




# BMJ Open Outpatient use patterns and experiences among diabetic and hypertensive patients in fragile settings: a cross-sectional study from Lebanon

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## ABSTRACT

**Objectives** Assess and describe the health service use and delivery patterns for non-communicable disease (NCD) services in two contrasting fragility contexts and by other principal equity-related characteristics including gender, nationality and health coverage.

**Setting** Primary healthcare centres located in the urbanised area of Greater Beirut and the rural area of the Beqaa Valley.

**Design** This is a cross-sectional study using a structured survey tool between January and September 2020.

**Participants** 1700 Lebanese and Syrian refugee patients seeking primary care for hypertension and diabetes.

**Primary and secondary outcomes** The main outcome is the comprehensiveness of service delivery comparing differences in use and service delivery patterns by fragility setting, gender, nationality and health coverage.

**Results** Compliance with routine NCD care management (eg, counselling, immunisations, diagnostic testing and referral rates) was significantly better in Beirut compared with Beqaa. Women were significantly less likely to be offered lifestyle counselling advice and referral to cardiologists (58.4% vs 68.3% in Beqaa and 58.1% vs 62% in Beirut) and ophthalmologists, compared with men. Across both settings, there was a significant trend for Lebanese patients to receive more services and more advice related to nutrition and diabetes management (89.8% vs 85.2% and 62.4% vs 55.5%, respectively). Similarly, referral rates were higher among Lebanese refugees compared with Syrian refugees. Immunisation and diagnostic testing were significantly higher in Beirut among those who have health coverage compared with Beqaa.

**Conclusions** The study discovered significant differences in outpatient service use by setting, nationality and gender to differentials. A rigorous and comprehensive appraisal of NCD programmes and services is imperative for providing policy makers with evidence-based recommendations to guide the design, implementation and evaluation of targeted programmes and services necessary to ensure equity in health services delivery to diabetic and hypertensive patients. Such programmes are an ethical imperative considering the protracted crises and compounded fragility.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The first study of its kind study to examine outpatient use patterns and experiences among patients in two contrasting fragility settings in Lebanon.
- ⇒ The large sample size of the study (1700) and the inclusion of a large number of refugees from Syria.
- ⇒ Sampling included only patients visiting healthcare centres, which may result in a selection bias.
- ⇒ The study did not measure the impact of economic crises nor did it account for the impact of the COVID-19 pandemic in Lebanon.

## BACKGROUND

Non-communicable diseases (NCDs), including cardiovascular disease, diabetes, cancer, chronic respiratory diseases and mental health disorders, are the leading cause of global mortality, contributing to 41 million (71%) of all deaths annually in 2018.<sup>1</sup> NCDs disproportionately affect people in low-income and middle-income countries, where 78% of all NCD deaths and 85% of premature deaths occur.<sup>2</sup> The rising burden of NCDs exacerbates health inequalities and worsens poverty, especially in fragile contexts marked by weak health systems and poor governance.<sup>3</sup>

Fragility is a multidimensional phenomenon encompassing political, security, environmental, economic and social risks and inadequate coping capacity by the state, system or community to manage, absorb or mitigate these risks.<sup>4</sup> Fragility therefore leaves populations vulnerable to a range of threats. The 2020 Organisation for Economic Co-operation and Development (OECD) State of Fragility Report notes that in fragile contexts, which are home to over 2 billion people, 460 million (76.5%) live in extreme poverty and lack access to essential services.<sup>4</sup>

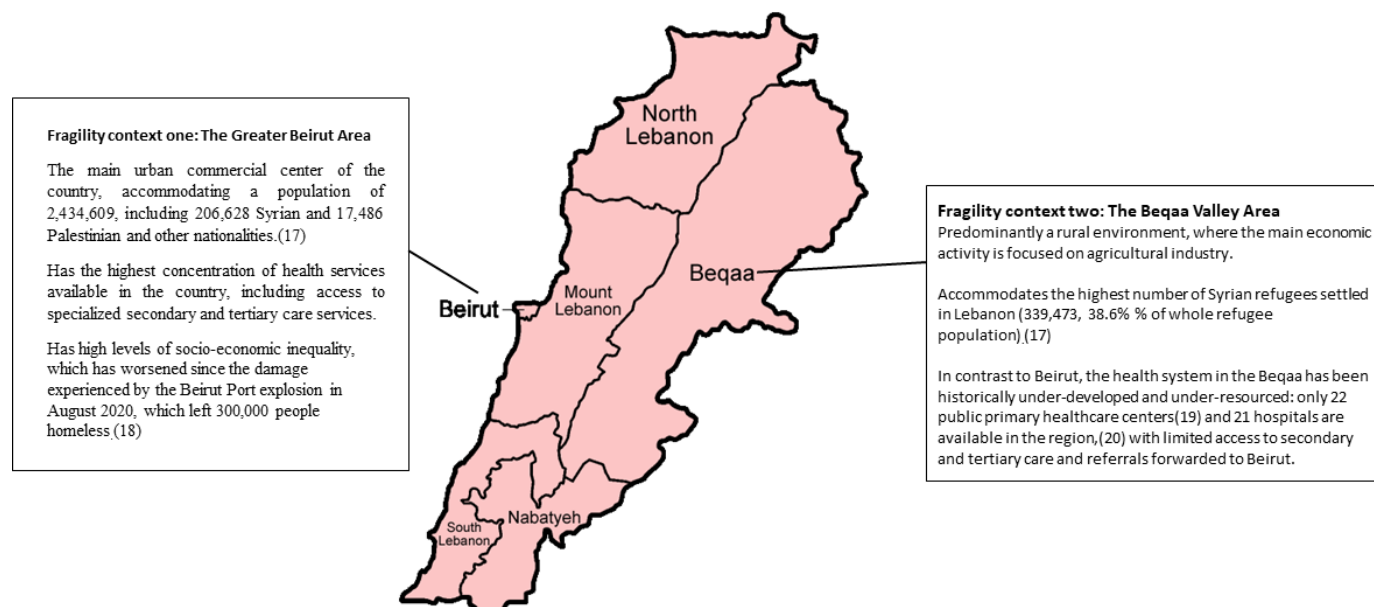
Lebanon is a small country on the Eastern Mediterranean, with a population of 6 million people,<sup>5</sup> including displaced populations from Syria and Palestine. Over the last few decades, Lebanon has experienced severe fragility-related risks, including regional and national conflicts and protracted internal strife. As a consequence, the country had several episodes of economic downturns with economic growth sharply declining in recent years.<sup>5,6</sup> The protracted crisis in Syria had further exacerbated the impact of fragility on the Lebanese health system with a huge influx of Syrian refugees into Lebanon since 2011, peaking at around one-third of its residents.<sup>7</sup> As a consequence, Lebanon has been experiencing a growing burden of NCDs, exacerbated by high levels of fragility.<sup>8</sup> In 2018, NCDs accounted for 91% of all deaths in the country, with hypertension and diabetes being the most prevalent NCDs.<sup>2</sup>

