared for us in the most crucial time of our lives and saved us from certain death. Rony, younger Bangladeshi

Having daily meals and basic sanitary products provided was described as a relief by many. Our survey findings found that belief in the timeliness and appropriateness of Circuit Breaker measures, OR=2.85 (95% CI 1.08 to 7.39, $p=0.03$) was positively associated with mental health. Many of our interview respondents reported that the government's competent handling of the pandemic did much to reduce tensions.

As long as I'm in Singapore, even if I'm infected, I can survive somehow; it won't be that much of a problem. Shurid, middle age-band Bangladeshi

In addition, while trust in information shared by Singapore's health agencies was not associated with study outcomes, trust in information shared by healthcare providers, played a vital protective role, buffering mental health outcomes, OR=26.06 (95% CI 3.03 to 308.30, $p=0.01$). Trust may have been a contributing factor for instilling protective attitudes such as not fearing death if infected by COVID-19, OR=5.32 (95% CI 1.47 to 19.33, $p=0.01$).

DISCUSSION AND RECOMMENDATIONS

Our findings align with existing studies of migrant worker prepandemic and during COVID-19 times,^{8 9 22–26} yet drill down explicitly to illustrate insights from Indian and Bangladeshi migrant workers on mental health related experiences under dormitory lockdown. Identified

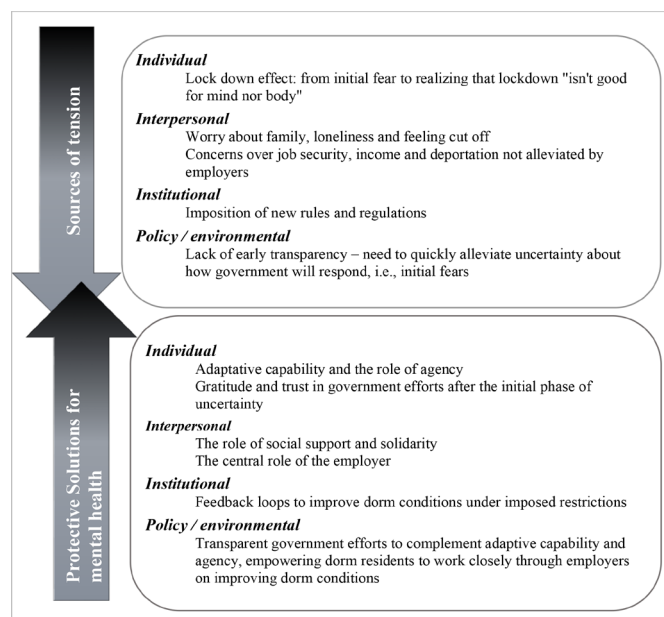


Figure 3 Mapping sources of tension to protective solutions supporting mental health.

sources of tension and solutions can be best understood, overarchingly, when mapped according to the socioecological model (see [figure 3](#)).²⁷

However, far from being siloed in these levels, tension and solutions are interconnected and should be redressed as such. During this historically first national lockdown of dormitory accommodation a lack of early transparency was experienced, as policy makers mobilised in the face of the unknown to stem the threat of the virus. The need to quickly alleviate uncertainty, that is, to assuage initial fears and share government plans from the get-go, even as they are evolving was identified. An important lesson learnt, therefore, lies in planning for effective and rapid communication during periods of lockdown or quarantine.²⁸ In addition, adaptive capability and agency were central to maintenance of mental health, counter to some known representations of the migrant population as passive victims of circumstance.²⁹

Overall, therefore, this study suggests that transparent government efforts to complement adaptive capability and agency, empowering dorm residents to work closely through employers on improving dorm conditions are needed. Our case study also highlights the central role of employers, and the need to liaise effectively with dormitory operators as restrictive new rules and regulations unfold, causing rising tensions. Though strategies to support migrant workers have been implemented by NGOs providing platforms for information sharing, engagement and learning,^{14 30 31} much more can be done, using participatory interventions—working from the inside out—to strengthen these efforts, and prepare for any eventual future outbreaks.

MAJOR STRENGTHS AND LIMITATIONS

The core strength of the current study comes from the in-depth mixed-method triangulation and use

of well-trained interviewers who were able to build rapport and conduct interviews in the participants' native language. This may have helped to address social desirability bias, especially in relation to potential under-reporting of mental health outcomes in the self-administered survey.

Nevertheless, we were limited by e-data collection methods due to COVID-19 constraints. In a bid to keep the survey straight-forward and accessible, simple self-reported measure of stress and mental health were used. Quantitative data could have been improved by surveyor administered, more complex and comprehensive validated tools measuring these outcomes and further case comparisons.

Subsequent studies should assess the transferability of our conclusions and recommendations to other migrant worker nationalities, contexts and international settings beyond Singapore.

CONCLUSION

Project Dawn, a collaborative effort involving the Ministry of Manpower, the Institute of Mental Health and NGOs (HealthServe) is intended to provide a multitiered mental health platform in Singapore.¹⁵ This study informs how such initiatives can be expanded locally and beyond by giving migrant ambassadors a voice and strategic/leadership roles to tackle pain points that their communities face. Such interventions should aim at building both identified intrinsic coping, encouraging learning and development as well as other extrinsic drivers such as solidarity and support systems, demonstrated as important for stress management and protecting mental health.

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technical oversight from CST. MCPW synthesised the quantitative and qualitative data and cowrote the manuscript with ZJ-LH and inputs from co-authors. All authors commented on the manuscript and agreed the final submission.

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SUPPLEMENTARY FILE

Supplementary Table 1: Description of Survey and interview participants

Sociodemographic information			
Variables	Categories	Survey Participants (N=175)	Interviewees (N=23)
<i>Age</i>	21 to 29 years old	88	8
	30 to 37 years old	63	11
	38 to 47 years old	24	4
<i>Nationality</i>	Bangladeshi	69	12
	Indian	106	11
<i>Income range</i>	Less than \$500 per month	58	4
	\$500 to \$749 per month	61	10
	More than \$750 per month	56	9
<i>Marital Status</i>	Single	77	7
	Married/ divorced	98	16
<i>Highest education level</i>	Formal education up to high school only	92	15
	Tertiary education (vocational/ polytechnic/ pre-university, undergraduate)	83	8
<i>Time spent away from home country</i>	Less than 2 years	34	3
	More than 2 years	141	20

Supplementary Figure 1: Sampling grid for selection by variation in age and nationality, n=23, with characteristics reported in aggregate*

Sampling by age	Pseudonym	Marital status	Income-range
Bangladeshi	Zafar Rana Habib Rony	2x single 2x married	Average income is under s\$549 per month
Indian	Pandian Murugan Ganesh Natrajan	All single	Average income is under s\$874 per month
Younger: 21-29 years of age			

Bangladeshi	Amitava Shurid Manik Sakib	1x single 3x married	Average income is under s\$749 per month
Indian	Aravind Mahesh NA [†] NA	All married	Average income is under s\$999 per month
Middle age-band: 30-35 years of age			

Bangladeshi	Kamal Ijaz Omi Hashem	All married	Average income is under s\$949 per month
Indian	Mani Rachandranan Ramesh Raghu Vishnu	All married	Average income is under s\$1149 per month
Older: 36 years of age or more			

*Note: We have assigned pseudonyms which will be the main reporting criteria tagged to quote to ensure we preserve anonymity while accurately reporting findings;

[†]NA refers to not applicable as unable to recruit.