

- 29 Geddes JR, Carney SM, Davies C, et al. Relapse prevention with antidepressant drug treatment in depressive disorders: a systematic review. *Lancet* 2003;361:653–61.
- 30 Williams N, Simpson AN, Simpson K, Nahas Z. Relapse rates with long-term antidepressant drug therapy: a meta-analysis. *Hum Psychopharmacol* 2009;24:401–8.
- 31 Safer DJ, Zito JM. Do antidepressants reduce suicide rates? *Public health* 2007;121:274–7.
- 32 Isacson G, Rich CL, Jureidini J, Raven M. The increased use of antidepressants has contributed to the worldwide reduction in suicide rates. *Br J Psychiatry* 2010;196:429–33.
- 33 Ludwig J, Marcotte DE, Norberg K. Anti-depressants and suicide. *J Health Econ* 2009;28:659–76.
- 34 Moustgaard H, Joutsenniemi K, Myrskylä M, Martikainen P. Antidepressant Sales and the Risk for Alcohol-Related and Non-Alcohol-Related Suicide in Finland—An Individual-Level Population Study. *PLoS One* 2014;9:e98405.
- 35 Fischer EH, Dornelas EA, Goethe JW. Characteristics of people lost to attrition in psychiatric follow-up studies. *J Nerv Ment Dis* 2001;189:49–55.
- 36 Pirkola SP, Isometsä E, Suvisaari J, et al. DSM-IV mood-, anxiety- and alcohol use disorders and their comorbidity in the Finnish general population. *Soc Psychiatr Epidemiol* 2005;40:1–10.
- 37 Haukka J, Suvisaari J, Tuulio-Henriksson A, Lönnqvist J. High concordance between self-reported medication and official prescription database information. *Eur J Clin Pharmacol* 2007;63:1069–74.
- 38 Rauma PH, Koivumaa-Honkanen H, Kröger H, et al. The relationship between self-reported and registry-based data on use of psychoactive medications in postmenopausal women. *BMC Psychiatry* 2013;13:180.
- 39 World Health Organization. Introduction to Drug Utilization Research. Geneva: WHO, 2003.

.....
 The European Journal of Public Health, Vol. 26, No. 6, 1039–1044

© The Author 2016. Published by Oxford University Press on behalf of the European Public Health Association.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License

(<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium,

provided the original work is properly cited. For commercial re-use, please contact journals.permissions@oup.com

doi:10.1093/eurpub/ckw096 Advance Access published on 8 July 2016

.....
Associations between poor living conditions and multi-morbidity among Syrian migrant agricultural workers in Lebanon

Rima R. Habib¹, Diana Mikati¹, Safa Hojeij¹, Khalil El Asmar¹, Monique Chaaya¹, Rami Zurayk²

¹ Faculty of Health Sciences, American University of Beirut, Beirut, Lebanon

² Faculty of Agriculture and Food Sciences, American University of Beirut, Beirut, Lebanon

Correspondence: Rima R. Habib, PhD, Professor, Faculty of Health Sciences, American University of Beirut, P.O. Box: 11-0236 Riad El Solh, 1107 2020 Beirut, Lebanon, Tel: +961 1 340460 Ext 4630, Fax: +961 1 744470, e-mail: rima.habib@aub.edu.lb

Background: Syrian migrant farmworkers are among the most marginalized populations in Lebanon, living in poverty, lacking basic legal protections and frequent targets of discrimination. These realities produce living conditions that undermine their basic health and wellbeing. This study explores associations between household living conditions and acute and chronic health problems among Syrian migrant agricultural workers in the Bekaa region of Lebanon. **Methods:** A survey was carried out in summer of 2011 with a sample of 290 migrant agriculture workers and members of their household living in a migrant farmworker camp. The survey assessed participants living conditions, assets and health conditions. Regression analyses were carried out to examine associations between multi-morbidity and quality of household and neighborhood living conditions. **Results:** The mean age for the population was 20 years. Forty-seven percent of participants reported health problems. Almost 20% reported either one acute or chronic illness, 15% reported two health problems and 13% reported three or more. The analysis showed a significant positive association between multi-morbidity and poor housing and infrastructure conditions among study participants. **Conclusion:** The situation for migrant communities in Lebanon has likely further deteriorated since the study was conducted, as hundreds of thousands of new migrants have entered Lebanon since the outbreak of the Syrian armed conflict in 2011. These findings should inspire multi-faceted community development initiatives that provide basic minimums of neighborhood infrastructure and housing quality for Syrian migrant informal settlements across Lebanon, safeguarding the health and wellbeing of community residents.

