


# BMJ Open Chronic pain and mental health problems among Syrian refugees: associations, predictors and use of medication over time: a prospective cohort study

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## ABSTRACT

**Objectives** This study aims to examine associations, predictors and pharmacological treatment of chronic pain and mental health problems among Syrian refugees in a longitudinal perspective.

**Design** Prospective cohort study.

**Setting** We collected survey data among Syrian refugees in Lebanon granted resettlement to Norway (self-administered questionnaires) and at follow-up 1 year after arrival in Norway (structured telephone interviews).

**Participants** Adult Syrian refugees attending mandatory pretravel courses in Lebanon in 2017–2018 were invited to participate. In total, 353 individuals participated at both time points.

**Primary and secondary outcomes** We examined the cross-sectional associations between pain, mental health and migration-related exposures at baseline and follow-up and assessed whether associations changed significantly with time. Furthermore, we investigated the longitudinal association between mental health at baseline and pain at follow-up. We also evaluated temporal changes in use of analgesics and psychotropic drugs.

**Results** While most refugees reported improved health from the transit phase in Lebanon to the early resettlement phase in Norway, a few had persisting and intertwined health problems. Most migration-related stressors were more closely associated with chronic pain and mental health problems after resettlement as compared with the transit phase. In parallel, poor mental health was associated with chronic pain in the follow-up (adjusted risk ratio (ARR) 1.5 (1.0, 2.2)), but not at baseline (ARR 1.1 (0.8, 1.5)). Poor mental health at baseline was a statistically significant predictor of chronic pain at follow-up among those *not* reporting chronic pain at baseline. At both timepoints, one in four of those with chronic pain used analgesics regularly. None with mental health problems used antidepressants daily.

**Conclusions** Providers of healthcare services to refugees should be attentive to the adverse effect of postmigration stressors and acknowledge the interrelations between pain and mental health. Possible gaps in pharmacological

## Strengths and limitations of this study

- This is a prospective longitudinal study investigating changes in health among refugees as they traverse international borders.
- The study has a high response rate at follow-up, which is a rare feature in longitudinal studies among ‘hard-to-get’ populations such as refugees.
- While most longitudinal studies among refugees solely consider mental health, this article incorporates somatic health encouraging a holistic approach in management and care.
- The second wave of data collection was performed approximately 1 year postarrival, yet observation over a longer time span would yield a more thorough understanding of temporal changes in health among refugees.
- The deliberate choice to change mode of data collection between baseline and follow-up to reduce attrition-related selection bias may have introduced acquiescence bias.

treatment of pain and mental health problems need further clarification.

## INTRODUCTION

Forced displacement of populations is not a temporary phenomenon but persists throughout our time as a global challenge. Public health endeavours towards refugees are increasingly urged to shift from short-term to long-term responses to accommodate protracted refugee situations.<sup>1</sup> The healthcare needs of refugee populations will depend on the burden of disease in the country of origin, the demographic profile of the displaced group and migration experiences en route. Health reports commonly reported by refugees include

pain conditions such as headache, musculoskeletal complaints and injuries as well as acute infections, dental, gastrointestinal and mental health problems.<sup>2-6</sup> Importantly, health challenges may change along the migration stages.<sup>7</sup>

Somatic and mental health problems are interrelated and affected by social circumstances.<sup>8</sup> Forcibly displaced individuals are often subjected to profound psychological distress, which may manifest as both mental health problems and bodily experiences such as pain.<sup>9-10</sup> Most of the studies describing mental health symptoms and pain comorbidity among refugees evaluate clinic-based populations, particularly torture survivors.<sup>9-11-12</sup> However, the relationship between prevalent mental health problems and pain in *non-clinical* refugee populations remains poorly examined, and, to our knowledge, has not been assessed in longitudinal studies.<sup>13</sup>

Somatic and mental health are also affected by life experiences. The effect of migration-related exposures on health has been explained by the theories of allostatic load<sup>14</sup> and 'the exhausted migrant',<sup>15</sup> which emphasise how stressors related to the migration experience add up over years and increase the risk of a wide range of diseases. Migration factors contributing to adverse health effects may include exposure to violence, loss of belongings and beloved ones, a precarious journey, economic hardship as well as communication barriers and uncertain prospects. It remains unsettled how pain and mental health are affected by migration experience at different stages of the migration trajectories of refugees.

