



Risk and resilience of vulnerable families in Hong Kong under the impact of COVID-19: an ecological resilience perspective

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Abstract

Purpose Hong Kong has experienced four waves of COVID-19 since the first case was confirmed in January 2020. Several studies have highlighted the psychological impacts of the outbreak in Hong Kong but have largely ignored the protective factors that contribute to resilience among vulnerable families. This study adopted an ecological resilience framework to explore the impact of this epidemic on members of families with youth with a delinquent tendency/mental health concerns and the ecological protective factors for these vulnerable families.

Methods Random sampling based on a sampling frame provided by one of the largest local social service organizations in Hong Kong led to the recruitment of 407 respondents who were interviewed using a battery of standardized questionnaires.

Results The results showed that 30.6% and 11.5% of respondents reported a moderate and a severe level of psychological distress, respectively, almost double the percentages reported in a previous study conducted in Hong Kong before the COVID-19 outbreak. Around 36.6% of respondents indicated they had encountered financial problems and almost 40% indicated aggravated financial circumstances since the outbreak. Hierarchical regression analysis revealed that financial stress was the strongest predictor of psychological distress. Structural equation modeling indicated that family support, indoor leisure activities and community resources significantly mediated the negative influence of COVID-19-related stressors on psychological distress of family members.

Conclusion Family leisure activities, family support, community spirit and mutual help within the context of social-distancing restrictions may need to be promoted to benefit vulnerable families in Hong Kong under the COVID-19 epidemic.

Keywords COVID-19 · Vulnerable families · Family support · Community resources · Ecological resilience model

Introduction

The COVID-19 epidemic has spread throughout the world since December 2019. Globally, more than 120 million people had been infected and over 2.6 million deaths were reported by the end of Feb 2020 [1], resulting in public panic and mental health stress [2–4]. In a national survey at the initial outbreak of COVID-19 in Mainland China, Hong Kong, Macau and Taiwan, over one-third of respondents experienced psychological distress [5] and over half rated their psychological distress due to the pandemic as moderate or severe [4]. In Hong Kong, three studies could be traced by February 2021 that focused on the mental health impact of COVID-19 among Chinese community residents. Community residents reported a mild level of anxiety and deterioration in mental health in the early phase, while in later phase, approximately 18–28% of the general public were suffering from anxiety, depression and PTSD [6, 7].

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While these studies mainly reported the prevalence of mental health problems in the community, none investigated the protective psychosocial factors that may buffer the adverse effects. Identification of critical protective factors may facilitate more effective interventional programs and policies. Moreover [8], given the important role of family and community factors that influence Chinese people's mental health, adopting an individual perspective may overlook the importance of family and community systems in reflecting and cultivating individuals' mental health [9]. Besides, many overseas and local studies have mainly targeted the impact of COVID-19 on the general public but have not paid much attention to examining how familial and community factors affected individual functioning, especially those living in vulnerable families. Therefore, the study reported in this paper aimed to address this gap and examined how family and community factors influenced the mental health of Hong Kong Chinese people from vulnerable families during the COVID-19 pandemic.

Vulnerable families during COVID-19

Vulnerable families, defined as families with youths exhibiting delinquent tendencies and/or psychological problems in the current study, are believed to experience more stressors than general families. Families with juvenile offenders and drug abusers are vulnerable in terms of more frequent report of mental/emotional problems and familial problems. For example, 21.4% of family members with juvenile delinquents and/or substance users were found to have mental health problems [8]. Besides, parents and partners of young substance users reported a wide range of problems, including emotional, familial, financial, and health problems [10]. This target group may be relatively much more at risk of having emotional and mental problems under the pandemic. In times of economic hardship, as it is during COVID-19, family dynamics and family functioning of vulnerable families can be adversely affected, leading to decreased family social support and family cohesiveness [11] and an increase in family conflicts [12]. Besides economic hardships, an increase in family violence may also occur in families, including the vulnerable ones, resulting in poorer family functioning [13, 14]. Lastly, families with members having addictive behaviors, such as alcohol abuse and other drug addiction, were likely to suffer from more pressure, such as family dysfunction and financial breakdown, due to possible aggravated addictive behaviors induced by the COVID-19 situation [15]. Indeed, a study of counselors of helpline service has revealed that confinement during COVID-19 had generated and/or aggravated the pre-existing family and mental health problems [16].

In Hong Kong, statistics released by the government show that Hong Kong has experienced an unprecedented unemployment rate of 6.2%, the highest for 15 years [17]. Additionally, Hong Kong residents with pre-existing adverse health conditions suffered greatly from the disruption to daily life, with co-occurring anxiety and depression [7, 18]. Lastly, admission to shelters by female victims of domestic violence over a 1-year period increased 1.7 times [19].

