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# Utilization Patterns and Experiences among Diabetic and Hypertensive patients in Fragile Settings: A Cross-Sectional Study from Lebanon

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Utilization Patterns and Experiences among Diabetic and Hypertensive patients in Fragile Settings: A Cross-Sectional Study from Lebanon

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ABSTRACT

Objective
Characterize the health service utilization and delivery patterns for NCD services in two contrasting fragility contexts and by other principal equity-related characteristics including: gender, nationality, and health coverage.

Setting
Primary Healthcare Centers located in the urbanized area of Greater Beirut (fragility setting 1) and the rural area of the Beqaa Valley (fragility setting 2).

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

Participants
1,700 Lebanese and Syrian-refugee patients seeking primary care for hypertension and diabetes.

Primary and Secondary Outcome
The main outcome of the study is the comprehensiveness of service delivery comparing differences in delivery patterns by fragility setting, gender, nationality, and health coverage.

Results
Compliance with routine NCD care management (e.g., counselling, immunizations, diagnostic testing, and referral rates) was significantly better in Beirut compared to Beqaa. Women were significantly less likely to be offered lifestyle counseling advice and referral to cardiologists (58.4% vs 68.3% in Beqaa and 58.1% vs 62% in Beirut) and ophthalmologists, compared to 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 compared to Syrian refugees. Immunization and diagnostic testing were significantly higher in Beirut among those who have health coverage compared to Beqaa.

Conclusions
Findings illustrate the contribution of setting, nationality, and gender to differentials in service utilization. A rigorous and comprehensive appraisal of NCD programs and services is imperative for providing policymakers with evidence-based recommendations to guide the design, implementation and evaluation of targeted programs and services necessary to ensure equity in health services delivery to diabetic and hypertensive patients. Such programs are an ethical imperative considering the protracted crises and compounded fragility.

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Keywords: fragility, diabetes, hypertension, refugees, gender, nationality, equity
Article Summary

Strengths of the study

- The first of its kind study comparing two fragility contexts in Lebanon and capturing the experiences of both the native Lebanese population and the Syrian refugees.
- The study utilized a comprehensive survey tool that captured the utilization patterns and experiences of 1,700 Lebanese and Syrian diabetic and hypertensive patients seeking primary health care in Lebanon.
- The large sample size supported the identification of policy recommendations to enhance the delivery of equitable care to diabetic and hypertensive patients, with sensitivity to the level of need resulting from compounded fragility.

Limitations of the study

- The study included a representative sample of health facilities from two regions in Lebanon, however the data may 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.
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.(1) NCDs disproportionately affect people in low- and middle-income countries (LMICs), where 78% of all NCD deaths and 85% of premature deaths occur.(1) The rising burden of NCDs exacerbates health inequalities and worsens poverty, especially in fragile contexts marked by weak health systems and poor governance.

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.(2) Fragility therefore leaves populations vulnerable to a range of threats. The 2020 OECD State of Fragility Report notes that in fragile contexts, which are home to over two billion people, 460 million (76.5%) live in extreme poverty and lack access to essential services.(2)

Lebanon is a small country on the Eastern Mediterranean, with a population of 6 million people,(3) 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 strives. As a consequence, the country had several episodes of economic downturns with economic growth sharply declining in recent years.(3, 4) 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.(5) As a consequence, Lebanon has been experiencing a growing burden of NCDs, exacerbated by high levels of fragility.(6) In 2018, NCDs accounted for 91% of all deaths in the country, with hypertension and diabetes being the most prevalent NCDs.(1)

Healthcare in Lebanon is highly fragmented and provided predominantly by the private sector,(7) The long years of civil war and political conflict have taken its toll on the financial capacities of the public healthcare system,(8) and have led to inequitable concentration of specialized health services in highly urbanized areas (e.g. Greater Beirut) as compared to poorly resourced rural areas such as the Beqaa (a fertile valley in eastern Lebanon).(1) Although the country runs six social insurance funds, close to half the population have no formal health coverage,(9) and out-of-pocket household expenditures remains a main contributor to health financing.(10) In 2015, in order to strengthen primary care delivery and respond to the increasing NCD burden in the country, the Ministry of Public Health in collaboration with the World Bank launched the Emergency Primary Health Care 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 Program (NPTP).(11) The program offers six types of health packages,(11) and prioritizes NCD services for diabetes mellitus and hypertension. These packages support access to: immunizations, follow-up diagnostic tests, consultations (including pertinent counseling and health education), and medication prescriptions. By 2018, the project had delivered services to 101,454 beneficiaries, of whom 61,887 were adults.(12)

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, the study objective was to examine the equitable delivery of services in the context of fragility. Specifically, it characterizes health service utilization and delivery patterns for NCD services in two contrasting fragility contexts: The Greater Beirut and the Beqaa Valley (see Box: Setting information) and by other principal equity-related characteristics including: gender, nationality, and health coverage.

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**Box: Setting information**

| Fragility context one: The Greater Beirut Area | Fragility context two: The Beqaa Valley Area |
|-----------------------------------------------|------------------------------------------|
| The main urban commercial center of the country, accommodating a population of 2,434,609, including 206,628 Syrian and 17,486 Palestinian and other nationalities.(13) | Predominantly a rural environment, where the main economic activity is focused on agricultural industry. Accommodates the highest number of Syrian refugees settled in Lebanon (339,473, 38.6% % of whole refugee population).(13) |
Has the highest concentration of health services available in the country, including access to specialized secondary and tertiary care services. Has high levels of socio-economic inequality, which has worsened since the damage experienced by the Beirut Port explosion in August 2020, which left 300,000 people homeless.(14) In contrast to Beirut, the health system in the Beqaa has been historically under-developed and under-resourced: only 22 public primary healthcare centers(15) and 21 hospitals are available in the region,(16) with limited access to secondary and tertiary care and referrals forwarded to Beirut.

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 urbanized area of Greater Beirut (fragility setting 1) and the Beqaa Valley (fragility setting 2), see Box 1. The study utilized a team of 8 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 using KoBo, a toolkit for collecting and managing data in challenging environments (17).

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 are (1) older than 40 years and (2) diagnosed with diabetes or hypertension (as based on personal self-reporting following a confirmed diagnosis). Anyone not meeting the above-mentioned criteria or not consenting to participate was excluded.

Patient and Public Involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research project.

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 Appendix 1). Assuming an average 90% score on this index per population group (Lebanese or Syrian) and per setting (Beirut or Beqaa), and 80% power and 5% error, a total of 1,800 persons would need to be recruited. Overall, we recruited 1,700, 94.4% of the intended sample size. All participants had to complete the study informed consent form prior to their participation in this study.

Data sources

All eligible patients consenting to participation were surveyed using a standardized tool which comprises 12 questions on demographics, 11 on disease risk factors, 26 on itemized accounts of services received at accessed Primary HealthCare Center (PHCC) or via referral, 10 on disease outcomes, 13 on perceptions of patient satisfaction with services and also patient self-management, 2 questions on general access and affordability of NCD services and care coverage (Complete tool in Appendix 2). In the development of the study tool we have drawn on the World Health Surveys,(18) the Patient Satisfaction questionnaire of the Royal College of General Practitioners(19) ‘The National Survey of People with Diabetes’,(20) and the WHO individual questionnaire.(21) The questions on service delivery match those outlined in the service packages designed/outlined by the Lebanese Ministry of Public Health (MoPH) at the primary health care 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 (e.g., weight and BP monitoring), life-style advice received (e.g., nutrition), immunizations 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 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 analyzed in SPSS V27. Note that the use of Kobo has ensured data completeness and that variables with missing data were excluded from this study. Means and standard deviations were used to summarize numerical data, whereas frequency and percentages were used for categorical data. Bivariate analyses were carried out using the independent t-test and the ANOVA F test when comparing means among groups, and the Pearson Chi-square when comparing differences in proportions. The significance level was set at p < 0.05

Role of the funding source

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Ethics

The study protocol was reviewed and approved by the Ethics Research Panel of Queen Margaret University, Edinburgh (Protocol number QMU: REP 0201) and the Ethics Review Committee of the American University Beirut (protocol number AUB: SBS-2018-0514).

RESULTS

A total of 1,700 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 to setting 1 [55.90 (SD=10.11) vs 60.04 (SD=10.09)]. Two-thirds of the patients were females, 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 received 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 to 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).

Table 1: Participant characteristics by fragility settings

| Age (mean±SD) | 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 | Fragility Setting 1 | Fragility Setting 2 |
| N (%)         | N (%)             | N (%)                | N (%)            | N (%)                | N (%)             | N (%)                | N (%)            | N (%)                | N (%)             | N (%)             |
| Age (mean±SD) | 58.1±10.0         | 54.8±9.62*           | 60.4±10.7        | 55.6±10.45*         | 60.8±9.39         | 58.69±9.23*         | 60.04±10.0        | 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   |                  |                      |                  |                     |                  |                     |                  |                     |
Health services delivered by setting and health condition

The most consistently offered check-up items were blood pressure monitoring (for 91.2% of patients) and nutritional advice (for 78.2%). Assessment of weight was carried out less frequently in setting 1 vs. setting 2 (for 60% vs 77.4% of patients). Height was measured more among patients in setting 2 (94.5% vs 81.8%) for the hypertensive and diabetic patients. However, patients reported higher rates of non-compliance (68.9% vs 75.9% vs 78.2% and 81.8%) and non-compliance (68.9% vs 75.9% vs 78.2% and 81.8%) in setting 2 compared to those in setting 1. However, patients reported higher rates of non-compliance (68.9% vs 75.9% vs 78.2% and 81.8%) and non-compliance (68.9% vs 75.9% vs 78.2% and 81.8%) in setting 2 compared to those in setting 1. However, patients reported

Diabetic and comorbid patients received more nutrition (95.2% and 95.2% vs 95.2% and 95.2%) and exercise advice (68.9% and 75.9% vs 56.9% and 62.2%) in setting 2 compared to those in setting 1. However, patients reported
receiving smoking and alcohol advice more frequently in setting 1 compared to setting 2 (50.6% vs 42.8%) and 
(16.7% vs 6.6%); respectively (Table 2). Compared to setting 2, a significantly higher proportion of patients in 
setting 1 received hepatitis B (37.4% vs 2.2%) and flu vaccines (12.6% vs 2.2%). Diagnostic testing rates were 
generally high, with FBS (fasting blood sugar), Hba1c (Hemoglobin 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 to setting 2. 
Overall, rates of referrals were significantly higher in setting 1 compared to setting 2 (Table 2).

Table 2: Description of all services delivered by patient health condition and fragility setting

