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Tracking the Trajectory and Predictors of Peritraumatic Distress among Chinese Migrants in Canada across the Three Years of the COVID-19 Pandemic

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Abstract: Negative effects of the COVID-19 pandemic on mental health have been widely reported. Chinese populations, especially those living overseas, are highly vulnerable to mental health problems considering the unique challenges they faced during the pandemic. Even though the pandemic lasted for three years, little is known about the mental health condition of this special population over this time course. The current study aimed to assess peritraumatic distress among Chinese migrants in Canada and identify its consistent risk predictors across the three years of the pandemic (2020, 2021, 2022). Three groups of Chinese adult migrants (i.e., aged 18 or above) living in Canada were randomly recruited through social media and the internet to complete an online survey in 2020, 2021, and 2022 respectively. Peritraumatic distress was assessed with the COVID-19 Peritraumatic Distress Index (CPDI). Univariate analysis of variance (ANOVA) models and a subsequent hierarchical multiple regression model were conducted to track peritraumatic distress differences across the three years and identify potential risk factors. The results showed that the CPDI score increased from 2020 to 2022 and peaked in 2021. Age, birthplace, health status, perceived discrimination, self-contraction and family contraction worry were identified as significant sociodemographic and COVID-19-related predictors for peritraumatic distress (absolute βs = 2.16–9.00; ps < 0.05). The results provide insight into the mental health condition of overseas Chinese migrants across the three years of the pandemic.

Keywords: Chinese migrants; peritraumatic distress; COVID-19 risk factors; sociodemographic risk factors; mental health

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1. Introduction

The detrimental effects of the COVID-19 pandemic on mental health have been observed in different countries [1,2]. In Canada, the number of people experiencing anxiety, depression, and post-traumatic stress disorder increased from 2020 to 2021 [3]. Specifically, a national survey showed that the percentage of Canadians reporting anxiety and depression increased from 19% in 2020 to 23% in 2021 [3]. A slight increase was also observed in the percentage of Canadians reporting post-traumatic stress from 6% in 2020 to 7% in 2021 [3]. These changes may reflect a prolonged negative impact of the pandemic on mental health. Moreover, a number of factors such as social isolation [4] and racial discrimination [5] could be associated with poor mental health outcomes during the pandemic. Chinese migrants overseas may be especially susceptible to mental health issues because of the rising anti-Chinese racial discrimination during the pandemic. Some earlier studies have identified sociodemographic and COVID-19-related predictors for mental health and psychological distress among Chinese in Canada during the pandemic [5–7]. Despite the persistent nature of the pandemic, little is known about whether these mental health effects of the COVID-19 pandemic vary across the three years (2020–2022) of its duration. To fill

this gap, the current study adds a temporal dimension to examine whether the patterns remain across the 3-year time course of the pandemic.

The COVID-19 pandemic posed a global mental health threat. As an index of mental health, peritraumatic distress is defined as physiological and emotional distress that occurs during and/or immediately after a traumatic event and is associated with a risk of post-traumatic stress disorder (PTSD) [8]. It is expected to decrease as time passes after the potential traumatic event [9]. The COVID-19 pandemic, including a series of traumatic events with an unknown timeline, may result in peritraumatic distress [10]. Peritraumatic distress has been widely reported in different countries during the COVID-19 pandemic [11–15]. A study comparing the prevalence of peritraumatic distress across 13 countries in Asia and Africa found that respondents in Vietnam experienced the highest prevalence of peritraumatic distress compared with other countries during the pandemic [16]. In addition, peritraumatic distress has been found to be associated with poor well-being such as poor quality of life, and lower resilience among vulnerable populations, such as cancer patients [17] and medical students [18], during the pandemic. Therefore, it became critical to assess the levels of peritraumatic distress during the pandemic among vulnerable populations, such as minoritized groups.

Some previous studies assessing temporal associations between trauma-related mental health outcomes and different stages of the pandemic revealed mixed results. A Japanese study found an increased level of severe psychological distress from the early (February 2020) to the community transmission stage (April 2020) of the COVID-19 pandemic [19]. However, by tracking cases of post-traumatic stress symptoms and disorder in China over a 4-week period since the initial outbreak stage, another study found an increased number of cases but the severity level of the symptoms remaining stable [20]. The discrepancy in these results might be due to the brief interval between the two testing time points in previous research [20]. A study [21] conducted in France with a longer time lag revealed a decreased level of peritraumatic distress from before (March 2022) to after the national confinement (May 2022). Despite the prolonged nature of the COVID-19 pandemic, it is still unknown whether and how peritraumatic disstress and its associated risk factors might vary over the three years of the pandemic from 2020 to 2022.

