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Predicting poor mental health among older Syrian refugees in Lebanon during the COVID-19 pandemic: a nested cross-sectional study

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ABSTRACT

Introduction The COVID-19 pandemic has worsened pre-existing vulnerabilities among older Syrian refugees in Lebanon, potentially impacting their mental health. The study aims to describe the evolution of poor mental health over time and to develop and internally validate a prediction model for poor mental health among older Syrian refugees in Lebanon.

Methods This prognostic study used cross-sectional data from a multiwave telephone survey in Lebanon. It was conducted among all Syrian refugees aged 50 years or older from households that received assistance from a humanitarian organisation. Data were collected between 22 September 2020 and 20 January 2021. Poor mental health was defined as a Mental Health Inventory-5 score of 60 or less. The predictors were identified using backwards stepwise logistic regression. The model was internally validated using bootstrapping. The calibration of the model was presented using the calibration slope (C-slope), and the discrimination was presented using the optimised adjusted C-statistic.

Results There were 3229 participants (median age=56 years (IQR=53–62)) and 47.5% were female. The prevalence of poor mental health was 76.7%. Predictors for poor mental health were younger age, food insecurity, water insecurity, lack of legal residency documentation, irregular employment, higher intensity of bodily pain, having debt and having chronic illnesses. The final model demonstrated good discriminative ability (C-statistic: 0.69 (95% CI 0.67 to 0.72)) and calibration (C-slope 0.93 (95%CI 0.82 to 1.07)).

Conclusion Mental health predictors were related to basic needs, rights and financial barriers. These allow humanitarian organisations to identify high-risk individuals, organise interventions and address root causes to boost resilience and well-being among older Syrian refugees in Lebanon.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Few previous prognostic models on mental health for Syrian refugees have been developed exclusively among participants at high risk of poor mental health. Older adults were under-represented in these studies, which had small sample sizes and focused primarily on inter-relational factors. None were developed during the COVID-19 pandemic.

WHAT THIS STUDY ADDS

⇒ The study found that most older refugees had poor mental health. Among older Syrian refugees, younger age, food insecurity, water insecurity, lack of legal residency documentation, irregular employment, higher intensity of bodily pain, debt and having multiple chronic illnesses were predictors of poor mental health.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The study underscores the importance of addressing mental health issues in older Syrian refugees by involving humanitarian sectors beyond health, such as food assistance, water, sanitation and hygiene (WASH) and legal assistance programmes.

INTRODUCTION

Forcibly displaced populations are at an increased risk of mental health problems, and these outcomes have been shown to be worse among refugees who had temporary shelter or lacked access to economic opportunities.[1] Moreover, the pandemic generated an additional set of challenges for refugees, including difficulties in adhering to preventive measures due to overcrowding, limited access to information and healthcare services; they also faced job loss and discrimination, as the host community perceived refugees as a potential source of communicable diseases transmission.[2 3] These combined stressors may have led to a deterioration in the mental health of refugees.[3]

Lebanon hosts the highest number of refugees per capita including approximately

1.5 million Syrian refugees (831 053 registered with the United Nations High Commissioner for Refugees [UNHCR]) and 11 238 refugees of other nationalities.[4 5] The prevalence of moderate to severe depression symptoms among Syrian adults was 22%,[6] which is higher than the depression rate among the host population (9.9%).[7] This figure is likely to have increased due to the co-occurrence of an economic crisis and political instability, which further reduced governmental social protection and mental health services for Syrian refugees.[8]

Furthermore, older adults were at a higher risk of experiencing the deleterious psychosocial effects of the COVID-19 pandemic.[9] A study among older adults showed increased levels of depression and loneliness during the COVID-19 pandemic compared with before the outbreak.[10] This may be explained by social isolation, lack of social support and fear of infection.[3 10]

In this context, prediction models have the ability to identify those at high risk of experiencing poor mental health and inform humanitarian programming. To date, previous prognostic models on Syrian refugees have been developed only among very specific subgroups such as widowed women,[11] those with diagnosed post-traumatic stress disorder[12] or those who experienced ambiguous loss[13] and are not generalisable to older Syrian refugees. As well, none of these studies were developed during the COVID-19 pandemic.[11–13] This study aims to develop and internally validate a prediction model for poor mental health among older Syrian refugees in Lebanon.

