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Impact of multi-dimensional precarity on rough sleeping: Evidence from Hong Kong

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ABSTRACT

While there is a body of literature on the explanation of homelessness in Western contexts, rough sleeping is understudied in non-Western societies. Based on a multi-dimensional precarity framework, this quantitative study employed data from the largest study of the homeless population in Hong Kong in 2021, comparing the rough and non-rough sleepers. Descriptive statistics and logistic regressions were used to investigate the association between rough sleeping, economic, housing, and health precarity. The results showed that lack of employment, food insecurity, and the incidence of chronic diseases were less risky for sleeping rough, compared with non-rough sleeping. Moreover, the analysis suggests that unemployment, mental health issues, repeated homelessness, and the lack of relationships with social work professionals appear to be the risk factors. This paper makes three significant contributions. First, it conceptually expands the conceptualization of rough sleeping and homelessness in relation to varying dimensions of precarity, formulating a framework connecting structural forces and individual experiences. Second, it extends the empirical findings of rough sleeping to a non-Western context. Third, it informs a multi-faceted intervention approach to rough sleeping by addressing the multi-dimensional precarity.

1. Introduction

Informed by the emerging concepts of housing-related precarity (Clair et al., 2019; DeLuca & Rosen, 2022), this article connects the understanding of rough sleeping to multi-dimensional precarity in people's everyday life in a Chinese context. While there is a growing debate over the individual and structural causation of homelessness in the Western contexts (Batterham, 2019; Bramley & Fitzpatrick, 2018; Somerville, 2013), little is known about the forces contributing to the situations of homelessness or rough sleeping in the Asian societies. Additionally, recent literature suggests that the understanding of homelessness should be expanded to different levels of housing exclusion (Organisation for Economic Co-operation and Development (OECD), 2021; Olsen & Benjaminsen, 2018), such as rooflessness, houselessness, inadequate housing, insecure housing, and social isolation. It is suggested that the definitions of homelessness are context-dependent, in which the social meanings of home and homelessness vary across social settings (Kellett & Moore, 2003; Tipple & Speak, 2005), for example, different standards of adequate housing used in urban and rural areas. A set of criteria could be applied to investigate the dimensions of homelessness used by government officials and non-governmental organisations, including lifestyle, security of tenure, locality, quality of housing, and welfare entitlements. Speak (2013) highlights political, economic, and social values, alongside related policy approaches and cultural norms, as the causes of homelessness in the Global South contexts, which are continually overlooked in the Western-based literature. Walters and Gaillard (2014) also emphasise the contextualization and multiplicity of homelessness that constructs homeless people's vulunerability in different social circumstances, such as the risks resulting from hazards and eviction. Regardless of the varying definitions and typologies, sleeping rough is generally classified as the most extreme form of homelessness due to the absence of shelter (Busch-Geertsema et al., 2016), i.e., bed down in the open air or places not suitable for habitation, lacking private space and legal right to live anywhere (Aldridge, 2020; Bretherton & Pleace, 2018; OECD, 2021). Considering the context of better policymaking, it is of vital importance

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to investigate the risk factors of rough sleeping.

2. Previous studies on sleeping rough as an extreme form of homelessness

The notion of sleeping rough differs from the broader sense of lifetime homelessness (Chamberlain & Johnson, 2015), where it is considered to be the absence of a relatively stable home, the presence of a home but could not live in it, or the need to temporarily stay at hostels, homes of relatives or friends. While official census data is known to continuously underestimate the number of both short-term and chronic homeless, the latter is positively correlated to street sleeping. The literature emphasises the salience of sleeping rough among other forms of homelessness (Box et al., 2022, pp. 1–16; Maguire, 2017), in which rooflessness is commonly E those with continued experiences of housing insecurity. Overall, the needs and considerations of rough sleepers are complicated (Bowpitt, 2020), some of them include resource constraints and negative risk perceptions, which are yet to be fully addressed in varying contexts and require closer attention (Clair et al., 2019).

The discussion here about the causation of homelessness offers some insight to understand the patterns of rough sleeping. In an attempt to explain the multi-causal relations of and pathways to homelessness, Somerville (2013) argued that it is central to situate a specific set of risk factors, or the individual experiences, within the structural contexts. The research on the risks and the mechanisms leading to homelessness cannot be independent of unpacking the 'causal power' (Batterham, 2019), based on the risks' relative importance in producing homelessness. Therefore, the account of rough sleeping should examine risk factors as the micro or macro determinants, and conceptualise mechanisms as the causal processes; at-risk of rough sleeping means people who have a higher likelihood of becoming rough sleepers as they are susceptible to more than one of the risk factors.

