

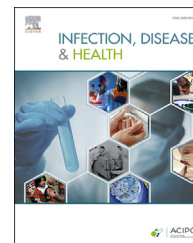


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Research paper

The COVID-19 risk perceptions, health precautions, and emergency preparedness in older CALD adults in South Australia: A cross-sectional study

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KEYWORDS

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South Australia

Abstract *Background:* In Australia, the relationships of cultural contexts with health challenges in older culturally and linguistically diverse (CALD) adults during the COVID-19 remain under-investigated. This study explored the older CALD adults' risk perceptions of COVID-19, and identified demographics and risk perceptions associated with their health precautions and emergency preparation in South Australia.

Methods: A cross-sectional online survey was conducted. 155 older adults aged 60 years and over from 28 CALD communities completed the surveys. We described demographics, risk perceptions, seven items of health precautions, and five items of emergency preparedness. Data were analyzed in Stata/MP version 13.0.

Results: Mean sum-score of fear was 7.3 [SD 1.9], signifying that the participants were afraid of being infected with COVID-19. Health precaution items presented a mean sum-score of 24.8, with a compliance in washing and disinfecting hands [M: 4.4], avoiding public places and events [M: 3.9] and transports [M: 3.8], but they did not present high-alignment with staying at home and avoiding meeting at risk population groups. Overall health precautions were positively influenced by ethnicity [Asian β 3.40; 95% CI 1.21, 5.59; African β 5.46; 95% CI 0.76, 10.16]; perceptions of long-term effects [β 1.82; 95% CI 0.65, 2.99]; and fear [β 0.55; 95% CI 0.08, 1.01]. Mean sum-score of emergency preparedness was 14.9, which indicated the participants' responses, on average, did not prevent them from buying large quantities and storing essential goods.

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Conclusion: A pandemic-related response plan is needed to ensure all older CALD adults receive and follow advice and care appropriately.

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Highlights

- Risk perception of COVID-19, a critical determinant for the adherence to public health measures.
 - No studies on older CALD Australians' risk perceptions and health precautions.
 - A fear of being infected and affected by COVID-19 was identified.
 - Lack of compliance with staying at home, avoiding risk population groups and not buying large quantities and storing foods.
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Introduction

Globally, people of all ages are at risk of COVID-19, but older adults are particularly vulnerable due to a higher morbidity, comorbidity, and mortality [1]. Several studies, conducted in the USA, Sweden, and Portugal explored age-related differences in risk perception of the pandemic [2–4], and in general, the findings suggest that risk perception of COVID-19 tends to decrease as age increases [3,5]. Studies have also found older adults to be less likely to report distress associated with exposure compared to young adults, leading to a conclusion that older adults tend to react less to the pandemic [6,7].

The levels of risk perception and health precaution in older adults were investigated in several studies, whereas no studies investigated the emergency responses of this cohort. Health precaution has been defined in the study, using the microanalytic attributes that imply coping, where a person copes with a natural disaster by self-protecting behaviors and avoidance of risk factors [4,6]. In a recent study of risk perception, worries, and behavioral changes in a sample of US residents, older adults, especially men, had a lower level of COVID-19 worry and they also engaged fewer health precautions compared to younger counterparts [8]. Another study assessed impacts of COVID-19 on wellbeing of older adults in Sweden and found older adults aged 65–71 years who perceived higher risk of the pandemic, viewing it as a major threat to health, safety, and wellbeing worldwide, also practiced more or higher levels of health precautions [4]. There appears to be some association between risk perception and health precaution among older adults. Nevertheless, taking health precautionary behaviors may decline as older adults become even older. Pasion et al. (2020) showed that the engagement of protective behaviors declined with advancing age [2]. This indicates that the oldest of old people may engage less in health precautions regardless of risk perception. Therefore, investigating risk perception of COVID-19 is a critical determinant for the adherence to public health measures within a given community. This is important especially for those with increased vulnerability to disease, such as Culturally and linguistically diverse (CALD) older adults in Australia, who often live with compromised health conditions.

In Australia, about 15% of the population were aged 65 years and above in 2017, and 37% of older Australians were born overseas with the majority speaking languages other than English, commonly known as CALD populations [9,10]. Given that the term CALD lacks a precise definition, following Pham et al. (2021) in this paper we use it to mean those people who were born in non-English speaking countries and/or those who do not speak English at home [11]. They are among the most disadvantaged people in Australian society, and continue to experience disadvantages including adverse socioeconomic conditions, less educational qualifications, and poorer health [12]. However, scant research has focused on understanding the safety, resilience and wellbeing of older CALD adults during the pandemic. This study, therefore, aims to understand the older CALD adults' risk perceptions of COVID-19, and identify health precautions and emergency preparation associated with their risk perceptions and demographics in South Australia.

