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LIVING AND HEALTH CONDITIONS OF PALESTINIAN REFUGEES IN AN UNOFFICIAL CAMP IN THE LEBANON: A CROSS-SECTIONAL SURVEY

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ABSTRACT

Objective: To determine the living conditions and self-reported health of Palestinian refugees living in an unofficial camp in Lebanon.

Design: Cross-sectional survey.

Setting: Gaza displacement centre, Beirut, Lebanon.

Participants: 97 households and 437 residents.

Main outcome measures: Household characteristics, including number of rooms per household; access to outside air; presence of mould and dampness. Resident characteristics, including age; educational attainment; and chronic conditions.

Results: Half of the households surveyed had only one room; 44% three or more people per room; 11% no external ventilation; 49% no heating; 54% mould and dampness. The use of wood or charcoal for heating was associated with an increase in mould and dampness ($p = 0.015$). 135 (31%) of the population were aged under 15; 130 (30%) had a chronic condition. Logistic regression results showed that overcrowding (OR = 3.26) and a member of the household living in Gaza buildings for more than 15 years (OR = 0.48) were significantly associated with children under 15. Age over 45 years (OR = 5.32), member of the household in full-time employment (OR = 0.58) and a member of the household living in Gaza buildings for more than 15 years (OR = 1.71) were significantly associated with chronic disease.

Conclusion: This study demonstrates the poor conditions under which Palestinian refugees in unofficial camps live, resembling the slum housing of the UK last century. In the absence of routine data collection, research may be the only way to obtain such data for future public and environmental health planning.

What is already known on this subject.

Gathering health and environmental data on refugee and displaced populations for public health purposes is often difficult.

One such situation is that of the 394,532 Palestinian refugees living in the Lebanon, of which 224,000 are housed in official UNRWA camps.

While there is some information on the living conditions of those refugees, little is known about the living conditions of those in unofficial camps.

What this study adds.

Palestinians living in an unofficial displacement centre experience housing conditions similar to that of the slum housing in the UK last century.

In the absence of routine systems to collect such data, research may be the only way to collect robust data for future planning

INTRODUCTION

Forced migration, particularly due to war or internal conflict, has been a major public health issue for much of the 20th century.[1,2] However, the collection of routine data in such situations to inform public health responses and planning is difficult,[3] and can continue after the initial crisis is over. One such area is the Middle East, with Palestinian refugees and their descendents displaced for almost 60 years in the West Bank, the Gaza Strip and the neighbouring countries of Lebanon, Syria, Jordan and Egypt. To deal with this, the United Nations established the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) in 1949, which continues to carry out education, health, relief and social programmes for Palestinian refugees registered with UNRWA (Box 1).[4] Today, those original refugees and descendents number 394,532, approximately 10% of the Lebanese population.[5] Approximately 224,000 live in one of the 12 official UNRWA camps. The remainder live either in Lebanese towns and villages or in what are called unofficial or unregistered camps or displacement centres. In addition to this population, there is an undefined number of Palestinian refugees who do not qualify for UNRWA registration because they, or their ancestors, were not displaced during the original 1948 conflict (Box 1). These individuals also live in the unofficial camps or displacement centres, but are deprived of UNRWA services. However, whether registered with UNRWA or not, Palestinian refugees are marginalised in Lebanese society by the imposition of restrictions on their civil rights. They are curtailed in the extent to which they can travel through restrictions on the availability of visas; denied the right to become Lebanese citizens; excluded from over 72 professions, forcing them into low-paid, often unregulated work; denied access to higher education, health services and social security; suffer restrictions on building and reconstruction work within the camps; and are prevented from owning land in Lebanon.[6-8] Thus, a marginalised population contains an even more marginalised group with almost no access to basic services other than that provided by non-governmental organisations (NGOs), resulting in few opportunities to monitor their health and living conditions.

It is one such site that is the setting for the research reported here. Families occupied the Gaza displacement centre during the “war of the camps” in 1985-1987, when Palestinian refugees were attacked by a Lebanese militia group. Located in the Sabra area, surrounding the Shatila camp in Beirut, the site was formerly a hospital but was semi-destroyed in 1982. The centre is a cluster of four buildings (known as

Gaza 1 to 4). As an unofficial camp, it is excluded from UNRWA activities. Instead a local NGO, Popular Aid for Relief and Development (PARD), provides basic medical care, health education and sanitation services.