|                   | Diabetic (n=458) | Hypertensive (n=908) | Comorbid (n=334) | All patients (n=1700) |
|-------------------|------------------|----------------------|------------------|-----------------------|
|                   | Fragility Setting 1 | Fragility Setting 1 | Fragility Setting 1 | Fragility Setting 1 |
| N (%)             | N (%)             | N (%)                | N (%)             | N (%)                |
| **Check-up items**|                   |                      |                   |                       |
| Height            | 35 (59.3%)*      | 165 (41.8%)          | 301 (38.3%)       | 154 (58.3%)*         |
|                   | 58 (54.2%)*      |                      | 61 (62.2%)*       | 61 (39.7%)*          |
| Weight            | 34 (57.6%)*      | 313 (79.2%)          | 609 (77.4%)       | 172 (74.5%)*         |
|                   | 60 (55.6%)*      |                      | 65 (66.3%)        | 159 (60%)*           |
| Blood pressure    | 45 (76.3%)*      | 367 (92.9%)          | 756 (96.1%)       | 212 (91.8%)*         |
|                   | 37 (92.2%)       |                      | 83 (84.7%)        | 216 (81.8%)*         |
| Foot examination  | 13 (22.8%)*      | 37 (9.4%)            | 26 (5.3%)         | 34 (14.8%)           |
|                   | 4 (8.3%)         |                      | 20 (21.1%)        | 37 (18.5%)*          |
| **Life-style advice** |                |                      |                   |                       |
| Smoking           | 29 (50%)         | 142 (39.2%)          | 298 (43.8%)       | 301 (38.3%)          |
|                   | 50 (47.2%)       |                      | 61 (62.2%)*       | 93 (46%)             |
| Nutrition         | 45 (77.6%)*      | 376 (95.2%)          | 532 (79%)         | 81 (81.8%)*          |
|                   | 78 (78%)         |                      | 61 (62.2%)*       | 218 (95.2%)*         |
| Exercise          | 33 (56.9%)*      | 273 (68.9%)          | 535 (67.6%)       | 176 (75.9%)*         |
|                   | 54 (50.9%)       |                      | 61 (62.2%)*       | 148 (56.3%)*         |
| Alcohol           | 9 (15.8%)*       | 14 (4.2%)            | 45 (7.1%)         | 17 (9.1%)            |
|                   | 18 (17.5%)*      |                      | 16 (16.3%)        | 43 (16.7%)*          |
| DM management     | 33 (57.9%)*      | 298 (75.4%)          | 155 (32.9%)       | 182 (78.8%)          |
|                   | 17 (37%)         |                      | 61 (61.6%)*       | 111 (55%)            |
| HP management     | 10 (35.7%)       | 75 (39.7%)           | 59 (55.7%)        | 59 (57.3%)           |
|                   | 599 (75.3%)      |                      | 58 (60.4%)*       | 180 (77.9%)          |
|                   | 58 (57.3%)       |                      | 127 (55.2%)*      | 854 (70.3%)          |
| **Immunizations** |                   |                      |                   |                       |
| Hepatitis B       | 20 (33.3%)*      | 7 (1.8%)             | 35 (32.1%)        | 13 (1.6%)            |
|                   | 13 (1.6%)        |                      | 46 (45.5%)*       | 11 (4.7%)            |
| Flu vaccine       | 4 (6.7%)*        | 10 (2.5%)            | 10 (9.2%)*        | 16 (2.0%)            |
|                   | 16 (2.0%)        |                      | 20 (19.8%)*       | 6 (2.6%)             |
|                   | 34 (12.6%)*      |                      | 32 (2.2%)*        |                       |
| **Diagnostic testing** |             |                      |                   |                       |
| FBS               | 52 (86.7%)*      | 383 (96.2%)          | 63 (57.8%)*       | 378 (47.3%)          |
|                   | 63 (57.8%)*      |                      | 378 (47.3%)       | 90 (89.1%)           |
| Hba1c             | 57 (95%)         | 377 (94.7%)          | 78 (72.9%)*       | 285 (35.7%)          |
|                   | 78 (72.9%)*      |                      | 96 (96%)*         | 206 (88.8%)          |
| Lipid profile     | 44 (73.3%)       | 256 (64.3%)          | 87 (81.3%)*       | 538 (67.3%)          |
|                   | 87 (81.3%)*      |                      | 90 (90%)*         | 187 (80.6%)          |
| CBC               | 27 (45%)         | 164 (41.2%)          | 60 (55.0%)        | 382 (47.8%)          |
|                   | 60 (55.0%)       |                      | 61 (60.4%)        | 137 (58.8%)          |
| Platelets         | 32 (53.3%)*      | 112 (28.1%)          | 68 (64.2%)*       | 283 (35.5%)          |
|                   | 70 (70%)*        |                      | 70 (70%)*         | 102 (44.2%)          |
| Na                | 18 (30%)*        | 14 (3.5%)            | 64 (58.7%)*       | 139 (17.4%)          |
|                   | 67 (66.3%)*      |                      | 56 (24%)          | 149 (55.2%)*         |
|                   | 149 (55.2%)*     |                      | 209 (14.6%)       |                       |
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 to 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 (e.g., lipid tests, uric acid, creatinine and EKG) compared to men. Compared to 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 to Lebanese vs. Syrian patients, we observe that Lebanese patients received significantly more advice on nutrition and diabetes management when compared to 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 CBC test), although this was more pronounced in facilities in setting 2. This trend was particularly marked for EKG, SGPT and SGOT. Compared to 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 checkups (58.4% and 15.7%) compared to those in setting 2 (39.5% and 11.6%), while those in setting 2 had more weight and blood pressure checkups (76.9% vs 59.6% and 93.6% vs 83.3%; respectively). The results showed a similar pattern for Syrians. Similarly, a higher proportion of Lebanese and Syrian patients residing in setting 1 received hepatitis B and flu vaccines compared to those in setting 2.
Table 3: Description of all services delivered by gender, nationality, and health coverage, and by fragility setting

| Check-up items | Gender | Nationality | Health coverage |
|----------------|--------|-------------|-----------------|
|                | Female | Male        | Lebanese        | Syrians        | Yes | No |
|                | Fragility Setting 1 | 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 (%) | N (%) |
| 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%)* |
| Life-style 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 (58.5%)* |
| 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%)* |
| Immunizations | | | | | | | | | |
| 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%)* |
| Flu 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

| Test       | Value | Frequency |
|------------|-------|-----------|
| FBS        |       |           |
| HbA1c      |       |           |
| Lipid profile |     |           |
| CBC        |       |           |
| Platelets  |       |           |
| Na         |       |           |
| K          |       |           |
| Ca         |       |           |
| Uric Acid  |       |           |
| Creatinine |       |           |
| SGPT       |       |           |
| SGOT       |       |           |
| Urine test |       |           |
| EKG        |       |           |

### Referral to Specialists

| Specialist      | Value | Frequency |
|-----------------|-------|-----------|
| Endocrinologist |       |           |
| Cardiologist    |       |           |
| Ophthalmologist |       |           |

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| Profession          | Count | Percentage | Count | Percentage | Count | Percentage | Count | Percentage | Count | Percentage | Count | Percentage |
|---------------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
| Dentist             | 13    | 7.1%       | 11    | 1.1%       | 4     | 4.8%       | 5     | 1.1%       | 13    | 6.4%       | 7     | 1.4%       |
| Clinical dietician   | 24    | 13.0%      | 8     | 0.8%       | 2     | 2.4%       | 10    | 2.1%       | 25    | 12.3%      | 9     | 1.8%       |

*Indicates statistical difference between the fragility settings with a p-value<0.05

1. Indicates statistical difference between gender groups within fragility settings with a p-value<0.05
2. Indicates statistical difference between nationality groups within fragility settings with a p-value<0.05
3. Indicates statistical difference between health coverage groups within fragility settings with a p-value<0.05

4. FBS: fasting blood sugar, HbA1c: Hemoglobin A1C, Na: Sodium, K: potassium, Ca: calcium, SGPT: Serum glutamic pyruvic transaminase, SGOT: serum glutamic-oxaloacetic transaminase, EKG: electrocardiography.
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 to those with no coverage, those patients had more weight and blood pressure checkups (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 checkups (65.8% vs 36.7% and 10.5% vs 8.1%; respectively), compared to those reporting no health coverage. In terms of diagnostic testing, overall, laboratory testing was significantly higher in setting 1 compared to the setting 2 among those who have health coverage compared to those who do not. As for referrals, those patients who reported having health coverage were referred more frequently to cardiologist and endocrinologist in setting 2 in comparison to those who are 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 overwhelmingly better NCD service delivery in setting 1 (an urbanized area of Greater Beirut) as manifested by the higher rate of check-up provision, patient education, immunization, diagnostic testing and referral rates when compared to 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 to Syrians. The findings also showed that health coverage status can impact the service delivery provided.

Our findings that the urbanized 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. (5) Furthermore, a recent national facility assessment conducted across primary healthcare centers in Lebanon identified significant regional disparities between rural and urbanized areas, (22) 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 taskforce to be in major need for health institutional support, (3) whereas setting 1 includes some of the most advanced medical services and facilities, (23) with a lower percentage of Syrian refugees’ settlement (26%), (24) 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 (e.g. 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 underutilize necessary healthcare, (25) and less likely to be instructed on secondary prevention strategies compared to men. (26) Several studies highlighted gender inequalities in utilization of healthcare services. (27, 28) 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 to men. (27, 28) In addition, this could be also attributed to the fact that women tend to seek help less frequently, (29) or at more advanced stages compared to men. (30) 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 programs to restore equitable access to NCD services. The findings further call on policy and decision makers, to work collaboratively with underprivileged and refugee communities, to design, implement and evaluate evidence-based targeted programs 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 utilization. Earlier studies reported underutilization of NCD services among Syrian refugees compared to Lebanese community members. (31, 32) The highly privatized 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. (33) 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 to refugees. (31, 32) 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 prioritize the provision of equitable access to NCD care for
refugees since the poor detection and control of NCDs does not only increase the number of patients seeking care
services but also increases 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.

The study further highlights the importance of considering the various aspects that would further exacerbate and
compound the fragility of NCD patients. For example, Syrian refugees are more fragile compared to host
communities, female patients are more fragile compared to males, and patient in setting 2 are more fragile compared
to 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 programs should not offer the same size for
all services and should be structured with sensitivity to the level of need resulting from compounded fragility. Future
research could explore this concept in further details 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 three 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.

This study contributed to the understanding of equity of service delivery by setting, 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 endeavors towards the achievement of universal health coverage
such as the national unified long-term primary healthcare subsidization protocol (LPSP).
CONTRIBUTORSHIP STATEMENT

SS has made substantial contributions to the analysis, interpretation of the data, write up and revising the manuscript.

DM has made substantial contributions to the acquisition, analysis, interpretation of the data, drafting the original manuscript and revising it.

AN has made substantial contributions to the acquisition, analysis, interpretation of the data and the revision the manuscript.

RH have made substantial contributions to the interpretation of the data and the revision of the manuscript.

HD has made substantial contributions to the analysis, interpretation of the data, and revising the manuscript.

KD has made substantial contributions to the conception and design of the work, analysis, interpretation of the data, and revising the manuscript.

SA has made substantial contributions to the analysis and interpretation of the data, and the revision of the manuscript.

AA have made substantial contributions to the interpretation of the data and the revision of the manuscript.

MA has made substantial contributions to the conception and design, supervision of the work, write up and revision of the manuscript.

All authors have read and approved the submitted version of the manuscript.

DECLARATION OF INTERESTS

The authors declare no competing interests.

DATING SHARING

As per the ethical approval protocol, deidentified data could be shared by special request to the senior authors on this manuscript.

ETHICAL APPROVAL

The study protocol was reviewed and approved by the Ethics Research Panel of Queen Margaret University, Edinburgh (Protocol number QMU: REP 0201) and the Ethics Review Committee of the American University Beirut (protocol number AUB: SBS-2018-0514).

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PATIENT AND PUBLIC ENGAGEMENT

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.
REFERENCES

1. World Health Organization WHO. Noncommunicable diseases country profiles 2018 [Available from: https://www.who.int/nmh/publications/ncd-profiles-2018/en/.

2. OECD. States of Fragility 2020 [Available from: https://www.oecd.org/dac/states-of-fragility-fa5a6770-en.htm.

3. United Nations. Lebanon Crisis Response Plan 2017–2020 (2019 update) [Available from: https://www.unhcr.org/lb/wp-content/uploads/sites/16/2019/04/LCRP-EN-2019.pdf.

4. Trinh HT, Nguyen HT, Pham VT, Ba HL, Dong PT, Cao TT, et al. Hospital clinical pharmacy services in Vietnam. International Journal of Clinical Pharmacy. 2018;40(5):1144-53.

5. Zablith N, Diaconu K, Naja F, El Koussa M, Loffreda G, Bou-Orm I, et al. Dynamics of non-communicable disease prevention, diagnosis and control in Lebanon, a fragile setting. Conflict and Health. 2021;15(1):4.

6. Naja F, Shatila H, El Koussa M, Meho L, Ghandour L, Saleh S. Burden of non-communicable diseases among Syrian refugees: a scoping review. BMC Public Health. 2019;19(1):637.

7. World Health Organization WHO. Regional Health Systems Observatory- EMRO. Health Systems Profile- Lebanon. 2006 [Available from: https://rho.emro.who.int.

8. Ammar W. Health system and reform in Lebanon: Ministry of Public Health; 2003.

9. Ajluni S, Kawar M. Towards decent work in Lebanon: Issues and challenges in light of the Syrian refugee crisis: ILO; 2015.

10. Ministry Of Public Health. National Health Statistics Report in Lebanon 2012 [Available from: https://www.usj.edu.lb/intranet/annonce/files/pdf/175_pdf_1.pdf.

11. World Bank. Lebanon Health Resilience Project 2017 [Available from: https://www.worldbank.org/en/news/loans-credits/2017/06/26/lebanon-health-resilience-project.

12. Hamadeh R, Kdouh O, Hammoud R, Haddad I. Non-Communicable Diseases Epidemiology And Response in Lebanon. HUMAN & HEALTH. 2019;47.

13. United Nations High Commissioner for Refugees. Total Registered Refugees 2020 [Available from: https://data2.unhcr.org/en/situations/syria/location/71.

14. Giovetti O. The humanitarian impact of the Beirut explosion 2020 [Available from: https://www.concern.net/news/humanitarian-impact-beirut-explosion.

15. Ministry Of Public Health. National PHC Network. 2019 [Available from: https://moph.gov.lb/en/Pages/0/8116/national-phc-network.

16. Syndicate of Hospitals. Hospitals in Lebanon 2021 [Available from: https://www.syndicateofhospitals.org.lb/Hospitals/Index/8.