However, some criticise that micro-level risks such as individual attributes tend to be over-represented in the current literature (Bramley & Fitzpatrick, 2018; Somerville, 2013), with the danger of individualising the complex origins of different forms of homelessness. While individual characteristics *per se* are not known to directly result in homelessness, social contexts matter in the way that some groups marked by particular characteristics are 'more socially and economically disadvantaged than the rest of the population' (Batterham, 2019, p. 3).

Regarding the risk factors of chronic and extreme forms of homelessness, generally, five dimensions are identified in the Western contexts (Batterham, 2019; Bowpitt, 2020; Box et al., 2022, pp. 1–16; Bramley & Fitzpatrick, 2018; Maguire, 2017). First, housing market conditions could reinforce housing unaffordability, especially in the private rental market. Second, the labor market and economic resources are also the key drivers of street sleeping, including poverty, unemployment, income precarity, and limited access to relevant social services, for example, health and temporary housing. Third, past experiences of homelessness may sustain discrimination and stigma perceived by rough sleepers. Fourth, interpersonal relationship issues and the loss of family connections or community networks will undermine people's relational resources and social support that prevent rough sleeping. Finally, poor health and well-being may create additional financial pressures and specific housing needs based on their ailments that potentially contribute to homelessness.

Bramley and Fitzpatrick (2018) contend that the risks of homelessness, even rough sleeping, are not randomly distributed in society. A critical approach to homelessness studies should be aimed to figure out the risk and protective factors as the tendencies and countervailing forces mediating the odds of homelessness across social groups and within the homeless population. A more dynamic understanding of homelessness requires situating the individual correlates, for example, behavior and experiences, in the social structures. Hence, risks should not be identified as purely necessary or sufficient conditions for sleeping rough but also as the factors that may increase individuals' likelihood of experiencing extreme homelessness, which appears as the hypothesis to be tested to achieve more contextual knowledge (Batterham, 2019; Clair et al., 2019).

3. A multi-dimensional precarity approach to rough sleeping

The concept of 'multiple exclusion homelessness' has been receiving increased attention to measure the patterns and intensity of homeless experiences in relation to the multiplicity of deep social exclusion (England et al., 2022; Fitzpatrick et al., 2011; Pattison & McCarthy, 2022). Sleeping rough, as overlapping adverse life experiences, is associated with drug abuse, street drinking, and institutional care, reflecting the complex needs and vulnerabilities of homeless people (Dobson, 2019). However, the overemphasis on individual characteristics of homelessness, for example, behavior and health conditions, constantly overlooks the structural causes of homelessness and the interaction between individual and structural determinants (Bramley & Fitzpatrick, 2018). Arguably, studies on homelessness need to investigate the patterns of homeless people's insecurities (Daher-Nashif, 2022), which are individually experienced and structurally shaped.

Informed by the concept of 'multiple exclusion homelessness' and 'precarity' in housing and homelessness studies, this article adopts a multi-dimensional precarity approach to examining the risk factors associated with rough sleeping based on a set of uncertainties in different life aspects (Clair et al., 2019; Lombard, 2021, pp. 1–19; Richardson, 2018). Instead of focusing on individual attributes, rough sleepers are assumed to be exposed to a set of events involving uncertainty and unpredictability, resulting from the institutional arrangements (Clair et al., 2019). As such, the levels and forms of precarity signal the positions of social groups, displaying the structure-agency dynamics of homelessness (Lombard, 2021, pp. 1–19). Overall, the intersectional nature of homelessness-related precarities is associated with precarious housing, economic resources, health, and social relationships (Hoolachan et al., 2017).

Economic precarity, such as insecure material and financial resources, for example, unstable employment and incomes, could lead to homelessness (DeLuca & Rosen, 2022). Therefore, labor market insecurity is associated with precarious housing for unemployed persons (Bobek et al., 2021; Jones et al., 2020). Desmond and Gershenson (2016) further emphasise the interaction between the loss of a job and home, revealing both the working poor and unemployed may also experience housing insecurity and homelessness.

Housing precarity as a risk factor of homelessness entails the likelihood of housing experiences related to instability, unaffordability, poor quality of the house, inadequate access to services, and eviction (Beer et al., 2016; Richardson, 2018). In Europe, housing precarity tends to impact young, unemployed, and unpartnered tenants, with poor self-reported health and lower educational attainment (Clair et al., 2019). As a combined individual and structural risk, housing precarity is characterised by residential uncertainty, for example, forced move or displacement, caused by gentrification and housing market conditions (DeLuca & Rosen, 2022). A cycle of rough sleeping appears as a form of repeated homelessness, resulting from self-perpetuating housing precarity (Batterham, 2019; Maguire, 2017).