Links between poor environmental conditions and ill health have been postulated, with overcrowding, cold, dampness, mould and poor sanitation suggested to contribute to poor physical and mental health.[9-13] There are acknowledged limitations with research in this area, including difficulties with the generalisability of small scale studies, lack of clarity around the direct (e.g. the physical characteristics of the housing) and indirect (e.g. demographic and social characteristics of the occupants) effects on health, and the lack of agreement on definitions such as overcrowding.[13-16] Even with such limitations, however, there is evidence to suggest a link between poorer housing and health with long-term impacts on children, although most of this has been conducted in the UK, Europe and America.[14,16,17]

To date, there has been little work on the impact of housing on the health of refugee populations. One study, the LIPRIL survey (Living conditions among Palestinian refugees living in camps and gatherings in Lebanon), has looked at the health and living conditions of refugees in the official camps,[18,19] but much less is known about the conditions facing individuals living in the unofficial camps. Here, we report on the living conditions and self-reported health of a sample of families living within the Gaza displacement camp, with particular reference to the impact of housing conditions on the health of children and on chronic disease.

METHODS.

Sample selection

A cross-sectional survey was conducted in May 2003, using a specially developed questionnaire designed to investigate the physical environment of the buildings and the health of the residents. All households in the displacement centre's four buildings (Gaza 1 to 4) were eligible for inclusion in the study. No maps existed of the interior of the buildings and the need to utilise all the space in the buildings meant that there was no formal structure to or knowledge of the number of households on each floor. To overcome this, a social worker employed by PARD sketched out the households on every floor of all four buildings, identifying 274. A 35% random sample of households was then generated, stratified by building and by floor. This resulted in a final sample of 97 households, with data collected on 437 individuals living in those households. The sample size was selected pragmatically, based on estimates of the time it would take health educators to administer the survey and the number of households that they could collect data from each day, within the timeframe of the study.

Questionnaire development and administration

A pilot questionnaire was developed following a review of the literature, questionnaires used by the World Health Organization Large Analysis and Review of European Housing and Health Status (LARES) project (http://www.euro.who.int/Housing/activities/20020711_1) and previous work conducted in refugee camps, including the LIPRIL study.[18,20] The pilot questionnaire was revised in Lebanon in consultation with representatives of PARD, World Vision Lebanon (who sponsor projects conducted by PARD in the area) and PARD's health educators. The final questionnaire covered three main areas:

1. Physical conditions in the household including floor area and size; access to external ventilation, water, kitchen and toilets; presence of mould and damp; garbage collection and the source of energy for heating and cooking.
2. General conditions of the household including the number of residents; years of residency in the buildings; source of external financial support; and availability of other residential place outside Gaza.

3. Demographic and socioeconomic status and health of the residents including age; gender; physical disability; chronic illness; educational attainment; employment and type of travel document.

When the questionnaire content was agreed, it was translated into Arabic. JZ then returned to Beirut to train three local health educators to administer it. These health educators visited each of the selected households, completing the questionnaire with a member of the household, who answered on behalf of all the others in the household. The health educator measured the size of the rooms and noted the presence of windows, mould and dampness.

Analysis

Questionnaire data were entered into Excel, then imported into SPSS version 10.0 for analysis. Descriptive analyses were carried out using frequency tables. Continuous variables were not normally distributed. Therefore median values were reported and comparisons analysed by Kruskall-Wallis test. Where appropriate, the Chi-square test was used as a measure of associations between categorical variable; the Mann-Whitney or Kruskall-Wallis tests were used for ordered categorical variables, depending on whether the second variable had two or more categories. Two-by-two contingency tables were constructed to explore the association between children under 15 and chronic disease with household and personal characteristics. Statistical significance was established using Fisher's Exact test [21]; odds ratios and 95% confidence intervals were calculated using an on-line calculator (www.hutchon.net/ConfidOR.htm). Significant independent variables ($p < 0.10$) were entered into logistic regression models using backwards elimination.

Ethical approval

This study was conducted as part of a Masters degree at the University of Glasgow. At the time the study was conducted, formal University ethical approval was not required. Ethical approval, as understood in the UK, was not required in the Lebanon. However, formal approval to access the population was obtained through PARD, the local NGO.