Methods

A cross-sectional observational survey was conducted. The survey questionnaire was prepared by the authors in English to avoid the complexity of translating the questionnaire, which comprised demographics, risk perception, and coping indicators. The 15-indicators COVID-19 risk perception scale was included in the questionnaire, informed by Slovic's "psychometric concepts— a. cognitive [i.e., likelihood of being affected] and affective dimension [i.e., fear and general concerns], and b. psychometric paradigm [i.e., severity, controllability, and personal impact]" [7]. The 12-indicators coping scale (i.e., health precautions and emergency preparation) was drawn based on the Folkman & Lazarus's (1988) coping strategies [7]. Although the survey questionnaire was not validated, the scale items have been confirmed by the existing evidence and opinion of experts. The items have been gathered from different research studies which investigated the same topic and included older adults as participants [3,5,7,8]. The researchers also sought opinions from social gerontologists in the process of scale development.

Following the ethics approval from the University Human Research Ethics Committee [Project Number: HEL2215], data were collected from older CALD adults (≥ 60 years) from July 1 to December 31, 2020. We adopted several procedures at the data collection stage, as suggested in Podsakoff et al. (2003), to inform participants that the survey was for academic research and their responses would remain confidential in aim to reduce the likelihood of respondents providing socially desirable answers [13]. The procedures included seeking answers to the questions from an honest perspective, maintaining anonymity of participants, and logical inclusion of items in the survey questionnaire [13]. Recruitment materials, including the online survey [SurveyGizmo], were provided to 11 South Australian organisations who agreed to support dissemination. These 11 organisations comprised faith-based agencies providing human service supports to CALD communities and CALD organisations providing community supports to discrete ethnic groups. These organisations variously distributed the electronic Participation Information Sheet and Survey Link to their community members via mailing lists and their social media pages, inviting voluntary participation via self-nomination. A total of 155 older adults (≥ 60 years) from 28 CALD communities participated in the survey. Surveys were self-administered, and the consent for participation was implied, by completing the survey.

The demographic characteristics and risk perceptions were considered as explanatory variables. The demographics were categorised into: age [60–69 years, 70–79 years, and 80 years and above]; gender [male and female]; education [no formal education, primary school, high school, Bachelors, and Masters and above]; and ethnicity (country of birth; classified as Asian, African, and non-English speaking self-nominated CALD European). The COVID-19 risk perception scale included: three items of likelihood of becoming infected; six items about individual feelings of dread risks, four items of unknown risks, and two items of fear of the pandemic.

Seven items of behavioural precaution and five items of emergency preparation (12 indicators; detailed in the [Supplementary File 1](#)) were considered to be the outcomes. The internal consistency in behavioural dimensions was 0.79 (Cronbach's $\alpha = 0.7927$), and the internal consistency in emergency preparations was 0.83 (Cronbach's $\alpha = 0.8292$). Two sum-scores (one generated from the seven items of behavioural dimensions, and other generated from the five items of emergency preparedness) were also considered as outcome measures.

The data analysis was performed with Stata/MP version 13.0 (StataCorp, LP, College Station, Texas, USA). The demographics and distribution of the participants' risk perceptions, health precautions and emergency preparedness were calculated in percentages, frequencies, mean, and standard deviation. Thereafter, multiple linear regression analysis was conducted to examine the associations between explanatory variables and outcome measures. Multicollinearity was checked in regression analyses by examining the tolerance values. The tolerance values less than 0.40 indicate numerical problems, such as multicollinearity among the explanatory variables [14]. No evidence of multicollinearity was observed. The results were presented as β coefficients and 95% confidence

interval (CI), and coefficients were considered as statistically significant at $p < 0.05$. Reporting and interpretation of the findings were compliant with the CROSS (2021) guidelines (See [CROSS Checklist – Appendix 2-Supplementary File 2](#)) [15].

Results

Table 1 shows that the majority (50.3%) were aged 70–79 years [50.3%; $n = 78$], were female [74.2%; $n = 115$]; and attained high school or above education [53.6%; $n = 83$]. In terms of ethnicity, most of the participants were non-English speaking self-nominated CALD European [80.6%; $n = 125$], with 16.8% Asian and 2.6% African backgrounds.