17. Toolbox K. KoBo Toolbox. https://www.kobotoolbox.org/

18. World Health Organization. WHO Multi-Country Studies Data Archive 2018 [Available from: http://apps.who.int/healthinfo/systems/surveydata/index.php/catalog/whs.

19. Royal College of General Practitioners. Patient Satisfaction Questionnaire (PSQ) - old WPBA programme 2019 [Available from: https://www.rcgp.org.uk/training-exams/training/mrcgp-workplace-based-assessment-wpba/psq-for-workplace-based-assessment.aspx.

20. Harris J, McGee A, Andrews F, D'Souza J, Sproston K. The National Survey of People with Diabetes 2007 [Available from: http://www.nhssurveys.org/Filestore/documents/Diabetes_key_findings_rpt.pdf.

21. World Health Organization. World Health Survey - Individual Questionnaire, Long Version, Rotation A 2002 [Available from: https://www.who.int/healthinfo/survey/whslongindividuala.pdf.

22. Hemadeh R, Kdouh O, Hammoud R, Jaber T, Khalek LA. The primary healthcare network in Lebanon: a national facility assessment. East Mediterr Health J. 2020;26(6):700-7.
23. Ammar W. Health beyond politics 2009 [Available from: https://www.moph.gov.lb/en/view/3908/health-beyond-politics.

24. United Nations High Commissioner for Refugees. Syria Regional Refugee Response – Inter-agency Information Sharing Portal 2018 [Available from: http://data.unhcr.org/syrianrefugees/regional.php

25. Azad AD, Charles AG, Ding Q, Trickey AW, Wren SM. 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(1):119-.

26. Caulin-Glaser T, Blum M, Schmeizl R, Prigerson HG, Zaret B, Mazure CM. Gender differences in referral to cardiac rehabilitation programs after revascularization. J Cardiopulm Rehabil. 2001;21(1):24-30.

27. Peters SA, Woodward M, Jha V, Kennedy S, Norton R. Women's health: a new global agenda. BMJ global health. 2016;1(3):e000080.

28. Langer A, Meleis A, Knaul FM, Atun R, Aran M, Arreola-Ornelas H, et al. Women and health: the key for sustainable development. The Lancet. 2015;386(9999):1165-210.

29. Parr JD, Lindeboom W, Khanam MA, Pérez Koehlmoos TL. Diagnosis of chronic conditions with modifiable lifestyle risk factors in selected urban and rural areas of Bangladesh and sociodemographic variability therein. BMC Health Services Research. 2011;11(1):309.

30. Baschieri F, Acciarresi M, Caso V. Gender-Based Approaches for the Prevention and Control of Noncommunicable Diseases. Stroke. 2018;49(12):2810-1.

31. Lyles E, Burnham G, Chlela L, Spiegel P, Morlock L, Doocy S. Health service utilization and adherence to medication for hypertension and diabetes among Syrian refugees and affected host communities in Lebanon. Journal of Diabetes & Metabolic Disorders. 2020;19(2):1-15.

32. United Nations High Commissioner for Refugees. Refugees in Lebanon caught in vicious debt cycle 2015 [Available from: https://www.unhcr.org/news/briefing/2015/11/564ef96f6/refugees-lebanon-caught-vicious-debt-cycle.html.

33. Hanna-Amodio C. Syrian refugee access to healthcare in Lebanon 2020 [Available from: https://reliefweb.int/report/lebanon/syrian-refugee-access-healthcare-lebanon.
Appendix A – Facility Assessment

Date of assessment:

Persons involved in completing assessment:

Eligibility assessment

| Criteria                                                                 | Number | Yes | No |
|-------------------------------------------------------------------------|--------|-----|----|
| Facility is located in Greater Beirut or Beqaa                           | NA     |     |    |
| Facility delivers NCD services (as reported by the head of the facility – consultations for diabetes and hypertension) | NA     |     |    |
| Facility offers services to both Lebanese and Syrian refugees: at minimum 50 consultations for Lebanese and 20 consultations for Syrians per month |        |     |    |
| Facility has a minimum patient load for diabetes of 20 outpatient consultations per week and 20 hypertension outpatient consultations per week |        |     |    |
| Consent to participate                                                  | NA     |     |    |

Eligibility

| Eligibility |
|-------------|
| Eligible    |
| Ineligible  |

Affiliation of the PHC:

- Government
- Non-governmental

Location (Greater Beirut or Beqaa):

ID number:
A. Service availability

What type of services is available?

1. Yes 0. No  
Comment on why resources are/are not available

1. Reproductive, Maternal, Newborn, and Child Health (RMNCH)

2. Communicable disease services

3. Non-communicable diseases

4. Minor and major injury services

5. Ear, Nose, and Throat (ENT) services

6. Ophthalmology

7. Other

B. Health information systems

What is available at clinic level?

1. Yes 0. No  Comment on why resources are/are not available

1. Health information technology resources and systems

2. Does the facility have electronic stock card or log books for medicine?

3. Does the facility have electronic stock card or log books for consumables (e.g. syringes, bandages)?

4. Does the facility keep a record of all the patient visits?

5. Are the records kept in a registry system?

6. Are patient files retrieved and consulted each time they visit the facility?

7. Are medical records of diabetic/hypertensive patients computerized?
8. Is the Internet used for communication and information exchange regarding diabetic/hypertensive patients?

9. Are there magnetic cards developed for diabetic/hypertensive patients/user identification?

10. Is there an electronic scheduling system for diabetic/hypertensive patients' appointments?

11. Is there an electronic scheduling system for diabetic/hypertensive patients' examinations?

12. Is there an electronic scheduling system for diabetic/hypertensive patients' admissions?

13. Are there any computerized protocols for diagnosis and treatment support of diabetic/hypertensive patients?

C. Human resources

What type of human resources are available? How many?

1. Yes 0. No How many?

1. Physicians

2. Psychologists

3. Registered nurses

4. Registered midwives

5. Social workers

6. Occupational therapists

7. Pharmacists

8. Dietitians/nutritionists

9. Community health worker/health educator

10. Human Resources (available upon referral)

D. Facility infrastructure

Please tell us more about the facility infrastructure
1. The building is in a good state of repair (e.g., windows are not broken, paint is not peeling from the walls)

2. The building is accessible for persons with physical disabilities

3. The building’s lighting (artificial and natural), heating and ventilation provide a comfortable living environment

4. The physical equipment and supplies are sufficient and in good condition

5. Measures are in place to protect people against injury through fire

6. The toilet facilities are clean and working properly

7. The toilet facilities allow privacy, and there are separate facilities for men and women

8. The toileting needs of service users who have impaired mobility or other physical disabilities are accommodated

9. There are ample furnishings, and they are comfortable and in good condition

10. The layout of the facility is conducive to interaction between and among service users, staff and visitors

E. Equipment for NCDs

1. How often are blood pressure measuring devices (BPMDs) calibrated and checked for accuracy?
   1. Once a year or more
   2. Less than once a year
   3. Never
   4. Don’t know

2. How often are weight scales calibrated and checked for accuracy?
1. Once a year or more
2. Less than once a year
3. Never
4. Don’t know

3. How often are glucometers calibrated and checked for accuracy?

1. Once a year or more
2. Less than once a year
3. Never
4. Don’t know

4. Are there any consumables that you need?

_____________

5. Are they accessible?

_____________

6. How is the equipment usually repaired and maintained?

1. Repaired at the facility
2. Sent back to manufacturer for repair
3. Other, specify _______________

7. What, if any, are the difficulties in getting repairs to equipment done?

..................................................................................................................................................................

..................................................................................................................................................................

F. Infrastructure/services

1. Are the following procedures being conducted at the facility when needed?

1. Yes 0. No, why not? .......................

1. Administration of oxygen (via mask or tube)
2. Administration of intravenous (IV) fluids/drip
3. IV injection
4. Intramuscular (IM) injection
5. Subcutaneous injection
6. Electrocardiography (ECG)
7. Cardiopulmonary resuscitation
8. Manual ventilation with a bag valve mask resuscitator (ambu-bag)
9. Visual acuity examination
10. Examination for neuropathy with knee hammer/tuning fork, etc.
11. Peak flow test
12. Ophthalmoscopy

2. Do you have a bed where you can stabilize a very ill patient before transfer to a referral institution?
   1. Yes
   0. No

3. If injections are provided at the facility, what type of needle is used?
   1. Disposable needles
   2. Reusable, sterilized needles.
   3. How are needles sterilized? .................................................................
   4. Injections not provided at the facility
   5. Don’t know

4. Is there a safe disposal for used needles available?
   1. Yes
   0. No

G. Utilization of services

1. What is the total number of visits to the health facility for outpatient services last month?
   1. Total number of visits last month: _______________
   2. On average how many consultations were for diabetes? _______________
      This figure is based on:
      a. Register/record
      b. Estimation
   3. On average how many consultations were for hypertension? _______________
      This figure is based on:
      a. Register/record
      b. Estimation

2. What is the total number of visits to the health facility for outpatient services yesterday?
   1. Total number of visits yesterday: _______________
   2. On average how many consultations were for diabetes? _______________
      This figure is based on:
      a. Register/record
      b. Estimation
3. On average how many consultations were for hypertension? _______________
   This figure is based on:
   a. Register/record
   b. Estimation

3. How many of the patient visits made yesterday were for:
   1. Number of visits made for hypertension: _______________
      This figure is based on:
      a. Register/record
      b. Estimation
   2. Number of visits made for diabetes: _______________
      This figure is based on:
      a. Register/record
      b. Estimation

4. How do patients access the facility?
   1. Walk-in only
   2. By appointment only
   3. Combination of appointments and walk-ins

H. Financing and administration

1. Do patients pay the facility for medicines?
   1. Yes, full payment
   2. Yes, partial payment
   3. No, medicines are provided for free
   4. Other: ....

2. If medicines are provided for free or for partial payment, who subsidizes it?
   1. Specify: ................................................... Proportion paid by patient: ......%
   2. Specify: ................................................... Proportion paid by patient: ......%
   3. Specify: ................................................... Proportion paid by patient: ......%
   4. Specify: ................................................... Proportion paid by patient: ......%
   5. Specify: ................................................... Proportion paid by patient: ......%
   6. Specify: ................................................... Proportion paid by patient: ......%
   7. Specify: ................................................... Proportion paid by patient: ......%
   8. Don’t know
3. Do patients pay the facility for consultations?

1. Yes, full payment
2. Yes, partial payment
0. No, consultations are provided for free
3. Other: _________________

4. If consultations are provided for free or for partial payment, who subsidizes it?

   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%

8. Don’t know

5. Do patients pay the facility for diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
0. No, diagnostic tests are provided for free
3. Other: _________________

6. If diagnostic tests are provided for free or for partial payment, who subsidizes it?

   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%
   Specify: ...................................................                     Proportion paid by patient: ......%

8. Don’t know

I. Diabetes services - Financing

1. For how long have the diabetes services been provided at the clinic?

_______________

2. Do patients pay the facility for diabetes medicines?
1. Yes, full payment
2. Yes, partial payment
0. No, medicines are provided for free
3. Other:....