METHODS

Study design and setting

This study used cross-sectional data from a five-wave study that aimed to examine the vulnerabilities of older Syrian refugees living in Lebanon during the COVID-19 pandemic. This study was reported following the Transparent Reporting of a Multivariable Prediction Model for Individual Prognosis or Diagnosis (TRIPOD) reporting guideline[14] and Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)[15] reporting guideline.

Sampling and study population

Using a list of beneficiaries of a humanitarian non-governmental organisation (NGO) (Norwegian Refugee Council) from 2017 to 2020, all Syrian refugee households with at least one adult aged 50 years or older were invited to participate (n=17 384). If there was more than one eligible participant in a household, one participant was randomly chosen. Verbal informed consent was obtained from all participants and the data were collected via telephone interviews. Participants aged 65 years or older underwent a capacity assessment to consent before participation.[16] The study population included participants who had complete responses for the mental health outcome measure in the first two waves of the study (September 2020–January 2021).

Data sources

The questionnaire for each wave was developed using a combination of sources, including validated questionnaire modules, contextually specific questions and community-identified priorities. The survey tool was cocreated by academics, humanitarian actors, local government officials and focal points from the refugee communities. It was created in English and translated into Arabic. Modules varied between the waves. The Arabic-language questionnaire was piloted internally with data collectors and local community focal points to ensure face validity. Trained data collectors administered the surveys in Arabic and entered data into structured electronic data collection forms hosted on KoboToolbox. Data entry checks and monitoring were performed for quality assurance throughout data collection. More details about the development of the survey tool have been previously described.[17] For the present study, demographic characteristics and the mental health variables were extracted from wave 1 (22 September 2020–21 December 2020) and data related to chronic conditions, regularisation and violence were extracted from wave 2 (23 October 2020–20 January 2021).

Outcome measure

The primary outcome was poor mental health, which was assessed using the Mental Health Inventory-5 (MHI-5), a subscale of the 36-item Short Form Survey. The MHI-5 is considered as a measure of individuals' psychological well-being and distress. It includes five items assessing the frequency of depressive and anxiety symptoms (being nervous, feeling blue and down), as well as positive signs of mental health (feeling calm and being happy), during the past month. Each item is rated on a 6-point scale, which was summed to produce a total score ranging from 5 to 30, with low values indicative of poor mental health. The MHI-5 had excellent reliability in this population (Cronbach's alpha=0.82). The total score was transformed using a linear transformation according to standard methods into a score ranging between 0 and 100.[18] A score of 60 or less, a widely used cut-off point,[18] indicated poor mental health.

Candidate predictors

The following possible predictors were included in the full model: sex (male/female), age (measured in years), education (never attended school/elementary/preparatory or above), marital status (partnered including married and engaged/unpartnered including single, divorced and widowed), living arrangement (living alone/with others), having unmet waste management needs (no/yes), number of self-reported chronic illnesses (none/one/two or more), intensity of bodily pain measured on a scale from 1 (no pain) to 6 (very severe pain), housing eviction notice (received/did not receive), household water insecurity (measured using the short-form Household Water Insecurity Scale: water secure (<4)/water insecure (≥4)),[19] household food

insecurity (measured using the Food Insecurity Experience Scale: food secure (0–3)/food insecure (4–6)/severely food insecure (7–8)),[20] regular employment (if they engaged in paid, regular work in the last 7 days), having received humanitarian cash assistance (yes/no), having received other kind of assistance (yes/no), having debt (yes/no), self-reported experience of any kind of physical abuse or violence inside or outside home (did not report/reported), self-reported experience of any kind of verbal abuse or violence inside or outside home (did not report/reported), residence inside or outside informal tented settlements (ITS) and having regularised residency documentation (regularised/not regularised). Regularisation of legal residency status documentation allows refugees to legally remain in Lebanon.

Missing data

Missing data in item responses were negligible (all variables had <5% missing). Missing responses were assumed to be missing at random and a complete case analysis was used.

Statistical analyses

Absolute frequencies, proportions and unadjusted logistic regression models with ORs and 95% CIs were presented. The odds of having poor mental health for each candidate predictor were first examined using bivariate analyses.

The candidate predictors for mental health outcomes were included in a full multivariable logistic regression model. A stepwise backwards method (P<0.157) was used to remove variables, leaving the model with the best set of predictors for the outcome.[21 22] The C-statistic (area under the curve) was used to assess discrimination in the final model. A C-statistic value of 1 shows perfect discrimination between individuals who had a poor mental health outcome and those who did not; while a value closer to 0.5 indicates poor discriminative ability.