.....
Introduction

Migrant farmworkers are among the most marginalized populations; they are often poor, lack basic legal protections, frequently discriminated against in host communities, and face life circumstances that undermine their basic human rights. Farm labor is physically taxing work and can pose many potential health risks.¹ Migrant farmworkers also often live in underserved rural communities that lack basic social and health services, infrastructure

and adequate housing. These neighborhood and household conditions complicate health burdens for migrant farmworkers, who already live precariously on the economic, social and political fringe.^{2–5}

Syrian migrant workers in Lebanon

These concerns are acute to the Lebanese context, where Syrian migrants have widely participated in the agricultural workforce

since the 1940s.⁶ The number of permanent and seasonal Syrian workers in Lebanon have fluctuated over the past few decades, depending on local and regional socio-political changes. Very few Syrian migrants have ever received working permits,⁷ so the vast majority projected at 600 000 were in the country without official documentation and legal status.^{6,8} Without legal protections and support services, Syrian migrants have remained in marginalized, transient communities vulnerable to exploitation from their employers and the Lebanese authorities.

Although the harsh realities of migrant workers were visible to the Lebanese public—on the streets and in the media—the health and wellbeing of these workers had not been a focus of public health research/programming in the country.^{9,10} Over a million Syrians have registered as ‘refugees’ in Lebanon with the advent of the Syrian Civil War in 2011. Many of these people may in fact be former migrant workers, who have now been reclassified by the United Nations High Commissioner for Refugees (UNHCR).¹¹

Before the Syrian armed conflict, Syrian workers moved freely between Lebanon and Syria. The universal healthcare coverage in Syria enabled migrants to schedule medical vacations, and return back to Lebanon for work.^{9,10} The majority of migrants have little formal education and work in the agriculture, construction and service industries.^{8,12} Migrant Syrians working in agricultural fields reportedly received salaries of US\$10–15 per 8–10 h workday, though anecdotal evidence suggests that many work >10 h/day.^{8–10} As unauthorized workers, Syrians cannot sign binding contracts or receive social security benefits.¹²

Living conditions and the health of Syrian farmworkers

This research focuses on the nexus of living conditions and health outcomes for Syrian migrant workers in Lebanon’s agricultural industry. These migrants make up a large proportion of the agricultural workforce in the country.³ In addition to the harsh working conditions, the living conditions that migrant Syrian agricultural workers experience pose an added risk to their health and wellbeing.¹ Syrian agricultural workers in the Bekaa valley of eastern Lebanon live in clusters of makeshift dwellings adjacent to the agricultural fields in which they work. These workers often resort to a broker, known as the ‘Shaweesh’, for help in securing work and accommodation.¹³ The ‘Shaweesh’ usually leases a piece of land from Lebanese property owners and charges the migrants a fee for rent, water supply and other amenities, though conditions remain quite primitive.^{10,13} Dwellings are often poorly constructed, with leaky roofs, insufficient lighting and poor ventilation. Established evidence correlates inadequate household conditions with direct and indirect negative impacts on health.^{14–19} For example, indoor dampness and mold has been associated with increased development and exacerbation of respiratory problems, recurrent headaches, fever, nausea and vomiting.^{16,17,19–22} Poorly insulated housing can lead to increased mortality rates from cardiovascular conditions and respiratory diseases.^{20,22} Pest infestations have been associated with infectious diseases and asthma.¹⁷ Syrian workers often reside in tiny overcrowded dwellings shared with 10 or more people. These conditions contribute to an increased risk of infectious diseases, such as tuberculosis and hepatitis.¹ Community infrastructure, including the availability and quantity of clean drinking water, functionality of local sewage systems, availability of electricity and solid waste disposal services, impact household health.²²

A number of studies conducted in disadvantaged communities in Lebanon^{14,15} show a positive association between the increase in household and infrastructure problems and the presence of illness. Yet only a few studies on housing and health explore the cumulative effect of household living conditions on the health of residents.^{19,23} This study explores the association between household living

conditions and multi-morbidity among Syrian migrant agricultural workers residing in the Bekaa region in Lebanon.

Methods

A cross-sectional survey was carried out on migrant agricultural workers and members of their household living in the Asheish campsite, a cluster of tented dwellings in the town of Joub Jannine. This town is located in the West Bekaa valley of Lebanon at an elevation of 930 m above sea level and ~68 km from the capital. It stretches over an area of ~1575 ha, and is surrounded by agricultural fields.²⁴ In mapping the West Bekaa valley, the research team found most Syrian migrant farm workers’ campsites to share structural features (i.e. tented dwellings close to agricultural fields). Hence, the Asheish campsite was considered to represent the living conditions of migrant agricultural workers in that region.

In summer of 2011, the researchers approached all housing units in the camp ($n=48$), and data were collected on 290 individuals living in 46 housing units on the campsite (96% response rate). Face-to-face interviews were conducted with one proxy respondent (designated as the head of the household) from each housing unit in the camp. In the event that this person was not present during the visit, the spouse or sibling was interviewed.