Health precarity as an associate of sleeping rough (Aldridge, 2020), is represented both in the sense of a risk factor and impact. Precarious health conditions refer to the vulnerabilities and the loss of control over health-related issues, with increasing exposure to illness and death (Daher-Nashif, 2022). Women who are rough sleepers are more likely to have worse health and a greater need for healthcare services (Box et al., 2022, pp. 1–16). As the social determinants of health and homelessness are somehow intertwined (Maguire, 2017; Stafford & Wood, 2017), it is also central to map out how health precarity may impact rough sleeping.

The final dimension of precarity with regard to rough sleeping is social relationships. As social connections and contacts could serve as a buffer for homeless experiences (Bramley & Fitzpatrick, 2018), the

availability of social networks and support is a primary protective factor of homelessness, in addition to the presence of a partner or living in a multi-adult household. More specifically, family relations could be seen as close social ties (DeLuca & Rosen, 2022), while weak social ties include social and community support from the local service organisations that mediate and mitigate chronic homelessness (Ecker & Aubry, 2016; Johnstone et al., 2016; Tabner, 2010). For example, it is suggested that community networks and social services could reshape the social norms and belief systems of homeless people (Cummings et al., 2022). As such, relational precarity pertains to the lack of or insecure social relationships with family and community that shapes the availability of both informal and formal housing support.

Based on the multi-dimensional precarity framework, this study investigates varying precarious experiences' impact on rough sleeping in Hong Kong.

4. Homelessness and housing issues in the Hong Kong context

While there is extensive literature on housing issues in relation to poverty, well-being, and affordability in Hong Kong (Chan et al., 2022; Chan & Wong, 2020), the research on homelessness is surprisingly limited. Chan (2022) suggests that Hong Kong is a global city where unaffordable housing is a deep-rooted social problem. The housing factors, including housing costs, housing quality, and housing satisfaction, mediate low-income families' subjective well-being, especially for private renters living in informal housing (Chan & Wong, 2022; Zhu & Holden, 2023). Gou et al. (2018) also contend that the housing environment appears to be the most central determinant of the poor's quality of life in Hong Kong, in which better locality and private space are considered their most pressing needs. Households living in sub-divided units tend to have a lower income elasticity of housing demand (Leung et al., 2022), downsizing and downgrading the housing facilities to limit the rents. Also, living density is positively associated with the incidence of anxiety and stress (Chan et al., 2021), leading to worse mental health. More recently, Hong Kong's housing issues have been attenuated by the new urban developmentalism centered on economic financialisation and private property-led redevelopment (Ip, 2018), along with the promotion of private homeownership by the neoliberal housing policies (Yip, 2014). In other words, low-income families in Hong Kong are structurally challenged by the dilemma between adequate and affordable housing, with higher risks of housing and economic insecurity.

Against this background, Hong Kong's homelessness, arguably, is the result of housing insecurity and social exclusion experienced by the most underprivileged group (Kennett & Mizuuchi, 2010). Homeless people in Hong Kong are more likely to experience poverty and mental health issues (Legislative Council Secretariat, 2021; Yim & Leung, 2021). Kwok and Chan (1998) condemn the individualistic explanation of homelessness from the Hong Kong government in terms of lifestyle and attitudes; their evidence demonstrates that unfavorable financial position and high rent are the drivers of homelessness and continual rough sleeping in Hong Kong. More recently, it has been suggested that the inability to pay high rental costs, the lack of affordable accommodation, and the poor relationship with family or tenants could lead to homelessness (Social Welfare Department, 2021). Kornatowski and Wong (2017) revealed that almost half of the homeless population are rough sleepers, in which the distinction between rough and non-rough sleepers was relatively clearer than in the Western contexts, with less mobility between rough and shelter sleeping. Given the strict eligibility of shelter services, strong monitoring of usage, and limited places of shelter services, it was less likely for the sleepers to freely shift between the street and the shelter. Most rough sleepers were either waiting for the shelter or refusing the accommodation. The estimated number of street sleepers, as per the statistics by the Social Welfare Department (SWD) and updated by social workers in service units, tripled from 7 in 2011/12 to 21 at the eTd-2020 per 100 000 population in Hong Kong (Legislative Council Secretariat, 2021). However, community service support is far behind the growing needs, despite the resurgence of homelessness after the global financial crisis in 2008. Due to the structural barriers, most homeless people are involuntarily sleeping rough without adequate support.

Accordingly, homelessness in Hong Kong is yet to be addressed by policy intervention, and the question about the associates of experiencing rough sleeping remains unanswered. This calls for a more detailed investigation of the risk factors of rough sleeping in Hong Kong under the lens of precarities, which could also inform homelessness studies in similar social contexts.