Calibration plots of the final model were presented. Calibration indicates agreement between the observed and expected outcomes (predictive probabilities) in a model. The plots were created using ten risk groups (grouped based on predictive probabilities). The plots show the mean observed proportion of events against each group's mean predicted risk of the outcome. Perfect calibration is shown by an intercept of 0 and a slope of 1. Calibration-in-the-large (CITL) was used to evaluate the difference between the actual number of individuals with poor mental health and the average predictive risk of this outcome.

The predictors, discrimination and calibration-slope estimates of the final model were internally validated, using bootstrapping techniques with replacement, where 500 bootstrap samples were used. This generated optimism estimates, an optimism-adjusted C-statistic, an optimism-adjusted CITL and an optimism-adjusted calibration plot. Beta coefficients of the final model were modified using bootstrap shrinkage (multiplying the optimism-adjusted C-slope by the beta coefficients), and ORs were presented. All statistical analyses were undertaken using Stata V.17.

RESULTS

Out of 3838 participants who were eligible and consented to participate, 3322 completed both waves 1 and 2; of those, 3229 participants had available data on their mental health status (figure 1). The median age of the study sample was 56 years (IQR=53–62); 47.5% were female, 98.1% lived with others, 70.7% had a partner, 3.1% reported physical abuse and 10.9% reported verbal abuse, 92.7% were in debt, 69.8% received cash assistance, 20.1% received other assistance, 29.6% had received an eviction notice and 47.8% did not report experiencing bodily pain. Most of the participants did not have regularised legal residency documentation (75.8%) and lived outside ITS (61.2%). Additionally, 43.7% had multiple chronic illnesses and 48.4% had not previously attended school. Only 1.9% were regularly employed, 44.8% had experienced severe household food insecurity and 30.7% lived in water-insecure households. Most participants had MHI-5 score ≤60 (76.7%) (table 1). The frequencies and percentages of each item are presented in online supplemental table 1.

Unadjusted ORs of having an MHI-5 score ≤60 are presented for each potential predictor. Characteristics associated with increased odds of having an MHI-5 score ≤60 included being unpartnered compared with partnered (OR 1.21; 95% CI 1.01 to 1.45), being food insecure (OR 2.18; 95% CI 1.65 to 2.87) or severely food insecure compared with being food secure (OR 3.70; 95% CI 2.78 to 4.92), being water insecure compared with being water secure (OR 1.84; 95% CI 1.52 to 2.24), having two or more chronic illnesses compared with none (OR 1.70; 95% CI 1.40 to 2.06), receiving an eviction notice compared with not receiving one (OR 2.03; 95% CI 1.66 to 2.48), being in debt compared with having no debt (OR 2.11; 95% CI 1.59 to 2.78), reporting verbal abuse (OR 1.60; 95% CI 1.20 to 2.15) compared with not reporting it, not having regularised legal residency documentation (OR 1.26; 95% CI 1.04 to 1.51) compared with having regularised status and having no work or irregular work compared with having regular work (OR 3.89; 95% CI 2.33 to 6.50). Additionally, the participants showed a progressive increase in the likelihood of having an MHI-5 score ≤60 with experiencing higher intensity of bodily pain compared with not experiencing it, with OR ranging from 1.87 (95% CI 1.26 to 2.77) for very mild pain to 5.48 (95% CI 3.38 to 8.87) for very severe pain (table 1).

The final prediction model for poor mental health (MHI-5 score ≤60) retained eight predictors: age, household food insecurity, household water insecurity, employment status, having debt, legal residency documentation, intensity of bodily pain and number of chronic conditions (table 2). After adjustment for optimism, the final model had a C-statistic of 0.69 (95% CI 0.67 to 0.72),