Information on demographics, household conditions, working conditions and the general health of this population was collected through a structured questionnaire. The questionnaire was developed in English and then translated into colloquial Arabic and pilot tested with a few migrant workers in a different area in the Bekaa valley. The study was approved by the Institutional Review Board at the American University of Beirut (IRB Protocol Number: FHS.RH1.02).

Indicators

The primary outcome of this study is multi-morbidity measuring the number of distinct health problems (zero, one, two, three or more), counting once for each acute and chronic illness. Chronic illnesses were reported by the proxy respondent with ‘Yes/No’ answers to the question: ‘Does (name) suffer from a chronic illness?’ Acute illnesses were reported by the proxy with the question: ‘In the past 3 months, has (name) suffered from an acute illness?’ Respondents answering ‘yes’ could report up to four types of chronic illnesses and four types of acute illnesses. All illnesses were categorized based on the 10th revised edition of the International Classification of Diseases.²⁵

The independent variable of interest is housing quality which was measured by an index of housing and infrastructure (HII) conditions. All housing units in our study were tents. By definition, a tent ‘is a portable shelter with a cover and a structure’; the descriptive terms adopted for tent are ‘roof’, ‘walls’ and ‘floor’.²⁶ The tents in the Asheish campsite were made of hard cloth material and cardboard, supported by poles and car wheels. On the inside, they were divided into separate ‘rooms’/compartments. The choice of index is based on published research by Habib et al.^{14,15} Items included in the index have been previously used in assessing housing conditions with slightly varying methods.^{5,20,27} The index included six items relating to the housing unit, as follows:

- (1) *Presence of holes or tears in the ‘walls’ of the tent:* Respondents were asked whether their tents showed any holes or tears.
- (2) *Presence of holes or tears the ‘roof’ of the tent:* Similar to the component above.
- (3) *Rainwater flooding:* Settlements similar to Asheish camp are at risk of flooding, particularly during the rainy season. Respondents were asked if they suffered any flooding incident due to rainwater over the past year.
- (4) *Pest infestation (including cockroaches, rats, mice and ants):* Presence of pests is a common indicator of poor housing

quality. Respondents were asked to report pest infestations in their housing units.

- (5) *Absence of a heating source:* Respondents were asked if they possessed a heating source/device for the winter. Since the index is a summation of problems in housing conditions, the variable was recoded such that ‘yes’ denoted the absence of a heating source and ‘no’ denoted the presence of a heating source.
- (6) *Shortage in drinking water:* Respondents were asked if they suffered from shortages in drinking water and how often that problem occurred (always, most of the time, some of the time or never). The variable was later recoded into a yes/no question to be included in the index.

All the items of the HII are dichotomized such that zero denoted the absence of the problem and one denoted its presence. These items are summed up to form a score ranging from 0 to 6. A higher score on the index indicated worse housing and infrastructure conditions.

Associations were drawn between health indicators and the HII, adjusting for age, gender, crowding, household assets and wealth. Crowding was calculated by dividing the number of individuals residing in each housing unit by the number of ‘rooms’ in the unit (not including the kitchen area). Overcrowded residences housed more than three persons per room.²⁸ An assets score was calculated based on a principal components analysis of a respondent’s household assets and amenities (fridge, dishwasher, laundry machine, cell phone, house phone, water heater, radio, television and satellite). Indicators of household assets and amenities were converted into z-scores, and factor loadings for a single assets factor were calculated. For each respondent, values of the indicator variables were multiplied by the factor loadings to obtain an assets score. Respondents were grouped into quartiles by assets score. Wealth included income, owning a house in Syria and the ability to rent the land they currently live on.

Bivariate analyses were carried out to examine the associations between multi-morbidity and other independent variables. An ordinal logistic regression model was carried out to establish the association between the HII and the number of health outcomes adjusting for age, gender, crowding, assets and wealth. Statistical analysis was conducted using Stata 10. Adjusted and unadjusted odds ratios and their 95% confidence intervals are reported, and *P* values <0.05 are considered significant.

Results

All of the migrants residing in the campsite held Syrian nationality. The population was young, with a mean age of 20 years and almost an equal distribution between genders (table 1). Forty-one percent had low levels of formal education, being either illiterate or not having completed any level of education. The population lived in crowded dwellings (an average of six persons per ‘room’), and 62% of the housing units categorized as overcrowded. Household income was categorized into two equal groups indicating that almost half of all households earned <800 dollars total per month.

The survey revealed that a considerable percentage of households in the camp had problems in housing and infrastructure conditions (table 2). About 68% reported holes in the ‘walls’ and 72.1% reported holes in the ‘roof’. Thirty-five percent had no heating source for the winter season, and 64.8% were subjected to flooding due to rainwater. Almost all (94.5%) reported the presence of pest infestation. Around two-thirds of the housing units (62.4%) reported suffering shortages in drinking water supply. In sum, we found that almost 70% of inhabitants reported living in housing units with over three problems in housing and infrastructure conditions.