The negative mental health impacts of the pandemic are concerning among Chinese in Canada. For example, discrimination against Chinese has been rising during the COVID-19 pandemic. Among visible minority groups in Canada, the proportion of individuals perceiving an increase in racial harassment or attacks was the highest in Chinese Canadians during the initial stage of the pandemic [22]. Moreover, in the early stage of the pandemic in 2020, approximately 11.3%, 10.83%, and 5.1% of Chinese respondents in Canada experienced moderate to severe levels of depression, anxiety, and stress, respectively [7]. The prolonged racial discrimination tension may pose a greater risk for Chinese migrants in Canada to experience peritraumatic distress.

Some risk factors have been found to be associated with peritraumatic distress, including a younger age [13,23], higher risk perception [15], stronger fear of COVID-19 [15], and living alone [11]. Some earlier studies with Chinese migrants in Canada identified a number of predictors, such as self-contraction worry (i.e., the degree of worry about being infected with COVID-19), poor health status, and perceived and experienced discrimination (i.e., the perception and experience of prejudice and discrimination against Chinese Canadians during the pandemic, respectively) for peritraumatic distress [5,6,24]. Religion has also been suggested to buffer mental health conditions throughout the COVID-19 pandemic [25]. However, little is known about whether these factors remained as robust and consistent predictors for peritraumatic distress across the three years of the pandemic. Furthermore, we also would like to explore and assess the potential effects of other factors (e.g., residence status, birthplace) specific to immigrant populations.

In the current study, we sought to track changes in the peritraumatic distress level of Chinese migrants in Canada and identify sociodemographic and COVID-19-related predictors over the three years of the COVID-19 pandemic. Specifically, we aimed to

address the following research questions: (1) Did peritraumatic distress change each year from 2020 to 2022 among Chinese migrants in Canada? (2) What are the endurable sociodemographic and COVID-related risk predictors for peritraumatic distress across the three years? These questions were addressed with a cross-sectional design with a sample of Chinese migrants in Canada being independently recruited to complete an online survey each year. Consistent with previous studies [14], the COVID-19 Peritraumatic Distress Index (CPDI) was administered to assess peritraumatic distress during the COVID-19 pandemic at each time point. The three time points were also labeled as three waves with the following time periods: April–May 2020 (i.e., the first wave of the COVID-19 pandemic), January–March 2021 (i.e., the end of the second wave and beginning of the third wave of the COVID-19 pandemic), and March–April 2022 (i.e., a subsequent wave of the COVID-19 pandemic) [26].

2. Materials and Methods

2.1. Sample

A random sampling approach was used to recruit participants at three different time points. Recruitment was primarily through online platforms such as WeChat (the most popular social media application in Chinese communities), websites (e.g., our dedicated lab website and the partner community organizations' websites such as https://cniw.org/, accessed on 11 October 2024), and emails (i.e., emails to the partner community leaders to distribute our recruitment/survey link to their members). Participants voluntarily responded to the survey either without any compensation (i.e., in 2020) or with minimal monetary incentive in the format of a prize draw (i.e., in 2021 and 2022). A total of 458, 922, and 678 valid respondents, all Chinese migrants residing in Canada at the time of data collection, completed the survey in 2020, 2021, and 2022, respectively. Only those who completed at least half of the items in the CPDI were included as valid cases in the final analysis. Thus, the final sample (n = 1391) consisted of 457, 848, and 627 respondents from the 2020, 2021, and 2022 time points, respectively. A sensitivity test indicated that this sample size allowed for the detection of a small effect size (f^2 = 0.018) with a power of 0.95 at an alpha level of 0.05 in the 11-predictor linear multiple regression model reported in this paper. Across the three testing time points, the majority of the samples were from Mainland China (> 95%), Canadian citizens (> 90%), or residing in Ontario (> 87%). Table 1 shows the sample characteristics in sociodemographic and COVID-19 variables.

Table 1. Sample characteristics.

		2020 (n/%)	2021 (n/%)	2022 (n/%)	Chi	p
CPDI score	Normal	266 (58.21)	31 (3.66)	278 (44.34)	665.52	<0.001
	Moderate	168 (36.76)	440 (51.89)	297 (47.37)		
	Severe	23 (5.03)	377 (44.46)	52 (8.29)		
Sociodemographic Variables						
Age	34 and under	44 (10)	113 (12.26)	62 (9.28)	51.04	<0.001
	35 to 44	75 (16.38)	114 (12.36)	98 (14.67)		
	45 to 54	204 (44.54)	299 (32.43)	242 (36.23)		
	55 to 64	81 (17.69)	225 (24.40)	113 (16.92)		
	65 and above	54 (11.79)	171 (18.55)	153 (22.90)		
Sex	Female	332 (72.97)	590 (64.41)	498 (73.56)	32.09	<0.001
	Male	123 (27.03)	316 (34.50)	164 (24.22)		
	Other	0 (0)	10 (1.09)	15 (2.22)		
Birthplace	Mainland China	443 (97.82)	879 (95.34)	659 (97.20)	10.8	0.029
	HK/Macau/Taiwan	14 (3.06)	25 (2.71)	14 (2.06)		
	Other	1 (0.22)	18 (1.95)	5 (0.74)		
Marital status	Married/Partnered	382 (83.41)	761 (82.54)	522 (76.99)	10.17	0.006
	Other	76 (16.59)	161 (17.46)	156 (23.01)		