Despite the mounting media coverage relating to the negative stressors affecting the mental health of Hong Kong families, no research has systematically examined the extent to which certain COVID-19-related stressors are perceived to have deteriorated during the pandemic, and if these perceived changes might account for the worsening mental health of the individuals living in vulnerable families.

Conceptual framework of family and community process in mental health issues

Resilience is considered a dynamic process whereby individuals bounce back despite experiencing significant adversities or traumas [20]. A review of the literature indicates the most widely studied resilience factors are related to individual psychological characteristics, such as intelligence, ability to control impulse, high internal locus of control, planning and foresight and strong religious orientation [21]. Some scholars have argued that such a heavy focus on intrapersonal factors ignores the influence of the eco-systemic contexts of resilience [22]. Indeed, some authors counter-suggest that maintaining resilience in the midst of adversities largely depends on environmental rather than individual qualities and the resources that are available and accessible to nurture and sustain the individual concerned [23]. These authors have proposed an ecological model of resilience which consists of six subsystems nested within each other: the biosystem, microsystem, mesosystem, exosystem, macrosystem and chronosystem [23, 24].

In this study, we selected two of these subsystems as our research targets—the microsystem and exosystem—which include the individual's family and environmental subsystems. The microsystem is the family or school in which individuals face and interact with their parents, teachers, and peers daily. This is an important subsystem that significantly influences the mental well-being of an individual, particularly children and youth. The exosystem refers to the neighborhood, and the surrounding community where an individual resides. How well an individual can relate to these two subsystems and to successfully access the resources and support available in them will significantly affect their well-being [23]. In this study, we explored the importance of family support and family leisure in the microsystem and

the utilization of community resources in the exosystem in impacting the lives of family members during COVID-19. These two subsystems were chosen because: (1) empirical studies have found that the cumulative impact of individual-level factors typically accounts for less of the variance in resilience outcomes than systemic factors, such as the quality of family, school, or community [23, 25]; (2) factors in the two subsystems are most modifiable by and relevant to social welfare service systems and social welfare policy-making; (3) the two subsystems involve some of the most influential proximal and distal factors (i.e. family and the neighborhood) that impact on an individual's psychosocial development [23, 26]; and (4) the COVID-19 pandemic has led to home confinement and social isolation that have interrupted interaction between other systems (e.g. schools, peers, wider social contacts). We did not downplay the influence of individual factors that contribute to the resilience process. Rather, the social–environmental contexts during COVID-19 gave us an opportunity to examine certain factors in the microsystem and exosystem that influence an individual's resilience outcomes. Highlighting the possible contributions of protective factors in these two subsystems may assist practitioners and policy makers to design and implement effective resilience-based programs at the individual's microsystem and exosystem levels.

Microsystem level factors affecting resilience

Protective factors are resources or assets that offer protection against risks and are associated with positive outcomes [20]. Family support and leisure activities are two important protective factors at the microsystem level. As the most proximal unit where people are directly involved, a family unit and its members are important agents for enhancing resilience in people of different ages and at different stage of developments [27, 28]. When facing adversities, the family unit can potentially provide resources, such as guidance, reassurance, attachment, and integration, through sharing of common beliefs and providing relational and structural support [29]. Furthermore, it has also been suggested that family leisure activities characterized by the “time that parents and children spend together in free time or recreational activities” [30, p. 98] create a sense of rhythm within the family and develop an internal locus of confidence for managing unpredictable changes [31]. Empirical evidence supports the importance of family support and resources and family leisure for adult health outcomes. Prazeres and Santiago [32] found that male primary care patients who received higher family support reported better physical and mental health. Studies have also revealed that family leisure activities were related to perceptions of higher family functioning, such as cohesion, adaptability and family communication [33, 34].

Guided by traditional collectivist values, Chinese people embrace a higher sense of familial connectedness [35] and the norm to reciprocate in intergenerational relationships [36]. Positive family relationships may therefore be vital for Chinese people's psychological adjustment during stressful times. In the context of COVID-19, it would be useful to explore if perceptions of the availability of family support, resources, and family leisure activities enhanced family members' mental health.