RESULTS

There were 274 households in total. Residents in 67 of the 97 randomly sampled households agreed to participate (initial response rate = 69%). The remaining 30 household units were either vacant (8) or the residents were long-term absentees (22). In these cases, the preceding household was approached. In this way, 97 households were recruited into the study. The number of households in each building, and thus recruited into the study, varied (Table 1). In most cases, the household respondents were female adults.

Household characteristics

There were marked differences in the living conditions of the four buildings (Table 1). Conditions were most crowded in Gaza 1 and included 8 homes constructed in the backyard (Figure 1).

Half of the households (51%) surveyed had only 1 room (Table 1). The median floor area of households differed significantly across the four buildings (Gaza 1: 18.1m^2, IQR: 14.0 – 28.5; Gaza 2: 43.3m^2, IQR: 37.1 – 50.5; Gaza 3: 25.0m^2, IQR: 18.0 – 33.6; Gaza 4: 18.8m^2, IQR: 12.8 – 37.7. K-W statistic = 18.084, df = 3, $p < 0.0001$). However, as the largest family groups were housed in Gaza 2, the median floor area per person was not significantly different across the four buildings (Gaza 1: 6.1m^2, IQR: 3.7 – 8.8; Gaza 2: 7.7m^2, IQR: 5.6 – 8.8; Gaza 3: 6.0m^2, IQR: 4.2 – 12.4; Gaza 4: 5.0m^2, IQR: 2.3 – 16.7. K-W statistic = 2.301, df = 3, $p = 0.524$). It was apparent, though, that the amount of space was limited, with 43 households (44%) overall meeting the LIPRIL definition of overcrowding[18,19] and 27 (28%) meeting the WHO (Europe) definition[10] (Table 1).

There was a lack of access to heating facilities with half of all households (47; 49%) relying instead on blankets and clothing. Of the 50 households reporting a source of heating, the most common was charcoal or wood (18; 36%); electricity (15; 30%); diesel/kerosene (9; 18%); and gas/methane (8; 16%). This again varied between buildings (Table 1). 52 (54%) of households had mould and dampness; 11 (11%) reported having no window or door giving access to outside air and light.

The presence of heating was associated with mould and dampness (presence of mould and dampness in heated houses = 33/50 (66%) vs presence of mould and

dampness in unheated houses = 19/47 (40%), p = 0.015, Fisher's exact test). Houses with external ventilation were less likely to have mould and dampness compared to those with no external ventilation, although this was not statistically significant (presence of mould and dampness in houses with external ventilation = 43/86 (50%) vs presence of mould and dampness in houses with no ventilation = 9/11 (82%), p = 0.058, Fisher's exact test).

Access to water for domestic use varied, with over half (56%) only able to access water through piping networks that they had constructed (Table 1). A further one-third had no access to piped water of any sort. All respondents purchased drinking water, either commercially or from the Lebanese municipality (3%). Almost all households had their own toilets, with the exception of Gaza 1 where only 19% did. Access to personal kitchen and shower facilities was again poorest in Gaza 1 (Table 1).

Table 1. Characteristics of the households surveyed (Number of households (%)).

	Gaza 1	Gaza 2	Gaza 3	Gaza 4	Total
Total number of households in the building	109	31	102	32	274
Number of floors per building	6	8	10	6	30
Mean number of households per floor	18	4	10	5	9
Number of households recruited into study	42	9	36	10	97
Number of rooms within each household				K-W statistic = 15.593, df = 3, p = 0.001.	
1 room	21 (50.0)	1 (11.1)	23 (63.8)	4 (40.0)	49 (50.5)
2 rooms	18 (42.9)	2 (22.2)	11 (30.6)	5 (50)	36 (37.1)
3 or 4 rooms	3 (7.1)	6 (66.7)	2 (5.6)	1 (10)	12 (12.4)
Access to heating	21 (50.0)	7 (77.8)	14 (38.9)	8 (80.0)	50 (51.5)
Presence of mould and dampness	25 (59.5)	6 (66.7)	13 (36.1)	8 (80.0)	52 (53.6)
External ventilation	34 (81.0)	8 (88.9)	34 (94.4)	10 (8.9)	86 (88.7)