Table 1. *Cont.*

		2020 (n/%)	2021 (n/%)	2022 (n/%)	Chi	*p*
Education	College and under	110 (24.02)	209 (22.67)	190 (28.02)	8.62	0.071
	University	184 (40.17)	405 (43.93)	284 (41.89)		
	Graduate	164 (35.81)	308 (33.41)	204 (30.09)		
Employment status	Employed/Self-employed	301 (65.72)	514 (55.75)	373 (55.01)	15.52	<0.001
	Other	157 (34.28)	408 (44.25)	305 (44.99)		
Living arrangement	House	370 (99.20)	727 (79.02)	504 (96.55)	152.89	<0.001
	Other	3 (0.80)	193 (20.98)	18 (3.45)		
Resident status	Citizen	416 (90.83)	832 (90.24)	622 (91.74)	21.97	0.005
	Permanent resident	13 (2.84)	56 (6.07)	22 (3.24)		
	International student	14 (3.06)	20 (2.17)	24 (3.54)		
	Visitor/Tourist	7 (1.53)	4 (0.43)	2 (0.29)		
	Business	8 (1.75)	10 (1.08)	8 (1.18)		
Province	Ontario	376 (88.26)	780 (87.15)	618 (91.29)	6.77	0.029
	Other province	50 (11.74)	115 (12.85)	59 (8.71)		
Religion	None	248 (53.75)	554 (60.28)	400 (59.08)	21.44	<0.001
	Christianity/Catholicism	152 (33.55)	220 (23.94)	204 (30.13)		
	Other	53 (11.70)	145 (15.78)	73 (10.78)		
Housing type	House	370 (99.20)	727 (79.02)	504 (96.55)	152.89	<0.001
	Other	3 (0.80)	193 (20.98)	18 (3.45)		
Length of stay in Canada	0–5 yrs	72 (15.72)	160 (17.41)	107 (15.78)	2.61	0.624
	6–15 yrs	158 (34.50)	282 (30.69)	223 (32.89)		
	15 yrs and above	228 (49.78)	477 (51.90)	348 (51.33)		
Housing Size	1	22 (4.86)	50 (6.06)	67 (9.88)	25.64	0.001
	2	98 (21.63)	243 (29.45)	190 (28.02)		
	3 to 4	249 (54.97)	404 (48.97)	321 (47.35)		
	5 to 6	73 (16.11)	115 (13.94)	91 (13.42)		
	7 or more	11 (2.43)	13 (1.58)	9 (1.33)		
Health status	Poor	146 (32.37)	351 (38.15)	335 (49.57)	37.42	<0.001
	Good	305 (67.63)	569 (61.85)	341 (50.43)		
	Agree	244 (53.63)	355 (38.55)	398 (59.49)	75.53	<0.001
Perceived discrimination	Neutral	147 (32.31)	407 (44.19)	182 (27.20)		
	Disagree	64 (14.07)	159 (17.26)	89 (13.30)		
COVID-19-Related Variables						
Self-contraction status	Yes	1 (0.22)	4 (0.47)	47 (6.93)	75.52	<0.001
	No	456 (99.78)	852 (99.53)	631 (93.07)		
Exposure history	Yes	12 (2.63)	65 (7.51)	190 (28.06)	208.53	<0.001
	No	344 (75.44)	653 (75.49)	358 (52.88)		
	Not sure	100 (21.93)	147 (16.99)	129 (19.05)		
	Not worried	94 (20.61)	136 (15.72)	169 (25.07)	21.17	<0.001
Self-contraction worry	Neutral	102 (22.37)	216 (24.97)	144 (21.36)		
	Worried	260 (57.02)	513 (59.31)	361 (53.56)		
	Not worried	66 (14.47)	97 (11.21)	112 (16.62)	12.69	0.013
Family contraction worry	Neutral	68 (14.91)	167 (19.31)	110 (16.32)		
	Worried	322 (70.61)	601 (69.48)	452 (67.06)		
Threat perception	Agree	380 (83.33)	764 (88.53)	462 (68.55)	104.21	<0.001
	Neutral	60 (13.16)	83 (9.62)	156 (23.15)		
	Disagree	16 (3.51)	16 (1.85)	56 (8.31)		

Note. HK = Hong Kong.