As state parties or signatories of international treaties recognising health-related human rights, hosting countries are obliged to provide adequate medical care for refugees.<sup>16</sup> Furthermore, in cases where somatic and mental health problems are interrelated, the conditions should be managed in a holistic approach. Nevertheless, many studies report barriers preventing forcibly displaced individuals from accessing healthcare services.<sup>17</sup> Less is known about the access to pharmacological treatment, hence a knowledge gap remains concerning the use of relevant medication for pain and mental health problems among refugees.<sup>2</sup>

In this study, we aim to examine associations, predictors and use of pharmacological treatment for chronic pain and mental health problems among Syrian refugees over time. We explore the main aim from three angles. First, we assess the cross-sectional associations between chronic pain, mental health and migration-related exposures among refugees in the transit and the early postmigration phase and investigate if associations change significantly between these two migration phases. Second, we examine whether poor mental health in the transit period predicts chronic pain in the early postmigration phase. Third, we describe the temporal changes in use of pharmacological treatment for chronic pain and mental health symptoms in the transit and early postmigration phase.

## METHODS

### Study design, setting and data collection

This is a prospective cohort study surveying Syrian refugees in a conflict-near setting in the Middle East with follow-up approximately 1 year after arrival in Northern Europe. The study is part of the Changing Health and health care needs Along the Syrian Refugees' Trajectories to Norway project recruiting Syrian refugees registered with the United Nations High Commissioner for Refugees in Lebanon and granted resettlement in Norway.<sup>18</sup>

We invited all Syrian refugees aged 16 and above participating in the mandatory pre-travel courses organised by the International Organization for Migration in Lebanon in the period August 2017 to April 2018. At baseline, respondents self-completed a questionnaire in Arabic. Project staff assisted those with low literacy level and healthcare workers were available to respond to potential signs of retraumatisation. Based on consent from the participants, contact details after resettlement in Norway were obtained from The Directorate of Integration and Diversity and local public immigration offices. The follow-up data collection was carried out during 2018–2019, approximately 1 year after the arrival of respondents in Norway and was completed as a structured telephone interview facilitated by Arabic-speaking study staff. The current study includes refugees who participated both at baseline in Lebanon and at follow-up in Norway.

### Measures

#### Dependent variables

The outcomes in this study are chronic pain, anxiety/depression symptoms and use of analgesics and psychotropics.

We examined chronic pain using a single, validated item asking: 'Do you have physical pain now that has lasted more than 6 months?'.<sup>19</sup>

Symptoms of anxiety and/or depression were assessed by the Hopkins Symptom Checklist (HSCL-10).<sup>20-21</sup> The HSCL-10 item asks respondents to rate the extent to which they have suffered from various symptoms of anxiety and depression during the last week on a 4-point Likert scale. We employ a mean HSCL-10 score of 1.85 (range 1–4) as a cut-off indicating clinically relevant anxiety or depression in line with suggestions from the literature.<sup>21</sup>

Furthermore, we assessed the use of painkillers and psychotropics, including antidepressants, tranquillisers and sedatives, using questions from the Oslo Health Study.<sup>22</sup>

#### Independent variables

Sociodemographic variables recorded included: age, gender, mother tongue, marital status, number of children, level of education and work participation. The Single General Trauma Item was used to identify exposure to traumatic events connected to being forcibly displaced.<sup>23</sup> Further, we sought to map various exposures relating to the respondent's migration journey and

developed questions on length of stay, migration without family members and residence permit in transit country.

To answer the first research question, anxiety/depression symptoms were treated as an explanatory variable, and chronic pain as the outcome variable. Additionally, a single question on sleep quality, considered a clinically interesting topic, was extracted from the HSCL-10 item and investigated separately as an explanatory variable. Post-traumatic stress symptoms were assessed by the Harvard Trauma Questionnaire (HTQ).<sup>24 25</sup> The HTQ uses the same time frame and response scale as HSCL-10. We adhere to the manual suggesting a mean HTQ score of 2.5 (range 1–4) as a threshold for clinical post-traumatic stress disorder (PTSD). Both HSCL-10 and HTQ are validated instruments widely used among refugees and have exhibited satisfactory psychometric properties among Arabic speakers.

In order to identify exposures related to the respondent's lived migration experience, we used items from the WHO Quality of Life Scale (WHOQOL-BREF).<sup>26</sup> Variables included satisfaction with personal relationships, support from friends, safety, physical environment, economy, information, leisure activities, living place, access to healthcare and transportation rated on a 5-point Likert scale. The items were dichotomised into binary measures where either *not at all* and *a little* or *very dissatisfied* and *dissatisfied* were merged as indicative of poor outcome. The WHOQOL-BREF has demonstrated good psychometric properties, reliability and validity in Arab populations.<sup>26</sup>

We used standardised procedure to translate, double back-translate and pilot the study instrument among the target population.<sup>27</sup>

### Statistical analysis

Sociodemographic and migration-related characteristics of the study cohort were described as crude prevalence proportions and medians and IQR. We assessed for selection bias in background variables between the cohort and the loss-to-follow-up group using Fisher's exact-test and Student's t-test. Additionally, we used logistic regression to evaluate bias related to associations between sociodemographic characteristics and missing values for key outcomes.