The mean sum-score of reported risk perception of being infected was 8 [SD 2.8], indicating across the sample a perceived chance of infection that was below neutral. The participants' reported belief about COVID-19 being a global disaster returned the highest mean score of 4.5 in dread risk (i.e., personal feeling of general concerns) items. The mean sum-score of fear of becoming infected was 7.3 [SD 1.9], situating participants' reporting on worry associated with being affected by SARS-CoV-2 virus as high. The overall health precautions of participants presented a mean sum-score of 24.8 [SD 5], with self-reported high compliance in washing and disinfecting hands [Mean: 4.4; SD 0.9], avoiding public places and events [Mean: 3.9; SD 0.8], and public transports [Mean 3.8; SD 0.9]. However, the mean sum-score of emergency preparedness was 14.9 [SD 4.2], which indicated the participants' responses, on average, did not reportedly prevent them from buying more foods [Mean 2.9; SD 1.1]; buying in large quantities [Mean: 2.8; SD 1.1], and storing essential goods [Mean 2.6; SD 1.1], following the advice of the South Australian Government.

Table 2 shows the associations between explanatory variables and reported health precautions with COVID-19. The level of education [with reference no formal education, β 0.50; 95% CI 0.03, 0.98] was positively associated with frequency of hand wash and disinfection (CB-BD-1). The sum-score of becoming infected was negatively associated [$\beta -0.06$; 95% CI -0.12, -0.01] with avoiding public places and events (CB-BD-2), whereas perceptions of long-term effects of COVID-19 (DR-2, β 0.31; 95% CI 0.10, 0.51) and the sum-score of fear [β 0.09; 95% CI 0.01, 0.17] were positively associated with avoiding public places or events. The health precaution item of avoiding public transports [CB-BD-3] had a negative association with attaining high school [$\beta -0.54$; 95% CI -1.02, -0.05] and Bachelor degrees [$\beta -0.60$; 95% CI -1.09, -0.11]; sum-score of becoming infected [$\beta -0.09$; 95% CI -0.14, -0.03]; and taking the responsibility of COVID-19's consequences [$\beta -0.23$; 95% CI -0.41, -0.06]. However, the same health precaution item was positively associated with Asian ethnic background [with reference to non-English speaking CALD European, β 0.73; 95% CI 0.34, 1.12]; reported perceptions of long-term effects of COVID-19 [β 0.31; 95% CI 0.10, 0.52]; and sum-score of fear [β 0.09; 95% CI 0.01, 0.17].

In relation to avoiding contact with at risk population groups, such as people with previous or current illness, positively associated variables were Asian ethnicity [with reference to non-English speaking CALD European, β 0.88;

Table 1 Descriptive statistics of demographics and the indicators of risk perceptions, health Precautions, and Emergency Preparedness (n = 155).

Variables	Percentage	Number
Age group		
60-69	22.0	34
70-79	50.3	78
80+	27.7	43
Gender		
Male	25.8	40
Female	74.2	115
Education		
No formal education	16.1	25
Primary school	30.3	47
High school	20.7	32
Bachelors	18.1	28
Masters and above	14.8	23
Ethnicity		
European	80.6	125
Asian	16.8	26
African	2.6	4
	Mean (SD)	Range (Min-Max)
Sum-score of becoming infected (from 3 items)	8.0 (2.8)	(3–14)
Dread risk (DR)		
COVID-19 is a global disaster (DR-1)	4.5 (0.9)	(1–5)
COVID-19 will become more dangerous over time (DR-2)	3.7 (0.9)	(1–5)
COVID-19 will affect future generations (DR-3)	3.7 (0.9)	(1–5)
I can easily reduce the risk of infection (DR-4)	3.6 (0.9)	(1–5)
The consequences of COVID-19 for me are my responsibility (DR-5)	3.8 (0.9)	(1–5)
COVID-19 affects me personally (DR-6)	3.4 (1.1)	(1–5)
Unknown risk (UR)		
COVID-19 is something completely new to me (UR-1)	4.3 (0.9)	(1–5)
The effects of COVID-19 can be managed well (UR-2)	3.4 (0.9)	(1–5)
The experts know about COVID-19 (UR-3)	3.5 (1.2)	(1–5)
I know that I will not be affected by COVID-19 (UR-4)	2.5 (1.1)	(1–5)
Sum-score of fear of being affected (from 2 items)	7.3 (1.9)	(2–10)
Coping behaviors, Health precautions (CB-BD)		
I wash and disinfect my hands more often than usual (CB-BD-1)	4.4 (0.9)	(1–5)
I avoid public places/events (CB-BD-2)	3.9 (0.8)	(1–5)
I avoid public transports (tram, bus, train) (CB-BD-3)	3.8 (0.9)	(1–5)
I avoid contact with risk groups (old people and people with previous/current illnesses) (CB-BD-4)	3.5 (1)	(1–5)
I bought larger quantities of hand disinfectant/soap (CB-BD-5)	3.4 (1.2)	(1–5)
I bought larger amounts of staple foods (flour, sugar, pasta, rice, canned food) due to COVID-19 (CB-BD-6)	3 (1.2)	(1–5)
I bought large quantities of toilet paper and other hygiene items (CB-BD-7)	2.7 (1.3)	(1–5)
Sum-score of health precautions (from 7 items)	24.8 (5)	(10–35)
Coping behaviors, Emergency preparedness (CB-EP)		
I bought more food than usual due to COVID-19 (CB-EP-1)	2.9 (1.1)	(1–5)
I don't want to go shopping every day (CB-EP-2)	3.7 (1)	(1–5)
I buy large quantities of special offers (CB-EP-3)	2.8 (1.1)	(1–5)
I deliberately store essential goods in order to be prepared for COVID-19 (CB-EP-4)	2.6 (1.1)	(1–5)
I collect all emergency services contact details (CB-EP-5)	3 (1.1)	(1–5)
Sum-score of emergency preparedness (from 5 items)	14.9 (4.2)	(5–25)