2.2. Surveys

All three surveys were built in Qualtrics and delivered online in simplified Chinese. They were administered at the following testing time points (i.e., year): 2020 (April–May), 2021 (January–March), and 2022 (March–April). In light of previous studies [5,6,11,13,15,23] and to further explore the potential effects of other sample-specific variables on the CPDI, all three surveys included questions on demographics, COVID-19-related experiences, and scales measuring psychological well-being, in addition to the CPDI. An attention

check question (i.e., "what is your favorite color?") was included at the end to catch inattention/random respondents or robots' responses. All participants in the final sample provided a meaningful response to this question. The data from the three surveys were merged into one file that included all overlapped variables across the three surveys.

2.3. Explanatory Variables and Covariates

There were two sets of explanatory variables. The first set included sociodemographic variables such as age, sex, birthplace, marital status, education, employment status, living arrangement, resident status, province, religion, housing type, length of stay in Canada, housing size, perceived discrimination ("Do you think Chinese Canadians will experience prejudice and discrimination because of the COVID-19?"), and health status (physical, mental, and sleep quality). The second set captured COVID-19-related experiences and perceptions, including self-contraction status ("Have you ever been diagnosed with COVID-19?"), exposure history ("Have you ever interacted with any confirmed/suspected COVID-19 cases?"), self-contraction worry ("Do you worry about yourself being infected with COVID-19?"), family-contraction worry ("Do you worry about your family members being infected with COVID-19?"), and threat perception ("Do you think that the COVID-19 pandemic is a real threat?"). Following our previous work [5,7], all explanatory variables listed in Table 1 were measured via single-item survey questions.

2.4. Outcome Variable

The main outcome measure was the COVID-19 Peritraumatic Distress Index (CPDI), which has 24 items based on a 5-point Likert scale ranging from 0 ("Never") to 4 ("Very often"). The sum score, ranged from 0 to 96, was used to index the level of peritraumatic distress. A score between 28 and 51 signifies a mild to moderate level of peritraumatic distress and a score $\geq$ 52 shows a severe level of peritraumatic distress. Example questions included "I feel sympathetic and sad about the COVID-19 patients and their families" and "I am gradually losing trust in the situation and people around me". The scale showed high reliability in a previous study [27] (Cronbach's alpha = 0.91) and in the three surveys of the current study (Cronbach's alpha = 0.94 for the 2020 and 2021 surveys and Cronbach's alpha = 0.95 for the 2022 survey). It has been used as a valid and reliable tool to assess peritraumatic distress during the COVID-19 pandemic in multiple studies [5,14].

3. Results

3.1. Data Analysis Approach

Data analysis was performed in IBM SPSS Statistics Version 23. Following previous practice [5,7] and to ensure clarity in the statistical analysis and meaningful interpretation of the results, categorical explanatory variables (i.e., sociodemographic and COVID-19-related variables) were recoded by collapsing/merging levels (e.g., those with a very small sample size and showed similar outcome variable score) into meaningful categorical groups. The recoding was performed to best capture the variance in the outcome variable (i.e., CPDI) based on the preliminary frequency and exploratory analysis consistently across the three samples. We conducted three sets of final data analysis as follows: (1) Chi-squared tests were run on each of the explanatory variables to examine their frequency distribution across three years (Table 1). (2) A separate univariate analysis of variance model (ANOVA) was conducted to assess group differences in the CPDI score as stratified by sociodemographic and COVID-19-related variables (Table 2). As per convention [5,7,28] and to best capture all potential predictors, all sociodemographic and COVID-19-related variables with $p \leq 0.20$ were identified as potential predictors to be entered in the subsequent regression models. (3) A two-step hierarchical linear regression model was performed to identify sociodemographic and COVID-19-related predictors while controlling for the testing year. Year was entered in the first step, with all the identified potential predictors added in the second step (Table 3).

Table 2. Group differences in the CPDI scores by sociodemographic and COVID-19-related factors.