Exosystem level factors affecting resilience

The utilization of community resources, as indicated by accessing resources and support in the neighborhood network, friends and public and social service agencies in the community, have been considered as important exosystem factors contributing to individual resilience and psychological well-being [23]. Walsh [37] argues that community efforts involving local agencies and residents are essential to meeting the challenges of a major disaster. For example, a study on community resilience following Typhoon Morakot in Taiwan in 2008 demonstrated that effective use and coordination of community resources and partnership between the public and private sectors, enabled affected communities to recover much more quickly than had been anticipated [38]. Indeed, some scholars have called for greater community collaboration to respond to the crisis created by COVID-19 [7, 39]. However, the role of community resources and support in response to mental health crises in the COVID-19 pandemic has not been studied. Chinese culture places particular emphasis on neighborhood support in people's daily lives, as reflected in the Chinese saying, “A good neighbor outmatches a distant relative.” [40]. Therefore, it is worth exploring whether the utilization of community resources affects the mental health outcomes of Hong Kong residents during the COVID-19 pandemic.

The present study

This study pioneered examination of factors in the individual's microsystem and exosystem that can influence the mental health of people living in vulnerable families in Hong Kong. In essence, the study aimed to explore how families of youths with delinquency and/or mental health issues might be affected by the COVID-19 pandemic in terms of social and health outcomes. Second, we aimed to identify protective factors at the family and community levels affecting the mental health of individual family members and provide policy and practical recommendations for helping these vulnerable families. We had the following hypotheses:

Hypothesis 1: Family members of youths with delinquent and/or mental health issues would report increased

levels of financial burden, mental/emotional problems, family violence and addiction behaviors under the influence of COVID-19.

Hypothesis 2: COVID-19-related stressors including financial burden, mental/emotional problems, family violence and addiction behaviors would negatively impact family members' psychological distress.

Hypothesis 3a: Protective factors from the microsystem that include family support and leisure activities would positively impact family members' psychological distress.

Hypothesis 3b: Protective factors from the exosystem that encompasses community resources, would positively impact family members' psychological distress.

Hypothesis 4a: Protective factors from the microsystem would mediate the negative effect of COVID-19-related stressors on psychological distress.

Hypothesis 4b: Protective factors from the exosystem would mediate the negative effect of COVID-19-related stressors on psychological distress.

Methodology

Procedures and respondents

We employed random sampling using a sampling frame of the registered service users of one of Hong Kong's largest social service organization, the Hong Kong Federation of Youth Groups (HKFYG) Youth Crime Prevention Center, that provides family and youth services. The Center which is composed of various units is established to serve youths with delinquent behaviors or substance abuse and their families. The sampling frame consisted of 1685 families and a systematic random sampling strategy was adopted. Every family that was receiving social services from HKFYG had a case number. Staff of the Center selected every 3rd person from the case list (e.g., 4, 7, 10, 13, 16 etc.), and contacted the selected families by telephone and obtained oral consent prior to data collection. Family members of the youths, mainly their caregivers, partners or siblings aged 18 or above, were interviewed in late-May to mid-June 2020. The Human Research Ethics Committee of The University of Hong Kong (Application No: EA2005003) approved the study. All respondents were required to be: (1) Chinese adult family members aged 18 or above; (2) able to understand Cantonese or Mandarin; and (3) permanent residents of Hong Kong. Five hundred and thirty-five subjects were contacted successfully, of whom 117 declined to take part and eleven did not meet the eligibility criteria. The final sample comprised 407 respondents.

Measurements

A battery of standardized scales was selected to create the questionnaire.

The three items on the Utilizing Social Resources (USR) subscale of the Chinese Family Resilience Assessment Scale (C-FRAS) [41] were used to evaluate the social resources that a family might solicit. Each item, such as "We ask neighbors for help and assistance", is rated on a 4-point scale (1 = strongly disagree to 4 = strongly agree). The Cronbach's α of the subscale was 0.56, indicating acceptable reliability given only three items [42].

A Family Leisure Activity checklist was developed based on the Family Leisure Activity Profile [43]. Examples of items include: "How often do you have meals with your family?" and "How often do you pursue indoor leisure activities together with your family?" Respondents were asked to rate the weekly frequency or duration on a 7-point Likert scale. In addition, respondents were also asked to compare their current leisure activity involvement with that preceding the pandemic. The Cronbach's α of the scale was 0.72, suggesting satisfactory reliability.

The 10-item Support Provision Scale (SPS) [43] was adopted and modified to evaluate family support and resources. The scale covers five dimensions: reliable alliance (practical help), guidance (informational support), attachment (emotional support), social integration (belonging to a group of similar peers), and reassurance of worth (esteem support). Items are rated on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree). A Cronbach's α of 0.75 has been reported for this scale [44], indicating adequate reliability. The Chinese version of the SPS has been used in Chinese communities by Li et al. [45]. The Cronbach's α of the SPS in this study was 0.88, indicating satisfactory reliability.