Healthcare in Lebanon is highly fragmented and provided predominantly by the private sector.<sup>9</sup> The long years of civil war and political conflict have taken its toll on the financial capacities of the public healthcare system<sup>10</sup> and have led to inequitable concentration of specialised health services in highly urbanised areas (eg, Greater Beirut) as compared with poorly resourced rural areas such as the Beqaa (a fertile valley in eastern Lebanon).<sup>2</sup> Although the country runs six social insurance funds, close to half the population have no formal health coverage,<sup>11</sup> and out-of-pocket household expenditures remains a main contributor to health financing.<sup>12</sup> In 2015, in order to strengthen primary care delivery and respond to the increasing NCD burden in the country, the Ministry of Public Health (MoPH), in collaboration with the World Bank, launched the Emergency Primary Healthcare Restoration Project (EPHRP), which aimed to provide free healthcare services to 150 000 citizens identified

as living below the poverty line by the National Poverty Targeting Programme.<sup>13</sup> The programme offers six types of health packages<sup>13</sup> and prioritises NCD services for diabetes mellitus and hypertension. These packages support access to immunisations, follow-up diagnostic tests, consultations (including pertinent counselling and health education) and medication prescriptions. By 2018, the project had delivered services to 101 454 beneficiaries, of whom 61 887 were adults.<sup>14</sup>

A recent study from Lebanon on health service use among patients seeking care for diabetes and hypertension among the Lebanese host community members and Syrian refugees identified significant gaps in care-seeking behaviour and reported that host community members had better access to care and fewer reports of medication interruption compared with refugees.<sup>15</sup> Lack of health coverage and affordability was found to be a significant barrier, with 39% of Syrian refugees in Lebanon reporting not receiving needed care due to unaffordable treatment and medication costs.<sup>16–18</sup> Lebanese and Syrian community members further identified several barriers to health seeking, including limited availability of services and perceptions of poor-quality care.<sup>7</sup>

Given the fragility of Lebanon overall and the need to address the rising NCD burden among both Lebanese host communities and Syrian refugees in particular, this study aimed to examine the equitable delivery of services in the context of fragility. Specifically, it assesses and describes the outpatient health service use patterns for NCD services in two contrasting fragility contexts: the Greater Beirut and the Beqaa Valley (figure 1)<sup>19–22</sup> and by other principal equity-related characteristics including gender, nationality and health coverage.



**Figure 1** Background information on the two fragility contexts of this study.

## Research in context

### Evidence before this study

This study comprised two phases. In the first phase, literature review was conducted in order to synthesise the extant literature and identify the gaps in knowledge and to provide a theoretical foundation for the proposed study. The search was done using PubMed engine using different combinations of keywords that include non-communicable diseases; Lebanon; fragile context; public health; health systems, in addition to electronic journals and websites. This was followed by semi-structured interviews and group model building, which helped identify the need for health promotion and primary prevention activities and priority interventions in the study areas.

### Added value of this study

Non-communicable diseases (NCDs) are considerably increasing in Lebanon. Since Lebanon is swamped by its already socioeconomic and financial crisis and underdeveloped health systems, it is inevitable to investigate the equity in delivering healthcare services among its population. Our study explores these differences between two contrasting settings in Lebanon. Our results showed that NCD management and healthcare services are higher in Beirut compared with the Beqaa region and are more delivered to Lebanese refugees than to Syrian refugees.

### Implications of all the available evidence

The findings of our paper will guide healthcare policy makers in Lebanon to establish a well-designed and targeted programme to achieve equity between health services delivery to diabetic and hypertensive patients.

## METHODS

### Study design and setting

This is a cross-sectional study using a quantitative survey design, conducted between January and September 2020 in two contrasting regions of Lebanon: the urbanised area of Greater Beirut (fragility setting 1) and the Beqaa Valley (fragility setting 2) (see [figure 1](#)). Note that the unit of analysis in this study was the patient, and the sampling unit was the health centre.

### Data collection

In preparation for data collection, the study used a team of eight data collectors who attended a 2-day training which included an overview of the study and its objectives, the recruitment process, and research ethics and proper surveying practices. Data collection was performed by filling electronic spreadsheets using KoBo, a toolkit for collecting and managing data in challenging environments.<sup>23</sup> Data collectors approached participants in the reception room while they were waiting for their appointment. Participants who were interested to participate and met the inclusion criteria were invited to fill out the questionnaire.

### Participants

Targeted health facilities were those highly accessed by disadvantaged Lebanese and Syrian populations that offered diabetes and hypertension services. Overall, 14 facilities were approached, out of which 11 agreed to participate in the study. At these facilities, targeted

participants were Syrian or Lebanese individuals who were (1) older than 40 years and (2) diagnosed with diabetes or hypertension (based on personal self-report following a confirmed diagnosis). Anyone not meeting the aforementioned criteria or not consenting to participate was excluded.

### Sample size

We based sample size calculations on an index of services to be provided in line with the NCD service delivery package supported by the EPHRP (see online supplemental appendix 1). Assuming an average 90/100 and 85/100 score on this index per population group (Lebanese and Syrian, respectively) and per setting (Beirut or Beqaa), and 80% power and 5% error, a total of 1800 persons would need to be recruited. Overall, we recruited 1700, 94.4% of the intended sample size.

### Data sources

All eligible patients consenting to participate were surveyed using a standardised tool which comprises 12 questions on demographics, 11 on disease risk factors, 26 on itemised accounts of services received at accessed a primary healthcare centre (PHCC) or via referral, 10 on disease outcomes, 13 on perceptions of patient satisfaction with services and also patient self-management, and 2 on general access and affordability of NCD services and care coverage (complete tool in online supplemental appendix 2). In the development of the study tool, we have drawn on the World Health Surveys,<sup>24</sup> the Patient Satisfaction questionnaire of the Royal College of General Practitioners,<sup>25</sup> 'The National Survey of People with Diabetes'<sup>26</sup> and the WHO individual questionnaire.<sup>27</sup> The questions on service delivery match those outlined in the service packages designed/outlined by the Lebanese MoPH at the primary healthcare level, specifically for diabetes and hypertension care.

### Statistical methods and main variables

The main outcome of the study is the comprehensiveness of service delivery, with a view to understand differences in delivery patterns by fragility setting and equity-related characteristics, including gender, nationality and health coverage. We report on bivariate analyses examining differences in services delivered by patient category and fragility setting, specifically focusing on individual service items for each category: routine check-up items (eg, weight and blood pressure (BP) monitoring), lifestyle advice received (eg, nutrition), immunisations and diagnostic tests received, and referrals recommended and accessed. The results represent the subjective responses of patients with no additional data retrieved from their service providers or medical files. To understand whether all of these services are equitably delivered, we further examined patterns by patient group (distinguishing between diabetic, hypertensive and comorbid patients) and conducted bivariate analyses by gender, nationality

and by health coverage status, comparing service delivery between the two fragility contexts.