	Variables	CPDI Mean (SD)	F	*p*	Multiple Comparisons [1]
Year	1 = 2020	25.45 (14.09)	558.45	**<0.001**	2 > 1 ***
	2 = 2021	50.44 (14.57)			3 > 1 ***
	3 = 2022	30.53 (15.01)			2 > 3 ***
Sociodemographic Variables					
Age	1 = 34 and under	39.86 (20.85)	4.93	**0.001**	none
	2 = 35 to 44	36.56 (18.22)			
	3 = 45 to 54	37.26 (17.76)			
	4 = 55 to 64	40.43 (18.59)			
	5 = 65 and above	37.37 (17.60)			
Sex	1 = Female	38.23 (37.79)	0.47	0.626	
	2 = Male	37.79 (18.14)			
	3 = Other	35.05 (13.98)			
Birthplace	1 = Mainland China	38.13 (18.40)	2.64	**0.072**	
	2 = HK/Macau/Taiwan	34.18 (16.11)			
	3 = Other	41.23 (18.07)			
Marital status	1 = Married/Partnered	37.64 (18.04)	0.03	0.865	
	2 = Other	39.95 (19.55)			
Employment status	1 = Employed/Self-employed	37.17 (18.05)	0.39	0.532	
	2 = Other	39.32 (18.69)			
Housing type	1 = House	37.43 (18.27)	60.34	**<0.001**	
	2 = Other	50.92 (16.17)			
Residence status	1 = Citizen	37.99 (18.27)	1.61	**0.168**	
	2 = Permanent resident	41.04 (20.03)			
	3 = International student	37.00 (17.94)			
	4 = Visitor/Tourist	42.17 (23.57)			
	5 = Business	34.63 (15.19)			
Province	1 = Ontario	38.03 (18.16)	0.04	0.839	
	2 = Other	38.37 (19.62)			
Religion	1 = None	38.50 (17.91)	3.48	**0.031**	3 > 2 *
	2 = Christianity/Catholicism	36.26 (19.07)			
	3 = Other	40.05 (18.54)			
Housing size	1 = 1	39.05 (17.44)	1.27	0.278	
	2 = 2	38.91 (18.30)			
	3 = 3 to 4	37.25 (18.22)			
	4 = 5 to 6	35.40 (18.75)			
	5 = 7 or more	35.34 (19.37)			
Health status	1 = Poor	44.86 (17.97)	126.62	**<0.001**	
	2 = Good (>3)	33.60 (17.21)			
Perceived discrimination	1 = Agree	39.22 (18.27)	10.02	**<0.001**	1 > 3 ***
	2 = Neutral	39.23 (18.30)			2 > 3 ***
	3 = Disagree	31.87 (17.29)			
COVID-19-Related Variables					
Exposure history	1 = Yes	37.30 (17.90)	1.09	0.337	
	2 = No	37.77 (18.04)			
	3 = Not sure	39.64 (19.65)			
Self-contraction status	1 = Yes	33.10 (18.20)	0.37	0.542	
	2 = No	38.12 (18.34)			
Self-contraction worry	1 = Not worried	26.58 (14.87)	35.66	**<0.001**	3 > 1 ***
	2 = Neutral	35.13 (15.94)			2 > 1 ***
	3 = Worried	43.37 (18.22)			
Family contraction worry	1 = Not worried	25.46 (15.00)	3.79	**0.008**	3 > 1 ***
	2 = Neutral	34.64 (16.30)			3 > 2 ***
	3 = Worried	41.54 (18.15)			2 > 1 ***
Threat perception	1 = Agree	40.25 (18.18)	13.49	**<0.001**	1 > 2 ***
	2 = Neutral	29.93 (16.08)			1 > 3 ***
	3 = Disagree	25.33 (15.32)			

Note. HK = Hong Kong. [1] Only statistically significant comparisons are displayed. *F* and *p* values refer to the univariate ANOVA results. Bolded *p* values ($p < 0.20$) refer to the variables to be entered as covariates in the regression model displayed in Table 3. * $p < 0.05$, *** $p < 0.001$.

Table 3. Linear regression models for the CPDI scores.