Notes: Max indicates Maximum; Min indicates Minimum; SD indicates Standard Deviation.

95% CI 0.42, 1.33] and perceptions of long-term effects of COVID-19 [β 0.32; 95% CI 0.08, 0.56]. The demographic of Asian background [β 0.59; 95% CI 0.01, 1.18] had positive association with buying hand disinfectant or soap [CB-BD-5].

The associations of explanatory variables with sum-score of health precaution indicated that only the sum-score of becoming infected was negatively associated with overall health precaution, while the participants' overall health

Table 2 Multiple linear regression models explaining the health precautions (n = 155).

Variables	CB-BD-1	CB-BD-2	CB-BD-3	CB-BD-4	CB-BD-5	CB-BD-6	CB-BD-7	Sum-score of health precautions (from 7 items)
	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)
Age group (Ref: 60–69)								
70-79	−0.01 (−0.39, 0.37)	0.01 (−0.34, 0.36)	−0.31 (−0.66, 0.04)	−0.13 (−0.54, 0.28)	−0.12 (−0.64, 0.41)	0.04 (−0.47, 0.54)	0.03 (−0.53, 0.58)	−0.50 (−2.47, 1.48)
80+	−0.10 (−0.55, 0.34)	0.04 (−0.37, 0.45)	−0.19 (−0.59, 0.22)	0.06 (−0.42, 0.54)	−0.53 (−1.14, 0.08)	−0.12 (−0.71, 0.46)	−0.47 (−1.12, 0.18)	−1.31 (−3.61, 0.98)
Gender (Ref: Male)								
Female	−0.07 (−0.41, 0.26)	−0.16 (−0.47, 0.15)	0.14 (−0.17, 0.45)	−0.08 (−0.44, 0.28)	−0.28 (−0.75, 0.18)	−0.14 (−0.59, 0.30)	−0.29 (−0.78, 0.20)	−0.89 (−2.64, 0.85)
Education (Ref: No formal education)								
Primary school	0.50 (0.03, 0.98)	0.22 (−0.21, 0.66)	−0.15 (−0.59, 0.28)	0.20 (−0.30, 0.71)	0.11 (−0.54, 0.76)	0.49 (−0.13, 1.11)	0.22 (−0.46, 0.91)	1.60 (−0.84, 4.04)
High school	0.06 (−0.46, 0.59)	0.05 (−0.43, 0.54)	−0.54 (−1.02, −0.05)	0.02 (−0.55, 0.59)	−0.24 (−0.96, 0.49)	0.31 (−0.38, 1.01)	−0.35 (−1.12, 0.42)	−0.67 (−3.40, 2.06)
Bachelors	0.28 (−0.25, 0.81)	−0.03 (−0.52, 0.46)	−0.60 (−1.09, −0.11)	−0.77 (−1.34, −0.20)	−0.70 (−1.43, 0.03)	−0.11 (−0.81, 0.59)	−0.48 (−1.26, 0.29)	−2.42 (−5.16, 0.33)
Masters and above	0.15 (−0.40, 0.69)	0.09 (−0.41, 0.59)	−0.24 (−0.74, 0.26)	−0.04 (−0.63, 0.54)	−0.37 (−1.12, 0.38)	−0.36 (−1.08, 0.36)	−0.69 (−1.48, 0.11)	−1.46 (−4.28, 1.36)
Ethnicity (Ref: Self-nominated CALD European)								
Asian	0.06 (−0.36, 0.48)	0.36 (−0.03, 0.76)	0.73 (0.34, 1.12)	0.88 (0.42, 1.33)	0.59 (0.01, 1.18)	0.49 (−0.07, 1.05)	0.28 (−0.33, 0.90)	3.40 (1.21, 5.59)
African	0.36 (−0.55, 1.26)	0.52 (−0.31, 1.36)	0.79 (−0.04, 1.62)	0.76 (−0.22, 1.73)	0.97 (−0.28, 2.22)	0.80 (−0.40, 2.00)	1.26 (−0.06, 2.58)	5.46 (0.76, 10.16)
Sum-score of becoming infected (from 3 items)	−0.02 (−0.08, 0.03)	−0.06 (−0.12, −0.01)	−0.09 (−0.14, −0.03)	−0.09 (−0.15, −0.03)	−0.02 (−0.10, 0.06)	−0.02 (−0.09, 0.06)	−0.01 (−0.09, 0.07)	−0.31 (−0.60, −0.01)
DR-1	−0.01 (−0.19, 0.18)	−0.04 (−0.21, 0.13)	0.01 (−0.17, 0.17)	−0.06 (−0.26, 0.14)	−0.26 (−0.51, −0.01)	−0.08 (−0.33, 0.16)	−0.10 (−0.36, 0.17)	−0.54 (−1.50, 0.42)
DR-2	0.09 (−0.14, 0.32)	0.31 (0.10, 0.51)	0.31 (0.10, 0.52)	0.32 (0.08, 0.56)	0.29 (−0.02, 0.60)	0.25 (−0.05, 0.55)	0.26 (−0.07, 0.59)	1.82 (0.65, 2.99)
DR-3	0.02 (−0.20, 0.23)	0.06 (−0.14, 0.26)	0.01 (−0.19, 0.21)	0.07 (−0.16, 0.31)	0.25 (−0.05, 0.54)	0.17 (−0.11, 0.46)	0.10 (−0.21, 0.41)	0.68 (−0.43, 1.79)
DR-4	−0.02 (−0.23, 0.19)	0.01 (−0.18, 0.20)	0.20 (0, 0.39)	−0.03 (−0.25, 0.20)	−0.01 (−0.29, 0.28)	−0.20 (−0.48, 0.08)	−0.08 (−0.38, 0.23)	−0.13 (−1.21, 0.96)
DR-5	0.01 (−0.2, 0.19)	−0.14 (−0.31, 0.04)	−0.23 (−0.41, −0.06)	−0.19 (−0.40, 0.01)	0.03 (−0.23, 0.30)	−0.24 (−0.49, 0.01)	−0.10 (−0.38, 0.18)	−0.88 (−1.88, 0.12)
DR-6	−0.14 (−0.29, 0.02)	−0.06 (−0.2, 0.08)	−0.03 (−0.17, 0.11)	0.13 (−0.03, 0.30)	−0.10 (−0.32, 0.11)	−0.01 (−0.21, 0.19)	−0.03 (−0.25, 0.19)	−0.24 (−1.04, 0.55)