Because of the high prevalence for most of the outcomes, risk ratios were judged as a more appropriate measure of association than odds ratios. Poisson regression was chosen above log-binomial regression to estimate risk ratios due to failing convergence.<sup>28</sup> The association between migration-related stressors and chronic pain and poor mental health, respectively (online supplemental DAG figure 1A) was first investigated in baseline data and follow-up data separately using Poisson regression with robust error variance (sandwich estimation) and reported as risk ratios with 95% CIs. We ran unadjusted regression models and models adjusted for age and gender. We used the same statistical procedure to study associations between poor mental health and chronic

pain (online supplemental DAG figure 1B) and included models additionally adjusted for trauma as such exposure may be associated both with poor mental health and pain. We assessed whether the cross-sectional associations changed significantly between the two time points using generalised estimation equation (GEE) with log as link-function, Poisson distribution and exchangeable working correlation structure and included an interaction term between exposure and timepoint. The p value for the interaction term is reported as a test for change in association over time.

Furthermore, Poisson regression was used to investigate whether poor mental health stratified by chronic pain in transit (baseline) predicted chronic pain in the early resettlement phase (follow-up) both in crude models and models adjusted for age and gender. We evaluated whether association varied significantly depending on pain status at baseline by including interaction terms between poor mental health and pain at baseline and report the p value for the interaction term of the adjusted models.

Last, we used GEE regression to assess the temporal change in use of painkillers stratified by reporting chronic pain. There were too few users of psychotropics to allow equivalent statistical analysis.

Missing values were handled with listwise deletion in all regression models. All tests were two sided with the level of statistical significance set to 0.05. Analyses were conducted in Stata IC V.16.0.

### Patient and public involvement

Syrian refugees were represented in the reference groups of the study, which were consulted during the development, including formulation of research question and design. During recruitment, participants provided helpful information to identify reasons for non-response. Result will be disseminated to the Syrian community in Norway primarily through schools offering a mandatory 2-year educational programme for newly arrived refugees as well as through public channels.

### RESULTS

Altogether, 506 Syrian refugees participated in the study at baseline in Lebanon. Of these, 464 were confirmed resettled in Norway and 353 participated at follow-up, resulting in an attrition rate of 24%. Reasons for lost-to-follow-up included: no contact information (13), did not answer phone/wrong phone number (60), did not wish to participate (38).

The final study population of 353 respondents who participated both at baseline and follow-up is described in table 1.

Sensitivity analyses comparing the cohort and the loss-to-follow-up group did not support selection bias related to attrition (online supplemental table 1), nor did we find indications of bias associated with missing values for key outcomes (online supplemental tables 2,3).

**Table 1** Sociodemographic and migration-related factors (n=353)

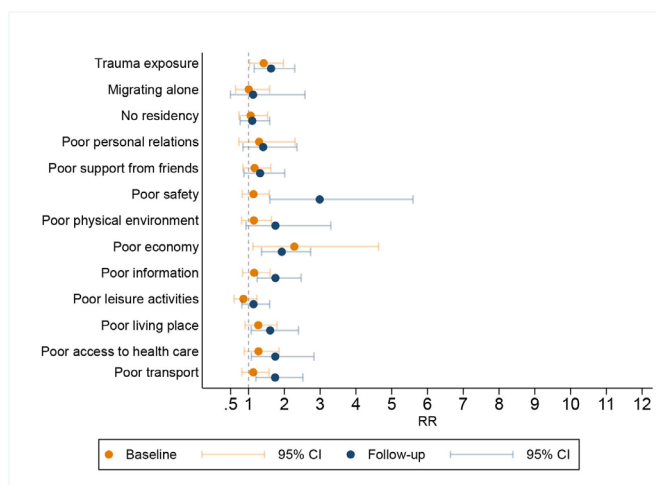
Sociodemographic factors at baseline		
Gender (n, %)		
Women	181	51
Men	171	49
Age in years (median, IQR)	34	27–41
Mother tongue (n, %)		
Arabic	335	95
Kurmanji	15	4
Marital status (n, %)		
Married	265	75
Living with partner if married	260	98
Number of children (median, IQR)	3	2–4
Education in years (median, IQR)	8	6–10
Work participation prior to flight (n, %)	187	38
Migration-related factors at baseline		
Time since flight from Syria in years (median, IQR)	5	4–6
No residence permit in Lebanon (n, %)	242	69
Migrating without family from Syria to Lebanon (n, %)	55	16
Exposure to traumatic event(s) (n, %)*	135	40
Migration-related factors at follow-up		
Time since arrival in Norway at follow-up in months (median, IQR)	14	12–15
Migrating without family from Lebanon to Norway (n, %)	8	2

\*Measured by the Single General Trauma Item.