Step	Predictors		B	95% CI
1	Year	1 = 2020 (reference)		
		2 = 2021	24.97 ***	(23.20, 26.74)
		3 = 2022	3.62 ***	(1.65, 5.58)
2	Year	1 = 2020 (reference)		
		2 = 2021	24.76 ***	(23.19, 26.33)
		3 = 2022	3.51 ***	(1.82, 5.20)
	Age	1 = 34 and under (reference)		
		2 = 35 to 44	−1.09	(−3.91, 1.74)
		3 = 45 to 54	−1.6	(−4.21, 1.00)
		4 = 55 to 64	−1.22	(−3.96, 1.52)
		5 = 65 and above	−4.05 **	(−6.93, −1.18)
	Birthplace	1 = Mainland China (reference)		
		2 = HK/Macau/Taiwan	−3.82 *	(−7.61, −0.03)
		3 = Other	0.13	(−5.28, 5.54)
	Religion	1 = None (reference)		
		2 = Christianity/Catholicism	0.35	(−1.02, 1.71)
		3 = Other	−0.49	(−2.28, 1.30)
	Resident status	1 = Citizen (reference)		
		2 = Permanent resident	−0.22	(−3.92, 3.45)
		3 = International student	−1.58	(−5.82, 1.70)
		4 = Visitor/Tourist	9.46	(−0.62, 17.81)
		5 = Business	1.59	(−5.41, 5.99)
	Housing type	1 = House (reference)		
		2 = Other	1.57	(−0.12, 4.03)
	Health status	1 = Poor (reference)		
		2 = Good	−9.00 ***	(−10.25, −7.75)
		1 = Agree (reference)		
	Perceived discrimination	2 = Neutral	−2.16 ***	(−3.49, −0.83)
		3 = Disagree	−5.42 ***	(−7.19, −3.65)
	Self-contraction worry	1 = Not worried (reference)		
		2 = Neutral	1.41	(−0.92, 3.73)
		3 = Worried	7.01 ***	(4.71, 9.31)
		1 = Not worried (reference)		
	Family-contraction worry	2 = Neutral	3.10 *	(0.42, 5.78)
		3 = Worried	4.70 ***	(2.18, 7.22)
	Threat perception	1 = Agree (reference)		
		2 = Neutral	−1.28	(−3.09, 0.53)
		3 = Disagree	−1.92	(−4.98, 1.15)

Note. The listwise method was used to handle missing data. B refers to unstandardized B. HK = Hong Kong. CI = Confidence Interval. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3.2. Peritraumatic Distress

Peritraumatic distress was categorized into three levels of severity. The number (proportion) of participants who reported normal, mild to moderate, and severe distress were 266 (58.21%), 168 (36.76%), and 23 (5.03%) in 2020; 31 (3.66%), 440 (51.89%), and 377 (44.46%) in 2021; and 278 (44.34%), 297 (47.37%), and 52 (8.29%) in 2022. The chi-square test showed significant differences in the distributions of normal, mild to moderate, and severity of peritraumatic distress across three years ($\chi^2 = 665.52$, $p < 0.001$). The mean CPDI scores of each year were 25.45, 50.44, and 30.53, respectively. The univariate ANOVA showed that the CPDI score varied significantly across testing years ($F = 558.45$, $p < 0.001$). Post hoc multiple comparisons revealed significant group differences between 2020 and 2021, between 2021and 2022, and between 2020 and 2022 (ps < 0.001). Compared with 2021, peritraumatic distress was significantly lower in 2020 and 2022. Compared with 2020, peritraumatic distress was significantly higher in 2022. Altogether, these findings showed that peritraumatic distress increased from 2020 to 2022, with a peak in 2021. The current report focuses on the continuous CPDI score as the outcome variable.

3.3. Sociodemographic and COVID-19-Related Predictors

The univariate ANOVA on the CPDI score by sociodemographic variables identified the following variables as potential covariates ($p \leq 0.20$) [28]: age, birthplace, housing type, residence status, religion, health status, and perceived discrimination, with statistically significant effects of age, housing type, religion, health status, and perceived discrimination (Fs = 3.48–60.34, ps < 0.05). Post hoc multiple comparisons revealed significant group differences by religion, health status, and perceived discrimination (ps < 0.05). People who had no religion or other religions reported higher peritraumatic distress than those who were Christian/Catholic. People who had poor health status and perceived discrimination reported higher peritraumatic distress than their counterparts. These results are presented in Table 2.

The univariate ANOVA model on the CPDI score stratified by COVID-19-related variables identified the following variables as potential covariates ($p \leq 0.20$): self-contraction worry, family contraction worry, and threat perception. They all showed significant effects on the CPDI (Fs = 3.79–35.66, ps < 0.01). Post hoc multiple comparisons revealed that those who were worried about self- or family contraction and those who perceived the COVID-19 pandemic as a real threat reported higher peritraumatic distress than their counterparts. These results are presented in Table 2.

A two-step hierarchical linear regression model was conducted with the CPDI score as the outcome variable (see Table 3). Year (2020, 2021, 2022) was entered in the first step, and then potential sociodemographic and COVID-19-related covariates ($p \leq 0.20$ from the univariate ANOVAs) were added in the second step. All predictive variables with more than two levels were dummy-coded. Both the Step 1 ($R^2 = 0.39$, $p < 0.001$) and Step 2 ($R^2 = 0.57$, $p < 0.001$) models explained a significant amount of variance in CPDI. In Step 1, the testing year was identified as a significant predictor, with the 2021 ($\beta = 24.97$, $p < 0.001$) and 2022 samples ($\beta = 3.62$, $p < 0.001$) reporting a significantly higher level of peritraumatic distress than the 2020 sample. In Step 2, after controlling for all sociodemographic and COVID-19-related covariates, the testing year remained a significant predictor (2021: $\beta = 24.76$, $p < 0.001$; 2022: $\beta = 3.51$, $p < 0.001$). Additionally, some sociodemographic variables (i.e., age, birthplace, health status, perceived discrimination) and COVID-19-related variables (i.e., self-contraction worry and family contraction worry) were identified as significant predictors for peritraumatic distress (absolute $\beta = 1.95$–9.00, ps < 0.05). Specifically, individuals aged 65 and over, born outside Mainland China, and in good health status who did not perceive discrimination reported lower peritraumatic distress than their counterpart groups. Furthermore, individuals who were worried about self- or family contraction reported higher distress than those who were less worried.