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Table 2 (continued)

Variables	CB-BD-1	CB-BD-2	CB-BD-3	CB-BD-4	CB-BD-5	CB-BD-6	CB-BD-7	Sum-score of health precautions (from 7 items)
	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)
UR-1	0.06 (-0.12, 0.24)	-0.05 (-0.22, 0.12)	0.08 (-0.09, 0.24)	-0.03 (-0.23, 0.16)	-0.03 (-0.28, 0.22)	0.15 (-0.09, 0.39)	0.05 (-0.21, 0.31)	0.23 (-0.71, 1.16)
UR-2	0.29 (0.12, 0.47)	0.14 (-0.02, 0.31)	0.10 (-0.06, 0.26)	0.15 (-0.04, 0.34)	0.17 (-0.08, 0.41)	0.20 (-0.03, 0.44)	-0.10 (-0.36, 0.16)	0.95 (0.03, 1.87)
UR-3	0.01 (-0.12, 0.14)	0.03 (-0.09, 0.15)	-0.04 (-0.15, 0.08)	0.12 (-0.02, 0.26)	0.05 (-0.13, 0.23)	0.14 (-0.03, 0.32)	0.19 (0, 0.38)	0.51 (-0.17, 1.18)
UR-4	-0.07 (-0.23, 0.08)	-0.01 (-0.15, 0.13)	-0.01 (-0.24, 0.05)	-0.02 (-0.18, 0.15)	0.06 (-0.16, 0.27)	0.27 (0.06, 0.47)	0.34 (0.12, 0.57)	0.47 (-0.34, 1.28)
Sum-score of fear of being affected (from 2 items)	0.08 (-0.01, 0.17)	0.09 (0.01, 0.17)	0.09 (0.01, 0.17)	0.08 (-0.01, 0.18)	0.11 (-0.02, 0.23)	0.08 (-0.03, 0.20)	0.01 (-0.12, 0.14)	0.55 (0.08, 1.01)
R-squared	0.1842	0.213	0.356	0.3113	0.2064	0.225	0.1862	0.3143