5. Method

5.1. Data and sample

The project "Hong Kong Homeless Census 2021" ('Homeless Census 2021') was the largest survey examining the homeless people's condition and characteristics in Hong Kong, which provided the data for this study. The survey covered rough sleepers on the street and also non-rough-sleeping homeless people living in temporary shelters, short-term hostels, and guesthouses. The shelter sleepers are referred by social workers or after having applied to the shelters with the status of street sleeping. The survey was conducted by academic institutions and NGOs, and the data was gathered between the late evening (7 p.m.) of July 9 and the early morning (3 a.m.) of July 10, 2021. Training session for interviewers was co-organised by universities and NGOs, and more than 300 volunteers from NGOs, universities and higher institutions participated. The hotspots of homeless, which were the areas with the highest concentrations of homeless people, were identified by the NGOs and experienced social workers who served homeless people for many years. The social workers organised the interviewers' routes to visit various hotspots. One route was assigned to a team of two to three interviewers and one to two team leaders. More than 360 hotspots for homeless persons in various Hong Kong districts were covered under the survey. During the time that data was being collected, it aims to contact every homeless person in Hong Kong. If a crew discovered any empty beds with no occupants, they returned three times to the same spot. Informed consent was obtained from all respondents to complete the questionnaire. A total of 1532 homeless people were identified, and 1103 of them were willing to be interviewed. 65.2% of homeless individuals completed the questionnaire which accounts for 719 respondents. Meanwhile, considering the quality of responses, 711 questionnaires were valid for data analysis.

5.2. Measurement

5.2.1. Demographic variables

The demographic characteristics of the respondents were collected in the survey and used in the analysis, including sex, age, education level, marital status, and ethnicity.

5.2.2. Economic insecurity

For understanding the role of economic insecurity, the survey has explored the current employment and food security status of the respondents. The question of whether the respondents were working or not was asked. They answered in the form of 'yes' or 'no' to the question. Two questions from the Food Insecurity Experience Scale (FIES) (Cafiero et al., 2018) were asked to collect information on the food insecurity experience of the respondents. The two questions are, 'Was there a time when you were worried you would not have enough food to eat because of a lack of money or other resources?' and 'Was there a time when you had to skip a meal because there were not enough money or other resources to get food during the past 12 months'? The answers include 'yes', 'no', and 'I do not know'. Those who answered 'yes' to each question were counted as encountering one item of food insecurity.

5.2.3. Health insecurity

The survey examined the physical and mental health of respondents. For physical health, the respondents were asked whether they are suffering from chronic diseases requiring regular treatment. The answers included 'yes' or 'no'. For mental health, the short version of the Patient Health Questionnaire (PHQ), PHQ-2, was employed. PHQ-2 consists of the first two items of PHQ-9, which is a full assessment scale for depression. The stem question is 'Over the last two weeks, how often have you been bothered by any of the following problems?'. The two items of PHQ-2 are 'Little interest or pleasure in doing things' and 'Feeling down, depressed or hopeless'. Each item scores on a Likert scale from 0 (not at all), 1 (several days), 2 (more than half the days), to 3 (nearly every day), with total scores ranging from 0 to 6. The PHQ measurement was validated as having high sensitivity in detecting major depression. PHQ-2 scores larger or equal to 3 are recommended to identify a major depressive disorder (Löwe et al., 2005, 2010). The Chinese versions of PHQ-2 have been validated in the previous study in Chinese society (Yu et al., 2011).

5.2.4. Housing insecurity

Two questions were used to assess housing insecurity, repeat homelessness, and housing as the cause of homelessness. The questionnaire explored whether the homeless people were homeless for the first time or more than once. The respondents who answered more than one time were counted as repeat homelessness. Another question asked about their reported causes of homelessness. Housing-related reasons included expensive rent, being evicted by the landlord, previous accommodation being demolished, being too crowded, conditions too poor, or infested by fleas. Examples of other reasons included health problems, problems with family, and discharge from prison. Those respondents reported housing-related reasons were counted as "housing as the cause of homeless".

5.2.5. Relational insecurity

Two questions were asked to examine the social relationship among respondents. Questions were asked whether they have regular contact with family and friends (i.e., contact at least once a month) and contact with social workers or social service agencies. The respondents answers included either 'yes' or 'no' for each question.

6. Results

6.1. Descriptive results

As shown in Table 1, among the homeless respondents, 435 are rough sleepers, while 268 are non-rough sleepers. Participants aged from 18 to 39, 40 to 59, and above 60 accounted for 8.2%, 45.6%, and 46.2%, respectively. A one-way ANOVA analysis revealed a statistically significant age difference between rough sleepers and non-rough sleepers ($F(1, 686) = 10.23$, $p = .001$). Concerning educational levels, homeless people who received an education in primary school or below comprised 35.1%, and those educated in secondary school and tertiary education or above accounted for 56.5% and 8.3%, respectively. In the non-rough sleepers' group, 77% of people had either secondary school or a higher degree, while only 56.2% of people had secondary school or a higher degree in the rough sleepers' group. An analysis of variance showed that the effect of the type of homeless people on the educational level was significant, $F(1, 665) = 32.71$, $p < .001$.