Various key migration-related stressors were found to be associated with reporting chronic pain both in crude models and adjusted models (figure 1, online supplemental table 4). Trauma exposure and poor economy were associated with chronic pain both at baseline and follow-up. Poor safety, poor information, poor living place, poor access to healthcare and poor transportation were all associated with chronic pain at follow-up only. The association between poor information and chronic pain showed statistically significant interaction with migration stage ( $p=0.034$ ).

Several migration-related stressors were also associated with poor mental health outcome (figure 2, online supplemental table 5). Trauma exposure, poor support from friends, poor safety and poor living place were associated with poor mental health both at baseline and follow-up. We found statistically significant interaction with migration stage in the association between poor mental health and poor personal relationships, poor support from friends, poor safety, poor economy and poor information, respectively.

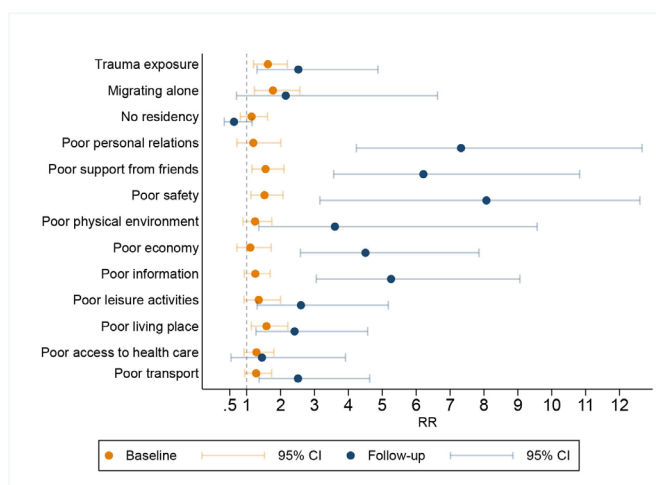
Table 2 shows the cross-sectional association between mental health and chronic pain at baseline and follow-up



**Figure 1** Associations between migration-related factors (exposure) and chronic pain (outcome) in baseline and follow-up. Separate Poisson regression models for each exposure with robust standard errors adjusted for age and gender. Chronic pain measured by asking: 'Do you have physical pain now that has lasted more than 6 months?' RR, relative risk.

separately. While the number reporting symptoms indicating anxiety/depression decreased from baseline to follow-up (118 to 39), the proportion reporting chronic pain among those with anxiety/depression symptoms increased (33% to 50%) between the two timepoints (table 2).

Similarly, the number experiencing symptoms compatible with PTSD was reduced from baseline to follow-up (14 to 7), but the proportion reporting chronic pain among those with likely PTSD rose (43% to 86%). Anxiety/depression symptoms were associated with chronic pain in the follow-up in all models (table 2). However, at baseline, we did not find any statistically significant association



**Figure 2** Associations between migration-related factors (exposure) and anxiety/depression (outcome) in baseline and follow-up. Separate Poisson regression models for each exposure with robust standard errors adjusted for age and gender. Anxiety/depression measured by the Hopkins Symptoms Checklist 10 with cut-off for suspected anxiety/depression 1.85. RR, relative risk.

**Table 2** Associations between mental health (exposure) and chronic pain (outcome) at baseline and follow-up (n=353)

	Baseline			Follow-up			Interaction test§
	N	Chronic pain, n (%)	RR (95% CI)	N	Chronic pain, n (%)	RR (95% CI)	
<b>Anxiety/depression symptoms¶</b>							
No	235	66 (28.6)	1	1	1	1	1
Yes	118	38 (32.5)	1.1 (0.8 to 1.6)	1.1 (0.8 to 1.6)	1.1 (0.8 to 1.5)	2.0 (1.4 to 2.9)	1.5 (1.0 to 2.2)
<b>PTSD symptoms**</b>							
No	296	80 (27.4)	1	1	1	1	1
Yes	14	6 (42.9)	1.6 (0.8 to 2.9)	1.3 (0.6 to 2.7)	1.1 (0.5 to 2.4)	3.2 (2.3 to 4.6)	2.3 (1.4 to 3.8)
<b>Poor sleep</b>							
No	295	84 (29.0)	1	1	1	1	1
Yes	52	19 (36.5)	1.3 (0.8 to 1.9)	1.2 (0.8 to 1.8)	1.1 (0.7 to 1.7)	3.1 (2.3 to 4.1)	2.2 (1.5 to 3.2)

\*Unadjusted estimates from Poisson regression with robust standard errors, separate models for baseline and follow-up.