Data were imported and analysed using SPSS V.27. Means and SDs were used to summarise numerical data after checking for normal distribution, whereas frequency and percentages were used for categorical data. Bivariate analyses were carried out using the independent t-test when comparing means between two groups, and the Pearson  $\chi^2$  when comparing differences in proportions. The significance level was set at  $p < 0.05$ .

### Role of the funding source

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## RESULTS

A total of 1700 patients were recruited, 458 with diabetes (26.94%), 908 with hypertension (53.41%) and 334 with comorbid conditions of hypertension and diabetes (19.64%). The average response rate was 87% for Greater Beirut (fragility setting 1) and 97% for Beqaa Valley (fragility setting 2).

### Demographic characteristics

Patients in setting 2 were on average younger compared with those in setting 1 (55.90 (SD=10.11) vs 60.04 (SD=10.09)). Two-thirds of the patients were women, regardless of the fragility setting and disease status. A significantly higher proportion of patients in setting 1 were Lebanese (76.3%), while in setting 2, the majority were Syrians (64.6%) ( $p < 0.05$ ). Most patients (85.2%) in setting 2 had minimal education (none or just primary), and the proportion of employed patients was significantly lower in setting 2. A higher percentage of patients living in a crowded household was reported in setting 2, as compared with setting 1 (52.8% vs 41.3%). Overall, 81.6% of presenting patients were overweight or obese and 31.88% were smokers, with 1.52% reporting consumption of alcohol (table 1).

### Health services delivered by setting and health condition

The most consistently offered check-up items were BP monitoring (for 91.2% of patients) and nutritional advice (for 78.23%). Assessment of weight was carried out less frequently in setting 1 versus setting 2 (for 60% vs 77.4% of patients). Height was measured more frequently among patients in setting 1 (58.3% vs 39.7%), while BP was measured more among patients in setting 2 (94.5% vs 81.8%) for the hypertensive and diabetic patients only. Foot examinations were provided for less than 10% of hypertensive patients in both settings; rates, however,

were higher in setting 1 for both diabetic (22.8% vs 9.4%) and comorbid (21.1% vs 14.8%) patients (table 2).

Diabetic and comorbid patients received more nutrition (95.2% and 95.2% vs 77.6% and 81.8%) and exercise advice (68.9% and 75.9% vs 56.9% and 62.2%) in setting 2 compared with those in setting 1. However, patients reported receiving smoking and alcohol advice more frequently in setting 1 compared with setting 2 (50.6% vs 42.8% and 16.7% vs 6.6%, respectively; table 2). Compared with setting 2, a significantly higher proportion of patients in setting 1 received hepatitis B (37.4% vs 2.2%) and influenza (12.6% vs 2.2%) vaccines. Diagnostic testing rates were generally high, with fasting blood sugar, haemoglobin A1c and lipid profiles each secured for over 65% of patients, although rates for all tests were significantly higher in facilities in setting 1 compared with setting 2. Overall, rates of referrals were significantly higher in setting 1 compared with setting 2 (table 2).

### Health services by gender

When comparing the proportion of services delivered by gender, we observe the following patterns: women were significantly less likely to be offered lifestyle advice regarding nutrition, smoking and exercise compared with men (7.76, 12% and 8.7% vs 31.4, 66.2% and 57.9%, respectively), especially in facilities in setting 2. Women visiting facilities in setting 2 were less likely to be offered diagnostic tests (eg, lipid tests, uric acid, creatinine and electrocardiography) compared with men. Compared with women, men were more likely to be referred to cardiologists (68.3% vs 58.4% in setting 2 and 62% vs 58.1% in setting 1) and ophthalmologists (21.6% vs 12.6% in setting 2) (table 3). No consistent differences were observed in sex differences across the two settings.

### Health services by nationality

When comparing service delivery between Lebanese and Syrian patients, we observed that Lebanese patients received significantly more advice on nutrition and diabetes management compared with Syrians (89.8% vs 85.2% and 62.4% vs 55.5%, respectively). In terms of diagnostic testing, across both settings, there was a trend for Syrians to receive fewer services than Lebanese (except for the complete blood count test), although this was more pronounced in facilities in setting 2. This trend was particularly marked for EKG, SGPT and SGOT. Compared with Syrians, Lebanese patients were more likely to be referred to endocrinologists (30.1% vs 17.2% in setting 1 and 26.5% vs 21.8% in setting 2) and ophthalmologists (25.7% vs 15.6% in setting 1 and 23.5% vs 11.2% in setting 2).

However, setting specific differences are notable. For example, a significantly higher proportion of Lebanese patients residing in setting 1 had height and foot examination check-ups (58.4% and 15.7%) compared with those in setting 2 (39.5% and 11.6%), while those in setting 2 had more weight and BP checkups (76.9% vs 59.6% and 93.6% vs 83.3%, respectively); the results