In terms of current employment status, 75.3% and 58.1% of people were unemployed in the group of rough sleepers and non-rough sleepers, respectively. There was a statistically significant difference between the two groups ($F(1, 698) = 23.53$, $p < .001$). Concerning food insecurity, 50.2% of non-rough sleepers and 36.5% of rough sleepers reported two items of food insecurity. A one-way measure ANOVA was conducted to compare the effect of the types of homeless people on food insecurity ($F(1, 660) = 12.91$, $p < .001$). Regarding physical health, 33.9.% of rough sleepers were found to have chronic diseases. Meanwhile, the percentage of non-rough sleepers who suffered from chronic diseases was slightly higher at 47.0%. There was a statistically significant difference between the two groups ($F(1, 690) = 12.14$, $p = .001$). As for the repeat homelessness situation, most of the people living in the shelter instead of rough sleeping were homeless for the first time, comprising 74.8%. Repeat homeless people accounted for 56.9% of the group of rough sleepers. The groups between rough sleepers and non-rough sleepers were significantly different ($F(1, 677) = 22.58$, $p < .001$). A total of 53.2% of rough sleepers and 39.8% of non-rough sleepers reported that they lacked contact with their families and friends ($F(1, 690) = 12.03$, $p = .001$). A total of 61.8% of rough sleepers and 90.7% of non-rough sleepers reported that they were willing to contact NGOs and social workers. The groups between rough sleepers and non-rough sleepers were significantly different ($F(1, 687) = 77.63$, $p < .001$).

Table 1
Demographic, socioeconomic information, and physical condition of respondents.

	Overall		Rough Sleepers		Non-rough sleepers		p-value
	N	%	N	%	N	%	
Sex							
Male	594	83.8	372	85.5	218	81.3	.144
Female	114	16.1	63	14.5	50	18.7	
Age							
18–39	57	8.2	22	5.2	34	12.7	.001
40–59	316	45.6	191	45.5	142	46.3	
≥60	320	46.2	207	49.3	110	41.0	
Median	58						
Education							
Primary School or below	236	35.1	176	43.8	59	22.3	.000
Secondary School	380	56.5	201	50.0	176	66.4	
Tertiary Education or above	56	8.3	25	6.2	30	11.3	
Marital Status							
Married	118	17.6	75	18.6	43	16.3	.451
Single/Widowed/ Separated/Divorced	554	82.4	329	81.4	221	83.7	
Ethnicity							
Chinese	641	91.3	394	91.2	245	92.5	.563
Non-Chinese	61	8.7	38	8.8	20	7.5	
Current Employment Status							
Working	219	31.6	106	24.7	113	41.9	.000
Not working	486	68.4	324	75.3	157	58.1	
Food Insecurity (Worried about not having enough food to eat, and having to skip a meal)							
0 item	249	37.4	167	42.1	81	30.6	.000
1 item	136	20.4	85	21.4	51	19.2	
2 items	281	42.2	145	36.5	133	50.2	
Chronic Diseases							
Yes	272	39.0	143	33.9	127	47.0	.001
No	425	61.0	279	66.1	143	53.0	
Mental Health							
PHQ-2 score ≥ 3 (major depressive disorder)	192	28.7	118	29.9	72	26.8	.385
PHQ-2 score <3	477	71.3	277	70.1	197	73.2	
Re-homeless							
Yes	247	36.1	183	43.1	64	25.2	.000
No	437	63.9	242	56.9	190	74.8	
Housing as cause of homeless							
Yes	397	55.8	259	59.4	135	50.0	.014
No	314	44.2	177	40.6	135	50.0	
Contact with families and friends							
Yes	364	51.2	198	46.8	162	60.2	.001
No	333	47.8	225	53.2	107	39.8	
Contact with NGOs and social workers							
Yes	507	73.2	259	61.8	245	90.7	.000
No	186	26.8	160	38.2	25	9.3	

6.2. Logistic regression models

Logistic regression analysis was performed to examine the influence of various independent variables on the homeless situation. The dependent variable is the homeless situation, whereas rough sleeping is counted as '1' and non-rough sleeping count as '0' in the logistic regression analysis. In the univariate model, age, educational level, economic insecurity, health insecurity, housing insecurity, and relational insecurity were significantly associated with the homeless situation. Multivariate logistic regression was employed in Models 1 to 5. The adjusted odds ratios (OR) and the 95% confidence interval (CI) are shown in Table 2. In Model 1, age and educational level showed significant effects on the risks of being rough sleepers. Compared to people from 18 to 41 years old, those aged 41 to 59 (OR 2.35, CI: 1.25–4.40) and aged 60 or above (OR 2.33, 95% CI: 1.21–4.51) had more than twice the chances to be rough sleepers. Participants studied in secondary school (OR 0.42, 95% CI: 0.29–0.63) or tertiary school (OR 0.32, 95% CI: 0.16–0.62) showed significant and lower possibilities to become rough sleepers, compared with those primarily educated.