The Cantonese–Chinese version of the Kessler-6 [46] was adopted to measure respondents' mental health. The K6 comprises six questions that ask respondents to rate how often over the past month they felt: (1) nervous, (2) hopeless, (3) restless or fidgety, (4) so depressed that nothing could cheer you up, (5) that everything was an effort, and (6) worthless. The response options are: the whole 30 days, most of the time, some of the time, a little of the time, and none of the time and are, respectively, coded from 4 to 0; thus, the unweighted summary scale has a range of 0–24. Lee et al. [46] reported Cronbach's α of 0.84 for the K6. In our study, the α was 0.88.

A self-constructed mental and social health questionnaire was developed to collect information concerning family stressors aggravated by COVID-19 faced by the vulnerable families, such as mental/emotional problems health problems, financial burden, family violence and behavioral problems such as substance use. Sample items included

“Do your family members have mental health concerns?”, and “Do your family members have financial problems?” Respondents were also asked to indicate if such problems had become better, worse, or remained the same compared to pre-COVID-19 period. A score of 1 will be given if the respondents rated ‘becoming worse’.

Data analysis

Data analysis was performed using SPSS version 26. First, frequencies and descriptive statistical analysis were conducted for demographic information and the major study variables. Means and standardized deviations were calculated. Second, bivariate correlation analysis was performed primarily to examine the associations between the study variables. Third, we operationalized mental health conditions using Kessler-6 to examine the percentages of respondents reporting either moderate (i.e., score ≥ 8) or severe (i.e., score ≥ 13) psychological distress (Lee et al.) [47]. Fourth, hierarchical regression analysis was utilized to examine the relative impacts of individual COVID-19-related stressors and protective factors on psychological distress. At last, a structural equation model was fitted to examine the mediating paths of the protective factors on psychological distress. The SEM was conducted using Mplus 7, and maximum likelihood estimation was adopted to estimate the model fit. Bootstrapping analysis with 5000 resamples was performed to determine the indirect effects and associated bias-corrected (BC) Confidence Intervals of each mediational path between life stressors and psychological distress. In addition, as suggested by Leth-Steensen and Gallitto [48], the test of joint significance (TJS) was also adopted in determining the mediational effects. TJS concludes that mediational effects are proved if the individual paths making up the compound path representing the indirect effect are all significant. It is because the TJS is believed to produce more statistical power than bias-corrected bootstrapping and also yielded more reasonable Type I errors in SEM analysis.

Results

Respondents’ demographic information is presented in Table 1. The age range of the 407 respondents was 18–83 years, with a mean age of 44.53 years. Most respondents were female (73%), over half (54%) had a full-time job; most had completed secondary education (71%) and had an annual family income below 30,000 HK dollars (66.1%). Most respondents lived with their child(ren) (76.7%), the rest lived with a spouse, parent(s), grandparent(s), grandchild(ren) or sibling(s).

The percentages of respondents with moderate or severe levels of psychological distress are presented in Table 2.

Table 1 Respondents’ demographic information

Variables	N	(%)
Gender		
Female	297	73.0
Male	110	27.0
Age	18–83	
Mean (SD)	44.53 (10.28)	
Employment		
Full time	222	54.5
Part time	53	13.0
Housekeeper	83	20.4
Unemployed	21	5.2
Retired	15	3.7
Student	12	2.9
Other	1	0.2
Family income (HK\$)		
10,000 below	67	16.5
10,001–20,000	106	26.0
20,001–30,000	96	23.6
30,001–40,000	72	17.7
40,001–50,000	35	8.6
50,001 or above	31	7.6
Education		
Primary or below	56	13.8
Form 1–Form 3	142	34.9
Form 4–Form 6	147	36.1
Hong Kong Diploma of Secondary Education Examination	8	2.0
Associate degree/diploma	13	3.2
Degree or above	41	10.1
Residence		
Hong Kong Island	14	3.4
Kowloon	102	25.1
New Territories	287	70.5
Others	4	1.0
Family members living together		
Children	312	76.7
Parents	82	20.1
Grandchildren	22	5.4
Grandparents	9	2.2
Spouse	194	47.7
Siblings	46	11.3

Table 2 Proportions of people with normal, moderate and severe levels of psychological distress

Levels of psychological distress	N	%
Normal level	235	57.9
Moderate level	125	30.6
Severe level	47	11.5
Mean value	6.90	

Respondents reported a moderate (30.6%) or severe (11.5%) level of psychological distress under the influence of COVID-19. The social and health impact of COVID-19 is presented in Table 3. First, 36.6% indicated they had financial problems and almost 40% indicated more aggravated financial conditions since the start of the pandemic. Second, 24.4% of respondents reported family members had mental/emotional problems, and 21.5% reported more aggravated mental/emotional problems among their family members, during the COVID-19 outbreak. Lastly, around 21.5% reported that a family member had addiction problems during COVID-19 and 15.4% reflected a deterioration since the start of the pandemic. Though we only identified around 4% of families reporting domestic violence, more than half (53%) of these families reported aggravating conditions of domestic violence.