Notes: Coefficients in boldface are statistically significant at $p < 0.05$; CB-BD indicates health precautions; Health precautions (CB-BD-1 to 7 are provided in Table 1); DR indicates Dread risk (DR-1 to 6 are provided in Table 1); Ref indicates Reference category; UR indicates Unknown risk (UR-1 to 4 are provided in Table 1).

precaution items were positively influenced by demographic variables of Asian and African cultural background [vs non-English speaking CALD European; β 3.40; 95% CI 1.21, 5.59; β 5.46; 95% CI 0.76, 10.16 respectively]; reporting on long-term effects of COVID-19 [β 1.82; 95% CI 0.65, 2.99]; managing capacity of COVID-19 [β 0.95; 95% CI 0.03, 1.87]; and sum-score of fear [β 0.55; 95% CI 0.08, 1.01].

Table 3 presents the associations of explanatory variables with emergency preparedness. Buying more food among older CALD adults was positively associated with perceptions of long-term effects of COVID-19 [β 0.31; 95% CI 0.02, 0.61] and knowledge of experts about the pandemic [β 0.17; 95% CI 0.01, 0.34]. The variable, stayed at home rather than shopping everyday [CB-EP-2] had positive association with understanding of the contagious effects of COVID-19 on future generation [β 0.28; 95% CI 0.04, 0.53]. Buying larger quantity of special offers had positive association with having education [vs no formal education], and with reported perceptions of the effects of COVID-19 on future generation [β 0.34; 95% CI 0.08, 0.60]. The storing of essential goods, an aspect of preparedness [CB-EP-4], was positively associated with Asian and African ethnicity. The oldest of the old [80 years and over] and having Bachelor degree was negatively associated with collection of emergency services contacts [β -0.70; 95% CI -1.26, -0.14; β -0.72; 95% CI -1.39, -0.05]. Regarding the sum-score of emergency preparedness, the oldest age group of 80 years and above [vs 60–69 years] presented a negative association, and African presented a positive association with the sum-score of emergency preparation.

Discussion

Our cross-sectional survey indicated that the older CALD South Australians perceived COVID-19 as a global disaster. Effects of the pandemic for older CALD adults can be categorized into three broad aspects. Firstly, many older CALD adults associate with having two homelands, indicating that migrating to and living in a new country did not disconnect them from their origins and culture. Evidence indicates that they are inclined to gather pandemic-related information from their originating country, and their originating country's pandemic situation influenced their current living circumstance including behaviors and emergency preparedness towards COVID-19 [16,17]. Secondly, highly infectious COVID-19 virus disestablished their communication networks, resulting an isolation and a lack of emotional support for them. Although the Australian federal government offered translated information pack and free telephone consultation to reduce the loneliness, distress or confusion, studies are limited in focusing on the use of these services by older CALD South Australians [18,19]. Finally, CALD populations in South Australia are generally identified with a low health literacy and a lack of access to healthcare and social support services [20]. We have generated knowledge about the effects of COVID-19 on their risk perceptions in cognitive, emotional and social risk domains that provides data on their behavioral coping and emergency responses to the pandemic.

Table 3 Multiple linear regression models explaining emergency preparedness (n = 155).