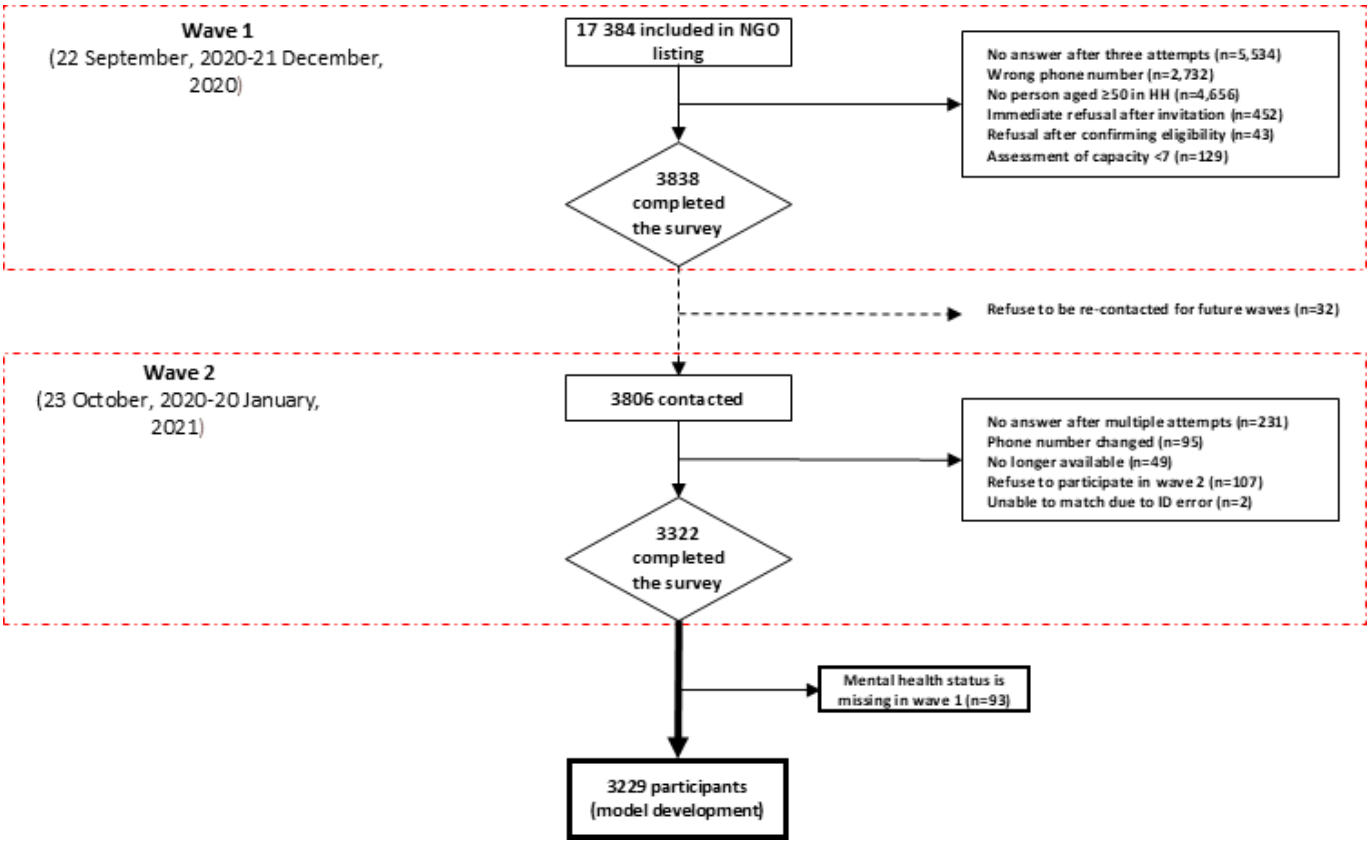

Figure 1 Flow diagram of Syrian refugees included in the study population. HH, household; NGO, non-governmental organisation.

which showed good discriminative ability, and a calibration slope of 0.93 (95% CI 0.82 to 1.07) as well as CITL of −0.003 (95% CI −0.08 to 0.09), indicating a good calibration (figure 2). The calibration plot of the apparent model before correction for optimism is shown in online supplemental figure 1. The ORs along with their 95% CI are presented in table 2.

In the final model, coefficients of predictors indicated the expected directions of association with the outcome. Household food and water insecurity, younger age, higher intensity of bodily pain, having multiple chronic illnesses, having no work or irregular work, having debt and not having regularised legal residency documentation increase the likelihood of having an MHI-5 score ≤60 (table 2).

To demonstrate the model, the predicted probability of having an MHI-5 score ≤60 (poor mental health), for a 60-year-old Syrian refugee who was not engaging in regular work, had debt, experienced household water insecurity and severe household food insecurity, lacked legal residency documentation, suffered from very severe bodily pain and had multiple chronic illnesses was approximately 95%. Meanwhile, a person who was 60 years old, engaging in regular work, not having debt, water secure, food secure, with legal residency documentation and not suffering from bodily pain or chronic illnesses had a predicted probability of having an MHI-5 score ≤60 (poor mental health) at 19%.