Our analysis showed a significant positive association between multi-morbidity and poor housing and infrastructure conditions (table 3). Almost half the population suffered from at least one illness (47.2%), with 13% suffering from three types of illness or

Table 1 Demographic, socio-economic and health characteristics of Syrian migrant workers and members of their household living in informal settlements in Bekaa, Lebanon, *n*=290, 2011

	<i>N</i>	%
Gender		
Male	131	45.2
Female	156	53.8
No answer	3	1.0
Age (years)		
0–10	63	21.7
11–20	87	30.0
21–30	50	17.2
>30	43	14.8
No answer—Don’t know	47	16.2
Mean (min–max)	19.88 (1 month–80 years)	
Level of education		
Does not read and write/did not complete any level of education	120	41.4
Primary/elementary	63	21.7
Intermediate/secondary	69	23.8
Does not apply ^a	19	6.6
No answer	19	6.6
Assets		
Lowest	82	28.3
Middle	112	38.6
Highest	96	33
Household income/month (dollars)		
≤800	139	48.0
>800	151	52.0
Mean (min–max)	1074 (83–2400)	
Crowding		
≤3	109	37.6
>3	181	62.4
Mean (min–max)	5.80 (1–16)	
Number of illnesses		
None	153	52.8
One	57	19.6
Two	42	14.5
Three or more	38	13.1
Prevalence of type of illnesses (percent out of total)		
Diseases of the respiratory system (such as flu, acute tonsillitis and sore throat)	158	54.5
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (such as headache, cough, dizziness and nose bleeds)	48	16.6
Diseases of the digestive system	22	7.6
Diseases of the musculoskeletal system and connective tissue	13	4.5
Diseases of the circulatory system	11	3.8
Certain infectious and parasitic diseases	6	2.1
Endocrine, nutritional and metabolic diseases	4	1.8
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	3	1.0
Diseases of the nervous system	3	1.0
Diseases of the genitourinary system	2	0.7
Disorders of the eye and adnexa	1	0.3
Neoplasms	1	0.3
Diseases of the skin and subcutaneous tissue	1	0.3

a: Below the age of 5 years.

more. The most prevalent health problems (table 1) are diseases of the respiratory system (54.5%), undiagnosed symptoms (i.e. coughing, headache, dizziness and nose bleeds; 16.6%), and digestive system illnesses (7.6%). With every unit increase in the HII, the odds of having an additional health problem increases by 77% (OR = 1.77; 95% CI = 1.37–2.29).

Discussion

The findings of the study add to mounting evidence of greater multi-morbidity among disadvantaged populations.^{29–31} The present research is consistent with findings from a previous study of Palestinian refugees in Lebanon showing a significant positive association between multi-morbidity and increasing disadvantage.³² The poor environmental and housing conditions and associated illnesses reported in the Asheish camp are comparable to those in other disadvantaged farming communities.^{2,5,27} The multiplicity of neighborhood and household problems found in disadvantaged communities has been associated with increased prevalence of multiple illnesses.^{14,18,33} This connection is strongly supported by an international literature, which associates housing problems such as structural integrity, dampness, flooding and pest infestations to increased morbidities.^{16,17,21} Our study showed a high prevalence of housing units with poor structural integrity (resulting in water

leakage and dampness), the presence of pests and shortage of drinking water, all of which have been linked to increased risks of chronic and acute illnesses.^{16,17,19,21} Consequently, improving the housing conditions of Syrian migrant workers may be one of the more achievable means to improve health outcomes.³²

Syrian civil war and Syrian migrant workers

The status of the Syrian seasonal migrant workers in Lebanon, following the field research of this study, has changed: they are either permanent migrants or refugees seeking asylum. By January 2016, official estimates suggested that >1 million Syrians now reside in Lebanon (representing 25% of Lebanon's total population).³⁴ With the escalation of the Syrian armed confrontation starting in March 2011, seasonal migrants are unable to cross the border; thus, they can no longer benefit from healthcare services in Syria. Consequently, the ongoing conflict and deterioration of Syria's healthcare infrastructure has produced a new 'therapeutic geography'.³⁵ This, in addition to the limited availability of cheap healthcare and already limited national infrastructure and economy in Lebanon, is expected to exacerbate the health of these migrants.³⁴

Mass evacuations from Syria to Lebanon negatively impacted living conditions of Syrian workers in Lebanon.¹³ For some, immediate and extended family members fled Syria and joined their crowded tents. Figure 1 shows the aerial maps of the Asheish camp in July 2011 around the time of data collection, and in May 2014. The difference in population density between 2011 and 2014 is

Table 2 Infrastructure and housing conditions of Syrian migrant workers and members of their household living in informal settlements in Bekaa, Lebanon, *n* = 290, 2011