**Table 1** Participant characteristics by fragility settings in Lebanon, 2020

	Diabetic (n=458)		Hypertensive (n=908)		Comorbid (n=334)		All patients (N=1700)	
	Fragility setting 1 N (%)	Fragility setting 2 N (%)	Fragility setting 1 N (%)	Fragility setting 2 N (%)	Fragility setting 1 N (%)	Fragility setting 2 N (%)	Fragility setting 1 N (%)	Fragility setting 2 N (%)
Age (mean±SD)	58.1±10.01	54.88±9.62*	60.4±10.70	55.61±10.45*	60.81±9.39	58.69±9.23	60.04±10.09	55.90±10.11*
Gender								
Female	41 (68.3)	249 (62.6)	76 (69.7)	561 (70.2)	70 (69.3)	147 (63.1)	187 (69.3)	957 (66.9)
Male	19 (31.7)	149 (37.4)	33 (30.3)	238 (29.8)	31 (30.7)	86 (36.9)	83 (30.7)	473 (33.1)
Nationality								
Lebanese	42 (70.0)	155 (38.9)*	86 (78.9)	246 (30.8)*	78 (77.2)	105 (45.1)*	206 (76.3)	506 (35.4)*
Syrian	18 (30.0)	243 (61.1)	23 (21.1)	553 (69.2)	23 (22.8)	128 (54.9)	64 (23.7)	924 (64.6)
Marital status								
Single	2 (3.3)	12 (3.0)	8 (7.3)	21 (2.6)*	7 (7.0)	6 (2.6)	17 (6.3)	39 (2.7)*
Married	52 (86.7)	325 (81.7)	90 (82.6)	661 (82.7)	78 (78.0)	181 (77.7)	220 (81.8)	1167 (81.6)
Divorced/widowed	6 (10.0)	61 (15.3)	11 (10.1)	117 (14.6)	15 (15.0)	46 (19.7)	32 (11.9)	224 (15.7)
Educational level								
No school/primary	30 (50.0)	323 (81.4)*	59 (54.1)	690 (86.4)*	67 (67.0)	204 (87.6)*	156 (58.0)	1217 (85.2)*
Secondary/high school	26 (43.3)	69 (17.4)	38 (34.9)	96 (12.0)	28 (28.0)	21 (9.0)	92 (34.2)	186 (13.0)
University/graduate studies	4 (6.7)	5 (1.3)	12 (11.0)	13 (1.6)	5 (5.0)	8 (3.4)	21 (7.8)	26 (1.8)
Employment status								
Working	15 (25.0)	68 (17.1)	25 (22.9)	102 (12.8)*	16 (16.0)	21 (9.0)*	56 (20.8)	191 (13.4)*
Not working	44 (73.3)	310 (77.9)	83 (76.1)	648 (81.1)	82 (82.0)	180 (77.3)	209 (77.7)	1138 (79.6)
Unable to work	1 (1.7)	20 (5.0)	1 (0.9)	49 (6.1)	2 (2.0)	32 (13.7)	4 (1.5) <sup>a</sup>	101 (7.1)
Crowding index†								
<1	11 (18.6)	42 (12.1)	23 (21.7)	81 (13.4)*	16 (16.2)	24 (12.6)	50 (18.9)	147 (12.9)*
1–2	25 (42.4)	123 (35.3)	25 (42.5)	194 (32.1)	35 (35.4)	75 (39.5)	105 (39.8)	392 (34.3)
>2	23 (39.0)	183 (52.6)	38 (35.8)	329 (54.5)	48 (48.5)	91 (47.9)	109 (41.3)	603 (52.8)
BMI								
Underweight	0 (0.0)	0 (0.0)	1 (1.0)	4 (0.5)	4 (4.8)	0 (0.0)*	5 (2.1)	4 (0.3)*
Normal	14 (25.0)	65 (17.5)	22 (22.9)	117 (15.6)	11 (13.1)	39 (18.8)	47 (19.9)	221 (16.7)
Overweight	20 (35.7)	160 (43.1)	42 (43.8)	302 (40.4)	32 (38.1)	80 (38.5)	94 (39.8)	542 (40.8)
Obese	22 (39.3)	146 (39.4)	31 (32.3)	325 (43.4)	37 (44.0)	89 (42.8)	90 (38.1)	560 (42.4)
Smoking status								
Yes, daily	21 (35.0)	111 (27.9)*	43 (39.4)	179 (22.5)*	33 (32.7)	67 (28.8)*	97 (35.9)	357 (25.0)*

Continued



Table 1 Continued

	Diabetic (n=458)		Hypertensive (n=908)		Comorbid (n=334)		All patients (N=1700)	
	Fragility setting 1 N (%)	Fragility setting 2 N (%)	Fragility setting 1 N (%)	Fragility setting 2 N (%)	Fragility setting 1 N (%)	Fragility setting 2 N (%)	Fragility setting 1 N (%)	Fragility setting 2 N (%)
Yes, but not daily	8 (13.3)	14 (3.5)	5 (4.6)	38 (4.8)	13 (12.9)	10 (4.3)	26 (9.6)	62 (4.3)
No	31 (51.7)	273 (68.6)	61 (56.0)	580 (72.8)	55 (54.5)	156 (67.0)	147 (54.4)	1009 (70.7)
Alcohol (yes)	4 (6.7)	0 (0.0)*	10 (9.2)	4 (0.5)*	5 (5.0)	3 (1.3)*	19 (7.1)	7 (0.5)*

\*P&lt;0.05.

†Crowding index is the number of people per room. BMI, body mass index.

showed a similar pattern for Syrians. Similarly, a higher proportion of Lebanese and Syrian patients residing in setting 1 received hepatitis B and influenza vaccines compared with those in setting 2.

### Health services by health coverage status

In terms of setting specific differences by health coverage status, there was a higher proportion of covered patients residing in setting 2, and, compared with those with no coverage, those patients had more weight and BP check-ups (81.4% vs 65% and 96.1% vs 82.5%, respectively). Furthermore, the patients with health coverage in setting 1 had more height and foot examination check-ups (65.8% vs 36.7% and 10.5% vs 8.1%, respectively) compared with those reporting no health coverage. In terms of diagnostic testing, overall, laboratory testing was significantly higher in setting 1 compared with setting 2 among those who have health coverage compared with those who do not. As for referrals, those patients who reported having health coverage were referred more frequently to cardiologists and endocrinologists in setting 2 in comparison to those who were not covered (table 3).

### DISCUSSION

This study explored patterns in NCD service delivery by setting, nationality and sex in two contrasting fragility settings in Lebanon. We identify better NCD service delivery in setting 1 (an urbanised area of Greater Beirut) as manifested by the higher rate of check-up provision, patient education, immunisation, diagnostic testing and referral rates when compared with setting 2 (predominantly rural area of the Beqaa Valley). Sex-related differences were observed mainly in relation to patient counselling and diagnostic testing. Our findings also highlight the impact of nationality on the provision of health services with analyses revealing that Lebanese patients received more services and education and were more likely to be referred to specialists when compared with Syrians. The findings also showed that health coverage status can impact the service delivery provided.

Our findings that urbanised setting 1 generally provides better NCD services is unsurprising and is in line with other recent work on NCDs in Lebanon, including qualitative work marking difficulties in service delivery in fragility setting 2 specifically.<sup>7</sup> Furthermore, a recent national facility assessment conducted across PHCCs in Lebanon identified significant regional disparities between rural and urbanised areas,<sup>28</sup> similar to those reported in our study. The availability of, and accessibility to, health services are known to vary among the two selected settings. For instance, the rural areas of setting 2, which host the highest percentage of the Syrian refugee population (36%), are considered by the UN–Lebanon Interagency task force to be in major need for health institutional support,<sup>5</sup> whereas setting 1 includes some of the most advanced medical services