DISCUSSION

This study showed that poor mental health among older Syrian refugees was very common during the COVID-19 pandemic in Lebanon. We developed a predictive model of poor mental health that included younger age, household food insecurity, household water insecurity, lack of legal residency documentation, irregular employment, higher intensity of bodily pain, having debt and having multiple chronic illnesses. This research provides insight into specific socioecological vulnerabilities faced by older Syrian refugees (online supplemental figure 2).

Older Syrian refugees in Lebanon faced distress and had depressive and anxiety symptoms during the pandemic, as shown by the MHI-5 items; this finding is similar to the results of the previous surveys.[3 10] Experiencing daily stressors could have a significant negative impact on mental health[3] as refugees faced distressing circumstances compounded by social adversity, the economic crisis and the pandemic.[1 2] Syrian refugees have referred to environmental and structural stressors as the main cause of their emotional distress, which they considered as a normal collective result of pressure accumulation.[23] These factors are not necessarily recognised by all mental health service providers, though some do recognise that referral to mental health services is sometimes premature considering basic needs are not being sufficiently addressed.[23]

Table 1 Characteristics of older Syrian refugees and their associations with mental health status (wave 1)

			Mental health status		
		Total (n=3229)	Good n=752 (23.3%)	Poor n=2477 (76.7%)	
		n (%)	n (%)	n (%)	Unadjusted OR (95% CI)*
Age (years)	(Median (Q1–Q3))	3229 (56 (53–62))	752 (57 (53–63))	2477 (56 (53–62))	0.98 (0.97 to 1.00)
Sex	Female	1533 (47.5)	328 (21.4)	1205 (78.6)	1
	Male	1696 (52.5)	424 (25.0)	1272 (75.0)	0.82 (0.69 to 0.96)
Marital status	Partnered	2283 (70.7)	554 (24.3)	1729 (75.7)	1
	Unpartnered	946 (29.3)	198 (20.9)	748 (79.1)	1.21 (1.01 to 1.45)
Residence	Inside informal tented settlements	1254 (38.8)	295 (23.5)	959 (76.5)	1
	Outside informal tented settlements	1975 (61.2)	457 (23.1)	1518 (76.9)	1.02 (0.86 to 1.21)
Living arrangement	With others	3169 (98.1)	741 (23.4)	2428 (76.6)	1
	Alone	60 (1.9)	11 (18.3)	49 (81.7)	1.36 (0.70 to 2.63)
Education	Never attended school	1558 (48.4)	355 (22.8)	1203 (77.2)	1
	Elementary	840 (26.1)	196 (23.3)	644 (76.7)	0.97 (0.80 to 1.18)
	Preparatory+	824 (25.6)	199 (24.2)	625 (75.8)	0.93 (0.76 to 1.13)
	Missing	7	2	5	
No. of chronic illnesses	None	977 (31.0)	282 (28.9)	695 (71.1)	1
	One	795 (25.2)	196 (24.7)	599 (75.3)	1.24 (1.00 to 1.53)
	Two or more	1377 (43.7)	265 (19.2)	1112 (80.8)	1.70 (1.40 to 2.06)
	Missing	80	9	71	
Intensity of bodily pain	None	1543 (47.8)	523 (33.9)	1020 (66.1)	1
	Very mild	158 (4.9)	34 (21.5)	124 (78.5)	1.87 (1.26 to 2.77)
	Mild	377 (11.7)	70 (18.6)	307 (81.4)	2.25 (1.70 to 2.97)
	Moderate	495 (15.3)	60 (12.1)	435 (87.9)	3.72 (2.78 to 4.97)
	Severe	434 (13.4)	46 (10.6)	388 (89.4)	4.32 (3.13 to 5.97)
	Very severe	222 (6.9)	19 (8.6)	203 (91.4)	5.48 (3.38 to 8.87)
Cash assistance	Did not receive	975 (30.2)	222 (22.8)	753 (77.2)	1
	Received	2249 (69.8)	528 (23.5)	1721 (76.5)	0.96 (0.80 to 1.15)
	Missing	5	2	3	
Other assistance	Did not receive	2570 (79.9)	577 (22.5)	1993 (77.5)	1
	Received	648 (20.1)	173 (26.7)	475 (73.3)	0.79 (0.65 to 0.97)
	Missing	11	2	9	