	CB-EP-1	CB-EP-2	CB-EP-3	CB-EP-4	CB-EP-5	Sum-score of emergency preparedness (from 5 items)
	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)
Age group (Ref: 60–69)						
70–79	–0.13 (–0.62, 0.37)	0.02 (–0.41, 0.46)	–0.24 (–0.71, 0.22)	0.13 (–0.33, 0.60)	–0.03 (–0.51, 0.45)	–0.25 (–2.05, 1.56)
80+	–0.45 (–1.02, 0.13)	–0.37 (–0.88, 0.14)	–0.48 (–1.02, 0.06)	–0.51 (–1.06, 0.03)	–0.70 (–1.26, –0.14)	–2.51 (–4.61, –0.41)
Gender (Ref: Male)						
Female	–0.13 (–0.56, 0.31)	–0.23 (–0.61, 0.16)	–0.06 (–0.48, 0.35)	–0.37 (–0.78, 0.04)	0.01 (–0.42, 0.43)	–0.78 (–2.38, 0.81)
Education (Ref: No formal education)						
Primary school	0.46 (–0.16, 1.07)	0.21 (–0.33, 0.75)	0.89 (0.32, 1.47)	0.27 (–0.31, 0.84)	0.29 (–0.31, 0.89)	2.12 (–0.11, 4.35)
High school	0.51 (–0.17, 1.19)	0.29 (–0.31, 0.89)	0.37 (–0.28, 1.01)	0.13 (–0.52, 0.77)	–0.36 (–1.03, 0.30)	0.93 (–1.57, 3.42)
Bachelors	0.28 (–0.40, 0.97)	0.03 (–0.57, 0.64)	0.17 (–0.48, 0.82)	–0.22 (–0.87, 0.43)	–0.72 (–1.39, –0.05)	–0.45 (–2.96, 2.06)
Masters and above	–0.02 (–0.72, 0.69)	–0.15 (–0.77, 0.47)	0.75 (0.08, 1.41)	–0.51 (–1.17, 0.16)	–0.66 (–1.34, 0.03)	–0.58 (–3.16, 2.00)
Ethnicity (Ref: Self-nominated CALD European)						
Asian	0.06 (–0.49, 0.61)	0.29 (–0.20, 0.77)	0.24 (–0.28, 0.76)	0.86 (0.34, 1.38)	0.19 (–0.34, 0.73)	1.64 (–0.36, 3.64)
African	0.90 (–0.27, 2.08)	0.63 (–0.41, 1.67)	0.67 (–0.43, 1.78)	1.53 (0.43, 2.64)	1.05 (–0.09, 2.20)	4.79 (0.50, 9.09)
Sum-score of becoming infected (from 3 items)	0.02 (–0.05, 0.09)	0.03 (–0.03, 0.10)	0.02 (–0.05, 0.09)	0.06 (–0.01, 0.13)	0.04 (–0.03, 0.11)	0.16 (–0.11, 0.43)
DR-1	–0.12 (–0.36, 0.12)	0.11 (–0.10, 0.32)	–0.17 (–0.40, 0.05)	–0.13 (–0.35, 0.10)	0.01 (–0.24, 0.23)	–0.31 (–1.19, 0.56)
DR-2	0.31 (0.02, 0.61)	0.04 (–0.22, 0.30)	0.13 (–0.14, 0.41)	0.04 (–0.23, 0.32)	0.15 (–0.14, 0.43)	0.67 (–0.39, 1.74)
DR-3	0.04 (–0.24, 0.32)	0.28 (0.04, 0.53)	0.34 (0.08, 0.60)	0.19 (–0.07, 0.46)	–0.03 (–0.30, 0.24)	0.83 (–0.19, 1.84)
DR-4	–0.12 (–0.39, 0.15)	–0.12 (–0.36, 0.12)	–0.30 (–0.55, –0.04)	–0.31 (–0.56, –0.05)	–0.01 (–0.27, 0.25)	–0.86 (–1.85, 0.13)
DR-5	–0.12 (–0.37, 0.13)	0.02 (–0.20, 0.24)	0.07 (–0.17, 0.30)	–0.13 (–0.37, 0.10)	–0.07 (–0.31, 0.17)	–0.24 (–1.15, 0.67)
DR-6	–0.11 (–0.31, 0.09)	–0.13 (–0.30, 0.05)	–0.16 (–0.35, 0.03)	–0.17 (–0.36, 0.02)	0.07 (–0.12, 0.27)	–0.50 (–1.22, 0.23)
UR-1	0.20 (–0.03, 0.44)	–0.01 (–0.21, 0.20)	0.08 (–0.14, 0.30)	0.15 (–0.07, 0.37)	0.04 (–0.18, 0.27)	0.48 (–0.38, 1.33)
UR-2	0.15 (–0.08, 0.38)	0.16 (–0.05, 0.36)	0.01 (–0.22, 0.22)	0.03 (–0.19, 0.25)	0.09 (–0.14, 0.31)	0.42 (–0.42, 1.26)
UR-3	0.17 (0.01, 0.34)	–0.09 (–0.24, 0.06)	0.11 (–0.04, 0.27)	0.10 (–0.06, 0.26)	0.09 (–0.07, 0.26)	0.39 (–0.23, 1.01)
UR-4	0.17 (–0.04, 0.37)	0.03 (–0.15, 0.21)	0.13 (–0.06, 0.32)	0.18 (–0.01, 0.37)	0.17 (–0.03, 0.37)	0.67 (–0.07, 1.41)
Sum-score of fear of being affected (from 2 items)	0.01 (–0.11, 0.12)	0.04 (–0.06, 0.14)	–0.02 (–0.13, 0.09)	0.04 (–0.07, 0.15)	–0.01 (–0.12, 0.10)	0.05 (–0.37, 0.48)
R-squared	0.1759	0.1629	0.2147	0.261	0.2014	0.2086

Notes: Coefficients in boldface are statistically significant at $p < 0.05$; CB-EP indicates emergency preparedness, Emergency preparedness (CB-EP-1 to 5 are provided in Table 1); DR indicates Dread risk (DR-1 to 6 are provided in Table 1); Ref indicates Reference category; UR indicates Unknown risk (UR-1 to 4 are provided in Table 1).