	Gaza 1	Gaza 2	Gaza 3	Gaza 4	Total
Total number of residents living in surveyed households	163	52	139	53	397
Number of residents per household				K-W statistic = 5.219, df = 3, p = 0.156.	
1 or 2 residents	14 (33.3)	0 (0)	10 (27.8)	3 (30.0)	27 (27.8)
3 – 5 residents	16 (38.1)	4 (44.4)	17 (47.2)	5 (50.0)	42 (43.3)
6 or more residents	12 (28.6)	5 (55.6)	9 (25.0)	2 (20.0)	28 (28.9)
Number of people per room				K-W statistic = 2.666, df = 3, p = 0.446.	
Less than 3	23 (54.8)	7 (77.8)	19 (52.8)	5 (50.0)	54 (55.7)
3.0 to 3.9	6 (14.3)	1 (11.1)	4 (11.1)	0 (0)	11 (11.3)
4 or more	13 (31.0)	1 (11.1)	13 (36.1)	5 (50.0)	32 (33.0)
Floor area (m^2) per person				X^2 = 1.104, df = 3, p = 0.776.	
0 – 7.9	30 (71.4)	5 (55.6)	23 (63.9)	7 (70.0)	65 (67.0)
8.0 +	12 (28.6)	4 (44.4)	13 (36.1)	3 (30.0)	32 (33.0)

	Gaza 1	Gaza 2	Gaza 3	Gaza 4	Total
Access to water (Number (%))					
Pipes as part of the building	0 (0)	5 (55.6)	0 (0)	0 (0)	5 (5.2)
Individually established pipes	23 (54.8)	0 (0)	31 (86.1)	0 (0)	54 (55.7)
Shared kitchens & toilets	2 (4.7)	0 (0)	0 (0)	1 (10.0)	3 (3.1)
No pipes	17 (40.5)	4 (44.4)	5 (13.9)	9 (90.0)	35 (36.1)
Access to kitchen & toilet facilities (Number (%))					
Separate kitchen within household	6 (14.3)	7 (77.8)	22 (61.1)	7 (70.0)	42 (43.3)
Separate toilet within household	8 (19.0)	9 (100.0)	35 (97.2)	10 (100.0)	62 (63.9)
Shower room within toilet in household	7 (16.7)	9 (100.0)	35 (97.2)	10 (100.0)	61 (62.9)
Separate shower room in household	2 (4.8)	0 (0)	1 (2.8)	0 (0)	3 (3.1)
Shared showers and toilets	25 (59.5)	0 (0)	0 (0)	0 (0)	25 (25.8)
Showering within the room space of the household	8 (19.0)	0 (0)	0 (0)	0 (0)	8 (8.2)

Residents' characteristics

Of the 97 households, 40 (41%) reported household members living in the Gaza buildings for more than 15 years. Only 19 (20%) had lived there for less than 5 years. Most households (86 (89%)) had no other place of residence and 77 (79%) had no external financial aid from sponsors or charity.

Data were collected on 437 people living in the 97 households (Table 2). The population was young, with only 67 residents (15%) over 45 years.
Educational attainment was generally low, with 99 (63%) males and 103 (57%) of female residents having left school before secondary level (i.e. before the age of 16); 31 (20%) of men and 43 (24%) of women had never attended school. Only 20 (13%) boys and 27 (15%) girls were reported to be currently in full-time education (i.e. between the ages of 6 and 18 years). There were no significant differences in population demographics across the four buildings.

19 residents (4%) were reported to have a physical disability; 130 (30%) were reported to have a chronic condition (Table 2); 119 (27%) were taking medication for a chronic condition.

Table 2. Characteristics of the residents (Number of residents (%)).

	Gaza 1 (n = 181)	Gaza 2 (n = 53)	Gaza 3 (n = 159)	Gaza 4 (n = 44)	Total (n = 437)
Gender					
Male	84 (46.4)	26 (49.1)	84 (52.8)	23 (52.3)	217 (49.7)
Female	97 (53.6)	27 (50.9)	75 (47.2)	21 (47.7)	220 (50.3)
Age					K-W statistic = 3.899, df = 3, p = 0.273.
0 – 15 years	50 (27.8)	15 (28.3)	53 (33.5)	17 (38.6)	135 (31.0)
16 – 44 years	96 (53.3)	31 (58.5)	84 (53.2)	22 (50.0)	233 (53.6)
45 years and over	34 (18.9)	7 (13.2)	21 (13.3)	5 (11.4)	67 (15.4)
Citizenship					
Palestinian refugee living in Lebanon	126 (69.6)	51 (96.2)	111 (69.8)	35 (79.5)	323 (73.9)
Palestinian refugee from Syria, Jordan or Egypt	12 (6.6)	1 (2.7)	9 (5.7)	0 (0)	22 (5.0)
Lebanese citizen	21 (11.6)	0 (0)	12 (7.5)	4 (9.1)	37 (8.5)
Syrian citizen	22 (12.2)	0 (0)	20 (12.6)	5 (11.4)	47 (10.8)
Other	0 (0)	1 (1.9)	7 (4.4)	0 (0)	8 (1.9)