†Estimates from Poisson regression with robust standard errors, adjusted for age and gender. Separate models for baseline and follow-up.

‡Estimates from Poisson regression with robust standard errors, adjusted for age, gender and trauma exposure. Separate models for baseline and follow-up.

§P value for interaction term between exposure variable and time (baseline/follow-up) for GEE model including both baseline and follow-up data with adjustment for age, gender and trauma exposure. Test for effect modification by migration phase.

¶Measured by the Hopkins Symptoms Checklist 10, cut-off or suspected anxiety/depression 1.85.

\*\*Measured by the Harvard Trauma Questionnaire, cut-off or suspected PTSD 2.5.

\*\*\*Generalised estimation equation; PTSD, post-traumatic stress disorder; RR, relative risk.

**Table 3** Mental health at baseline (exposure) as a predictor of chronic pain at follow-up (outcome) stratified by pain at baseline (n=353)

	RR (95% CI)				Interaction‡
	Model 1*		Model 2†		
	Pain at baseline	No pain at baseline	Pain at baseline	No pain at baseline	P
Anxiety/depression symptoms at baseline	0.8 (0.5 to 1.3)	1.8 (1.2 to 2.8)	0.9 (0.5 to 1.4)	1.7 (1.1 to 2.7)	0.039
PTSD symptoms at baseline	0.8 (0.2 to 2.5)	1.1 (0.3 to 3.9)	1.0 (0.3 to 3.0)	1.0 (0.3 to 3.0)	0.916
Poor sleep at baseline	0.6 (0.3 to 1.3)	1.5 (0.8 to 2.6)	0.6 (0.3 to 1.3)	1.4 (0.8 to 2.4)	0.075

\*Unadjusted estimates from Poisson regression with robust standard errors.

†Estimates from Poisson regression with robust standard errors, adjusted for age and gender.

‡P value for interaction term between exposure variable and pain status at baseline from GEE model with log-link, Poisson distribution and adjustment for age and gender.

GEE, generalised estimation equation; PTSD, post-traumatic stress disorder; RR, relative risk.

between anxiety/depression symptoms and chronic pain. The same pattern was seen for PTSD and poor sleep. Associations with chronic pain were in general stronger at follow-up than at baseline, but the test for interaction was only significant for poor sleep.

In table 3, we assess whether mental health problems at baseline predict chronic pain at follow-up. In stratified analyses, anxiety/depression symptoms at baseline were a statistically significant predictor of chronic pain at follow-up among those *not* reporting chronic pain at baseline (table 3).

We found an increase in daily use of painkillers among those reporting chronic pain (21% to 29%) (table 4). At the same time, there was a reduction in daily use of painkillers over time among those not reporting chronic pain (7% to 2%). Among those reporting symptoms indicating anxiety/depression, there were no daily users of antidepressants neither in the transit phase nor in the early resettlement phase.

## DISCUSSION

### Main findings

Overall, most of the refugees in this study exhibit a resilient pattern with decreasing mental health problems, while a few seem to have complex, interrelated and long-lasting health problems. Migration-related stressors appear to be more closely related to both chronic pain and poor mental health in Norway compared with the earlier transit phase. Correspondingly, poor mental health and chronic pain were significantly associated in the early postmigration phase in Norway but we were not able to detect the same association in the transit phase in Lebanon. Furthermore, poor mental health at baseline was a predictor of chronic pain at follow-up, highlighting the intertwined nature of these two conditions. In both migration phases, around one in four of those with chronic pain use painkillers daily, while none of those with symptoms of mental ill health use antidepressants.

**Table 4** Changes in use of pharmacological treatment of for chronic pain and mental health symptoms from baseline to follow-up (n=353)

	Baseline		Follow-up		Change*	
	n (%)		n (%)		RR (95% CI)	
	Chronic pain	No chronic pain	Chronic pain	No chronic pain	Chronic pain	No chronic pain
Painkillers daily	22 (21)	16 (7)	28 (29)	4 (2)	1.3 (0.9, 2.2)	0.2 (0.1, 0.7)
Painkillers last 4 weeks	66 (64)	86 (36)	67 (68)	78 (31)	1.1 (0.9, 1.3)	0.9 (0.7, 1.1)
	Anxiety/depression	No anxiety/depression	Anxiety/depression	No anxiety/depression	Anxiety/depression	No anxiety/depression
Antidepressants daily	0 (0)	1 (0)	0 (0)	0 (0)	–	–
Antidepressants last 4 weeks	3 (3)	4 (2)	2 (5)	0 (0)	–	–

\*Change in use of medicines from the transit phase to the early resettlement phase stratified by experiencing health problems or not. RR, relative risk.