3. If diabetes medicines are provided for free or for partial payment, who subsidizes it?

1. Specify: ...................................................                     Proportion paid by patient: ......%
2. Specify: ...................................................                     Proportion paid by patient: ......%
3. Specify: ...................................................                     Proportion paid by patient: ......%
4. Specify: ...................................................                     Proportion paid by patient: ......%
5. Specify: ...................................................                     Proportion paid by patient: ......%
6. Specify: ...................................................                     Proportion paid by patient: ......%
7. Specify: ...................................................                     Proportion paid by patient: ......%
8. Don't know

4. Do patients pay the facility for diabetes consultations?

1. Yes, full payment
2. Yes, partial payment
0. No, consultations are provided for free
3. Other:___________

5. If diabetes consultations are provided for free or for partial payment, who subsidizes it?

1. Specify: ...................................................                     Proportion paid by patient: ......%
2. Specify: ...................................................                     Proportion paid by patient: ......%
3. Specify: ...................................................                     Proportion paid by patient: ......%
4. Specify: ...................................................                     Proportion paid by patient: ......%
5. Specify: ...................................................                     Proportion paid by patient: ......%
6. Specify: ...................................................                     Proportion paid by patient: ......%
7. Specify: ...................................................                     Proportion paid by patient: ......%
8. Don’t know

6. Do patients pay the facility for diabetes diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
0. No, diagnostic tests are provided for free

3. Other:___________

7. If diabetes diagnostic tests are provided for free or for partial payment, who subsidizes it?

1.Specify: ...................................................                     Proportion paid by patient: ......%
2.Specify: ...................................................                     Proportion paid by patient: ......%
3.Specify: ...................................................                     Proportion paid by patient: ......%
4.Specify: ...................................................                     Proportion paid by patient: ......%
5.Specify: ...................................................                     Proportion paid by patient: ......%
6.Specify: ...................................................                     Proportion paid by patient: ......%
7.Specify: ...................................................                     Proportion paid by patient: ......%
8.Don’t know

J. Hypertension services - Financing

1. For how long have the hypertension services been provided at the clinic?

_______________________

2. Do patients pay the facility for hypertension medicines?

    1. Yes, full payment
    2. Yes, partial payment
    0. No, medicines are provided for free
    3. Other:___________

3. If hypertension medicines are provided for free or for partial payment, who subsidizes it?

1.Specify: ...................................................                     Proportion paid by patient: ......%
2.Specify: ...................................................                     Proportion paid by patient: ......%
3.Specify: ...................................................                     Proportion paid by patient: ......%
4.Specify: ...................................................                     Proportion paid by patient: ......%
5.Specify: ...................................................                     Proportion paid by patient: ......%
6.Specify: ...................................................                     Proportion paid by patient: ......%
7.Specify: ...................................................                     Proportion paid by patient: ......%
8.Don’t know

4. Do patients pay the facility for hypertension consultations?
1. Yes, full payment
2. Yes, partial payment
0. No, consultations are provided for free
3. Other: _______________

5. If hypertension consultations are provided for free or for partial payment, who subsidizes it?

1. Specify: ...................................................                     Proportion paid by patient: ......%
2. Specify: ...................................................                     Proportion paid by patient: ......%
3. Specify: ...................................................                     Proportion paid by patient: ......%
4. Specify: ...................................................                     Proportion paid by patient: ......%
5. Specify: ...................................................                     Proportion paid by patient: ......%
6. Specify: ...................................................                     Proportion paid by patient: ......%
7. Specify: ...................................................                     Proportion paid by patient: ......%
8. Don’t know

6. Do patients pay the facility for hypertension diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
0. No, diagnostic tests are provided for free
3. Other: _______________

7. If hypertension diagnostic tests are provided for free or for partial payment, who subsidizes it?

1. Specify: ...................................................                     Proportion paid by patient: ......%
2. Specify: ...................................................                     Proportion paid by patient: ......%
3. Specify: ...................................................                     Proportion paid by patient: ......%
4. Specify: ...................................................                     Proportion paid by patient: ......%
5. Specify: ...................................................                     Proportion paid by patient: ......%
6. Specify: ...................................................                     Proportion paid by patient: ......%
7. Specify: ...................................................                     Proportion paid by patient: ......%
8. Don’t know
Appendix B - Beneficiary Survey

“Please do not refer to the names of the people and facilities or provide any identifiable information”

A- Respondent’s socio-demographic characteristics

I would like to start by asking you some background questions before asking you questions on your health. This information is confidential and will only be used for research purposes.

1. What is your nationality:
   1. Lebanese
   2. Syrian
   3. If Syrian, when did you come to Lebanon?
      Year:

2. Have you ever been diagnosed with Diabetes Mellitus?
   1. Yes
   0. No

3. Have you ever been diagnosed with Hypertension?
   1. Yes
   0. No

4. Gender
   Female
   Male

5. How old are you?
   (Years) _____________________

6. What is your weight?
   (Kilos) _____________________

7. What is your height?
   (Centimeters) _____________________

8. What is your current marital status?
   1. Never Married
   2. Currently Married
   3. Separated
   4. Divorced
   5. Widowed

9. What is the highest level of education that you have completed?
   1. No formal schooling
   2. Primary school completed
   3. Secondary school completed
   4. High school (or equivalent) completed
   5. University completed
6. Post graduate degree completed

10. What is your current employment status?
   1. Working
   2. Not working
   3. Unable to work

11. What is the number of rooms within the household you live in? (The kitchen and the toilets are excluded)

12. How many residents are there in the household? (Including the housekeepers?)

B. Risk Factors

I will now ask you questions about your daily life.

Tobacco consumption

13. Do you currently smoke any tobacco products such as cigarettes, cigars, or pipes?
   1. Daily
   2. Yes, but not daily
   3. No, not at all

14. For how many years have you been smoking daily? _____________________

15. On average, how many of the following products do you smoke each day?
   1. Cigarette
   2. Narguileh
   3. Other:

16. Alcohol consumption (I understand this may be a sensitive topic, and I would like to stress again the confidentiality and privacy of the information. If the participant feels uncomfortable he/she can skip answering any of the addressed question(s))

   16. Have you ever consumed a drink that contains alcohol (such as beer, wine, etc.)?
      1. Yes
      0. No

17. During the past 7 days, how many standard drinks of any alcoholic beverage did you have each day?
   1. Monday _____________________
   2. Tuesday _____________________
   3. Wednesday _____________________
   4. Thursday _____________________
   5. Friday _____________________
   6. Saturday _____________________
   7. Sunday _____________________

Nutrition (cards that illustrate what a serving means will be prepared)
Now I am going to ask you about the fruit and vegetables you usually eat.

18. How many servings of fruit do you eat on a typical day? _____________________

19. How many servings of vegetables do you eat on a typical day? _____________________

Physical Activity

Now I am going to ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Think about the activities you do at work, as part of your house and yard work, to get from places to place, and in your spare time for recreation, exercise or sport.

20. During the last 7 days, on how many days did you do vigorous physical activities? Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling. Think only about those physical activities that you did for at least 10 minutes at a time.

Days:

21. How much time did you usually spend doing vigorous physical activities on one of those days?
Minutes per day _____________________

Moderate Activity

Now think about activities which take moderate physical effort that you did in the last 7 days.

22. During the last 7 days, on how many days did you do moderate physical activities? Moderate physical activities make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace, or doubles tennis. Do not include walking.

Again, think about only those physical activities that you did for at least 10 minutes at a time.

Days:

23. How much time did you usually spend doing moderate physical activities on one of those days?
Minutes per day _____________________

Walking

Now think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

24. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?
_____________________

25. How much time did you usually spend walking on one of those days?
Minutes per day _____________________

C-History of Disease
Now I would like to read to you questions about some health problems or health care needs that you and the young children in this house may have experienced, and the treatment or medical care that you may have received.

26. Have you ever been diagnosed with diabetes or hypertension?
   Yes (diabetes) – continue
   Yes (hypertension) – skip to question 29
   Yes (both) – continue

27. When were you diagnosed with diabetes? Even an approximate answer is helpful.
   1. Year: _____________________
   2. Month: _____________________
   3. N/A

28. Where were you diagnosed with diabetes?
   1._____________________
   2. N/A

29. When were you diagnosed with hypertension? Even an approximate answer is helpful.
   1. Year: _____________________
   2. Month: _____________________
   3. N/A

30. Where were you diagnosed with hypertension?
   1._____________________
   2. N/A

31. Do you suffer from any other disease?
   1. Yes (please specify)
   0. No
   2. Don’t know

D-Health services

I will now ask you questions about the health care services you receive.

Diabetes Mellitus Benefit Package: (if patient says yes to diabetes diagnosis)

32. During the past year, how many times did you see your GP/family doctor?

____________________

33. How many of these visits directly related to your diabetes?

____________________

34. Were you referred to – and then attended appointments with – other specialists?

| Specialist | Referred (1.Yes/0.No) | Reason for referral (routine / other: please specify) | Attended |
|------------|-----------------------|------------------------------------------------------|----------|

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
1. Endocrinologist
2. Ophtalmologist
3. Other specialties
   (Cardio/Nephro/Vascular)
4. Dentist
5. Clinical dietician

35. Now let me ask you about the immunizations and diagnostic tests you receive.

| Test                          | Received (1.Yes/0.No) | Any other information (e.g. do they receive it here? Do they co-pay?) |
|-------------------------------|-----------------------|---------------------------------------------------------------------|
| 1. Hepatitis B vaccine        |                       |                                                                     |
| 2. Flu Vaccine                |                       |                                                                     |
| 3. Fasting Blood Sugar        |                       |                                                                     |
| 4. Hba1c                      |                       |                                                                     |
| 5. Lipid profile              |                       |                                                                     |
| 6. Other blood tests (CBC)    |                       |                                                                     |
| 7. Platelets                  |                       |                                                                     |
| 8. Creatinine – (for kidney function) |               |                                                                     |
| 9. SGPT (for liver function)  |                       |                                                                     |
| 10. SGOT (for liver function) |                       |                                                                     |
| 11. Urine test (Urinalysis)   |                       |                                                                     |
| 12. Urine test (spot urine microalbumin) |               |                                                                     |
| 13. EKG                       |                       |                                                                     |

36. Now I would like to ask you what usually happens during your examinations. Does the physician or the nurse check:

| Consultation element          | Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never) |
|-------------------------------|---------------------------------------------------------------------------------------|
| 1. Height                     |                                                                                        |
| 2. Weight                     |                                                                                        |
| 3. Blood pressure             |                                                                                        |
| 4. Foot examination (for ulcers etc) |                                      |

36. Does your health care provider offer you any advice on: (I would like to stress again the confidentiality and privacy of the information)
| Consultation element | Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never) | Do you find this advice relevant? (1.very relevant, 2.relevant, 3.moderately relevant, 4.slightly relevant, 5.not relevant) |
|----------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 1.Smoking            |                                                 |                                                                                                                                 |
| 2.Healthy nutrition (sugar) |                                           |                                                                                                                                 |
| 3.Exercise           |                                                 |                                                                                                                                 |
| 4.Alcohol consumption |                                               |                                                                                                                                 |
| 5.Managing your diabetes |                                             |                                                                                                                                 |

**Hypertension Benefit Package:**

*If patient says yes to hypertension diagnosis*

37. During the past year, how many times did you see your GP/family doctor?  
____________________  

38. How many of these visits directly related to your hypertension?  
____________________  

39. Were you referred to – and then attended appointments with – other specialists?  
   **Specialist**  
   **Referred (1.Yes/0.No)**  
   **Reason for referral**  
   **Attended**  
   *(routine / other: please specify)*  

1.Cardiologist  
2.Ophthalmologist  
3.Other specialties  
(Nephro/Vascular)  
4.Dentist  
5.Clinical dietician  

40. Now let me ask you about the immunizations and diagnostic tests you receive.  
   **Test**  
   **Received (1.Yes/0.No)**  
   **Any other information (e.g. do they receive it here? Do they-co pay?)**  

1.Hepatitis B vaccine  
2.Water  
3.Fasting Blood Sugar  
4.Hba1c  
5.Lipid profile  
6.Other blood tests (CBC)  
7.Platelets  
8.Na
9. K
10. Ca
11. Uric acid
12. Creatinine – (for kidney function)
13. SGPT (for liver function)
14. Urine test (Urinalysis)
15. Urine test (spot urine microalbumin)
16. EKG

41. Now I would like to ask you what usually happens during your examinations. Does the physician or the nurse check:

| Consultation element | Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never) |
|-----------------------|-----------------------------------------------------------------------------------|
| 1. Height             |                                                                                   |
| 2. Weight             |                                                                                   |
| 3. Blood pressure     |                                                                                   |

42. Does your health care provider offer you any advice on: (I would like to stress again the confidentiality and privacy of the information)

| Consultation element | Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never) | Do you find this advice relevant? (1.very relevant, 2.relevant, 3.moderately relevant, 4.slightly relevant, 5.not relevant) |
|-----------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1. Smoking            |                                                                                   |                                                                                                 |
| 2. Healthy nutrition (salt) |                                                                                     |                                                                                                 |
| 3. Exercise           |                                                                                   |                                                                                                 |
| 4. Alcohol consumption |                                                                                   |                                                                                                 |
| 5. Managing your hypertension |                                                                                   |                                                                                                 |

E. Patient self-management

43. Do you feel you have enough knowledge to manage your diabetes at home?

- 1-disagree
- 2-partially disagree
- 3-neutral
- 4-partially agree
- 5-agree
- 6-N/A

44. Do you feel you have enough knowledge to manage your hypertension at home?

- 1-disagree
- 2-partially disagree
- 3-neutral
- 4-partially agree
- 5-agree
45. What challenges do you face?
____________________

INVENTORY OF MEDICINES AND DRUGS

We are interested in knowing about the availability and use of certain medicines and drugs. Remember that whatever information you give me is confidential and will only be used for research purposes.