	<i>N</i>	%
Presence of holes in walls		
Yes	198	68.3
No	92	31.7
Presence of holes in ceiling		
Yes	209	72.1
No	81	27.9
Absence of heating source		
Yes	102	35.2
No	188	64.8
Shortage in drinking water		
Yes	181	62.4
No	109	37.6
Rainwater flooding		
Yes	188	64.8
No	102	35.2
Pest infestation		
Yes	274	94.5
No	16	5.5
Housing and Infrastructure Index—HII (number of problems)		
1	8	2.8
2	27	9.3
3	61	21.0
4	76	26.2
5	105	36.2
6	13	4.5

Table 3 Ordinal logistic regression model of the association between the housing and infrastructure index and the number of health outcomes^a among Syrian migrant workers and members of their household living in informal settlements in Bekaa, Lebanon, *n* = 290, 2011

Multiple Health Outcomes ^a (<i>n</i> =239)				
	Unadjusted OR (95% CI)	<i>P</i> values	Adjusted OR ^b (95% CI)	<i>P</i> values
Housing and Infrastructure Index—HII	1.37 (1.13–1.66)	0.001	1.77 (1.37–2.29)	<0.001

a: The multiple health outcome is a composite score of having one or multiple chronic or acute illnesses.

b: Adjusted for age, gender, crowding, assets and wealth.

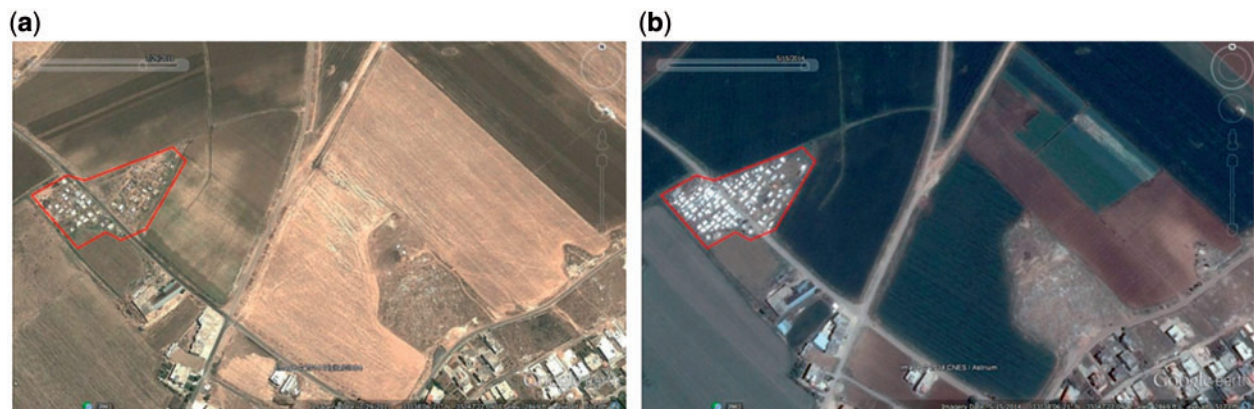


Figure 1 Aerial map of the Asheish camp on (a) 29 July 2011 and (b) 15 May 2014. Source: Google Earth Map. The Asheish camp site boundaries in the maps are marked with the red contour

clearly depicted by the increase in the number of dwellings in the camp (see figure 1). In a survey carried out by UNHCR in June 2015, Syrian refugee households showed increased crowding levels, and ~16% exhibited substandard and/or dangerous conditions.³⁶ Around 18% of households were located in informal settlements (i.e. tents, collective shelters, unfinished constructions, garages, squatting and separate rooms).³⁶

The number of makeshift camps like those described earlier have multiplied. Over 1224 informal settlements can now be found in Lebanon, particularly between the Bekaa and northern regions.³⁷ Observers have noted these housing communities to have poor sanitation conditions, fire hazards and flooding.^{11,36} In January 2015, heavy rainfall led to severe flash floods damaging Syrian refugees' camps and belongings.³⁸ In addition, the numerous reports of contaminated drinking water and overall poor hygiene in camps are troubling.³⁹ The spread of infectious diseases is a primary concern for camp residents.³⁹ Surveys reporting on the health of Syrian refugees in Lebanon indicated acute respiratory tract infections as the most common communicable diseases. The top causes for morbidity due to non-communicable diseases were diabetes, hypertension, cardiovascular illnesses and lung disease.⁴⁰

The new economic and humanitarian migrants from Syria have likely altered Syrian participation in the Lebanese labor force, as well as the complexity of workers' health issues. Further research is needed to explore the changing 'therapeutic geography' for Syrians residing in Lebanon, specifically on how the Syrian working population negotiates its healthcare access. Learning more is an important first step to establish and improve upon existing aid programs.

Limitations

A limitation of this study is that the data were collected prior to the influx of Syrians from the war. Yet, there are no preexisting studies on the association between health and neighborhood and household living conditions for this marginalized population. Another limitation of this study is the inability to stratify the analysis by independent variables (age, sex/gender, socioeconomic status, etc.) due to the relatively small sample of participants. This study provides a useful baseline from which to build future research, policy and practice, even if the realities on the ground are rapidly shifting.