**Table 2** Description of all services delivered by patient health condition and frailty setting

	Diabetic (n=458)		Hypertensive (n=908)		Comorbid (n=334)		All patients (N=1700)	
	Frailty setting 1	Frailty setting 2	Frailty setting 1	Frailty setting 2	Frailty setting 1	Frailty setting 2	Frailty setting 1	Frailty setting 2
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
<b>Check-up items</b>								
Height	35 (59.3)*	165 (41.8)	58 (54.2)*	301 (38.3)	61 (62.2)*	95 (40.9)	154 (58.3)*	561 (39.7)
Weight	34 (57.6)*	313 (79.2)	60 (55.6)*	609 (77.4)	65 (66.3)	172 (74.5)	159 (60)*	1094 (77.4)
Blood pressure	45 (76.3)*	367 (92.9)	88 (82.2)*	756 (96.1)	83 (84.7)†	212 (91.8)	216 (81.8)*	1335 (94.5)
Foot examination	13 (22.8)*	37 (9.4)	4 (8.3)	26 (5.3)	20 (21.1)	34 (14.8)	37 (18.5)*	97 (8.7)
<b>Lifestyle advice</b>								
Smoking	29 (50)	142 (39.2)	50 (47.2)	298 (43.8)	53 (54.6)	93 (46)	132 (50.6)*	533 (42.8)
Nutrition	45 (77.6)*	376 (95.2)	78 (78)	532 (79)	81 (81.8)*	218 (95.2)	204 (79.4)*	1126 (86.8)
Exercise	33 (66.9)†	273 (68.9)	54 (50.9)*	535 (67.6)	61 (62.2)*	176 (75.9)	148 (56.5)*	984 (69.3)
Alcohol	9 (15.8)*	14 (4.2)	18 (17.5)*	45 (7.1)	16 (16.3)†	17 (9.1)	43 (16.7)*	76 (6.6)
Diabetes management	33 (57.9)*	298 (75.4)	17 (37)	155 (32.9)	61 (61.6)*	182 (78.8)	111 (55)	635 (57.9)
Hypertension management	10 (35.7)	75 (39.7)	59 (55.7)*	599 (75.3)	58 (60.4)*	180 (77.9)	127 (55.2)*	854 (70.3)
<b>Immunisations</b>								
Hepatitis B	20 (33.3)*	7 (1.8)	35 (32.1)*	13 (1.6)	46 (45.5)*	11 (4.7)	101 (37.4)*	31 (2.2)
Influenza vaccine	4 (6.7)*	10 (2.5)	10 (9.2)*	16 (2.0)	20 (19.8)*	6 (2.6)	34 (12.6)*	32 (2.2)
<b>Diagnostic testing</b>								
FBS	52 (86.7)*	383 (96.2)	63 (57.8)*	378 (47.3)	90 (89.1)	217 (93.1)	205 (75.9)*	978 (68.4)
HbA1c	57 (95)	377 (94.7)	78 (72.9)*	285 (35.7)	96 (96)*	206 (88.8)	231 (86.5)*	868 (60.8)
Lipid profile	44 (73.3)	256 (64.3)	87 (81.3)*	538 (67.3)	90 (90)*	187 (80.6)	221 (82.8)*	981 (68.6)
CBC	27 (45)	164 (41.2)	60 (55.0)	382 (47.8)	61 (60.4)	137 (58.8)	148 (54.8)*	683 (47.8)
Platelets	32 (53.3)*	112 (28.1)	68 (64.2)*	283 (35.5)	70 (70)*	102 (44.2)	170 (63.9)*	497 (34.8)
Na	18 (30)*	14 (3.5)	64 (58.7)*	139 (17.4)	67 (66.3)*	56 (24)	149 (55.2)*	209 (14.6)
K	17 (54.8)*	13 (6.8)	60 (63.8)*	105 (16.1)	64 (70.3)*	44 (23.2)	141 (65.3)*	162 (15.7)
Ca	19 (31.7)*	15 (3.8)	64 (58.7)*	94 (11.8)	65 (64.4)*	44 (18.9)	148 (54.8)*	153 (10.7)
Uric acid	13 (41.9)*	40 (20.9)	63 (65.6)*	189 (29.3)	57 (64.8)*	56 (30.3)	133 (61.9)*	285 (27.9)
Creatinine	31 (51.7)*	56 (23.9)	58 (53.2)*	86 (10.8)	70 (69.3)*	65 (27.9)	159 (58.9)*	246 (17.2)
SGPT	21 (35.0)*	38 (9.5)	43 (41.0)*	32 (4.0)	44 (44.9)*	28 (12.1)	108 (41.1)*	98 (6.9)
SGOT	23 (38.3)*	35 (8.8)	17 (32.1)*	10 (2.0)	44 (45.4)*	23 (10.0)	84 (40.0)*	68 (6.0)
Urine test	44 (73.3)*	262 (65.8)	79 (72.5)*	450 (56.3)	69 (68.3)	153 (65.7)	192 (71.1)*	865 (60.5)
EKG	34 (56.7)*	126 (31.7)	73 (77.7)*	274 (44.9)	74 (74.7)*	123 (53.5)	181 (71.5)*	523 (42.2)
Referral to specialists								

Continued



Table 2 Continued

	Diabetic (n=458)		Hypertensive (n=908)		Comorbid (n=334)		All patients (N=1700)	
	Fragility setting 1	Fragility setting 2	Fragility setting 1	Fragility setting 2	Fragility setting 1	Fragility setting 2	Fragility setting 1	Fragility setting 2
N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Endocrinologist	28 (46.7)	198 (49.7)	5 (4.6)	42 (5.3)	40 (39.6)	96 (41.2)	73 (27)	336 (23.5)
Cardiologist	10 (32.3)	47 (24.5)	74 (67.9)	556 (69.6)	57 (58.2)	149 (64.5)	141 (59.2)	752 (61.5)
Ophthalmologist	18 (30)	94 (23.6)	12 (11)	76 (9.5)	33 (32.7)	53 (22.7)	63 (23.3)*	223 (15.6)
Dentist	5 (8.3)*	4 (1.0)	5 (4.6)*	8 (1.0)	7 (7.1)*	4 (1.7)	17 (6.4)*	16 (1.1)
Clinical dietician	1 (1.7)	2 (0.5)	7 (6.5)	9 (1.1)	18 (18.2)	7 (3.0)	26 (9.7)*	18 (1.3)
Other specialists	8 (13.3)	47 (11.8)	9 (8.5)	39 (4.9)	24 (24.2)*	30 (12.9)	41 (15.5)*	116 (8.1)

\*P<0.05.  
†P<0.10.  
Ca, calcium; CBC, complete blood count; DM, diabetes mellitus; EKG, electrocardiography; FBS, fasting blood sugar; HbA1c, haemoglobin A1c; HP, hypertension; K, potassium; Na, sodium; SGOT, serum glutamic-oxaloacetic transaminase; SGPT, serum glutamic-pyruvic transaminase.

and facilities,<sup>29</sup> with a lower percentage of Syrian refugees' settlement (26%),<sup>30</sup> hence having a lower burden on the health system.