Means and standardized deviations of the major variables are presented in Table 4. Correlational analysis yielded preliminary results on the relationships between the stressors, protective factors and the outcome variables. As expected, three of the four more aggravated life stressors experienced due to COVID-19, namely more aggravated mental/emotional problems ($r=0.163$, $p<0.01$), family violence ($r=0.150$, $p<0.01$) and financial burden ($r=0.237$, $p<0.01$), were correlated with higher psychological distress. In contrast, protective factors, such as family support ($r=-0.332$, $p<0.01$) and community resources and networks ($r=-0.223$, $p<0.01$), were significantly related to lower psychological distress.

The results of the hierarchical regression analysis are presented in Table 5. With regard to COVID-19 stressors, more aggravated financial burden was the strongest predictor of psychological distress ($\beta=0.172$, $p<0.001$), whereas family members' more aggravated mental health problems ($\beta=0.093$, $p=0.083$) and family violence ($\beta=0.095$, $p=0.067$) were marginally predictive of psychological distress in the second step. When protective factors were entered, they became insignificant, indicating possible mediating effects of the protective factors. Concerning protective factors, respondents who reported higher family support ($\beta=-0.284$, $p<0.001$) and more community resources and support ($\beta=-0.147$, $p<0.01$) were more likely to report lower psychological distress. Furthermore, respondents who engaged in more outdoor activities were marginally more

likely to have lower psychological distress ($\beta=-0.080$, $p=0.088$). The four COVID-19-related life stressors accounted for 7.1% of variances of psychological distress, while protective factors from family level and community level accounted for additional 9.5% and 2%, respectively. And the total model has explained 21% of the variances in COVID-19-related psychological distress.

The path diagram of the SEM is presented in Fig. 1. Demographic variables of age, gender, education attainment and family income were controlled in the model. Results indicated three mediational paths of protective factors. First, family support significantly mediated the negative effect of COVID-19 stressors on psychological distress ($\beta=0.063$, $p=0.004$, 95% CI [0.022, 0.115]). Second, indoor activities and family support jointly ($\beta=0.028$, $p=0.062$, 95% CI [-0.002, 0.058]) mediated the negative effect of COVID-19 stressors on psychological distress. Moreover, community resources significantly mediated the negative effect of COVID-19 stressors on psychological distress ($\beta=0.020$, $p=0.058$, 95% CI [-0.001, 0.040]). Although the latter two indirect effects were marginally statistically significant in the bootstrapping analysis, the mediational effects can be supported based on the TJS approach as every individual path making up the indirect effects were significant [48]. The model fit was satisfactory (Chi-square = 346.35, $df=169$, RMSEA = 0.052, 90% CI [0.045, 0.060], CFI = 0.926, TLI = 0.913, SRMR = 0.056).

Discussion

This study is the first to adopt a social ecological perspective in examining protective factors that predict resilience among Chinese families with youths with delinquency/mental health issues. This group of vulnerable families may be dually affected by the COVID-19 pandemic, and the results highlight aggravated mental and social risk factors since the COVID-19 outbreak. On the other hand, family support, outdoor-based and indoor-based family leisure activities and soliciting community resources are significant protective factors that contribute to better mental health among this vulnerable group.

Hypothesis 1 concerning aggravated social and health conditions was partially supported. Using the Kessler-6 as

Table 3 Proportions of people suffering from COVID-19-related stressors

COVID-19 related stressors	% reporting having the stressor (%)	% reporting having more aggravating on the stressor during COVID-19 (%)
Financial problems	36.6	38.3
Mental/emotional problems	24.4	21.5
Addiction problems	21.5	15.4
Domestic violence	3.8	3.8

Table 4 Means, standardized deviations (SDs) and correlations of variables

	Mean	SD	More aggravated mental/emotional	More aggravated family violence	More aggravated addiction behaviours	More aggravated financial burden	Family support	Outdoor activities	Indoor activities	Community resources
More aggravated mental/emotional problems	0.21	0.41								
More aggravated family violence	0.04	0.19	0.189**							
More aggravated addiction behaviours	0.15	0.36	0.379**	0.282**						
More aggravated financial burden	0.37	0.48	0.193**	0.123*	0.139**					
Family support	29.65	4.28	-0.097	-0.165**	-0.123*	-0.125*				
Outdoor activities	1.81	0.61	0.078	0.017	0.039	-0.090	-0.087			
Indoor activities	6.80	1.40	0.208**	0.093	0.069	0.077	0.109*	0.109*		
Community resources	8.17	1.62	-0.152**	-0.055	-0.018	-0.049	0.213**	-0.077	-0.058	
Psychological distress	6.90	1.52	0.163**	0.150**	0.083	0.237**	-0.332**	-0.044	0.083	-0.223**