	Gaza 1	Gaza 2	Gaza 3	Gaza 4	Total
Chronic conditions	**(n = 58)**	**(n = 17)**	**(n = 44)**	**(n = 11)**	**(n = 130)**
Cardiovascular disease	16 (27.6)	4 (23.5)	7 (15.9)	2 (18.2)	29 (22.3)
Respiratory	11 (19.0)	4 (23.5)	9 (20.5)	1 (9.1)	25 (19.2)
Musculoskeletal	10 (17.2)	1 (5.9)	7 (15.9)	3 (27.3)	21 (16.2)
Diabetes	4 (6.9)	3 (17.7)	3 (6.8)	0 (0)	10 (7.7)
Gastrointestinal	4 (6.9)	1 (5.9)	5 (11.4)	0 (0)	10 (7.7)
Nervous system including epilepsy	4 (6.9)	0 (0)	3 (6.8)	0 (0)	7 (5.4)
Renal	2 (3.4)	1 (5.9)	3 (6.8)	1 (9.1)	7 (5.4)
Others	7 (12.1)	3 (17.7)	7 (15.9)	4 (36.4)	21 (16.1)

Univariate analysis demonstrated that children under the age of 15 were more likely to live in overcrowded households, whether defined according to the LIPRIL (OR = 3.43) or the WHO Europe (OR = 3.24) definitions (Table 3). Heating (OR = 0.69), external ventilation (OR = 0.82) and mould and dampness (OR = 1.31) were not significantly associated with children (Table 3). Children were less likely to suffer from a chronic disease themselves (OR = 0.54), but were no more or less likely to live in a household where someone else had a chronic disease (OR = 1.06). Children were significantly less likely to live in a household where someone had been resident in the Gaza buildings for over 15 years (OR = 0.44). Significant univariate variables were entered into a logistic regression model. The LIPRIL definition of overcrowding was used, as it was the most appropriate for the population under study. The final model (Table 4) included overcrowding (OR = 3.26) and whether a member of the household had lived in the Gaza buildings for >15 years (OR = 0.48).

Individuals with chronic disease were less likely to live in overcrowded housing. This difference was statistically significant when overcrowding was defined using the LIPRIL definition (OR = 0.61), but was not significant when defined by the WHO Europe guidelines (OR = 0.67; Table 3). Other household characteristics were not associated with the presence or absence of chronic disease. Chronic disease was associated with age (OR = 5.61; Table 3). Individuals living in a house where at least one person had been educated to secondary school level or above (OR = 0.61) or where someone was in full-time employment (OR = 0.57) were less likely to suffer from chronic disease. Again, significant univariate variables were entered into a logistic regression model, as was an interaction term for age and the number of years living in the Gaza buildings. The final model (Table 4) included age over 45 years (OR = 5.32), whether a member of the household was in full-time employment (OR = 0.58) and whether a member of the household had lived in the Gaza buildings for >15 years (OR = 1.71).

Table 3. Association of household and personal characteristics with children under 15 and with chronic disease

	Age				
	Under 15 (n=135) Number (%)	Over 15 (n=300) Number (%)	Odds ratio	95% CI	p-value[a]
Overcrowding: 3 or more per room[b]	107 (79.3)	158 (52.7)	3.43	2.14 to 5.52	< 0.0001
Overcrowding: < 8m^2 per person[c]	123 (91.1)	228 (76.0)	3.24	1.69 to 6.2	< 0.0001
Heating in the household	60 (44.4)	161 (53.7)	0.69	0.46 to 1.04	0.079
External ventilation in the household	121 (89.6)	274 (91.3)	0.82	0.41 to 1.63	0.592
Mould and dampness in the household	81 (60.0)	160 (53.3)	1.31	0.87 to 1.98	0.212
Travel documents: Palestinian refugee	107 (79.3)	237 (79.0)	1.02	0.62 to 1.68	1.000
Member of household in full-time employment	71 (52.6)	165 (55.0)	0.91	0.60 to 1.36	0.678
Member of household educated to secondary school level or above	40 (29.6)	94 (31.3)	0.93	0.59 to 1.44	0.738
Suffering from chronic disease themselves	29 (21.5)	101 (33.8)	0.54	0.33 to 0.86	0.009
Member of household with a chronic disease	110 (81.5)	242 (80.7)	1.06	0.63 to 1.77	0.896
Member of household living in Gaza buildings for more than 15 years	36 (26.7)	136 (45.3)	0.44	0.28 to 0.68	< 0.0001