Most of the assessed migration-related exposures in this study were more closely associated with poor health outcomes in the early resettlement phase compared with the previous transit phase. The proximity to the horrors of the war in time and space in the transit phase might be an important driver for mental health symptoms. After arrival in Northern Europe, most of our respondents are more content with their socioeconomic situation. However, with larger geographical and temporal distance to the conflict, worries related to socioeconomic factors might receive higher attention among those experiencing poor health. Postmigration stressors, such as socioeconomic, social and interpersonal factors, as well as factors relating to the asylum process and immigration policy, have previously been demonstrated to be related with poor mental health.<sup>29</sup> Associations have also been shown between pain and postmigratory stressors as assessed by the 17-item Postmigration Living Difficulties Checklist.<sup>9</sup> Our results are in line with an emerging string of the literature, suggesting postsettlement factors to be of greater importance than premigratory conditions for the mental health of resettled refugees.<sup>30 31</sup> As a clinical tool, information about adverse lived migration experiences in the post-migration phase may serve as yellow flags when evaluating pain and mental health disorders among refugees.

Several studies have evaluated longitudinal changes in mental health among refugees.<sup>32 33</sup> However, research examining patterns of pain among refugees over time is scanty.<sup>13</sup> Pain in refugees has predominantly been assessed in cross-sectional studies and in clinical settings among torture survivors or patients with PTSD.<sup>9 11 34</sup> Furthermore, we are not aware of prior *population-based* studies investigating the associations between mental health and pain among forcibly displaced individuals.

The frequently observed concurrence of PTSD and pain has been explained by ‘the mutual maintenance theory’ describing how these conditions perpetuate each other.<sup>35</sup> Interrelatedness of poor mental health and chronic pain may have several potential explanations.<sup>36</sup> The phenomena may have a common source representing a shared vulnerability towards developing both health problems. Shared vulnerability is also the reason why we adjusted for trauma exposure in our analyses. Furthermore, poor mental health may exacerbate chronic pain and vice versa, constituting a mutually maintaining relationship.<sup>35</sup> This is highlighted by studies indicating a dose-response relation between pain and score on the HSCL for anxiety/depression.<sup>11 37</sup> Importantly, both mechanisms may apply simultaneously. In this study, the number reporting mental health problems decline, but among these, the proportion reporting chronic pain increases. Thus, we find an aggregation of individuals with concomitant complaints in the resettlement phase. We hypothesise that individuals with milder and more context-sensitive mental health problems may recover after transfer to a less stressful context in the resettlement phase in a ‘salutogenic’ manner.<sup>38</sup> Individuals with persisting symptoms may have more resistant

mental health challenges and more frequently exhibit concurrent reports of pain. This concentration of fewer, but more complex cases of anxiety/depression, may explain why we observe a stronger association between mental health and pain in the resettlement phase. Our findings support our hypothesis that poor mental health in the transit setting predicts chronic pain at follow-up, confirming our postulated direction of causality between mental health problems and pain.

Pharmacological treatment is not always indicated nor advisable in treating chronic pain and poor mental health. However, pharmacological treatment may also be a cornerstone in the treatment of conditions thresholding a certain severity level. Three in five of those with chronic pain in our study had used analgesics over the last 4 weeks, and this might represent both barriers to obtain medication, sufficient use or even overmedicalisation at the expense of other coping strategies. The corresponding rate of analgesics use over the last 4 weeks in the general Norwegian population is 60% in women and 37% in men, regardless of pain reporting.<sup>39</sup> Further research should explore coping strategies for chronic pain among refugees in depth. None of our respondents used antidepressants daily, and this finding might indicate barriers to pharmacological treatment yet the subject needs further scrutiny. The majority of intervention studies targeting mental ill health in refugees involve non-pharmacological treatment options, and studies evaluating the effect of antidepressants among refugees with trauma-related disorders have provided ambiguous evidence.<sup>40</sup> Importantly, regular treatments, such as antidepressants, are vulnerable to conflict-driven disruption in continuity of care.

In expanding our understanding of the dynamics between two health reports frequently reported among refugees, namely pain disorders and mental health challenges, our findings have important implications for stewards of healthcare systems as well as clinicians providing healthcare for refugees. While most of our respondents recover from the transit to the early postmigration phase, previous research reveals that declining health outcomes among refugees become evident only after several years postresettlement.<sup>41 42</sup> This study highlights the need to identify the minority of vulnerable individuals with entwined somatic and mental health problems and be attentive to adverse postmigration experiences that may make way for deteriorating health among all refugees.

### Strengths and weaknesses

Some methodological concerns regarding our study should be noted. First, health effects of migration-related stressors, as explained by the ‘exhausted migrant’ theory, develop over years. While beyond the scope of this study, an observation time over at least a decade would yield a more rigorous understanding of temporal changes in associations, predictors and treatment for chronic pain and poor mental health in refugees.