46. During the past year, the last time you sought care for diabetes or hypertension did the health care provider prescribe any medicine for you?

a. Diabetes:
   1. Yes
   0. No
   2. N/A

b. Hypertension:
   1. Yes
   0. No
   2. N/A

47. If yes: which medicines were they?
____________________

48. Of the medicines that were prescribed for you, how many of them were you able to get?
   1. All of them
   2. Most
   3. Some
   4. Very few
   5. None of them

49. Were these medications provided to you from the PHCC or did you have to get them yourself?
____________________

50. Which reason best explains why you did not get all the medicines you were prescribed?
   1. Could not afford
   2. Could not find all medicines
   3. Did not believe all the medications were needed
   4. Started to feel better
   5. Already had some of the medicines at home
   6. Other

F- Outcome (hospitalizations, glycemic episodes…)

51. When was the last time that you checked the HbA1C in the past year?
   1. Date:
   2. Never
   3. Don’t know

52. What was the HbA1C reading?
   1. Value:
2. Don’t know
3. N/A

53. How many times were you hospitalized for conditions related to diabetes in the past year?
   1. Number of times:
   2. Don’t know
   3. N/A

54. During the past four weeks, did you experience any symptoms of hypoglycemia? (shakiness, dizziness, sweating, hunger, irritability or moodiness, anxiety or nervousness)

____________________

55. When was the last time that you checked your blood pressure in the past year?
   1. Date
   2. Never
   3. Don’t know

56. What was the blood pressure value?
   1. Values
      a- Systolic BP:

      b- Diastolic BP:

   2. Don’t know
3. N/A

57. How many times were you hospitalized for conditions related to hypertension in the past year?
   1. Number of times:
   2. Don’t know
   3. N/A

58. Were you exposed to any of the following complications? (Tick all that apply)
   1. Heart disease
      a- Myocardial infarction or heart attack
      b- CABG – surgery
      c- Percutaneous Coronary Intervention
   2. Stroke
   3. Peripheral Artery disease
      a- Ulcers of the lower limbs (or toes)
      b- Amputation of the lower limbs (or toes)
   4. Diseases of the eye (retina)
   5. Kidney disease
   6. Thyroid problems
7. Other (specify):

59. Were you diagnosed with DM and/or HTN during these complications?

60. Did these complications happen in the past year?

G-Patient satisfaction and other factors affecting utilization

61. During the past year, when you needed health care for diabetes or hypertension did you get health care?

1. Always
2. Very Often
3. Sometimes
4. Rarely
5. Never

62. During the past year, did you visit this particular PHCC for the health care for diabetes or hypertension?

1. Always
2. Very Often
3. Sometimes
4. Rarely
5. Never

63. If you did not receive the health care, which reasons explain why you did not get health care? (tick all that apply)

1. Cost
   - A. Could not afford the cost of the visit
   - B. Could not afford the cost of transport

2. Knowing where to go
   - A. You did not know where to go

3. Physical access
   - A. No transport
   - B. No PHCC nearby?
   - C. Traffic

4. Previous experience of receiving care
   - A. The health care provider’s drugs or equipment were inadequate
   - B. The health care provider’s skills were inadequate
   - C. You were previously badly treated

5. Could not take time off work or had other commitments

6. You thought you were not sick enough

7. You tried but were denied health care

8. Other
Now I would like to ask you about how important some notions are to you

Would you say it is:
not important (1), slightly important (2), important (3), moderately important (4), very important (5) Skip (9)

64. How important is "respectful treatment" to you. (meaning: being shown respect when greeted by and when talking to health care providers and having physical examinations conducted in a way that respects your cultural norms)

65. How important is "confidentiality of personal information" to you. (meaning: having information about your health and other personal information kept confidential and having conversations with health care providers without other people overhearing)

66. How important is "convenient travel and short waiting times" to you. (meaning: having short travel times and convenient access to health care facilities and having short waiting times for consultations and hospital admissions)

67. How important is "choice of health care providers" to you. (meaning: being able to choose your health care provider (place or person) and being able to consult for a second opinion or with a specialist if so desired)

68. How important is "involvement in decision making" to you. (meaning: being involved as much as you want in deciding about your health care and freedom to discuss other treatment options or care regimes if you want)

69. How important are "good quality surroundings" to you? (meaning: having enough space, seating and fresh air in the waiting rooms, examination rooms and hospital wards and having a clean facility (including clean toilets))

70. How important is "contact with the outside world" to you? (meaning: having family and friends visit you as much as you want when you are a patient in hospital and being able to keep in contact with family and friends and to have information about what is happening outside the hospital)

71. How important is "clarity of communication" to you. (meaning: having the health care providers explain things in a way you can understand and having enough time to ask questions if you don’t understand something)

Now I would like to ask you about the care you received

72. During the last year, which type of health provider have you seen most frequently?
   1. Medical doctor
   2. Nurse
   7. Other

73. How would you rate your satisfaction regarding:
   Topic                                           Rating (1 lowest to 5 highest)
   During consultation
   1. Provider skills
2. Being spoken to respectfully
3. Privacy during consultation
4. Explanations about treatment options and alternatives
5. Time availability for questions and clarifications
6. Clarity of explanations during consultation
7. Involvement in decision making your health and treatment (e.g. plan)
8. Confidentiality of your personal information
9. Availability of equipment
10. Condition of the equipment (e.g. cleanliness, functionality)
11. Availability of medicines
12. Examination room space
13. Examination room cleanliness

Facility
14. Waiting time for appointment scheduling
15. Waiting time in facility (for receiving services)
16. Waiting space (availability, crowdedness)
17. Facility cleanliness (including toilets)
18. Staff greetings
19. Provider choice (within the centre)
20. Provider choice (between clinics/facilities)

74. On average, per visit, how much did you or your household pay for (local currency): [Interviewer: only write 0 if the service was free. If a person did not have tests or drugs, circle “Not applicable, not have”]

| Amount | Don’t know | Not applicable, not have |
|--------|------------|--------------------------|
| 1. [Health care provider’s] fees |
| 2. Medicines |
| 3. Tests |
| 4. Transport |
| 5. Other |

75. Do you have any health coverage? (please tick what applies)
   1. National Social Security Fund (NSSF)
   2. Civil Servants Cooperative (CSC)
   3. Military schemes
   4. Private insurance
   5. No health coverage

76. In the past year did you feel that you were treated worse by health care providers for any of the following reasons. Because of your:

   | Yes | No |
   |-----|----|
   | 1. Sex |
   | 2. Age |
   | 3. Lack of money |
   | 4. Social class |
   | 5. Type of illness |
   | 6. Nationality |
STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies

| Item No | Recommendation | Page No |
|---------|----------------|---------|
| **Title and abstract** | 1 | (a) Indicate the study’s design with a commonly used term in the title or the abstract | 1 |
| | | (b) Provide in the abstract an informative and balanced summary of what was done and what was found | 2 |
| **Introduction** | 2 | Explain the scientific background and rationale for the investigation being reported | 4 |
| **Objectives** | 3 | State specific objectives, including any prespecified hypotheses | 4 |
| **Methods** | 4 | Present key elements of study design early in the paper | 5 |
| | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 5 |
| | 6 | (a) Give the eligibility criteria, and the sources and methods of selection of participants | 5 |
| | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 5 |
| | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 5-6 |
| | 9 | Describe any efforts to address potential sources of bias | 12 |
| | 10 | Explain how the study size was arrived at | 5 |
| | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | 5-6 |
| | 12 | (a) Describe all statistical methods, including those used to control for confounding | 5-6 |
| | | (b) Describe any methods used to examine subgroups and interactions | 5-6 |
| | | (c) Explain how missing data were addressed | 6 |
| | | (d) If applicable, describe analytical methods taking account of sampling strategy | N/A |
| | | (e) Describe any sensitivity analyses | N/A |
| **Results** | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | 6 |
| | | (b) Give reasons for non-participation at each stage | 7 |
| | | (c) Consider use of a flow diagram | N/A |
| | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | 6-7 |
| | | (b) Indicate number of participants with missing data for each variable of interest | N/A |
| | 15* | Report numbers of outcome events or summary measures | 9-17 |
| | 16 | (a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 9-17 |
(b) Report category boundaries when continuous variables were categorized

(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period

| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | N/A |

**Discussion**

| Key results | 18 | Summarise key results with reference to study objectives | 6-13 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 14 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 13-14 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | 14 |

**Other information**

| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 15 |

*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.
Outpatient Utilization Patterns and Experiences among Diabetic and Hypertensive patients in Fragile Settings: A Cross-Sectional Study from Lebanon
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Outpatient Utilization Patterns and Experiences among Diabetic and Hypertensive patients in Fragile Settings: A Cross-Sectional Study from Lebanon

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ABSTRACT

Objective
Assess and describe the health service utilization and delivery patterns for NCD services in two contrasting fragility contexts and by other principal equity-related characteristics including: gender, nationality, and health coverage.

Setting
Primary Healthcare Centers located in the urbanized 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
1,700 Lebanese and Syrian-refugee patients seeking primary care for hypertension and diabetes.

Primary and Secondary Outcome
The main outcome is the comprehensiveness of service delivery comparing differences in utilization and service delivery patterns by fragility setting, gender, nationality, and health coverage.

Results
Compliance with routine NCD care management (e.g., counselling, immunizations, diagnostic testing, and referral rates) was significantly better in Beirut compared to Beqaa. Women were significantly less likely to be offered lifestyle counseling advice and referral to cardiologists (58.4% vs 68.3% in Beqaa and 58.1% vs 62% in Beirut) and ophthalmologists, compared to 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 compared to Syrian refugees. Immunization and diagnostic testing were significantly higher in Beirut among those who have health coverage compared to Beqaa.

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

Funding
The National Institute for Health Research

Keywords: fragility, diabetes, hypertension, refugees, gender, nationality, equity
Strengths and limitations of the study

- The first study of its kind to examine outpatient utilization 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 centers 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.(1) NCDs disproportionately affect people in low- and middle-income countries (LMICs), where 78% of all NCD deaths and 85% of premature deaths occur.(1) The rising burden of NCDs exacerbates health inequalities and worsens poverty, especially in fragile contexts marked by weak health systems and poor governance.(2)

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.(3) Fragility therefore leaves populations vulnerable to a range of threats. The 2020 OECD State of Fragility Report notes that in fragile contexts, which are home to over two billion people, 460 million (76.5%) live in extreme poverty and lack access to essential services.(3)

Lebanon is a small country on the Eastern Mediterranean, with a population of 6 million people,(4) 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.(4, 5) 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.(6) As a consequence, Lebanon has been experiencing a growing burden of NCDs, exacerbated by high levels of fragility.(7) In 2018, NCDs accounted for 91% of all deaths in the country, with hypertension and diabetes being the most prevalent NCDs.(1)

Healthcare in Lebanon is highly fragmented and provided predominantly by the private sector.(8) The long years of civil war and political conflict have taken its toll on the financial capacities of the public healthcare system,(9) and have led to inequitable concentration of specialized health services in highly urbanized areas (e.g. Greater Beirut) as compared to poorly resourced rural areas such as the Beqaa (a fertile valley in eastern Lebanon).(1) Although the country runs six social insurance funds, close to half the population have no formal health coverage,(10) and out-of-pocket household expenditures remains a main contributor to health financing.(11) In 2015, in order to strengthen primary care delivery and respond to the increasing NCD burden in the country, the Ministry of Public Health in collaboration with the World Bank launched the Emergency Primary Health Care Restoration Project (EHPRP) which aimed to provide free healthcare services to 150,000 citizens identified as living below the poverty line by the National Poverty Targeting Program (NPTP).(12) The program offers six types of health packages,(12) and prioritizes NCD services for diabetes mellitus and hypertension. These packages support access to: immunizations, follow-up diagnostic tests, consultations (including pertinent counseling and health education), and medication prescriptions. By 2018, the project had delivered services to 101,454 beneficiaries, of whom 61,887 were adults.(13)

A recent study from Lebanon on health service utilization among patients seeking care for diabetes and hypertension among the Lebanese host community members and Syrian refugees identified significant gaps in care-seeking behavior and reported that host community members had better access to care and fewer reports of medication interruption compared to refugees (14). Lack of health coverage and affordability were found to be significant barriers with 39% of Syrian refugees in Lebanon reporting not receiving needed care due to unaffordable treatment.
and medication costs (15),(16, 17). Lebanese and Syrian community members further identified several barriers to health seeking, including limited availability of services and perceptions of poor-quality care (6).

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 aims to examine the equitable delivery of services in the context of fragility. Specifically, it assesses and describes the outpatient health service utilization patterns for NCD services in two contrasting fragility contexts: The Greater Beirut and the Beqaa Valley (see Box: Setting information) and by other principal equity-related characteristics including: gender, nationality, and health coverage.