Our results suggest women were less likely than men to be offered lifestyle advice on nutrition, smoking and exercise and less access to some specific tests (eg, lipid tests, uric acid, creatinine and EKG), especially in setting 2. Our results are in agreement with studies that show that women are more likely to underuse necessary healthcare<sup>31</sup> and less likely to be instructed on secondary prevention strategies compared with men.<sup>32</sup> Several studies highlighted gender inequalities in the use of healthcare services.<sup>33 34</sup> Among the factors that contribute to women's disproportionate lack of access to care are traditional gender norms, the limited-decision making power, poorer access to resources, and the decreased economic and social utility compared with men.<sup>33 34</sup> In addition, this could be also attributed to the fact that women tend to seek help less frequently<sup>35</sup> or at more advanced stages compared with men.<sup>36</sup> The barriers to female patients' access to the aforementioned preventive and curative NCD care services need to be systematically investigated to guide evidence-based decision making on the necessary remedial activities and programmes to restore equitable access to NCD services. The findings further call on policy makers and decision makers to work collaboratively with underprivileged and refugee communities to design, implement and evaluate evidence-based targeted programmes that would address the gender gap in the NCD care processes in fragile settings.

In addition, our results illustrated the contribution of nationality to discrepancies in service use. Earlier studies reported underuse of NCD services among Syrian refugees compared with Lebanese community members.<sup>37 38</sup> The highly privatised Lebanese healthcare system and geographical location render healthcare inaccessible and expensive to a large proportion of Lebanese populations, with effects being more exacerbated for Syrian refugees.<sup>39</sup> Our results are consistent with recent studies which identified significant gaps between refugees and host community members in care seeking and reported that host community members had better access to care and fewer reports of medication interruption compared with refugees.<sup>37 38</sup> Future studies should build on the findings of this one to investigate the root causes for this discrepancy in NCD service delivery by nationality. Furthermore, relief and funding agencies need to prioritise the provision of equitable access to NCD care for refugees since the poor detection and control of NCDs do not only increase the number of patients seeking care services but also increase the cost of treatment on the long run. The economic collapse that Lebanon has been witnessing over the last couple of years may create an opportunity for the international community to expand the care networks of refugees at a more affordable cost.

**Table 3** Description of all services delivered by gender, nationality and health coverage, and by fragility setting\*

	Gender						Nationality						Health coverage					
	Female			Male			Lebanese			Syrians			Yes			No		
	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)
Check-up items																		
Height	107 (59.1)	366 (38.8)†	47 (56.6)	195 (41.5)†	118 (58.4)	198 (39.5)†	36 (58.1)	363 (39.8)†	52 (65.8)	261 (36.7)††	98 (55.4)	299 (42.8)†						
Weight	111 (61.0)	726 (77.0)†	48 (57.8)	369 (78.3)†	121 (59.6)	387 (76.9)†	38 (61.3)	708 (77.7)†	52 (65.0)	578 (81.4)††	103 (58.2)	516 (73.6)†						
Blood pressure	148 (81.8)	895 (94.9)†	68 (81.9)	441 (93.6)†	169 (83.3)	471 (93.6)†	47 (77.0)	865 (95.0)†	66 (82.5)	682 (96.1)††	144 (81.8)	652 (93.0)†						
Foot examination	26 (18.8)	57 (7.7) †	11 (17.7)	40 (10.7)	24 (15.7)	45 (11.6)§	13 (27.7)	52 (7.2)†	6 (10.5)	47 (8.1)	29 (21.2)	50 (9.4)†						
Lifestyle advice																		
Smoking	91 (50.8)	316 (39.0)†*	41 (50.0)	218 (50.0)	95 (48.0)	205 (45.1)	37 (58.7)	329 (41.6)†	43 (53.8)	250 (41.1)†	86 (49.4)	283 (44.6)						
Nutrition	140 (79.1)	722 (83.3)*	64 (80.0)	405 (94.0)†	155 (79.5)	405 (89.8)†§	49 (79.0)	722 (85.2)	62 (81.6)	566 (85.6)	137 (78.7)	558 (88.0)†						
Exercise	101 (56.4)	638 (67.1)†*	47 (56.6)	347 (73.8)†	106 (53.3)	347 (69.3)†	42 (66.7)	638 (69.3)	43 (53.1)	495 (69.1)†	102 (58.3)	488 (69.5)†						
Alcohol	28 (15.7)	27 (3.5)†*	15 (18.8)	49 (12.4)	25 (12.7)§	30 (7.1)†	18 (29.5)	46 (6.2)†	6 (7.4)†	35 (6.3)	36 (21.3)	40 (6.7)†						
DM management	79 (57.2)	402 (55.3)*	32 (50.0)	234 (63.1)†	81 (52.6)	241 (62.4)†§	30 (62.5)	395 (55.5)†	34 (58.6)	322 (57.2)	75 (54.0)	312 (68.5)						
HP management	95 (58.6)	582 (70.4)†	32 (47.1)	273 (70.2)†	93 (53.1)	294 (70.0)†	34 (61.8)	561 (70.5)	39 (55.7)	472 (73.8)††	87 (55.1)	382 (66.7)†						
Immunisations																		
Hepatitis B	69 (36.9)	16 (1.7)†	32 (38.6)	15 (3.2)†	83 (40.3)	13 (2.6)†	18 (28.1)	18 (1.9)†	33 (40.2)	11 (1.5)†	63 (35.6)	18 (2.5)†						
Influenza vaccine	24 (12.8)	19 (2.0)†	10 (12.0)	13 (2.7)†	30 (14.6)	15 (3.0)†	4 (6.3)	17 (1.8)†	9 (11.0)	12 (1.7)†	24 (13.6)	19 (2.7)†						
Diagnostic testing																		
FBS	143 (76.5)	641 (66.9)†	62 (74.7)	338 (71.5)	161 (78.2)	363 (71.7)§	44 (68.8)	616 (66.6)	67 (81.7)	496 (69.1)†	130 (73.4)	480 (67.7)						
HbA1c	158 (85.4)	572 (59.8)†	73 (89.0)	297 (62.8)†	179 (88.2)	332 (65.7)†§	52 (81.3)	537 (58.1)†	71 (86.6)	419 (58.4)†	151 (85.8)	448 (63.2)†						
Lipid profile	152 (82.2)	632 (66.0)†*	69 (84.1)	350 (74.0)†	171 (84.2)	384 (76.0)†§	50 (78.1)	598 (64.6)†	68 (82.9)	491 (68.4)†	144 (81.8)	489 (69.0)†						
CBC	103 (55.1)	464 (48.4)	45 (54.2)	220 (46.5)	121 (58.7)§	217 (42.9)†§	27 (42.2)	467 (50.5)	45 (54.9)	352 (49.0)	96 (54.2)	331 (46.7)						
Platelets	118 (63.8)	351 (36.7)†*	52 (64.2)	146 (31.0)†	135 (66.8)	159 (31.5)†	35 (54.7)	338 (36.6)†	56 (68.3)	253 (35.3)†	107 (61.1)	242 (34.1)†						
Na	101 (54.0)	141 (14.7)†	48 (57.8)	68 (14.4)†	120 (58.3)	101 (20.0)†§	29 (45.3)	108 (11.7)†	52 (63.4)	93 (13.0)†	92 (52.0)	115 (16.2)†						
K	96 (63.2)	114 (16.1)†	45 (70.3)	48 (14.7)†	113 (68.9)†§	69 (20.1)†§	28 (53.8)	93 (13.4)†	49 (76.6)†	74 (12.9)††	88 (59.9)	88 (19.0)†						
Ca	102 (54.5)	109 (11.4)†	46 (55.4)	44 (9.3)†	118 (57.3)	71 (14.0)†§	30 (46.9)	82 (8.9)†	51 (62.2)	67 (9.3)†	93 (52.5)	85 (12.0)†						
Uric acid	87 (58.8)	174 (24.8)†*	46 (68.7)	111 (34.7)†	106 (65.0)	135 (39.7)†§	27 (51.9)	150 (22.0)†	48 (75.0)†	156 (27.5)†	80 (54.8)†	128 (28.1)†						
Creatinine	113 (60.4)	131 (13.7)†*	46 (55.4)	115 (24.3)†	126 (61.2)	119 (23.5)†§	33 (51.6)	127 (13.7)†	53 (64.6)	111 (15.5)†	98 (55.4)	134 (18.9)†						
SGPT	78 (42.6)	57 (6.0)†	30 (37.5)	14 (8.7)†	61 (45.7)†§	57 (11.4)†§	17 (26.6)	41 (4.4)†	38 (46.3)	39 (5.4)††	65 (37.8)	59 (8.3)†						
SGOT	61 (42.1)	40 (5.3)†	23 (35.4)	28 (7.3)†	72 (45.0)†§	41 (10.5)†§	12 (24.0)	27 (3.6)†	26 (43.3)	29 (4.9)†	54 (37.8)	39 (7.1)†						
Urine test	137 (73.3)	570 (59.5)†	55 (66.3)	295 (62.4)	150 (72.8)	333 (65.8)§	42 (65.6)	532 (57.5)	67 (81.7)†	453 (63.1)††	118 (66.7)	411 (68.0)†						
EKG	122 (70.1)	304 (36.8)†*	59 (74.7)	219 (53.2)†	151 (77.8)§	209 (49.2)†§	30 (50.8)	314 (38.6)	61 (79.2)	251 (39.5)††	114 (67.9)	271 (45.0)†						
Referral to specialists																		
Endocrinologist	54 (28.9)	226 (23.6)	19 (22.9)	110 (23.3)	62 (30.1)§	134 (26.5)§	11 (17.2)	202 (21.8)	23 (28.0)	150 (20.9)†	43 (24.3)	184 (26.0)						