Second, we deliberately chose to change the mode of data collection between baseline and follow-up from self-completion of questionnaires to structured telephone interviews to prevent selection bias related to attrition with the risk of introducing acquiescence bias. Additionally, this study does not include clinical data, and the reporting of pain and mental health problems relies on self-assessment. Finally, the items assessing chronic pain and use of medicines have not been validated among refugees or Arab-speaking populations.

## Conclusion

Most refugees recover from mental health problems from the transit to the early resettlement phase, while a few have persisting problems. Among these, mental health and chronic pain are interrelated and associated with a range of postmigration stressors. Thus, our results illustrate a resilient majority and a concentration of the most vulnerable. Healthcare planners and clinicians providing healthcare services to newly arrived refugees should acknowledge interrelations between pain and mental health disorders, seek information about lived migration experiences and prevent discontinuity of care.

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**Competing interests** None declared.

**Patient consent for publication** Not required.

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## REFERENCES

- 1 UNHCR. *Global trends: forced displacement in 2018. report*. Geneva, 2019.
- 2 Strømme EM, Haj-Younes J, Hasha W, et al. Health status and use of medication and their association with migration related exposures among Syrian refugees in Lebanon and Norway: a cross-sectional study. *BMC Public Health* 2020;20:341.
- 3 Goodman LF, Jensen GW, Galante JM, et al. A cross-sectional investigation of the health needs of asylum seekers in a refugee clinic in Germany. *BMC Fam Pract* 2018;19:64.
- 4 Pfortmueller CA, Schwetlick M, Mueller T, et al. Adult asylum seekers from the middle East including Syria in central Europe: what are their health care problems? *PLoS One* 2016;11:e0148196.
- 5 van Berlaer G, Bohle Carbonell F, Manantsoa S, et al. A refugee cAMP in the centre of Europe: clinical characteristics of asylum seekers arriving in Brussels. *BMJ Open* 2016;6:e013963.
- 6 Hadgkiss EJ, Renzaho AMN. The physical health status, service utilisation and barriers to accessing care for asylum seekers residing in the community: a systematic review of the literature. *Aust Health Rev* 2014;38:142–59.
- 7 Strømme EM, Haj-Younes J, Hasha W, et al. Changes in health among Syrian refugees along their migration trajectories from Lebanon to Norway: a prospective cohort study. *Public Health* 2020;186:240–5.
- 8 Engel GL. The need for a new medical model: a challenge for biomedicine. *Science* 1977;196:129–36.
- 9 Morina N, Kuenburg A, Schnyder U, et al. The association of post-traumatic and postmigration stress with pain and other somatic symptoms: an explorative analysis in traumatized refugees and asylum seekers. *Pain Med* 2018;19:50–9.
- 10 Rohlf HG, Knipscheer JW, Kleber RJ. Somatization in refugees: a review. *Soc Psychiatry Psychiatr Epidemiol* 2014;49:1793–804.
- 11 Buhman C, Mortensen EL, Lundstrom S, et al. Symptoms, quality of life and level of functioning of traumatized refugees at psychiatric trauma clinic in Copenhagen. *Torture* 2014;24:25–39.
- 12 Harlacher U, Nordin L, Polatin P. Torture survivors' symptom load compared to chronic pain and psychiatric in-patients. *Torture* 2016;26:74–84.
- 13 Rometsch-Ogioun El Sount C, Windthorst P, Denking J, et al. Chronic pain in refugees with posttraumatic stress disorder (PTSD): a systematic review on patients' characteristics and specific interventions. *J Psychosom Res* 2019;118:83–97.
- 14 Tuggle AC, Cohen JH, Crews DE. Stress, migration, and allostatic load: a model based on Mexican migrants in Columbus, Ohio. *J Physiol Anthropol* 2018;37:28.
- 15 Bollini P, Siem H. No real progress towards equity: health of migrants and ethnic minorities on the eve of the year 2000. *Soc Sci Med* 1995;41:819–28.
- 16 International Organization of Migration, World Health Organization, UNHCR. *International migration, health and human rights*. Geneva, 2013.
- 17 Brandenberger J, Tylleskär T, Sontag K, et al. A systematic literature review of reported challenges in health care delivery to migrants and refugees in high-income countries - the 3C model. *BMC Public Health* 2019;19:755.
- 18 The CHART study (Changing Health and health care needs Along the Syrian Refugees' Trajectories to Norway).
- 19 Landmark T, Romundstad P, Dale O, et al. Estimating the prevalence of chronic pain: validation of recall against longitudinal reporting (the HUNT pain study). *Pain* 2012;153:1368–73.
- 20 Hesbacher PT, Rickels K, Morris RJ, et al. Psychiatric illness in family practice. *J Clin Psychiatry* 1980;41:6–10.
- 21 Strand BH, Dalgard OS, Tambs K, et al. Measuring the mental health status of the Norwegian population: a comparison of the instruments SCL-25, SCL-10, SCL-5 and MHI-5 (SF-36). *Nord J Psychiatry* 2003;57:113–8.
- 22 Norwegian Institute of Public Health. The Oslo health study (HUBRO).
- 23 Sigvardsdotter E, Nilsson H, Malm A, et al. Development and Preliminary Validation of Refugee Trauma History Checklist (RTHC)-A Brief Checklist for Survey Studies. *Int J Environ Res Public Health* 2017;14 doi:10.3390/ijerph14101175
- 24 Mollica RF, Caspi-Yavin Y, Bollini P, et al. The Harvard trauma questionnaire. validating a cross-cultural instrument for measuring