The study participants did not present a high-alignment with staying at home, avoiding in-person meeting risk population groups, and buying large quantities of disinfectant/soap, staple foods or toilet papers. Their reported compliance with health precautions varied by level of education and cultural backgrounds. It is well-documented in previous studies that education has significant influence on people's healthy behaviors [21], and as found in the study that the older CALD adults having no formal education were less likely to practice health precautions during the pandemic. In addition, ethnic background played a significant role in shaping the health precautions, for example, the older adults with Asian and African origins were more likely to present unsafe behaviors compared to non-English speaking CALD European. A plausible explanation is that the older adults with Asian and African origins living in South Australia with a lack of education may experience challenges in coping with COVID-19 and its protocols.

Fear was identified as a significant factor in the older CALD adults' decisions of avoiding the public place, events, and transports, and their fear was related with their perceptions of long-term effects of COVID-19, personal hygiene, and capacity for managing the effects. In Australia, the COVID-19 pandemic occurred in the wake of the 2019–2020 bushfires, in which almost 4.3 million hectares of land [2.45 million hectares of agricultural land] were burned, a total of 3094 houses had been lost, and 33 people died [22]. The pandemic exacerbated the bushfire experiences by contributing to a complex health and socioeconomic environment for the older CALD adults that impedes their personal and emotional care supports. There is already a high prevalence of psychological disorders in people aged 65 years and over in Australia, and because of the pandemic, isolation and loneliness co-exist that may develop fear in the older CALD adults and limit their ability to prepare for and respond to large-scale disruptions in their movements and travels. It is evident in the studies, as our study confirms, that the older CALD adults with Asian and African ethnicities may be at a high risk of anxiety and fear [20,23], therefore coping with the crisis is subject to the improvement of their health beliefs and care seeking behaviors through educational response interventions.

Emergency preparation of older CALD adults decreases as their age increases. While the older CALD adults adopted different health precautions, their emergency preparedness was subject to their perceptions about the COVID-19 effects at personal level. In order to act appropriately in COVID-19 emergency, the advice and instructions of the federal and state governments were not sufficiently effective in preventing the older CALD adults from buying more foods, buying the foods in large quantities, and storing essential goods, as identified in the other studies [24,25]. More importantly, older adults aged 80 years and above not only showed a lack of interest in the collection of services contacts, but also present poor compliance with emergency preparation [26]. This lack of compliance to emergency preparation in oldest CALD adults can be explained by either their experiences from previous pandemics, such as (H1N1) Influenza or reluctance because of health illiteracy [27–30].

Limitations of our study include a constraint in examining causal inferences and language of the survey

questionnaire. Being a cross-sectional study, it has limited capacity to examine causal inferences between risk perceptions and behavioural coping and emergency preparedness. The sample is not representative of all CALD communities in South Australia, considering the large sample ratio of non-English speaking self-nominated CALD European. This may have impacted our examination of the effects of risk perceptions on behavioural changes in older CALD adults equitably across ethnic groups. In addition, our study relied on English-language questionnaire in data collection that may have influenced participants' decision about completing the surveys.

The COVID-19 vaccination rollout in Australia is in progress, and until the vaccination is accessible to everyone, enormous efforts rest on containing community spread of infections through testing for suspected cases, practicing physical distancing, and maintaining personal hygiene. In order to save the older CALD adults' life and livelihoods, our study highlights an importance of developing a culturally-tailored pandemic response plan. Engaging the CALD communities in the development and implementation of the response plan is critical to address the language barriers and incorporate cultural and spiritual messages to motivate these older adults.

Ethics

The study received ethics approval from Flinders University Human Research Ethics Committee, Australia [Project Number: HEL2215].

Authorship statement

MH made substantial contributions to conception and design, acquisition of data, analysis, interpretation of data, drafted the initial manuscript and revising it critically for important intellectual content. NS made substantial contributions to conception, data collection, analysis and critical revision to the manuscript. HM contributed to the conception and design and critically revised the manuscript for important intellectual content. MIT contributed to the data analysis and critically revised the manuscript. All authors read the manuscript and approve the submission.

Conflict of interest

No potential conflict of interest was reported by the authors.

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Data availability

The data set is available at Harvard Dataverse: <https://doi.org/10.7910/DVN/OUGSUC>.

Consent to participate

Participation consent was implied, by completing the survey.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.idh.2022.04.001>.

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