Conclusion

The findings in this study show that multi-morbidity is closely tied to neighborhood and household environmental conditions of Syrian migrant informal settlements across Lebanon. A collaborative effort to address these conditions among stakeholders (namely community representatives, academics, NGOs and government offices) is necessary to help secure Syrian migrants' health and wellbeing. Given the scope of such an initiative, the fragmented efforts undertaken by the UNHCR, UNICEF and NGOs are insufficient.

Moreover, studies have not yet assessed the effect of the conflict and mass migration on the previous migrant farmworker communities in Lebanon. This avenue of research might help adapt new agricultural, labor and health policies around the changing realities for this population. Studies might explore whether these populations have registered as 'refugees', and if so, why? Have there been significant demographic shifts in these communities? Has the increased number of job seekers led to lower compensation and greater unemployment among these communities?

This research voices some of the health and community problems of this population with the hope that by highlighting these realities, greater advocacy work can be done to support the needs of these communities. Research and advocacy that benefit this population

will become increasingly relevant since the number of displaced Syrians seeking jobs in Lebanon's agricultural sector continues to grow. As the size of these informal settlements continues to multiply, it is unlikely that the pervasively poor living conditions will improve.

Key points

- This study is the first to explore the relationship between multi-morbidity and poor infrastructure and housing conditions in a migrant agricultural community.
- There is a statistically significant positive association between community members' household living conditions and multi-morbidity.
- The outbreak of the Syrian armed conflict which has displaced over a million Syrians to Lebanon may lead to a dramatic deterioration of living standards for migrant farmworker communities.
- Multi-faceted community development initiatives should promise basic minimums of neighborhood infrastructure and housing quality for Syrian migrant informal settlements across Lebanon and would safeguard the health and wellbeing of community residents.

Acknowledgements

The authors thank Lama Moussa, Athar Khalil and Alaa Khalil for their involvement in data collection.

Funding

This work has been partially funded by International Development Research Center (IDRC), Canada—Grant number: 106981-001.

Conflicts of interest: None declared.

References

- 1 Arcury TA, Quandt SA. Living and working safely: challenges for migrant and seasonal farmworkers. *N C Med J* 2011;72:466–70.
- 2 Early J, Davis SW, Quandt SA, et al. Housing characteristics of farmworker families in North Carolina. *J Immigr Minor Health* 2006;8:173–84.
- 3 Habib RR, Fathallah FA. Migrant women farm workers in the occupational health literature. *Work* 2012;41(Suppl 1):4356–62.
- 4 International Labour Organization (ILO). *Safety and Health in Agriculture*. Safe Work, Programme on Safety, health and the environment, Labour Protection Department, ILO, Geneva, 2000.
- 5 Vallejos QM, Quandt SA, Grzywacz JG, et al. Migrant farmworkers' housing conditions across an agricultural season in North Carolina. *Am J Indus Med* 2011;54:533–44.
- 6 Kawakibi S. Les travailleurs Syriens au Liban: Entre re'cupe'ration politique et exploitation. Robert Schuman Centre for Advanced Studies, European University Institute, Fiesole, 2008.
- 7 Central Administration of Statistics. *Statistical Yearbook 2010*. Beirut: Lebanese Republic Presidency of the Council of Ministers, 2011.
- 8 Les travailleurs syriens au Liban ou la complémentarité de deux systèmes [Internet]. 2007. Available at: http://hal.archives-ouvertes.fr/docs/00/28/39/11/PDF/Les_travailleurs_syriens_au_Liban.pdf (14 March 2014, date last accessed)
- 9 Habib RR. *Farm Workers: Double Marginalization*. Al-Akhbar, Beirut, 2010.
- 10 Habib RR, editor. Migrant agricultural workers in Lebanon: our harvest of shame. occupational health in developing countries: a cue for social justice. Proceedings of the American Public Health Annual Meeting. 6–10 November 2010. Denver, Colorado, 2010.