Research in context
Evidence before this study
This study was comprised of 2 phases, in the first phase literature review was conducted in order to synthesize the extant literature and identify the gaps in knowledge and 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 socio-economic and financial crisis and underdeveloped health systems, it is inevitable to investigate the equity in delivering health care services among its population. Our study explores these differences between two contrasting settings in Lebanon. Our results showed that NCDs management and health care services are higher in Beirut compared to the Beqaa region and are more delivered to Lebanese than to the 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 program to achieve equity between in health services delivery to diabetic and hypertensive patients.

Insert Figure One here

Figure 1: setting information.

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 urbanized area of Greater Beirut (fragility setting 1) and the Beqaa Valley (fragility setting 2), see Box 1. Note that the unit of analysis in this study was the patient and the sampling unit was the health center.

Data collection
In preparation for data collection, the study utilized a team of 8 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 (18). 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 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 are (1) older than 40 years and (2) diagnosed with diabetes or hypertension (as based on personal self-reporting following a confirmed diagnosis). Anyone not meeting the above-mentioned 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 Appendix 1). Assuming an average 90/100 and 85/100 score on this index per population group (Lebanese or Syrian respectively) and per setting (Beirut or Beqaa), and 80% power and 5% error, a total of 1,800 persons would need to be recruited. Overall, we recruited 1,700, 94.4% of the intended sample size.

**Data sources**

All eligible patients consenting to participation were surveyed using a standardized tool which comprises 12 questions on demographics, 11 on disease risk factors, 26 on itemized accounts of services received at accessed Primary Health Care Center (PHCC) or via referral, 10 on disease outcomes, 13 on perceptions of patient satisfaction with services and also patient self-management, 2 questions on general access and affordability of NCD services and care coverage (Complete tool in Appendix 2). In the development of the study tool we have drawn on the World Health Surveys,(19) the Patient Satisfaction questionnaire of the Royal College of General Practitioners,(20) ‘The National Survey of People with Diabetes’,(21) and the WHO individual questionnaire.(22) The questions on service delivery match those outlined in the service packages designed/outlined by the Lebanese Ministry of Public Health (MoPH) at the primary health care 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 (e.g., weight and BP monitoring), life-style advice received (e.g., nutrition), immunizations 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 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 analyzed in SPSS V27. Means and standard deviations were used to summarize 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-square when comparing differences in proportions. The significance level was set at p < 0.05

**Role of the funding source**

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**Ethics**

The study protocol was reviewed and approved by the Ethics Research Panel of Queen Margaret University, Edinburgh and the Ethics Review Committee of the American University Beirut.
RESULTS

A total of 1,700 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 to setting 1 [55.90 (SD=10.11) vs 60.04 (SD=10.09)]. Two-thirds of the patients were females, 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 received 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 to 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).

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 | Fragility Setting 2 | Fragility Setting 1 | Fragility Setting 2 | Fragility Setting 1 | Fragility Setting 2 | Fragility Setting 1 | Fragility Setting 2 |
| Age (mean±SD)          | 58.1±10.0        | 54.8±9.62*           | 60.8±9.39        | 58.6±9.23*           | 60.0±10.09         | 55.9±11.11*         |                  |
| 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%)       | 258 (30.7%)          | 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%)          | 33 (30.3%)       | 258 (30.7%)          | 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%)           | 12 (6.2%)           | 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%)*         | 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%)          | 55 (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%)         |
Within the context of assessing health services delivered by setting and health condition, the document highlights several key points:

- **Health services delivered by setting and health condition**:
  - The most consistently offered check-up items were blood pressure monitoring (for 91.2% of patients) and nutritional advice (for 78.23%). Assessment of weight was conducted less frequently in setting 1 vs. setting 2 (for 60% vs 77.4% of patients). Height was measured more often among patients in setting 1 (58.3% vs 39.7%), whereas blood pressure was measured more among patients in setting 2 (94.5% vs 81.8%) for hypertensive and diabetic patients only. Foot examinations were provided for less than 10% of hypertensive patients in both settings; rates were higher in setting 1 for both diabetic (22.8% vs 9.4%) and comorbid patients (21.1% vs 14.8%) (Table 2).

- Diabetic and comorbid patients received more nutrition (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 to those in setting 1. However, patients reported receiving smoking and alcohol advice more frequently in setting 1 compared to setting 2 (50.6% vs 42.8%) and (16.7% vs 6.6%); respectively (Table 2). Compared to setting 2, a significantly higher proportion of patients in setting 1 received hepatitis B (37.4% vs 2.2%) and flu vaccines (12.6% vs 2.2%). Diagnostic testing rates were generally high, with FBS (fasting blood sugar), Hba1c (Hemoglobin 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 to setting 2. Overall, rates of referrals were significantly higher in setting 1 compared to setting 2 (Table 2).

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

|                     | Diabetic (n=458) | Hypertensive (n=908) | Comorbid (n=334) | All patients (n=1700) |
|---------------------|------------------|----------------------|------------------|-----------------------|
| **Check-up items**  |                  |                      |                  |                       |
| **Fragility Setting** |                  |                      |                  |                       |
| **Setting 1**       | N (%)            | N (%)                | N (%)            | N (%)                 |
| **Setting 2**       |                  |                      |                  |                       |
| **Height**          | 35 (59.3%)*      | 165 (41.8%)          | 58 (54.2%)*      | 301 (38.3%)           |
| **Weight**          | 34 (57.6%)*      | 313 (79.2%)          | 60 (55.6%)*      | 609 (77.4%)           |
| **Blood pressure**  | 45 (76.3%)*      | 367 (92.9%)          | 88 (82.2%)*      | 756 (96.1%)           |
| **Foot examination**| 13 (22.8%)*      | 37 (9.4%)            | 4 (8.3%)         | 26 (5.3%)             |
| **Life-style advice** |                |                      |                  |                       |

* *Crowding index is the number of people per room.

*p-value<0.05
| Smoking | 29 (50%) | 142 (39.2%) | 50 (47.2%) | 298 (43.8%) | 53 (54.6%) | 93 (46%) | 132 (30.6%)* | 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 (56.9%)* | 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%) |
| DM management | 33 (57.9%)* | 298 (75.4%) | 17 (37%) | 155 (32.9%) | 61 (61.6%)* | 182 (78.8%) | 111 (55%) | 635 (57.9%) |
| HP management | 10 (35.7%) | 75 (30.7%) | 59 (55.7%)* | 599 (79.3%) | 81 (81.8%)* | 218 (95.2%) | 204 (79.4%)* | 1126 (86.8%) |
| Immunizations | | | | | | | | |
| 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%) |
| Flu 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%) |
| Diagnostic testing | | | | | | | | |
| FBS | 52 (86.7%)* | 383 (96.2%) | 63 (57.8%)* | 378 (47.3%) | 90 (89.1%) | 217 (93.1%) | 205 (79.4%)* | 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%)* | 10 (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%)* | 95 (23.9%) | 58 (53.2%)* | 86 (18.8%) | 70 (69.3%)* | 65 (27.9%) | 159 (58.9%)* | 246 (17.2%) |
| SGPT | 21 (35%) | 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 (53.3%)* | 181 (71.5%)* | 523 (42.2%) |
| Referral to Specialists | | | | | | | | |
| 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%) |
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 to 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 (e.g., lipid tests, uric acid, creatinine and EKG) compared to men. Compared to 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 to Lebanese vs. Syrian patients, we observe that Lebanese patients received significantly more advice on nutrition and diabetes management when compared to 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 CBC test), although this was more pronounced in facilities in setting 2. This trend was particularly marked for EKG, SGPT and SGOT. Compared to 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 checkups (58.4% and 15.7%) compared to those in setting 2 (39.5% and 11.6%), while those in setting 2 had more weight and blood pressure checkups (76.9% vs 59.6% and 93.6% vs 83.3%; respectively), the results showed a similar pattern for Syrians. Similarly, a higher proportion of Lebanese and Syrian patients residing in setting 1 received hepatitis B and flu vaccines compared to 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 to those with no coverage, those patients who had undergone weight and blood pressure checkups (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 checkups (65.8% vs 36.7% and 10.5% vs 8.1%; respectively), compared to those reporting no health coverage. In terms of diagnostic testing, overall, laboratory testing was significantly higher in setting 1 compared to the setting 2 among those who have health coverage compared to those who do not. As for referrals, those patients who reported having health coverage were referred more frequently to cardiologist and endocrinologist in setting 2 in comparison to those who are not covered (Table 3).
Table 3: Description of all services delivered by gender, nationality, and health coverage, and by fragility setting

| 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** | **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 (%)** |
| **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%) | 36 (41.5%) | 371 (41.5%) | 47 (57.8%) | 509 (57.5%) | 24 (50.0%) | 478 (50.0%) | 19 (41.3%) | 95 (48.0%) | 240 (47.4%) | 42 (42.8%) |
| **Blood pressure** | 148 (81.8%) | 895 (94.9%) | 47 (56.6%) | 419 (46.9%) | 47 (57.8%) | 518 (56.1%) | 24 (50.0%) | 467 (50.0%) | 19 (41.3%) | 95 (48.0%) | 240 (47.4%) | 42 (42.8%) |
| **Foot examination** | 26 (18.8%) | 57 (7.7%) | 11 (17.7%) | 40 (10.7%) | 13 (27.7%) | 52 (7.2%) | 6 (10.5%) | 47 (8.1%) | 29 (21.2%) | 50 (9.4%) |
| **Life-style advice** | | | | | | | |
| **Smoking** | 91 (50.8%) | 316 (39.0%) | 41 (50.0%) | 218 (50.0%) | 95 (48.0%) | 205 (45.1%) | 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 (94.0%) | 19 (77.0%) | 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%) | 341 (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%) | 395 (55.5%) | 34 (58.6%) | 322 (57.2%) | 75 (54.0%) | 312 (58.5%) |
| **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%) |
| **Immunizations** | | | | | | | |
| **Hepatitis B** | 69 (36.9%) | 16 (1.7%) | 32 (38.6%) | 15 (3.2%) | 83 (40.3%) | 18 (28.1%) | 18 (1.9%) | 33 (40.2%) | 11 (1.5%) | 63 (35.6%) | 18 (2.5%) |
| Test                        | Reference Range % | Abnormal % |
|-----------------------------|-------------------|------------|
| Flu vaccine                 | 24 (12.8%)        | 19 (2.0%)  |
| HbA1c                       | 158 (85.4%)       | 57 (37.8%) |
| Lipid profile               | 152 (82.2%)       | 63 (74.7%) |
| CBC                         | 103 (55.1%)       | 46 (52.5%) |
| Platelets                   | 118 (63.8%)       | 351 (57.3%)|
| Na                          | 101 (54.0%)       | 141 (52.5%)|
| K                           | 96 (63.2%)        | 114 (52.5%)|
| Ca                          | 102 (54.5%)       | 109 (52.5%)|
| Uric Acid                   | 87 (58.8%)        | 174 (52.5%)|
| Creatinine                  | 113 (60.4%)       | 131 (52.5%)|
| SGPT                        | 78 (42.6%)        | 57 (52.5%) |
| SGOT                        | 61 (42.1%)        | 40 (52.5%) |
| Urine test                  | 137 (73.3%)       | 57 (52.5%) |
| EKG                         | 122 (70.1%)       | 304 (52.5%)|

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| Medical Profession     | Count (%)     | Count (%)     | Count (%)     | Count (%) | Count (%) | Count (%) | Count (%) | Count (%) | Count (%) | Count (%) | Count (%) |
|------------------------|---------------|---------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 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%) | 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 the fragility settings with a p-value<0.05
1 Indicates statistical difference between gender groups within fragility settings with a p-value<0.05
2 Indicates statistical difference between nationality groups within fragility settings with a p-value<0.05
3 Indicates statistical difference between health coverage groups within fragility settings with a p-value<0.05
4: FBS: fasting blood sugar, Hba1c: Hemoglobin A1C, Na: Sodium, K: potassium, Ca: calcium, SGPT: Serum glutamic pyruvic transaminase, SGOT: serum glutamic-oxaloacetic transaminase, EKG: electrocardiography.
DISCUSSION

This study explored patterns in NCD service delivery by setting, nationality and sex in two contrasting fragility settings in Lebanon. We identify overwhelmingly better NCD service delivery in setting 1 (an urbanized area of Greater Beirut) as manifested by the higher rate of check-up provision, patient education, immunization, diagnostic testing and referral rates when compared to 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 to Syrians. The findings also showed that health coverage status can impact the service delivery provided.