- torture, trauma, and posttraumatic stress disorder in Indochinese refugees. *J Nerv Ment Dis* 1992;180:111–6.
- 25 Hollifield M, Warner TD, Lian N, *et al*. Measuring trauma and health status in refugees: a critical review. *JAMA* 2002;288:611–21.
  - 26 Ohaeri JU, Awadalla AW. The reliability and validity of the short version of the who quality of life instrument in an Arab general population. *Ann Saudi Med* 2009;29:98–104.
  - 27 Wild D, Grove A, Martin M, *et al*. Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (pro) measures: report of the ISPOR Task force for translation and cultural adaptation. *Value Health* 2005;8:94–104.
  - 28 Zou G. A modified poisson regression approach to prospective studies with binary data. *Am J Epidemiol* 2004;159:702–6.
  - 29 Li SSY, Liddell BJ, Nickerson A. The relationship between Post-Migration stress and psychological disorders in refugees and asylum seekers. *Curr Psychiatry Rep* 2016;18:82.
  - 30 Porter M, Haslam N. Predisplacement and postdisplacement factors associated with mental health of refugees and internally displaced persons: a meta-analysis. *JAMA* 2005;294:602–12.
  - 31 O'Donnell AW, Stuart J, O'Donnell KJ. The long-term financial and psychological resettlement outcomes of pre-migration trauma and post-settlement difficulties in resettled refugees. *Soc Sci Med* 2020;262:113246.
  - 32 Cooper S, Enticott JC, Shawyer F, *et al*. Determinants of mental illness among humanitarian migrants: longitudinal analysis of findings from the first three waves of a large cohort study. *Front Psychiatry* 2019;10:545.
  - 33 Bogic M, Njoku A, Priebe S. Long-term mental health of war-refugees: a systematic literature review. *BMC Int Health Hum Rights* 2015;15:29.
  - 34 Teodorescu D-S, Heir T, Siqveland J, *et al*. Chronic pain in multi-traumatized outpatients with a refugee background resettled in Norway: a cross-sectional study. *BMC Psychol* 2015;3:7.
  - 35 Sharp TJ, Harvey AG. Chronic pain and posttraumatic stress disorder: mutual maintenance? *Clin Psychol Rev* 2001;21:857–77.
  - 36 Asmundson GJG, Coons MJ, Taylor S, *et al*. PTSD and the experience of pain: research and clinical implications of shared vulnerability and mutual maintenance models. *Can J Psychiatry* 2002;47:930–7.
  - 37 Carlsson JM, Mortensen EL, Kastrup M. Predictors of mental health and quality of life in male tortured refugees. *Nord J Psychiatry* 2006;60:51–7.
  - 38 Antonovsky A. *Health, stress, and coping*. San Francisco: Jossey-Bass, 1979.
  - 39 Samuelsen P-J, Slørdal L, Mathisen UD, *et al*. Analgesic use in a Norwegian general population: change over time and high-risk use--The Tromsø Study. *BMC Pharmacol Toxicol* 2015;16:16.
  - 40 Sonne C, Carlsson J, Bech P, *et al*. Pharmacological treatment of refugees with trauma-related disorders: what do we know today? *Transcult Psychiatry* 2017;54:260–80.
  - 41 Diaz E, Kumar BN, Gimeno-Feliu L-A, *et al*. Multimorbidity among registered immigrants in Norway: the role of reason for migration and length of stay. *Trop Med Int Health* 2015;20:1805–14.
  - 42 Norredam M, Agyemang C, Hoejbjerg Hansen OK, *et al*. Duration of residence and disease occurrence among refugees and family reunited immigrants: test of the 'healthy migrant effect' hypothesis. *Trop Med Int Health* 2014;19:958–67.