- 11 United Nations High Commissioner for Refugees (UNHCR). *Lebanon: Syria Regional Refugee Response*, UNHCR Syria Regional Refugee Response, Inter-agency Information Sharing Portal. 2015.
- 12 Chaaban J. *Labour Markets Performance and Migration Flows in Lebanon*. Robert Schuman Centre for Advanced Studies, European University Institute Fiesole, 2009.
- 13 Council DR. *Emergency Market Mapping and Analysis (EMMA) of the Agricultural Labor Market System in North and Bekaa, Lebanon*. Danish Refugee Council, Department for International Development, Oxfam, International Rescue Committee, Save the Children. 2013.
- 14 Habib RR, Mahfoud Z, Fawaz M, et al. Housing quality and ill health in a disadvantaged urban community. *Public Health* 2009;123:174–81.
- 15 Habib RR, Yassin N, Ghanawi J, et al. Double jeopardy: assessing the association between internal displacement, housing quality and chronic illness in a low-income neighborhood. *J Public Health* 2011;19:171–82.
- 16 Haines A, Bruce N, Cairncross S, et al. Promoting health and advancing development through improved housing in low-income settings. *J Urban Health* 2013;90:5:810–831.
- 17 Krieger J, Higgins DL. Housing and health: time again for public health action. *Am J Public Health* 2002;92:758–68.
- 18 Bailie R, Stevens M, McDonald E, et al. Exploring cross-sectional associations between common childhood illness, housing and social conditions in remote Australian Aboriginal communities. *BMC Public Health* 2010;10:147.
- 19 Bonnefoy X. Inadequate housing and health: an overview. *Int J Environ Pollut* 2007;30:411–29.
- 20 Keall M, Baker MG, Howden-Chapman P, et al. Assessing housing quality and its impact on health, safety and sustainability. *J Epidemiol Commun Health* 2010;64:765–71.
- 21 Mendell MJ, Mirer AG, Cheung K, et al. Respiratory and allergic health effects of dampness, mold, and dampness-related agents: a review of the epidemiologic evidence. *Environ Health Perspect* 2011;119:748–56.
- 22 World Health Organization (WHO). *Environmental Burden of Disease Associated with Inadequate Housing*. WHO Regional Office for Europe. Copenhagen, 2011.
- 23 Adamkiewicz G, Spengler JD, Harley AE, et al. Environmental conditions in low-income urban housing: clustering and associations with self-reported health. *Am J Public Health* 2014;104:1650–6.
- 24 Les travailleurs syriens au Liban ou la complémentarité de deux systèmes [Internet]. 2008. Available at: <http://www.localiban.org/spip.php?article4554> (12 September 2014, date last accessed).
- 25 World Health Organization (WHO). *International Statistical Classification of Diseases and Related Health Problems, 10th edn*. WHO. Geneva, 1992.
- 26 United Nations Office for the Coordination of Humanitarian Affairs (OCHA). *A Guide to the Use and Logistics of Family Tents in Humanitarian Relief*. United Nations. Geneva, 2004.
- 27 Arcury TA, Weir MM, Summers P, et al. Safety, security, hygiene and privacy in migrant farmworker housing. *New Solut* 2012;22:153–73.
- 28 United Nations Human Settlements Programme (UN-Habitat). *Urban Indicators Guidelines—Better Information, Better Cities: Monitoring the Habitat Agenda and the Millennium Development Goals—Slums Target*. UN-Habitat. Nairobi, Kenya, 2009.
- 29 Barnett K, Mercer SW, Norbury M, et al. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *Lancet* 2012;380:37–43.
- 30 Mercer SW, Watt GC. The inverse care law: clinical primary care encounters in deprived and affluent areas of Scotland. *Ann Fam Med* 2007;5:503–10.
- 31 Walker AE. Multiple chronic diseases and quality of life: patterns emerging from a large national sample, Australia. *Chronic Illn* 2007;3:202–18.
- 32 Habib RR, Hojeij S, Elzein K, et al. Associations between life conditions and multimorbidity in marginalized populations: the case of Palestinian refugees. *Eur J Public Health* 2014;24:727–33.
- 33 Zabaneh JE, Watt GC, O'Donnell CA. Living and health conditions of Palestinian refugees in an unofficial camp in the Lebanon: a cross-sectional survey. *J Epidemiol Commun Health* 2008;62:91–7.
- 34 United Nations High Commissioner for Refugees (UNHCR). *Syria Regional Response Plan. Lebanon*, UNHCR. 2015.
- 35 Dewachi O, Skelton M, Nguyen VK, et al. Changing therapeutic geographies of the Iraqi and Syrian wars. *Lancet* 2014;383:449–57.
- 36 World Food Programme (WFP), United Nations High Commissioner for Refugees (UNHCR), United Nations Children's Emergency Fund (UNICEF). *Vulnerability Assessment of Syrian Refugees in Lebanon 2015 Report*. WFP, UNHCR, and UNICEF. 2015.
- 37 United Nations High Commissioner for Refugees (UNHCR) & United Nations Human Settlements Programme (UN-Habitat). *Housing, Land & Property Issues in Lebanon: Implications of the Syrian Refugee Crisis*. UNHCR & UN-Habitat. Beirut, 2014.
- 38 Knutsen E. *Cold Weather Worsens Living Conditions for Syrian Refugees*. The Daily Star, 2015.
- 39 International Labour Organization Regional Office for the Arab States (ILO-ROAS). *Assessment of the Impact of Syrian Refugees in Lebanon and Their Employment Profile*. Beirut: International Labor Organization, 2014.
- 40 United Nations High Commissioner for Refugees (UNHCR). *Inter-Agency Regional Response for Syrian Refugees*. Iraq, Jordan and Lebanon: Health and Nutrition Bulletin, 2013.