	Chronic disease				
	Yes (n=130) Number (%)	No (n=306) Number (%)	Odds ratio	95% CI	p-value[a]
Overcrowding: 3 or more per room[b]	68 (52.3)	197 (64.4)	0.61	0.40 to 0.92	0.024
Overcrowding: < 8m^2 per person[c]	99 (76.2)	253 (82.7)	0.67	0.41 to 1.10	0.144
Heating in the household	71 (54.6)	150 (49.0)	1.25	0.83 to 1.89	0.297
External ventilation in the household	120 (92.3)	276 (90.2)	1.30	0.62 to 2.75	0.588
Mould and dampness in the household	71 (54.6)	170 (55.6)	0.96	0.64 to 1.45	0.916
Travel documents: Palestinian refugee	107 (82.3)	237 (77.5)	1.35	0.80 to 2.29	0.305
Member of household in full-time employment	58 (44.6)	179 (58.5)	0.57	0.38 to 0.87	0.009
Aged over 45 years	42 (32.3)	24 (7.8)	5.61	3.22 to 9.78	< 0.0001
Member of household educated to secondary school level or above	31 (23.8)	104 (34.0)	0.61	0.38 to 0.97	0.041
Member of household living in Gaza buildings for more than 15 years	67 (51.5)	105 (34.3)	2.04	1.34 to 3.09	0.001

a Fisher's exact test.
b LIPRIL definition.
c WHO (Europe) definition.

Table 4. Association of household and personal characteristics with children under 15 and with chronic disease: logistic regression results

	Odds ratio	95% CI	p-value
Dependent variable: Children under 15			
Overcrowding: 3 or more per room[a]	3.26	2.01 to 5.27	< 0.0001
Suffering from chronic disease	0.64	0.39 to 1.05	0.079
Member of household living in Gaza buildings for >15 years	0.48	0.30 to 0.76	0.002
Dependent variable: Suffering from chronic disease			
Aged over 45 years	5.32	2.99 to 9.47	< 0.0001
Member of household in full-time employment	0.58	0.37 to 0.90	0.016
Member of household educated to secondary school level or above	0.64	0.38 to 1.05	0.079
Member of household living in Gaza buildings for >15 years	1.71	1.09 to 2.67	0.019

a LIPRIL definition.

DISCUSSION

Conducting health needs assessments amongst refugee and displaced communities is difficult.[2,3] This is compounded, in this situation, by the almost non-existent official status of this population who, for historical reasons, do not come under the auspices of UNRWA, are not recognised by the Lebanese government and rely on NGOs for support.

The study demonstrated that the conditions under which this long-term refugee population were living were comparable to those found in the slum housing of the UK last century.[22] Children under 15 were more likely to be living in overcrowded conditions and, although not statistically significant, in housing that was unheated. Multivariate analysis retained the association with overcrowding. Children were also part of a more recent wave of influx into the Gaza buildings, and may indicate that such families end up living in poorer accommodation. As could be expected, individuals suffering from chronic diseases were older and were in households that had been part of the GAZA buildings for longer. Chronic disease also appeared to be associated with improved social conditions, as those in full-time employment or educated to secondary school level or above were less likely to suffer from chronic disease.

There were limitations with this study. The first was the lack of consistent definitions, particularly for overcrowding.[16] However, by either definition used, a significant number of the households surveyed were overcrowded. The second was our inability to distinguish between the effects of poor housing on health and the possible confounding effects of lower income and lack of employment opportunities. Again, this is a recognised limitation of research in this area. [13-15] The final limitation was the lack of counterfactual, or control, data.[23] Collection of such data was not possible within the parameters of this study and such data are not routinely available. However, comparison of the findings reported here with that of the LIPRIL study offer useful insights. For example, the LIPRIL report defined overcrowded housing as that which had 3 or more people to a room.[18,19] Using this criterion, 44% of households in the Gaza buildings were overcrowded compared to 27% in official camps and gatherings in the Lebanon. The LIPRIL report also found that dwellings in the official camps had, on average, three rooms, excluding the kitchen, toilet and hallways.[18,19] Here, half of the dwellings had just one room used for cooking, eating, sleeping and socializing. The median floor area per household of 24.8 m^2 was

significantly less than the WHO minimum recommendation of 70 m^2 for a family of three to five.[10]