In Model 2, current employment status and food insecurity were included and have been shown to impact on risks of being rough sleepers. For current employment status, homeless people who were not working were used as the reference group. Compared with unemployed respondents, those having jobs had lower chances of being rough sleepers (OR 0.48, CI: 0.34–0.70). Respondents with no food insecurity were considered a reference group. Homeless people who had two items of food insecurity showed a lower risk of being rough sleepers (OR 0.48, CI: 0.33–0.72). In Model 3, for physical health, homeless people who did not have chronic diseases were used as a reference group. Respondents who suffered from chronic diseases showed a weaker association with being rough sleepers than those who did not (OR 0.47, CI: 0.32–0.68). Regarding mental health, people whose PHQ-2 score smaller than 3 were a reference group. Those who had depression were nearly 1.8 times more likely to be rough sleepers than those with healthy mental conditions (OR 1.78, CI: 1.18–2.70). In Model 4, people who were being homeless for the first time were used as a reference group. Repeat homeless respondents are twice more likely to be rough sleepers compared with those being homeless people the first time (adjusted OR 2.20, 95% CI [1.47–3.29]). Housing as a cause of homeless showed an insignificant effect on rough sleepers.

In Model 5, all independent variables were used in the multivariate model. For demographic variables, age and education showed significant effects on the risks of being rough sleepers. Compared with 18 to 40-year-old respondents, those aged 41 to 59 were relatively more likely

Table 2
Logistic Regression Models (DV: rough sleeping).

Variables	Univariate model Crude OR	Model 1 Adjusted OR	Model 2 Adjusted OR	Model 3 Adjusted OR	Model 4 Adjusted OR	Model 5 Adjusted OR
Demographic and socioeconomic						
Gender (ref: male)						
- Female	0.74(0.49–1.11)	0.81(0.53–1.26)	0.74(0.46–1.17)	0.76(0.47–1.23)	0.94(0.56–1.57)	0.93(0.52–1.66)
Age (ref: 18 to 40)						
- 41 to 59	2.38(1.33–4.26)**	2.35(1.25–4.40)**	2.09(1.09–4.03)*	2.19(1.12–4.30)*	2.19(1.09–4.40)*	2.49(1.15–5.37)*
- ≥ 60	2.91(1.62–5.22)***	2.33(1.21–4.51)*	1.70(0.85–3.42)	1.89(0.92–3.88)	1.87(0.89–3.94)	2.23(0.98–5.09)
Education (ref: Primary School or below)						
- Secondary School	0.38(0.27–0.55)***	0.42(0.29–0.63)***	0.44(0.29–0.66)***	0.39(0.26–0.60)***	0.43(0.28–0.67)***	0.48(0.30–0.77)**
- Tertiary Education or above	0.28(0.15–0.51)***	0.32(0.16–0.62)**	0.28(0.14–0.56)***	0.23(0.11–0.48)***	0.28(0.13–0.60)**	0.32(0.14–0.72)**
Marital Status (ref: Married/cohabit)						
- Single/separated/divorced/widowed	0.85(0.57–1.29)	0.93(0.60–1.43)	0.87(0.55–1.35)	0.85(0.53–1.34)	0.79(0.49–1.28)	0.73(0.42–1.25)
Ethnicity (ref: Chinese)						
- Non-Chinese	1.18(0.67–2.08)	1.65(0.86–3.17)	1.48(0.75–2.89)	1.39(0.69–2.78)	1.24(0.61–2.50)	1.45(0.67–3.12)
Economic Precarity						
Current Employment Status (ref: Not working)						
- Working	0.46(0.33–0.63)***		0.48(0.34–0.70)***	0.46(0.31–0.67)***	0.44(0.30–0.66)***	0.40(0.26–0.63)***
Food Insecurity (ref: No food insecurity)						
−1 item of food insecurity	0.80(0.52–1.25)		0.72(0.45–1.17)	0.71(0.44–1.16)	0.66(0.40–1.09)	0.74(0.44–1.27)
−2 items of food insecurity	0.53(0.37–0.74)***		0.48(0.33–0.72)***	0.48(0.31–0.72)***	0.45(0.29–0.68)***	0.44(0.27–0.69)***
Health Precarity						
Chronic Diseases (ref: No)						
- Yes	0.58(0.42–0.79)***			0.47(0.32–0.68)***	0.43(0.29–0.64)***	0.50(0.33–0.76)**
Depression (ref: PHQ-2 score <3)						
- PHQ-2 score ≥ 3	1.17(0.83–1.65)			1.78(1.18–2.70)**	1.70(1.10–2.61)*	1.75(1.10–2.79)*
Housing Precarity						
Repeat homelessness (ref: No)						
- Yes	2.25(1.60–3.16)***				2.20(1.47–3.29)***	2.63(1.71–4.04)***
Housing as cause of homeless (ref: No)						
- Yes	1.46(1.08–1.99)*				1.23(0.85–1.78)	1.32(0.89–1.97)
Relational Precarity						
Contact with families and friends (ref: No)						
- Yes	0.58(0.43–0.79)***					0.67(0.45–1.01)
Contact with NGOs and social workers (ref: No)						
- Yes	0.17(0.11–0.26)***					0.12(0.07–0.21)***