Continued

Table 1 Continued

		Total (n=3229)	Mental health status		
			Good n=752 (23.3%)	Poor n=2477 (76.7%)	
		n (%)	n (%)	n (%)	Unadjusted OR (95% CI)*
Household food insecurity	Food secure	252 (8.1)	108 (42.9)	144 (57.1)	1
	Food insecure	1468 (47.1)	376 (25.6)	1092 (74.4)	2.18 (1.65 to 2.87)
	Severely food insecure	1394 (44.8)	235 (16.9)	1159 (83.1)	3.70 (2.78 to 4.92)
	Missing	115	33	82	
Household water insecurity	Water secure	2232 (69.3)	590 (26.4)	1642 (73.6)	1
	Water insecure	987 (30.7)	161 (16.3)	826 (83.7)	1.84 (1.52 to 2.24)
	Missing	10	1	9	
Unmet waste management needs	No	2638 (81.9)	631 (23.9)	2007 (76.1)	1
	Yes	582 (18.1)	118 (20.3)	464 (79.7)	1.24 (0.99 to 1.54)
	Missing	9	3	6	
Eviction notice	Did not receive	2271 (70.5)	606 (26.7)	1665 (73.3)	1
	Received	953 (29.6)	145 (15.2)	808 (84.8)	2.03 (1.66 to 2.48)
	Missing	5	1	4	
Debt	Not in debt	234 (7.3)	88 (37.6)	146 (62.4)	1
	In debt	2977 (92.7)	662 (22.2)	2315 (77.8)	2.11 (1.59 to 2.78)
	Missing	18	2	16	
Verbal abuse	Did not report	2864 (89.1)	689 (24.1)	2175 (75.9)	1
	Reported	351 (10.9)	58 (16.5)	293 (83.5)	1.60 (1.20 to 2.15)
	Missing	14	5	9	
Physical abuse	Did not report	3115 (96.9)	729 (23.4)	2386 (76.6)	1
	Reported	101 (3.1)	18 (17.8)	83 (82.2)	1.41 (0.84 to 2.36)
	Missing	13	5	8	
Legal residency documentation	Regularised	778 (24.2)	206 (26.5)	572 (73.5)	1
	Not regularised	2433 (75.8)	542 (22.3)	1891 (77.7)	1.26 (1.04 to 1.51)
	Missing	18	4	14	
Employment	Regular work	60 (1.9)	32 (53.3)	28 (46.7)	1
	No or irregular work	3169 (98.1)	720 (22.7)	2449 (77.3)	3.89 (2.33 to 6.50)

*OR (95% CI) showing the unadjusted odds of having poor mental health.

Table 2 Multivariable model for predicting poor mental health (wave 1)

	Apparent model					Model adjusted by bootstrap shrinkage				
	Beta-coefficient	(95% CI)*	ORa	(95% CI)†	P value	Beta-coefficient	(95% CI)*	ORa	(95% CI)†	P value
Age (years)	−0.03	(−0.04 to −0.01)	0.97	(0.96 to 0.98)	<0.001	−0.02	(−0.04 to −0.01)	0.97	(0.96 to 0.99)	<0.001
Employment										
Regular work	1					1				
No/irregular work	1.18	(0.61 to 1.75)	3.26	(1.85 to 5.75)	<0.001	1.1	(0.57 to 1.62)	2.99	(1.77 to 5.07)	<0.001
Debt										
No	1					1				
Yes	0.3	(−0.02 to 0.61)	1.35	(0.98 to 1.85)	0.067	0.28	(−0.02 to 0.57)	1.32	(0.98 to 1.77)	0.067
Household water insecurity										
Water secure	1					1				
Water insecure	0.28	(0.07 to 0.50)	1.33	(1.08 to 1.64)	0.008	0.26	(0.07 to 0.46)	1.3	(1.07 to 1.58)	0.008
Household food insecurity										
Food secure	1					1				
Food insecure	0.56	(0.25 to 0.86)	1.74	(1.29 to 2.36)	<0.001	0.52	(0.24 to 0.80)	1.68	(1.27 to 2.22)	<0.001
Severely food insecure	0.88	(0.56 to 1.20)	2.41	(1.75 to 3.32)	<0.001	0.82	(0.52 to 1.11)	2.26	(1.68 to 3.05)	<0.001
Legal residency documentation										
Regularised	1					1				
Not regularised	0.16	(−0.04 to 0.36)	1.17	(0.95 to 1.43)	0.128	0.15	(−0.04 to 0.34)	1.16	(0.96 to 1.40)	0.128
Intensity of bodily pain	0.34	(0.28 to 0.40)	1.41	(1.32 to 1.49)	<0.001	0.32	(0.26 to 0.37)	1.37	(1.30 to 1.45)	<0.001
No. of chronic illnesses										
None	1					1				
One	0.07	(−0.16 to 0.30)	1.07	(0.85 to 1.35)	0.566	0.06	(−0.15 to 0.28)	1.06	(0.86 to 1.32)	0.566
Two or more	0.25	(0.03 to 0.46)	1.28	(1.03 to 1.59)	0.025	0.23	(0.03 to 0.43)	1.26	(1.03 to 1.54)	0.025
Intercept	−0.7	(−1.63 to 0.23)	0.5	(0.19 to 1.26)	0.143	−0.57	(−0.66 to −0.48)	0.56	(0.52 to 0.62)	<0.001