There were also differences across the four buildings. The LIPRIL survey indicated that over 90% of households had separate kitchen and toilet facilities.[18,19] While the Gaza 2, 3 and 4 buildings were similar, Gaza 1 had much poorer access to such facilities.

Many of the households also had mould and dampness, poor external ventilation and a lack of heating. All of these factors may contribute to poor health, particularly respiratory disease,[10-12,24] with evidence pointing to cold housing as being particularly associated with poor health. Up to one-third of the population did report some type of chronic condition, including respiratory problems, although these were self-reported. This was higher than that reported for official camps, where the figure was 19%.[18,19] There were, however, a lack of statistically significant associations between the presence of a chronic condition and these markers of poor housing. This may be due to a lack of power in the sample size or to the timing of the survey, conducted in early summer. However, the available evidence on the relationship between cold and damp housing comes from northern Europe and it may be that the impact of cold housing is less in a warm climate such as the Middle East.

One weakness of the study was the omission of any questions regarding residents' mental health. Poor housing impacts on individual's mental health and can contribute to depression.[9,10] In addition, given the overall situation in which these people find themselves, it is likely that mental health issues would be a major component of their overall ill-health, as recently reported by Karam et al for the Lebanese population as a whole.[25]

The study was unable to survey all of the households in the Gaza building, due to time and resource constraints. However, it does demonstrate that, with the right support and knowledge, access can be negotiated and that members of the community are willing to participate in such a survey. This was clearly facilitated by the role and knowledge of JZ, who is herself a Palestinian refugee and had previously worked for PARD as co-ordinator of their health clinics, giving the study important insight, local knowledge and credibility. The data collected in this survey are of the type routinely available in Western countries, such as census-type data on population denominators, health and environmental conditions. However, in the

absence of such social infrastructures, such data may only be obtained through research. Indeed, the findings from this study have already been used by the NGO to seek further funding for infrastructure improvements and to raise awareness of the conditions within such camps.

This study demonstrates, for the first time, the very poor conditions that Palestinian refugees in unofficial camps are living under. While those in the official UNRWA camps also experience poor living conditions and ill-health, these unofficial refugees have even poorer conditions with severe overcrowding, lack of external ventilation and lack of access to basic needs such as kitchens and toilets the norm. However, this study also demonstrates that, with the right support and knowledge, it is possible to collect evidence in a rigorous and robust manner, leading to opportunities to inform future policy and planning within the Gaza buildings.

POLICY IMPLICATIONS

Refugees and internally displaced peoples are frequently missed from the collection of data about environmental and health conditions. This study shows that such data collection is possible and that the findings can be used to inform future planning and service provision.

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COMPETING INTERESTS

JZ was previously employed by PARD and worked as a health co-ordinator in the Gaza displacement centre. Three are no other competing interests.

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Figure 1. Backyard with households constructed out of corrugated metal.

Box 1. Classification of Palestinian refugees in the Lebanon.

1. Resident and registered Palestinian in 1949.
Includes Palestinians and their descendents who have resided in Lebanon since 1948 and who were registered in the 1949-1959 census conducted by UNRWA and the International Red Cross. These people have legal identity cards and travel documents and are eligible for all UNRWA services. They also have records in the Lebanese Surete Generale and the Directorate of Arab Palestinian Refugees.
2. Resident but unregistered Palestinian in 1949.
Includes Palestinians and their descendents who have resided in Lebanon since 1948, but were not registered in the 1949-1959 census. It also included refugees who came to Lebanon after the 1967 war. Upon arrival in Lebanon, the Ministry of Internal Affairs issued them with identity cards and travel documents, but not being registered with UNRWA, they cannot benefit from the organisation's services.
3. Resident after 1967.
Includes Palestinians and their descendents who came to Lebanon after the 1976 Arab-Israeli war and have not been registered with the Lebanese Ministry of Internal Affairs or with UNRWA. They carry no identification cares or travel documents and do not benefit from UNRWA's services.