Note. Significant level, Odd ratio (OR) and 95% confidence interval (CI). Model 1 = demographic factors; Model 2 = Model 1+ economic precarity factors; Model 3 = Model 2 + health precarity factors; Model 4 = Model 3+ housing precarity factors; Model 5 = Model 4+ relational precarity factors. *p < .05, **p < .01, ***p < .001.

to be rough sleepers (OR 2.49, CI: 1.15–5.37), whereas those aged 60 or above did not have an association with being rough sleepers. The effect of the educational level was found to be critical with a large effect in all models. For economic insecurity, people having jobs (OR 0.40, CI: 0.26–0.63) and those who had two items of food insecurity (OR 0.44, CI: 0.27–0.69) had a lower association with being rough sleepers. In terms of health insecurity, respondents who had chronic diseases showed half of the chance to be rough sleepers compared with those who did not suffer from chronic diseases (OR 0.50, CI: 0.33–0.76). Meanwhile, depressed homeless people had more association with risks of being rough sleepers (OR 1.75, CI: 1.10–2.79). Regarding housing insecurity, repeat homeless people showed a significant and higher risk of being rough sleepers (OR 2.63, CI: 1.71–4.04). For relational insecurity, people who did not have contact with NGOs and social workers were a reference group. Homeless people who were willing to contact NGOs and social workers had a small chance to be rough sleepers (OR 0.12, CI: 0.07–0.21).

7. Discussion

Based on the multiple precarity framework, this study suggests that some economic, housing, health, and relational precarity appear as the key risk factors of sleeping rough compared with non-rough sleeping in Hong Kong, apart from the demographic characteristics of middle-old age and lower educational level of the study subjects. First, for the economic precarities, employment insecurity is evidenced as the critical risk factor of rough sleeping. Unemployment or a broader concept of employment precarity continually exists as a significant risk factor for sleeping rough (Bobek et al., 2021; DeLuca & Rosen, 2022; Jones et al., 2020). As this one is a cross-sectional study and the factor of labor market condition is somehow controlled, it is believed that the labor market institutions are stratified, and precarious workers are more likely to encounter rough sleeping (Kwok & Chan, 1998; Social Welfare Department, 2021). On the other hand, food insecurity is assumed to be positively correlated to sleeping rough. Yet the findings reveal that experiencing two aspects of food insecurity, i.e., perceived and objective food inadequacy tends to have a lower risk of rough sleeping. This result may reflect the dilemma faced by homeless people, who either pay the cost of informal housing but sacrifice their food security or sleep rough associated with less likelihood of hunger. Thus, two forms of economic precarity function in different ways. These findings add value that food insecurity, as a form of economic precarity, could reveal the dynamics of rough sleeping and homeless experiences.

Second, health precarities also demonstrate varying impacts on rough sleeping. People with poor and unstable mental health tend to experience higher risks of rough sleeping. This may be attributed to their severe challenges in interacting efficiently with neighbors or family members in everyday life (Yim & Leung, 2021). Meanwhile, compared to mental health issues, physical health issues and chronic illness may be more socially acceptable and visible in Hong Kong's cultural context, and it is relatively feasible to be addressed through the existing social and medical services. In other words, the current healthcare and housing systems are more suited to catering to the needs of physical health than mental health. Consequently, hostels and other transitional housing services may be more accessible for homeless people with chronic health problems, thereby preventing the odds of rough sleeping. The result indicates how health precarities could contribute to homelessness and rough sleeping differently (Aldridge, 2020).

Third, housing precarities display some impressive results among those sleeping rough. On the one hand, repeated homelessness could predict the possibility of sleeping rough than that first-time homeless people. This marks the gradual transition from inadequate housing to rooflessness over the spectrum of homelessness. Echoing the homelessness literature, rough sleeping is a product of accumulated disadvantages in securing adequate housing over time (Batterham, 2019; Maguire, 2017). On the other hand, other adverse housing experiences are only significant in the univariate model but not in models 4 and 5 after considering other covariates. In other words, housing precarities have a less significant impact on rough sleeping, among others. Arguably, high rents, eviction, demolished accommodation, overcrowding, or infestation are widely confronting most tenants and homeless people in Hong Kong, not only rough sleepers. Together they formulate the risks of homelessness in general. This may present a different picture from the Western cases that housing insecurity significantly contributes to homelessness and rough sleeping (Beer et al., 2016; Richardson, 2018.