Our findings that the urbanized 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. (6) Furthermore, a recent national facility assessment conducted across primary healthcare centers in Lebanon identified significant regional disparities between rural and urbanized areas, (23) 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 taskforce to be in major need for health institutional support, (4) whereas setting 1 includes some of the most advanced medical services and facilities, (24) with a lower percentage of Syrian refugees’ settlement (26%), (25) 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 (e.g. 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 underutilize necessary healthcare, (26) and less likely to be instructed on secondary prevention strategies compared to men. (27) Several studies highlighted gender inequalities in utilization of healthcare services, (28, 29) 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 to men. (28, 29) In addition, this could be also attributed to the fact that women tend to seek help less frequently, (30) or at more advanced stages compared to men. (31) 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 programs to restore equitable access to NCD services. The findings further call on policy and decision makers, to work collaboratively with underprivileged and refugee communities, to design, implement and evaluate evidence-based targeted programs 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 utilization. Earlier studies reported underutilization of NCD services among Syrian refugees compared to Lebanese community members. (32, 33) The highly privatized 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. (34) 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 to refugees. (32), (33) 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 prioritize the provision of equitable access to NCD care for refugees since the poor detection and control of NCDs does not only increase the number of patients seeking care services but also increases 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.

The study further highlights the importance of considering the various aspects that would further exacerbate and compound the fragility of NCD patients. For example, Syrian refugees are more fragile compared to host communities, female patients are more fragile compared to males, and patient in setting 2 are more fragile compared to 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 programs 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 details 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 three 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, 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 endeavors towards the achievement of universal health coverage such as the national unified long-term primary healthcare subsidization protocol (LPSP).
CONTRIBUTORSHIP STATEMENT

SS has made substantial contributions to the analysis, interpretation of the data, write up and revising the manuscript.

DM has made substantial contributions to the acquisition, analysis, interpretation of the data, drafting the original manuscript and revising it.

AN has made substantial contributions to the acquisition, analysis, interpretation of the data and the revision the manuscript.

RH have made substantial contributions to the interpretation of the data and the revision of the manuscript. HD has made substantial contributions to the analysis, interpretation of the data, and revising the manuscript. KD has made substantial contributions to the conception and design of the work, analysis, interpretation of the data, and revising the manuscript.

SA has made substantial contributions to the analysis and interpretation of the data, and the revision of the manuscript.

AA have made substantial contributions to the interpretation of the data and the revision of the manuscript.

MA has made substantial contributions to the conception and design, supervision of the work, write up and revision of the manuscript.

All authors have read and approved the submitted version of the manuscript.

DECLARATION OF INTERESTS

The authors declare no competing interests.

DATING SHARING

As per the ethical approval protocol, deidentified data could be shared by special request to the senior authors on this manuscript.

ETHICAL APPROVAL

The study protocol was reviewed and approved by the Ethics Research Panel of Queen Margaret University, Edinburgh (Protocol number QMU: REP 0201) and the Ethics Review Committee of the American University Beirut (protocol number AUB: SBS-2018-0514).

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PATIENT AND PUBLIC ENGAGEMENT

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.
REFERENCES

1. World Health Organization WHO. Noncommunicable diseases country profiles 2018 2018 [Available from: https://www.who.int/nmh/publications/ncd-profiles-2018/en/.
2. WHO. NCDs and development.
3. OECD. States of Fragility 2020 2020 [Available from: https://www.oecd.org/dac/states-of-fragility-2a5a6770-en.htm.
4. United Nations. Lebanon Crisis Response Plan 2017–2020 (2019 update) 2019 [Available from: https://www.unhcr.org.lb/wp-content/uploads/sites/16/2019/04/LCRP-EN-2019.pdf.
5. Trinh HT, Nguyen HT, Pham VT, Ba HL, Dong PT, Cao TT, et al. Hospital clinical pharmacy services in Vietnam. International Journal of Clinical Pharmacy. 2018;40(5):1144-53.
6. Zablith N, Diaconu K, Naja F, El Koussa M, Loffreda G, Bou-Orm I, et al. Dynamics of non-communicable disease prevention, diagnosis and control in Lebanon, a fragile setting. Conflict and Health. 2021;15(1):4.
7. Naja F, Shatila H, El Koussa M, Meho L, Ghandour L, Saleh S. Burden of non-communicable diseases among Syrian refugees: a scoping review. BMC Public Health. 2019;19(1):637.
8. World Health Organization WHO. Regional Health Systems Observatory- EMRO. Health Systems Profile- Lebanon. 2006 [Available from: https://rho.emro.who.int.
9. Ammar W. Health system and reform in Lebanon: Ministry of Public Health; 2003.
10. Ajluni S, Kawar M. Towards decent work in Lebanon: Issues and challenges in light of the Syrian refugee crisis: ILO; 2015.
11. Ministry Of Public Health. National Health Statistics Report in Lebanon 2012 [Available from: https://www.usj.edu.lb/intranet/annonce/files/pdf/175_pdf_1.pdf.
12. World Bank. Lebanon Health Resilience Project 2017 [Available from: https://www.worldbank.org/en/news/loans-credits/2017/06/26/lebanon-health-resilience-project.
13. Hamadeh R, Kdouh O, Hammoud R, Haddad I. Non-Communicable Diseases Epidemiology And Response in Lebanon. HUMAN & HEALTH. 2019;47.
14. Lyles E, Burnham G, Chlela L, Spiegel P, Morlock L, Doocy S, et al. Health service utilization and adherence to medication for hypertension and diabetes among Syrian refugees and affected host communities in Lebanon. Journal of Diabetes & Metabolic Disorders. 2020;19(2):1245-59.
15. A. E. Refugees in Lebanon caught in vicious debt cycle. 2015.
16. Doocy S, Lyles E, Roberton T, Akhu-Zaheya L, Oweis A, Burnham G. Prevalence and care-seeking for chronic diseases among Syrian refugees in Jordan. BMC public health. 2015;15(1):1-10.
17. 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(3):566-89.
18. KoBo. KoBo Toolbox.
19. World Health Organization. WHO Multi-Country Studies Data Archive 2018 [Available from: http://apps.who.int/healthinfo/systems/surveydata/index.php/catalog/whs.
20. Royal College of General Practitioners. Patient Satisfaction Questionnaire (PSQ) - old WPBA programme 2019 [Available from: https://www.rcgp.org.uk/training-exams/training/mrcgp-workplace-based-assessment-wpba/psq-for-workplace-based-assessment.aspx.
21. Harris J, McGee A, Andrews F, D’Souza J, Sproston K. The National Survey of People with Diabetes 2007 [Available from: http://www.nhssurveys.org/Filestore/documents/Diabetes_key_findings_rpt.pdf.
22. World Health Organization. World Health Survey - Individual Questionnaire, Long Version, Rotation A 2002 [Available from: https://www.who.int/healthinfo/survey/whslongindividuala.pdf.
23. Hemadeh R, Kdouh O, Hammoud R, Jaber T, Khalek LA. The primary healthcare network in Lebanon: a national facility assessment. East Mediterr Health J. 2020;26(6):700-7.
24. Ammar W. Health beyond politics 2009 [Available from: 
https://www.moph.gov.lb/en/view/3908/health-beyond-politics.
25. United Nations High Commissioner for Refugees. Syria Regional Refugee Response – Inter- 
agency Information Sharing Portal 2018 [Available from: 
http://data.unhcr.org/syrianrefugees/regional.php
26. Azad AD, Charles AG, Ding Q, Trickey AW, Wren SM. 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(1):119-. 
27. Caulin-Glaser T, Blum M, Schmeizl R, Prigerson HG, Zaret B, Mazure CM. Gender differences in 
referral to cardiac rehabilitation programs after revascularization. J Cardiopulm Rehabil. 2001;21(1):24- 
30.
28. Peters SA, Woodward M, Jha V, Kennedy S, Norton R. Women's health: a new global agenda. 
BMJ global health. 2016;1(3):e000080.
29. Langer A, Meleis A, Knaul FM, Atun R, Aran M, Arreola-Ornelas H, et al. Women and health: the 
key for sustainable development. The Lancet. 2015;386(9999):1165-210. 
30. Parr JD, Lindeboom W, Khanam MA, Pérez Koehlmoos TL. Diagnosis of chronic conditions with 
modifiable lifestyle risk factors in selected urban and rural areas of Bangladesh and sociodemographic 
variability therein. BMC Health Services Research. 2011;11(1):309. 
31. Baschieri F, Acciarresi M, Caso V. Gender-Based Approaches for the Prevention and Control of 
Noncommunicable Diseases. Stroke. 2018;49(12):2810-1. 
32. Lyles E, Burnham G, Chlela L, Spiegel P, Morlock L, Doocy S. Health service utilization and 
adherence to medication for hypertension and diabetes among Syrian refugees and affected host 
communities in Lebanon. Journal of Diabetes & Metabolic Disorders. 2020;19(2):1-15.
33. United Nations High Commissioner for Refugees. Refugees in Lebanon caught in vicious debt 
 cycle 2015 [Available from: https://www.unhcr.org/news/briefing/2015/11/564ef96f6/refugees- 
lebanon-caught-vicious-debt-cycle.html.
34. Hanna-Amodio C. Syrian refugee access to healthcare in Lebanon 2020 [Available from: 
https://reliefweb.int/report/lebanon/syrian-refugee-access-healthcare-lebanon.
Setting information

338x190mm (96 x 96 DPI)
Appendix A – Facility Assessment

Date of assessment:

Persons involved in completing assessment:

Eligibility assessment

| Criteria                                                                 | Number | Yes | No |
|---------------------------------------------------------------------------|--------|-----|----|
| Facility is located in Greater Beirut or Beqaa                           | NA     |     |    |
| Facility delivers NCD services (as reported by the head of the facility – consultations for diabetes and hypertension) | NA     |     |    |
| Facility offers services to both Lebanese and Syrian refugees: at minimum 50 consultations for Lebanese and 20 consultations for Syrians per month |         |     |    |
| Facility has a minimum patient load for diabetes of 20 outpatient consultations per week and 20 hypertension outpatient consultations per week |         |     |    |
| Consent to participate                                                   | NA     |     |    |

Eligibility

| Affiliation of the PHC: |
|-------------------------|
| • Government            |
| • Non-governmental     |

| Location (Greater Beirut or Beqaa): |
|-------------------------------------|

ID number:
A. Service availability

What type of services is available?

1. Yes  0. No  Comment on why resources are/are not available

1. Reproductive, Maternal, Newborn, and Child Health (RMNCH)

2. Communicable disease services

3. Non-communicable diseases

4. Minor and major injury services

5. Ear, Nose, and Throat (ENT) services

6. Ophthalmology

7. Other

B. Health information systems

What is available at clinic level?

1. Yes  0. No  Comment on why resources are/are not available

1. Health information technology resources and systems

2. Does the facility have electronic stock card or log books for medicine?

3. Does the facility have electronic stock card or log books for consumables (e.g. syringes, bandages)?

4. Does the facility keep a record of all the patient visits?

5. Are the records kept in a registry system?

6. Are patient files retrieved and consulted each time they visit the facility?

7. Are medical records of diabetic/hypertensive patients computerized?
8. Is the Internet used for communication and information exchange regarding diabetic/hypertensive patients?

9. Are there magnetic cards developed for diabetic/hypertensive patients/user identification?

10. Is there an electronic scheduling system for diabetic/hypertensive patients’ appointments?

11. Is there an electronic scheduling system for diabetic/hypertensive patients’ examinations?

12. Is there an electronic scheduling system for diabetic/hypertensive patients’ admissions?

13. Are there any computerized protocols for diagnosis and treatment support of diabetic/hypertensive patients?

C. Human resources

What type of human resources are available? How many?

1. Yes 0. No How many?

1. Physicians

2. Psychologists

3. Registered nurses

4. Registered midwives

5. Social workers

6. Occupational therapists

7. Pharmacists

8. Dietitians/nutritionists

9. Community health worker/health educator

10. Human Resources (available upon referral)

D. Facility infrastructure

Please tell us more about the facility infrastructure
(1) Strongly Agree, (2) Agree, (3) Undecided, (4) Disagree, (5) Strongly Disagree

Comments

1. The building is in a good state of repair (e.g., windows are not broken, paint is not peeling from the walls)

2. The building is accessible for persons with physical disabilities

3. The building’s lighting (artificial and natural), heating and ventilation provide a comfortable living environment

4. The physical equipment and supplies are sufficient and in good condition

5. Measures are in place to protect people against injury through fire

6. The toilet facilities are clean and working properly

7. The toilet facilities allow privacy, and there are separate facilities for men and women

8. The toileting needs of service users who have impaired mobility or other physical disabilities are accommodated

9. There are ample furnishings, and they are comfortable and in good condition

10. The layout of the facility is conducive to interaction between and among service users, staff and visitors

E. Equipment for NCDs

1. How often are blood pressure measuring devices (BPMDs) calibrated and checked for accuracy?

   1. Once a year or more
   2. Less than once a year
   3. Never
   4. Don’t know

2. How often are weight scales calibrated and checked for accuracy?
1. Once a year or more
2. Less than once a year
3. Never
4. Don’t know

3. How often are glucometers calibrated and checked for accuracy?

1. Once a year or more
2. Less than once a year
3. Never
4. Don’t know

4. Are there any consumables that you need?

5. Are they accessible?

6. How is the equipment usually repaired and maintained?

1. Repaired at the facility
2. Sent back to manufacturer for repair
3. Other, specify _______________

7. What, if any, are the difficulties in getting repairs to equipment done?

..................................................................................................................................................................
..................................................................................................................................................................
..................................................................................................................................................................