4. Discussion

This study aimed to examine changes in peritraumatic distress across three years of the pandemic between 2020 and 2022 and identify its associated sociodemographic and COVID-19-related risk factors. It adds a novel contribution to the current literature by tracking peritraumatic distress over the three pandemic years while controlling for other potential predictors. Specifically, peritraumatic distress increased from 2020 to 2021 or 2022, and dropped from 2021 to 2022, with a peak in 2021. Furthermore, the results also identified some endurable risk predictors for peritraumatic distress after controlling for the temporal variation over three years. In particular, the results identified age, birthplace, health status, perceived discrimination, and self- and family contraction worry as significant sociodemographic or COVID-19-related predictors for peritraumatic distress.

In the current study, it was found that the pandemic year significantly predicted peritraumatic distress after controlling for any other potential predictors. Specifically, there was an increase in the level of peritraumatic distress from 2020 (25.45) to 2021 (50.44), which was followed by a drop in 2022 (30.53). The proportion of people reporting peritraumatic distress echoed this finding with an increase from 2020 (42%) to 2021 (96%), followed by a drop in 2022 (56%). The proportion of people reporting peritraumatic distress in the

2020 sample (42%) was larger than that in a previous study [14] of Chinese living in China (35%) but lower than half of that in the countries reported in a study conducted across 13 countries [16]. The peak level of peritraumatic distress in 2021 was likely a reflection of the psychological response to the new surges of COVID-19 that appeared in late 2020/early 2021 [26]. Additionally, a series of strict public health interventions, such as mask mandate and travel restrictions, were implemented/reinforced in late 2020/early 2021 [29], which might have also contributed to the high level of peritraumatic distress among the Chinese population in 2021. Finally, vaccination was newly introduced and elicited mixed feelings of confusion, worry, fear, and excitement, which might also have contributed to the peak distress prevalence and level at that time.

The overall trend of growing peritraumatic distress between 2020 and 2022 was consistent with the findings from a national survey that showed a decrease in mental health status among a Chinese population, where the proportion reporting excellent or very good mental health status decreased from 63% in 2020 to 55% in late 2021/early 2022 [30]. Importantly, it is alarming that almost everyone tested in 2021 (96%), and over half of the sample tested in 2022 (56%), experienced moderate to severe levels of distress. The peak distress level in 2021 could also be explained by the continuously rising anti-Asian discrimination incidents from 2020 to 2021 in Canada [31], which has been identified to predict the level of psychological distress and loneliness among Chinese immigrants in Canada [5]. Furthermore, this result is consistent with the drop in the proportion of Canadians reporting a high level of life satisfaction in 2021 compared with 2020 [32]. This suggests the detrimental mental health impact of the pandemic is not only long-lasting but also widespread in this vulnerable population, possibly contingent on the unfolding of the pandemic waves and the associated social influences and public health policies/actions.

Nevertheless, it is worth noting that the distress level dropped in the final pandemic year (2022) relative to the peak level (2021), suggesting a recovery in psychological well-being towards the end of the pandemic. This provides further support for the "U-shape pattern" in mental health in the early pandemic (i.e., initial drop followed by an improvement) reported in Denmark [33] and in life satisfaction across the three pandemic years (drop in 2021 and a recovery in 2023) reported in Canada [32]. This suggests a recovery or habituation effect because people became more resistant to the negative impacts of the pandemic, gradually became more used to the situation, or both. They may have also developed effective coping strategies or built resilience to better respond to the pandemic along the way. Additionally, the pandemic severity also shifted from the worst scenario (i.e., in 2021) to a more manageable situation (in 2022), with more empirical or clinical evidence supporting vaccination. This may have released part of the distress towards the pandemic. Another possibility would be that the results might merely reflect a natural unfolding of the pandemic. If so, we would predict a linear change (i.e., a gradual decline in distress) across the three testing years, as expected with the passage of time following a traumatic event [9]. However, the current study revealed an initial increase from 2020 to 2021, followed by a drop from 2021 to 2022. This finding suggested that the results were unlikely to be merely driven by the natural unfolding of the pandemic. Although, on a positive note, it might reflect the adaptive coping process with gradual resilience-building or strategy development over the pandemic years.