Fourth, relational precarities cast more mixed results. Contact with family and friends, NGOs, and social workers is a protective factor against rough sleeping. Nevertheless, after considering other factors of precarity, with regard to contact with families and friends, it seems that the association is similar between rough and non-rough sleepers. Hence, the findings unveil the relative significance of varying relational precarities. While family relations, the close social ties (DeLuca & Rosen, 2022), may shape the general outcome of homelessness and appear to be a less significant protective factor, relationships with social work professionals emerge as a relatively stronger protective factor in preventing rough sleeping (Ecker & Aubry, 2016; Johnstone et al., 2016; Tabner, 2010).

Finally, the result suggests that respondents aged 41 to 59 are more likely to sleep rough, compared to the other age groups. One possible explanation is that this age group may hold stronger expectations to leave their parents over a housing career in Hong Kong (Xian & Forrest, 2020). However, their access to public housing is substantially limited by the current eligibility system, with limited quota to the non-elderly singletons, thereby undermining their housing security and affordability. As such, this specific category of older middle-aged group is overlooked by the existing welfare and housing systems. Moreover, educational level is strongly associated with Income levels in Hong Kong, which could predict people's job-and-income insecurity, leading to negative effects in all circumstances.

Overall, the multi-dimensional precarity framework initiated by this study makes three significant contributions to the studies on homelessness and rough sleeping. First, it conceptually links the risks experienced by individuals due to the current institutional arrangements. As the findings suggested, the multiplicity of precarity impacts the risks of rough sleeping in relation to the distribution of economic resources and opportunities, continual suffering from homelessness, unstable mental health issues, and formal community support. Second, this research empirically expands the investigation of rough sleeping to a non-Western and economically advanced context. The findings could inform the understanding of homelessness in both the Global North and South. Third, inspired by the evidence from Hong Kong, specific implications for policy intervention and service provision could be drawn.

As a set of risk and protective factors have been identified, policymakers should introduce multi-faceted support (Bowpitt, 2020; Dobson, 2019; England et al., 2022; Fitzpatrick et al., 2011; Pattison & McCarthy, 2022) to homeless people and rough sleepers challenged by inadequate housing. First, employment support could be incorporated into the homeless services with a supplementary role to mediate the employment precarity. Work-integrated social enterprises could also provide more decent workplaces and job opportunities for rough sleepers. Also, food assistance may target non-rough sleepers as they may risk stronger food insecurity. This approach may assist rough sleepers to increase their disposable incomes for paying rent.

Furthermore, community healthcare and homeless services should pay more attention and increase their sensitivity to mental health issues, as the latter is not evident enough for service providers and thus the high recorded rate of lack of treatment (Yim & Leung, 2021). More outreach social work and healthcare services are needed. Given that rough sleeping could be cushioned by protective factors for upstream intervention, it is central to prevent rough sleeping by helping homeless people residing in hostels and informal housing. Additionally, hostel services and community support should be strengthened by lengthening

the accommodation period and offering more diverse emergency shelters. Lastly, the government should review the housing policy, particularly regarding the supply and eligibility of public rental housing, and the quota and point system for non-elderly one-person applicants. Sustainable supply of affordable housing is crucial for housing the urban poor (Akinwande & Hui, 2022). More and better transitional or community housing could be taken as a buffer for homeless people's pressing needs for affordable and adequate housing.

Despite these contributions, there are several research limitations of this study calling for further studies in the future. First, the investigation of risk factors could not fully detail the mechanism through which how homeless people are driven into rough sleeping. Therefore, qualitative evidence about rough sleepers' lived experiences and meaning-making is needed for a deeper understanding. Second, this single case quantitative study only entails the cross-sectional data from Hong Kong, while the changes in rough sleeping over time and differences across social contexts could be captured by further longitudinal and comparative analysis. Finally, because of feasibility constraints, the variables used in this study are somewhat limited to make the survey workable and understandable to the respondents. More variables, especially other forms of precarity, should be incorporated into further studies.

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Ethical consideration

Informed consent was obtained from each respondent in the survey.

Author statement

Siu-Ming CHAN: Conceptualization, Methodology, Formal analysis; Hung WONG: Conceptualization, Supervision, Project administration; Tat-Chor AU-YEUNG: Conceptualization, Writing, Original draft preparation, Validation; Shen-Nan LI: Writing, Reviewing and editing, Visualization.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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