Continued

Table 3 Continued

	Gender						Nationality						Health coverage					
	Female			Male			Lebanese		Syrians		Yes		No					
	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)	Fragility setting 1	Fragility setting 2	N (%)			
Cardiologist	97 (58.1)	486 (58.4)*	44 (62.0)	267 (68.3)	112 (62.2)	293 (69.6)§	29 (50.0)	460 (57.4)	48 (67.6)	374 (58.2)†	88 (54.7)	376 (65.2)†						
Ophthalmologist	49 (26.2)	121 (12.6)†*	14 (16.9)	102 (21.6)	53 (25.7)	119 (23.5)§	10 (15.6)	104 (11.2)	15 (18.3)	104 (14.5)	42 (23.7)	117 (16.5)†						
Dentist	13 (7.1)	11 (1.1)†	4 (4.8)	5 (1.1)†	13 (6.4)	7 (1.4)†	4 (6.3)	9 (1.0)†	7 (8.6)	8 (1.1)†	10 (5.7)	8 (1.1)†						
Clinical dietician	24 (13.0)*	8 (0.8)†*	2 (2.4)	10 (2.1)	25 (12.3)§	9 (1.8)†	1 (1.6)	9 (1.0)	7 (8.5)	6 (0.8)†	17 (9.7)	11 (1.6)†						

\*Indicates statistical difference between gender groups within fragility settings with a p value of <0.05.  
†Indicates statistical difference between the fragility settings with a p value of 0.05.  
‡Indicates statistical difference between health coverage groups within fragility settings with a p value of 0.05.  
§Indicates statistical difference between nationality groups within fragility settings with a p value of <0.05.  
Ca, calcium; CBC, complete blood count; DM, diabetes mellitus; EKG, electrocardiography; FBS, fasting blood sugar; HbA1c, haemoglobin A1c; HP, hypertension; K, potassium; Na, sodium; SGOT, serum glutamic-oxaloacetic transaminase; SGPT, serum glutamic-pyruvic transaminase.

The study further highlights the importance of considering the various aspects that would further exacerbate and compound the fragility of patients with NCD. For example, Syrian refugees are more fragile compared with host communities; female patients are more fragile compared with male patients; and patients in setting 2 are more fragile compared with those in setting 1. A Syrian female patient residing in setting 2 is thus expected to have the highest propensity of being disadvantaged in the access and scope of service delivery. Relief programmes should not offer the same size for all and should be structured with sensitivity to the level of need resulting from compounded fragility. Future research could explore this concept in further detail to inform programming and service delivery.

It has to be noted that data collection was undertaken in extremely challenging conditions. The first phase of data collection was supposed to start in October 2019, which coincided with the beginning of the Lebanese revolution, the deterioration in the value of the national currency (Lebanese lira), and after resuming data collection, the first COVID-19 cases were detected in Lebanon and a total lockdown was imposed for almost 3 months. The pandemic did not only affect data collection but also impacted the access of patients to healthcare due to lockdown and fear of contracting COVID-19. Thus, screening and diagnosing rates are lower, especially since less people are accompanying patients. Although this study included a representative sample of health facilities from two regions in Lebanon, the sample might not be representative of the entire country. As a descriptive study, all p values should be regarded as exploratory rather than hypothesis testing, and moderate p values should be interpreted cautiously.

In conclusion, this study contributed to the understanding of equity of service delivery by setting and gender in an already fragile setting. These findings should be considered when reaching service delivery investments and policy decisions and provide solid ground for improvement of MoPH endeavours towards the achievement of universal health coverage such as the national unified long-term primary healthcare subsidisation protocol.