* $p < 0.05$, ** $p < 0.01$

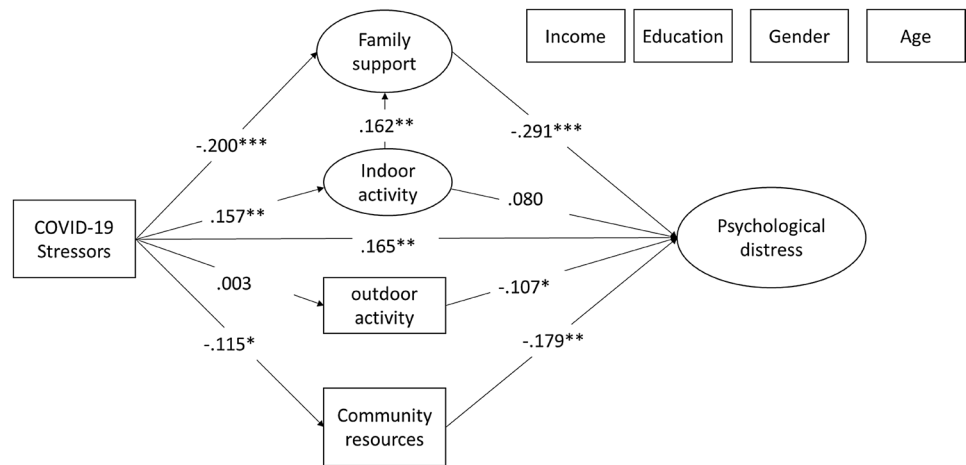
measurement, our study demonstrated an elevated trend of mental health problems during the pandemic among these families, in which about one-third (30.6%) and more than one-tenth (11.5%) of respondents reported moderate or severe levels of psychological distress, respectively. These percentages are almost doubling those reported in Lee et al.'s [47] study (i.e., 19.7% and 6.1%, respectively). In addition, more respondents (11.5%) in our study reported possible severe mental illness than among Caucasians (8.2%), Hispanics (9.3%), African Americans (10.3%) and Asian Americans (6.0%), as reported by Prochaska et al. [49, 44]. Furthermore, when compared to Lau [7] and Choi [6]'s studies, a significant higher percentage of people living in vulnerable families reported psychological distress during the COVID-19 epidemic. Moreover, the study explicitly highlighted financial burden as a major stressor during this period since around 37% of respondents indicated they had financial problems and about 40% of respondents reported worsening financial difficulties since the start of the pandemic. These worsening social and mental health problems may reflect that vulnerable families indeed are doubly influenced by COVID-19-related stressors. In the mid of the pandemic, there are continuing uncertainties about the viability of many businesses, for example, those in catering, tourism and retail businesses. Vulnerable families with low socioeconomic statuses are particularly hard-hit because they are usually more commonly employed in those businesses. Indeed, in the past year, there has been increases in the closure of many businesses leading to massive unemployment, overseas and locally. Such devastating financial and psychological circumstances may have jointly posed additional significant stresses and strains on family functioning of this group of vulnerable families. In addition, there have been reports on the increases in family conflicts and domestic violence, both in Hong Kong and elsewhere [50, 51]. Such worsening family circumstances invariably affect the mental health of individual family members.

Hypothesis 2 concerning the influence of COVID-19-related stressors was partially supported. As expected, financial burden was the strongest negative influence on family members' psychological distress. Family violence and mental/emotional problems were marginally negatively impacting on psychological distress. Other studies echo the fact that people from vulnerable families who experience worsened financial difficulties and addictive problems are more likely to suffer from psychological distress [52, 53]. Therefore, combined the findings we have generated from the testing of Hypothesis 1 and 2, Hong Kong Chinese people from vulnerable families may have suffered from more from the COVID-19-related stressors than general families. What is worse, these stressors are making devastated influences on psychological distress of family members. Thus, there is a strong need to identify protective factors that can

Table 5 Hierarchical regression analysis of risk and protective factors on psychological distress under the influence of COVID-19