Many studies found that people who had pre-existing mental and physical health conditions showed worse mental health than healthy individuals [34,35]. Earlier studies found that health status was a consistent predictor for mental health conditions with higher levels of depression, anxiety, and stress reported by those with poorer health status among Chinese residents in Canada [5–7]. Adding to that, the current study showed that health status was negatively associated with peritraumatic distress regardless of the pandemic years. Additionally, the results also identified age as a significant predictor, with lower peritraumatic distress among older than younger adults. This finding indicated that even though old adults perceived greater infection-fatality risk and were more vulnerable to the severity and mortality of COVID-19 infection [36,37], they tended to show better mental health

and less negative psychological responses to the COVID-19 pandemic [38]. One possible explanation would be that older adults developed more adaptive strategies, were more resilient, and demonstrated more positive affect in response to the pandemic [38,39]. For example, it has been reported that older adults showed a higher level of resilience relative to younger adults during the pandemic, which was found to be associated with lower levels of loneliness, perceived stress, and perceived risk associated with the COVID-19 pandemic [38].

The effects of racial discrimination on mental health among Asian populations during the COVID-19 pandemic have been well-documented [40–42]. Racial discrimination was found to be associated with a variety of mental health disorders such as depression and post-traumatic stress disorder [40]. Our earlier studies also identified perceived discrimination as a significant predictor for increased depression, anxiety, stress, and peritraumatic distress among Chinese migrants [5–7]. Adding to these previous findings, the current study showed that the prediction of the pandemic-related perceived discrimination for peritraumatic distress endured across all three pandemic years. These findings demonstrate the importance of policies and actions to address and reduce racial discrimination against the Asian population during and after the COVID-19 pandemic.

Previous studies suggested that self-contraction worry but not family contraction worry was predictive of the mental health condition of Chinese living in Canada [6,7]. Specifically, those who worried more about themselves being infected with COVID-19 reported higher levels of depression, anxiety, and stress in 2020 [7] and high levels of peritraumatic distress in 2021 [6]. However, the current finding suggested that both family contraction and self-contraction worry were predictive of peritraumatic distress across the pandemic years. This finding signified the prolonged and endurable negative impacts of COVID-19 infection fear/worry on mental health.

This study has several limitations. It does not track the same individuals over the three testing time points. However, it should be noted that this is largely due to the confidential nature of the three surveys given the ethical considerations and to encourage honest responses. Second, on a related note, the nature of the cross-sectional design prevents us from drawing any conclusions on within-individual trajectories in peritraumatic distress, and it is also subject to the cohort effect (e.g., the 2020 sample might be least distressed). Nevertheless, similar recruitment approaches were employed for all three surveys, without any systematic observed cohort bias. To a certain degree, this may minimize sample differences across the three testing years. Third, only variables included in all three surveys were included in the analysis in this study. We acknowledge that this might not capture all critical risk factors related to the pandemic. For example, the survey did not include some well-studied factors such as exposure to COVID-19-related deaths. Lastly, some important explanatory factors such as perceived discrimination were measured with a single question, which might have restricted the generalizability and reliability of these variables. Future studies may further verify the results with more comprehensive and standard measures.

Regardless, the current study provided a great understanding of the mental health condition of Chinese migrants in Canada. By tracking the temporal variation in peritraumatic distress while controlling for sociodemographic and COVID-19-related predictors, the current study shed important light on the mental health condition of vulnerable populations over time across the pandemic years. The results also identified sociodemographic and COVID-19-related risk factors across the pandemic years. The results urge the government and society to provide adequate and culturally sensitive mental health support for Asian populations during and following the COVID-19 pandemic. More importantly, despite the lifted public health measures and interventions in early 2022, the peritraumatic distress level remained higher than in the initial outbreak stage. This signals the importance of continuous post-COVID-19 mental health services and support, especially for vulnerable minority populations.

5. Conclusions

Overseas Chinese faced a variety of challenges during the COVID-19 pandemic, which put them at great risk of developing mental health issues. Previous studies have assessed mental health condition of Chinese migrants in Canada and identified associated sociodemographic and COVID-19-related risk factors, but research examining such associations on a temporal scale is limited. This study highlights the role of the year of the pandemic and identifies risk factors among Chinese migrants over the three pandemic years. The findings provide insight into understanding the long-term effects of the pandemic and can help the government and society develop proper mental health policies and intervention strategies for diverse populations in the post-pandemic era.

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