.....
The European Journal of Public Health, Vol. 26, No. 6, 1045–1049

© The Author 2016. Published by Oxford University Press on behalf of the European Public Health Association.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License

(<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact journals.permissions@oup.com

doi:10.1093/eurpub/ckw079 Advance Access published on 1 July 2016

Health-based risk neutralization in private disability insurance

Elisabeth C. Wijnvoord^{1,2,3}, Jan Buitenhuis^{1,3,4}, Sandra Brouwer¹, Jac J.L. van der Klink¹, Michiel R. de Boer^{1,5}

1 Department of Health Sciences, Community and Occupational Medicine, University Medical Center Groningen, Groningen, Netherlands

2 Medical Department Movir Insurance, Netherlands

3 Dutch Academic Center for Insurance Medicine

4 Medical Department Univé Insurance, Netherlands

5 Department of Health Sciences and the EMGO Institute for Health and Care Research, Faculty of Earth and Life Sciences, VU University, Amsterdam, Netherlands

Correspondence: Elisabeth C. Wijnvoord, Department of Health Sciences, Community and Occupational Medicine, University Medical Center Groningen, Antonius Deusinglaan 1, 9713 AV Groningen, Netherlands, Tel: +0031643008340, Fax: +0031306048455, e-mail: e.c.wijnvoord@umcg.nl

Background: Exclusions are used by insurers to neutralize higher than average risks of sickness absence (SA). However, differentiating risk groups according to one's medical situation can be seen as discrimination against people with health problems in violation of a 2006 United Nations convention. The objective of this study is to investigate whether the risk of SA of insured persons with exclusions added to their insurance contract differs from the risk of persons without exclusions. **Methods:** A dynamic cohort of 15 632 applicants for private disability insurance at a company insuring only college and university educated self-employed in the Netherlands. Mean follow-up was 8.94 years. Duration and number of SA periods were derived from insurance data to calculate the hazard of SA periods and of recurrence of SA periods. **Results:** Self-employed with an exclusion added to their insurance policy experienced a higher hazard of one or more periods of SA and on average more SA days than self-employed without an exclusion. **Conclusion:** Persons with an exclusion had a higher risk of SA than persons without an exclusion. The question to what extent an individual should benefit from being less vulnerable to disease and SA must be addressed in a larger societal context, taking other aspects of health inequality and solidarity into account as well.

Introduction

In modern society, insurers provide a valuable social function in shifting, spreading and reducing risks.¹ Therefore, accessibility and affordability of insurance are of great importance. Over the past years, private insurance companies have been met with growing criticism regarding risk selection practices, allegedly leading to unfair discrimination. Risk rating is thought to lead to discrimination of groups with chronic conditions.² A person's health is usually perceived as being influenced by a range of social and genetic factors, over which the person has limited or no control. Excluding people based on their health is seen as unethical by many.³ However, the fundamental rule that applies to all insurance products is that the premiums paid are appropriate to the risk of future claims.^{4,5} Thus risk classification based on medical underwriting lies at the core of most of these health-related voluntary insurance policies.⁶

Until now, most concern regarding risk stratification based on medical information has focused on life insurance and genetic information. However, other forms of insurance, e.g. disability insurance and risk factors other than genetic information such as past medical history are equally important and deserve just as much attention to prevent unfair discrimination.^{7,8}

When applying for private disability insurance, the risk of future claims is estimated by evaluating the current health status and the medical history of the applicant. Possible forms of risk management at application stage are a longer waiting period before a benefit is paid (longer deferment period), limited duration of the insurance

contract, extra premium or in case of an excessive risk even rejection of the insurance application. If a specific condition substantially increases the risk of claims being made, an exclusion can be added to neutralize this risk, i.e. the insured will not be entitled to a benefit if sickness absence (SA) is caused by the condition specified in the exclusion.^{4,9} Internationally, exclusions are a frequently used method of risk management in disability insurance.^{4,9} In a survey among Dutch self-employed 8% of those insured had an exclusion added to their insurance policy.¹⁰

Only two studies have attempted to evaluate this practice of risk neutralization. Wildhagen et al.¹¹ performed a case-control study in an exclusively male population comparing insured with and without exclusions. They found that insured without an exclusion claimed benefits less often than those with an exclusion. No significant difference in the length of the SA between those with and those without an exclusion was found.¹¹ Hamilton et al.¹² studied risk factors for insurance claims in a case-control study comparing claimants and non-claimants from a disability insurance company. In contrast to the findings of the previously mentioned study they found no relation between claims and exclusions.¹²

Thus knowledge regarding risk estimation and neutralization at application for private disability insurance is scarce, is based on limited evidence and is contradictory, leaving a considerable knowledge gap. The aim of this study is, therefore, to investigate whether the risk of SA of insured persons with exclusions added to their insurance contract differs from the risk of persons without exclusions.