Variables	Step 1	Step 2	Step 3	Step 4
Demographic information				
Gender	-0.073	-0.061	-0.078	-0.081
Education	0.108*	0.066	0.040	0.037
Age	0.089 [†]	0.051	0.041	0.039
Income	-0.083	-0.051	-0.029	-0.045
Life stressors due to COVID-19				
More aggravated/emotional problems		0.093 [†]	0.072	0.053
More aggravated family violence		0.095 [†]	0.071	0.068
More aggravated addiction behaviors		-0.018	-0.037	-0.030
More aggravated financial pressure		0.211***	0.177***	0.172***
Family level				
Family support			-0.315***	-0.284***
Indoor activity			0.086 [†]	0.080
Outdoor activity			-0.073	-0.080 [†]
Community level				
Community resources				-0.147**
<i>R</i> square	0.023 [†]	0.094***	0.190***	0.209**
<i>R</i> square change		0.071***	0.095***	0.020**
<i>F</i> change	2.255	7.574	14.939	9.438

[†] $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Fig. 1 Structural equation model of the pathway of ecological resilience model

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

either directly or indirectly compensate the negative effects of these stressors.

Hypothesis 3a about microsystem factors, namely family support and family leisure activities as protective factors of psychological distress among people from vulnerable families, was supported. First, family support positively contributed to family members' mental health. This finding is consistent with previous studies indicating that family cohesion, integration, closeness and relationship (i.e. family functioning) are important protective resources for individual mental health during stressful situations, such as earthquakes [54] and health-related epidemics (i.e., SARS

and COVID-19) [55]. Second, outdoor family leisure activities, such as sports and going to theme parks, were found to contribute to individuals' mental health. The COVID-19 pandemic has created significant challenges for families and society as social-distancing rules have restricted the number of people who may gather together in public areas. During this period, families may need to explore possible ways of engaging in appropriate outdoor activities under such regulations. The process by which family members negotiate, process and adapt to new experiences can contribute to family adaptability to challenges, family cohesion and family relationship as a whole. Moreover, the simple

fact that family can enjoy outdoor activities together would enhance the family relationships, and consequently, leading to better individual mental health among family members. In this study, Hypothesis 3b that people who solicited more community resources and support reported less psychological distress, is also supported. Our results echo previous studies which found that community social capital protects against disaster-related distress [59, 60]. Indeed, as asserted by Walsh [56], mutual support and collective resources can promote family resilience. Formal and informal services in a community can facilitate family functioning in terms of (1) resource pooling, (2) family sociability, (3) service augmentation, (4) normative accord, and (5) kin monitoring [57]. A recent study on community resources for families suggests that parents who received social support during the COVID-19 hardship had been protected against decrements in family functioning [58].

As tested in a SEM model, Hypothesis 4a regarding microsystem protective factors mediating the negative impact of the COVID-19-related stressors is partially supported. Family support was found to be the strongest mediator of the negative influences of COVID-19-related stressors on psychological distress. The results imply that even though the families are negatively influenced by life stressors, support, such as alliance, feelings of belongingness, guidance and reassurance of personal worthiness provided by family members, is important family factor that can facilitate family members' positive adaptation in the face of stressful situations [29]. It is suggested that family members with the common belief of "being in it together", can collectively share difficult feelings, maintain connectedness despite heightened family stress. Regarding family leisure activities, our findings suggest that it exerted an indirect protective effect through improving family support, which then led to better family functioning. Essentially, everyday low-cost leisure activities can provide a safe and positive context in which family relationships can be enhanced and feelings of family connectedness and integration to be increased. In turn, this may contribute to better psychological health [59]. In the case of vulnerable families with double jeopardies (i.e. pre-existing social and health difficulties and COVID-19 issues), these two positive family-level factors may assume more important functions because families with delinquent youths have poorer parent–child attachment and bonding [60], and may suffer from relationship conflicts, parenting disparities, and child neglect [61]. Strategies that can promote family leisure activities and enhance family integration may help these families to build up individual and family resilience.

Hypothesis 4b that "exosystem protective factor that encompassed community resources and network would significantly mediate negative effects of COVID-19-related stressors on psychological distress" was supported. According to Putnam and Feldstein [62], social capital is defined

as "social networks, norms of reciprocity, mutual assistance, and trustworthiness" (p. 2). Community networks, resources and support are important elements of social capital that are conducive to human resilience, especially in stressful and challenging situations, such as natural disasters or traumatic incidence [55]. During the SARS epidemic, in a Chinese community in Canada, community activities and utilization of community resources, such as a hotline, health promotional materials and dissemination of SARS-related information, had made a positive psychological impact on individual functioning [61]. Ungar [63] argues that social support, shared values, and instrumental support for daily tasks like childcare, public safety and food distribution, are social capital that predicts successful recovery following devastating life events.