*Beta coefficient (95% CI): adjusted beta coefficient of having poor mental health and its 95% CI/beta: Ln (OR).
†ORa (95% CI): adjusted OR of having poor mental health and its 95% CI.

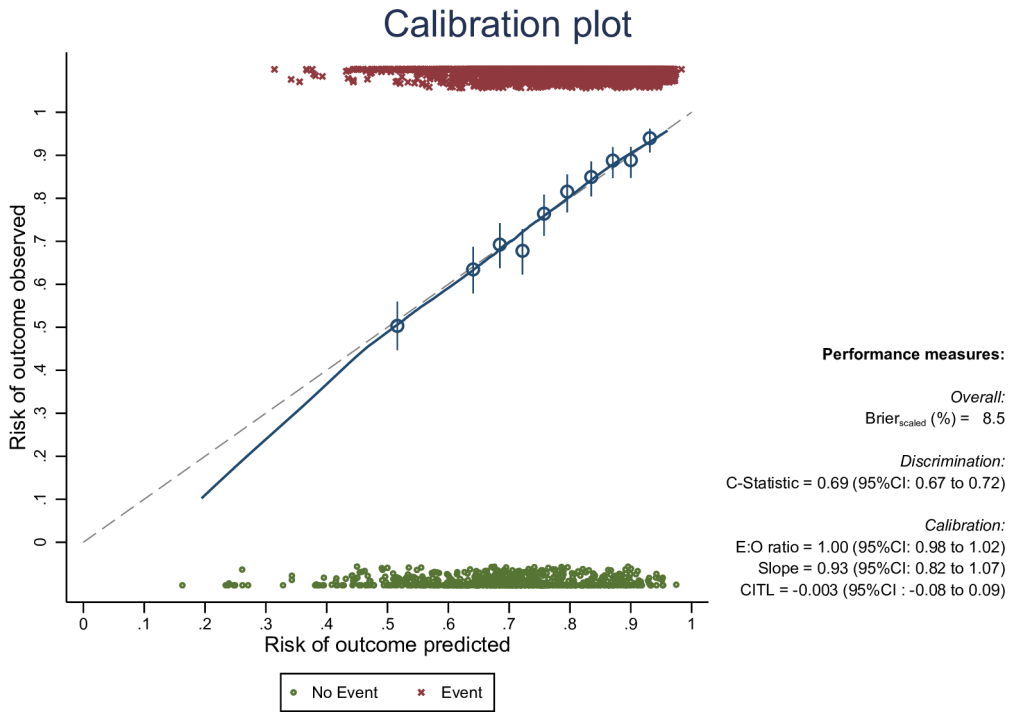

Figure 2 Models performance after adjustment for optimism at wave 1. CITL, calibration-in-the-large; E:O ratio, expected versus observed ratio.

Older Syrian refugees without legal residency documentation have higher odds of experiencing poor mental health compared with those with a regularised legal status, which is consistent with other findings.[24] In Lebanon, legal residency permits are required to be renewed on annual basis and the associated fees may be prohibitive to refugees. Undocumented refugees may face a higher burden of mental health disorders due to a fear of deportation, lack of social protection and barriers to access healthcare services.[24 25] A longitudinal study conducted on 387 migrants in Switzerland demonstrated that regularisation had a direct positive impact on reducing the severity of depression.[25] This indicates that the precarity of legal status needs to be addressed in the context of Syrian refugees in Lebanon.