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## REFERENCES

- World Health Organization. Noncommunicable diseases country profiles 2018, 2018. Available: <https://www.who.int/nmh/publications/ncd-profiles-2018/en/>
- World Health Organization WHO. Noncommunicable diseases country profiles 2018, 2018. Available: <https://www.who.int/nmh/publications/ncd-profiles-2018/en/>
- WHO. Ncds and development; 2021.
- OECD. States of fragility 2020, 2020. Available: <https://www.oecd.org/dac/states-of-fragility-fa5a6770-en.htm>
- United Nations. Lebanon crisis response plan 2017–2020 (2019 update), 2019. Available: <https://www.unhcr.org/lb/wp-content/uploads/sites/16/2019/04/LCRP-EN-2019.pdf>
- Trinh HT, Nguyen HTL, Pham VTT, et al. Hospital clinical pharmacy services in Vietnam. *Int J Clin Pharm* 2018;40:1144–53.
- Zablith N, Diaconu K, Naja F, et al. Dynamics of non-communicable disease prevention, diagnosis and control in Lebanon, a fragile setting. *Confl Health* 2021;15:4.
- Naja F, Shatila H, El Koussa M, et al. Burden of non-communicable diseases among Syrian refugees: a scoping review. *BMC Public Health* 2019;19:637.
- World Health organization who. Regional health systems observatory- EMRO health systems profile- Lebanon, 2006. Available: <https://rho.emro.who.int>
- Ammar W. *Health system and reform in Lebanon*. Ministry of Public Health, 2003.
- Ajluni S, Kawar M. *Towards decent work in Lebanon: issues and challenges in light of the Syrian refugee crisis*. ILO, 2015.
- Ministry Of Public Health. National health statistics report in Lebanon, 2012. Available: [https://www.usj.edu.lb/intranet/annonce/files/pdf/175\\_pdf\\_1.pdf](https://www.usj.edu.lb/intranet/annonce/files/pdf/175_pdf_1.pdf)
- Bank W. Lebanon Health Resilience Project, 2017. Available: <https://www.worldbank.org/en/news/loans-credits/2017/06/26/lebanon-health-resilience-project>
- Hamadeh R, Kdouh O, Hammoud R. *Non-Communicable diseases Epidemiology and response in Lebanon*. 47. Human & Health, 2019.
- Lyles E, Burnham G, Chlela L, et al. Health service utilization and adherence to medication for hypertension and diabetes among Syrian refugees and affected host communities in Lebanon. *J Diabetes Metab Disord* 2020;19:1245–59.
- UNHCR. Refugees in Lebanon caught in vicious debt cycle, 2015. Available: <https://www.unhcr.org/news/briefing/2015/11/564ef96f6/refugees-lebanon-caught-vicious-debt-cycle.html>
- Doocy S, Lyles E, Robertson T, et al. Prevalence and care-seeking for chronic diseases among Syrian refugees in Jordan. *BMC Public Health* 2015;15:1–10.
- Ay M, Arcos González P, Castro Delgado R. The perceived barriers of access to health care among a group of non-cAMP Syrian refugees in Jordan. *Int J Health Serv* 2016;46:566–89.
- UNHCR. Total registered Refugees; 2020.
- Giovetti O. *The humanitarian impact of the Beirut explosion*, 2020.
- MOPH. National PHC network; 2019.
- Lebanon SoHi. List of hospitals.
- KoboToolbox, 2012. Available: <https://eur03.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.kobotoolbox.org%2F&data=05%7C01%7Cdm55%40aub.edu.lb%7C677d9633dc2444053e5108da290432dc%7C7c7ba5b1a41b643e9a1206ff654ada137%7C1%7C1%7C637867395268103878%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6IjEhaWwiLCJXVCi6ImN0%3D%7C2000%7C%7C%7C&sdata=8swBiDL1FIVGkJcMyZf4ZFIUERMq%2FBvNBzYlyUInhc%3D&reserved=0>
- World Health Organization. Who Multi-Country studies data Archive, 2018. Available: <http://apps.who.int/healthinfo/systems/surveydata/index.php/catalog/whs>
- Royal College of General Practitioners. Patient Satisfaction Questionnaire (PSQ) - old WPBA programme, 2019. Available: <https://www.rcgp.org.uk/training-exams/training/mrcgp-workplace-based-assessment-wpba/psq-for-workplace-based-assessment.aspx>
- Harris J, McGee A, Andrews F, et al. The National survey of people with diabetes, 2007. Available: [http://www.nhssurveys.org/Filestore/documents/Diabetes\\_key\\_findings\\_rpt.pdf](http://www.nhssurveys.org/Filestore/documents/Diabetes_key_findings_rpt.pdf)
- World Health Organization. World Health Survey - Individual Questionnaire, Long Version. *Rotation A* 2002 <https://www.who.int/healthinfo/survey/whslongindividuala.pdf>
- Hamadeh R, Kdouh O, Hammoud R, et al. The primary healthcare network in Lebanon: a national facility assessment. *East Mediterr Health J* 2020;26:700–7.
- Ammar W. Health beyond politics, 2009. Available: <https://www.moph.gov.lb/en/view/3908/health-beyond-politics>



- 30 United Nations High Commissioner for Refugees. Syria regional refugee response – Inter-agency information sharing portal, 2018. Available: <http://data.unhcr.org/syrianrefugees/regional.php>
- 31 Azad AD, Charles AG, Ding Q, *et al.* The gender gap and healthcare: associations between gender roles and factors affecting healthcare access in central Malawi, June–August 2017. *Arch Public Health* 2020;78:119.
- 32 Caulin-Glaser T, Blum M, Schmeizl R, *et al.* Gender differences in referral to cardiac rehabilitation programs after revascularization. *J Cardiopulm Rehabil* 2001;21:24–30.
- 33 Peters SAE, Woodward M, Jha V, *et al.* Women's health: a new global agenda. *BMJ Glob Health* 2016;1:e000080.
- 34 Langer A, Meleis A, Knaul FM, *et al.* Women and health: the key for sustainable development. *Lancet* 2015;386:1165–210.
- 35 Parr JD, Lindeboom W, Khanam MA, *et al.* Diagnosis of chronic conditions with modifiable lifestyle risk factors in selected urban and rural areas of Bangladesh and sociodemographic variability therein. *BMC Health Serv Res* 2011;11:309.
- 36 Baschieri F, Acciarresi M, Caso V. Gender-Based approaches for the prevention and control of noncommunicable diseases. *Stroke* 2018;49:2810–1.
- 37 Lyles E, Burnham G, Chlela L, *et al.* Health service utilization and adherence to medication for hypertension and diabetes among Syrian refugees and affected host communities in Lebanon. *J Diabetes Metab Disord* 2020;19:1245–59.
- 38 United Nations High Commissioner for Refugees. Refugees in Lebanon caught in vicious debt cycle, 2015. Available: <https://www.unhcr.org/news/briefing/2015/11/564ef96f6/refugees-lebanon-caught-vicious-debt-cycle.html>
- 39 Hanna-Amodio C. Syrian refugee access to healthcare in Lebanon, 2020. Available: <https://reliefweb.int/report/lebanon/syrian-refugee-access-healthcare-lebanon>