Chui [64] mentions that Hong Kong has experienced diminished community cohesion characterized by profound loosening neighborliness and alienation due to economic, political and cultural changes. Such diminished sense of cohesion and increased sense of alienation have been more prominent during the pandemic because of social-distancing and social withdrawal [65]. Therefore, the results of this study point to a stronger need to advocate for mutual help and integration, strengthen social capital, and establish community-level social network support, especially in stressful contexts and for vulnerable families in need of social service support. What is at stake is the issue, on the one hand, of enhancing community integration and mutual support, and on the other hand, maintaining a necessary level of social distancing to successfully avoid spreading the disease. Community mutual help and support initiatives are found everywhere (e.g. foodbanks, and tele-support for isolated and vulnerable individuals) and governments should encourage expansion of such community spirit to enable more people to benefit from them. Indeed, such actions would be psychologically enhancing to individuals by encouraging a positive contributory spirit and thus fostering better mental health of individuals in the community.

Implications

This study has several important practical implications for enhancing resilience among people from vulnerable families facing this public health crisis in Hong Kong.

First, the role of a family system in supporting individuals in adapting to crisis has been established. To facilitate family integration (i.e. sense of belonging and connectedness and outdoor leisure activities) and to uphold social distancing, programs and strategies may need to be creatively designed and accessed through the internet or telephone. For example, a strength-based online program, Families Tackling Tough Times Together, has been developed and implemented in the

US to promote sharing among family members of a positive and hopeful outlook on stressful events, to make meaning of adversity, to enhance connectedness, and to openly express emotions [66]. In Hong Kong, Integrated Family Service Centres (IFSCs) provide community-based family services, including family counseling, parent–child activities, and out-reaching services for vulnerable families [67]. In addition, the Hong Kong Jockey Club has funded several large-scale projects to enhance the resilience of families in Hong Kong through training family social workers with advanced clinical skills in delivering emotional resilience for families and to develop innovative family resilience programs.

Second, the findings of this study also highlight the need to reinforce the development and use of social capitals, including encouraging mutual help within neighborhoods and building social networks within the community. Community organizations may develop coordinated services and programs to promote social capital [63]. For example, in the United Kingdom, voluntary community aid groups was initiated to support neighbors who are self-isolating [68]. In Germany, a community-based mental health support program, Coping with Corona: Extended Psychosomatic care in Essen (CoPE), was established as part of the community emergency action plan [69]. The Hong Kong Council of Social Service, the main coordinating body of social services in Hong Kong, has been actively facilitating and coordinating over 300 NGOs to provide services and support to the needy individuals and families in their neighborhoods at during the pandemic [70]. For example, targeting the elderlies in the community, one social service organization named Fu Shin Community Asset Networks for Aging in Place has encouraged volunteers to form a network in the neighborhood and attend to the needs of the local elderlies [71]. These initiatives can hopefully induce a sense of mutual support, trust and reciprocity among community members and facilitate access to social services that will be conducive to the mental health and resilience of families in Hong Kong and elsewhere.

Limitations and suggestions for future studies

The study is not without limitations. First, the study is cross-sectional, thus unable to establish causal relationships. We found in the current study that family social and health stressors induced by COVID-19 negatively impacted on community and family support, which in turn led to psychological distress. It is also possible that individual psychological conditions influenced the interpersonal relationship with families and friends, which induced the family conflicts and individual addictive behaviors [72]. Longitudinal studies in the future are advocated to provide more evidence in

understanding the mental health of vulnerable families under the pandemic and identify causal protective factors that can help vulnerable families to withstand stressful situations. Second, the sample only consists of family members of youth with delinquency/mental health issues, thus the results may not be generated to other groups of vulnerable families. Furthermore, the data were only collected in Hong Kong, thus may not be generated to Chinese people in other parts of the world. Further studies may be needed to explore other vulnerable groups of families among different Chinese communities to acquire more information concerning Chinese vulnerable families. Last but not least, as the main objective of the current study was to explore how families of youths with delinquency/mental health issues functions during the pandemic, we did not explicitly explore the characteristics of the youth-at-risk in the family. Future studies may further look at how the youth-at-risk adapt to the current stressful situation, which will help picture the psychological and behavioral impact of COVID-19 on vulnerable youths in Hong Kong.

Declarations

Conflict of interest Daniel F. K. Wong, Xiaoyu Zhuang, Yin Yim Lau, Wilson Man Ho Chan and Bob Siu Chui Lee declared no financial conflict of interest.

Ethical approval Ethics approval was sought and granted by the Human Research Ethics Committee, the University of Hong Kong (No. EA2005003).

Consent to participate Oral consent was obtained from the participating subjects before the data collection.

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