Food and water insecurity are two distinct but interconnected predictors of poor mental health identified in this study. These types of resource insecurities are well-known stressors, linked to worry, distress and increased depressive symptoms, which could affect individuals' well-being and are both basic needs that intersect.[26] When experienced together, water and food insecurities have reciprocal effects, leading to potentially additive and even multiplicative deterioration in mental health status.[27] It is, therefore, important for humanitarian interventions aiming to improve mental health in such settings to ensure that refugees receive basic needs support that can alleviate food and water insecurities.

Other predictors for poor mental health that emerged from this study were the intensity of bodily pain and having multiple chronic illnesses. The relationship between mental health disorders and pain and chronic illnesses, such as hypertension and diabetes, are well established in the literature.[28 29] For instance, complex biological, psychological and social factors interact and may lead to and exacerbate pain and disrupt individuals' daily life activities,[28] which increases the need to access healthcare services and use medication. In particular, older Syrian refugees in Lebanon have reported difficulties in accessing necessary healthcare and medication, and previous studies have shown these factors were associated with poor mental health among migrants and refugees.[4 30]

Indebtedness and lack of engagement in regular work are stressors that are related to financial status, which may contribute to poor mental health. These stressors are likely to be evident among older Syrian refugees who rely on humanitarian cash assistance as a primary source of income.[4] Refugees associate emotional well-being with secure employment and the absence of general economic worries.[31] For instance, Syrian refugees in Lebanon have a lack of employment opportunities at all ages and this is likely to be exacerbated among older adults.

In the context of the pandemic, mental health interventions for older refugees are necessary and need to be linked to the provision of other essential humanitarian services including but not limited to social safety net programmes that alleviate food insecurity (e.g., cash interventions and food assistance), water and sanitation interventions and legal and protection services. Predictive models of mental health could be applied to target individuals at high risk of poor mental health with interventions that aim to reduce vulnerabilities.

This study is one of the largest studies to explore the mental health status of older Syrian refugees in Lebanon, with a response rate higher than 85%. The sample of older Syrian refugees was obtained from a single humanitarian organisation's list of beneficiaries, which limits the generalisability of these results. Nevertheless, this humanitarian organisation (Norwegian Refugee Council) is one of the largest providers of assistance in Lebanon. Similar to the 2021 VASyR (a nationally representative survey of Syrian refugee households in Lebanon),[32] which surveyed all ages, the study population had the highest percentages of refugees from the Bekaa region and northern Lebanon (as described elsewhere).[17] Additionally, there were comparable proportions of households with family debts (92% in both surveys) and those who received eviction notices (29.6% in the study population vs 21% in VASyR, 2021).[32]

Furthermore, this study has added to the literature since there have been calls to concurrently collect data on water security and food security, along with mental health outcomes, to understand the risk each poses to health.[26 33] Several variables rely on self-reported indicators and MHI-5 was dichotomised into binary variables. While dichotomisation eases the interpretation of results, it has some disadvantages. These include losing the range of outcome variability and considering individuals at the cut-off point as markedly different rather than quite similar.[34] Moreover, other potential predictors for poor mental health were identified in the literature, but not included in our model, such as experiencing trauma during their life course, loss of family members or friends, personal or family history of mental health issues, which could improve the discrimination of our model. In particular, we acknowledge the role of social support as a protective factor for mental health. Nevertheless, social support variables were excluded from the model due to their negative impact on the model's performance.

Future research should evaluate the feasibility and face validity of the proposed predictive tool through qualitative methods, in collaboration with refugees and NGO workers. In addition, the model will be tested and externally validated in future studies conducted with refugees in Lebanon. We also plan to investigate factors associated with the deterioration of mental health over time to improve the predictive value of these models. Longitudinal studies are important because there are a lack of studies examining the causal connections between food and water insecurity, and their intersection with mental health outcomes.[33]

CONCLUSION

During the COVID-19 pandemic, poor mental health among older Syrian refugees in Lebanon was predicted by age, food insecurity, water insecurity, employment status, having debt, having multiple chronic illnesses, legal residency documentation and intensity of bodily pain. This model will allow humanitarian actors to identify those at the highest risk of poor mental health and organise interventions to assist older Syrian refugees in meeting their basic human needs, protecting their rights, and improving their health and well-being. In order to improve the wellbeing of refugee populations, vulnerabilities that are predictive of poor mental health must be directly addressed.

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