F. Infrastructure/services

1. Are the following procedures being conducted at the facility when needed?

1. Yes 0. No, why not? ..................

1. Administration of oxygen (via mask or tube)
2. Administration of intravenous (IV) fluids/drip
3. IV injection
4. Intramuscular (IM) injection
5. Subcutaneous injection
6. Electrocardiography (ECG)
7. Cardiopulmonary resuscitation
8. Manual ventilation with a bag valve mask resuscitator (ambi-bag)
9. Visual acuity examination
10. Examination for neuropathy with knee hammer/tuning fork, etc.
11. Peak flow test
12. Ophthalmoscopy

2. Do you have a bed where you can stabilize a very ill patient before transfer to a referral institution?
   1. Yes
   0. No

3. If injections are provided at the facility, what type of needle is used?
   1. Disposable needles
   2. Reusable, sterilized needles.
   3. How are needles sterilized? .................................................................
   4. Injections not provided at the facility
   5. Don’t know

4. Is there a safe disposal for used needles available?
   1. Yes
   0. No

G. Utilization of services

1. What is the total number of visits to the health facility for outpatient services last month?
   1. Total number of visits last month: _______________
   2. On average how many consultations were for diabetes? _______________

   This figure is based on:
   a. Register/record
   b. Estimation

   3. On average how many consultations were for hypertension? _______________

   This figure is based on:
   a. Register/record
   b. Estimation

2. What is the total number of visits to the health facility for outpatient services yesterday?
   1. Total number of visits yesterday: _______________
   2. On average how many consultations were for diabetes? _______________

   This figure is based on:
   a. Register/record
   b. Estimation
3. On average how many consultations were for hypertension? _______________
This figure is based on:
   a. Register/record
   b. Estimation

3. How many of the patient visits made yesterday were for:

1. Number of visits made for hypertension: _______________
This figure is based on:
   a. Register/record
   b. Estimation

2. Number of visits made for diabetes: _______________
This figure is based on:
   a. Register/record
   b. Estimation

4. How do patients access the facility?
   1. Walk-in only
   2. By appointment only
   3. Combination of appointments and walk-ins

H. Financing and administration

1. Do patients pay the facility for medicines?
   1. Yes, full payment
   2. Yes, partial payment
   3. No, medicines are provided for free
   4. Other:.....

2. If medicines are provided for free or for partial payment, who subsidizes it?
   1. Specify: ...................................................                     Proportion paid by patient: ......%
   2. Specify: ...................................................                     Proportion paid by patient: ......%
   3. Specify: ...................................................                     Proportion paid by patient: ......%
   4. Specify: ...................................................                     Proportion paid by patient: ......%
   5. Specify: ...................................................                     Proportion paid by patient: ......%
   6. Specify: ...................................................                     Proportion paid by patient: ......%
   7. Specify: ...................................................                     Proportion paid by patient: ......%
   8. Don’t know
3. Do patients pay the facility for consultations?

1. Yes, full payment
2. Yes, partial payment
0. No, consultations are provided for free
3. Other:_________________

4. If consultations are provided for free or for partial payment, who subsidizes it?

Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  

8. Don’t know

5. Do patients pay the facility for diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
0. No, diagnostic tests are provided for free
3. Other:________________________

6. If diagnostic tests are provided for free or for partial payment, who subsidizes it?

Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  
Specify: ...................................................  Proportion paid by patient: ......%  

8. Don’t know

I. Diabetes services - Financing

1. For how long have the diabetes services been provided at the clinic?

_______________

2. Do patients pay the facility for diabetes medicines?
1. Yes, full payment
2. Yes, partial payment
0. No, medicines are provided for free
3. Other:....

3. If diabetes medicines are provided for free or for partial payment, who subsidizes it?

1.Specify: ...................................................                     Proportion paid by patient: ......% 
2.Specify: ...................................................                     Proportion paid by patient: ......% 
3.Specify: ...................................................                     Proportion paid by patient: ......% 
4.Specify: ...................................................                     Proportion paid by patient: ......% 
5.Specify: ...................................................                     Proportion paid by patient: ......% 
6.Specify: ...................................................                     Proportion paid by patient: ......% 
7.Specify: ...................................................                     Proportion paid by patient: ......% 
8.Don’t know

4. Do patients pay the facility for diabetes consultations?

1. Yes, full payment 
2. Yes, partial payment 
0. No, consultations are provided for free
3. Other:___________

5. If diabetes consultations are provided for free or for partial payment, who subsidizes it?

1.Specify: ...................................................                     Proportion paid by patient: ......% 
2.Specify: ...................................................                     Proportion paid by patient: ......% 
3.Specify: ...................................................                     Proportion paid by patient: ......% 
4.Specify: ...................................................                     Proportion paid by patient: ......% 
5.Specify: ...................................................                     Proportion paid by patient: ......% 
6.Specify: ...................................................                     Proportion paid by patient: ......% 
7.Specify: ...................................................                     Proportion paid by patient: ......% 
8.Don’t know

6. Do patients pay the facility for diabetes diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
0. No, diagnostic tests are provided for free

3. Other:___________

7. If diabetes diagnostic tests are provided for free or for partial payment, who subsidizes it?

1.Specify: ...................................................                     Proportion paid by patient: ......%
2.Specify: ...................................................                     Proportion paid by patient: ......%
3.Specify: ...................................................                     Proportion paid by patient: ......%
4.Specify: ...................................................                     Proportion paid by patient: ......%
5.Specify: ...................................................                     Proportion paid by patient: ......%
6.Specify: ...................................................                     Proportion paid by patient: ......%
7.Specify: ...................................................                     Proportion paid by patient: ......%
8.Don’t know

J. Hypertension services - Financing

1. For how long have the hypertension services been provided at the clinic?

_______________________

2. Do patients pay the facility for hypertension medicines?

   1. Yes, full payment
   2. Yes, partial payment
   0. No, medicines are provided for free
   3. Other:___________

3. If hypertension medicines are provided for free or for partial payment, who subsidizes it?

1.Specify: ...................................................                     Proportion paid by patient: ......%
2.Specify: ...................................................                     Proportion paid by patient: ......%
3.Specify: ...................................................                     Proportion paid by patient: ......%
4.Specify: ...................................................                     Proportion paid by patient: ......%
5.Specify: ...................................................                     Proportion paid by patient: ......%
6.Specify: ...................................................                     Proportion paid by patient: ......%
7.Specify: ...................................................                     Proportion paid by patient: ......%
8.Don’t know

4. Do patients pay the facility for hypertension consultations?
1. Yes, full payment
2. Yes, partial payment
0. No, consultations are provided for free
3. Other: ________________

5. If hypertension consultations are provided for free or for partial payment, who subsidizes it?

1. Specify: ................................................... Proportion paid by patient: ......%
2. Specify: ................................................... Proportion paid by patient: ......%
3. Specify: ................................................... Proportion paid by patient: ......%
4. Specify: ................................................... Proportion paid by patient: ......%
5. Specify: ................................................... Proportion paid by patient: ......%
6. Specify: ................................................... Proportion paid by patient: ......%
7. Specify: ................................................... Proportion paid by patient: ......%
8. Don’t know

6. Do patients pay the facility for hypertension diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
0. No, diagnostic tests are provided for free
3. Other: ________________

7. If hypertension diagnostic tests are provided for free or for partial payment, who subsidizes it?

1. Specify: ................................................... Proportion paid by patient: ......%
2. Specify: ................................................... Proportion paid by patient: ......%
3. Specify: ................................................... Proportion paid by patient: ......%
4. Specify: ................................................... Proportion paid by patient: ......%
5. Specify: ................................................... Proportion paid by patient: ......%
6. Specify: ................................................... Proportion paid by patient: ......%
7. Specify: ................................................... Proportion paid by patient: ......%
8. Don’t know
Appendix B - Beneficiary Survey

“Please do not refer to the names of the people and facilities or provide any identifiable information”

A- Respondent’s socio-demographic characteristics

I would like to start by asking you some background questions before asking you questions on your health. This information is confidential and will only be used for research purposes.

1. What is your nationality:
   1. Lebanese
   2. Syrian
   3. If Syrian, when did you come to Lebanon?
      Year:

2. Have you ever been diagnosed with Diabetes Mellitus?
   1. Yes
   0. No

3. Have you ever been diagnosed with Hypertension?
   1. Yes
   0. No

4. Gender
   Female
   Male

5. How old are you?
   (Years) _____________________

6. What is your weight?
   (Kilos) _____________________

7. What is your height?
   (Centimeters) _____________________

8. What is your current marital status?
   1. Never Married
   2. Currently Married
   3. Separated
   4. Divorced
   5. Widowed

9. What is the highest level of education that you have completed?
   1. No formal schooling
   2. Primary school completed
   3. Secondary school completed
   4. High school (or equivalent) completed
   5. University completed
6. Post graduate degree completed

10. What is your current employment status?
   1. Working
   2. Not working
   3. Unable to work

11. What is the number of rooms within the household you live in? (The kitchen and the toilets are excluded)

12. How many residents are there in the household? (Including the housekeepers?)

B. Risk Factors
I will now ask you questions about your daily life.

Tobacco consumption

13. Do you currently smoke any tobacco products such as cigarettes, cigars, or pipes?
   1. Daily
   2. Yes, but not daily
   3. No, not at all

14. For how many years have you been smoking daily? _____________________

15. On average, how many of the following products do you smoke each day?
   1. Cigarette
   2. Narguileh
   3. Other:

Alcohol consumption (I understand this may be a sensitive topic, and I would like to stress again the confidentiality and privacy of the information. If the participant feels uncomfortable he/she can skip answering any of the addressed question(s))

16. Have you ever consumed a drink that contains alcohol (such as beer, wine, etc.)?
   1. Yes
   0. No

17. During the past 7 days, how many standard drinks of any alcoholic beverage did you have each day?
   1. Monday _____________________
   2. Tuesday _____________________
   3. Wednesday _____________________
   4. Thursday _____________________
   5. Friday _____________________
   6. Saturday _____________________
   7. Sunday _____________________

Nutrition (cards that illustrate what a serving means will be prepared)
Now I am going to ask you about the fruit and vegetables you usually eat.

18. How many servings of fruit do you eat on a typical day? _____________________

19. How many servings of vegetables do you eat on a typical day? _____________________

Physical Activity

Now I am going to ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Think about the activities you do at work, as part of your house and yard work, to get from places to place, and in your spare time for recreation, exercise or sport.

20. During the last 7 days, on how many days did you do vigorous physical activities? Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling. Think only about those physical activities that you did for at least 10 minutes at a time.

Days:

21. How much time did you usually spend doing vigorous physical activities on one of those days?
Minutes per day _____________________

Moderate Activity

Now think about activities which take moderate physical effort that you did in the last 7 days.

22. During the last 7 days, on how many days did you do moderate physical activities? Moderate physical activities make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace, or doubles tennis. Do not include walking.

Again, think about only those physical activities that you did for at least 10 minutes at a time.

Days:

23. How much time did you usually spend doing moderate physical activities on one of those days?
Minutes per day _____________________

Walking

Now think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

24. During the last 7 days, on how many days did you walk for at least 10 minutes at a time? _____________________

25. How much time did you usually spend walking on one of those days?
Minutes per day _____________________

C-History of Disease
Now I would like to read to you questions about some health problems or health care needs that you and the young children in this house may have experienced, and the treatment or medical care that you may have received.

26. Have you ever been diagnosed with diabetes or hypertension?
   - Yes (diabetes) – continue
   - Yes (hypertension) – skip to question 29
   - Yes (both) – continue

27. When were you diagnosed with diabetes? Even an approximate answer is helpful.
   1. Year: _____________________
   2. Month: _____________________
   3. N/A

28. Where were you diagnosed with diabetes?
   1. _____________________
   2. N/A

29. When were you diagnosed with hypertension? Even an approximate answer is helpful.
   1. Year: _____________________
   2. Month: _____________________
   3. N/A

30. Where were you diagnosed with hypertension?
   1. _____________________
   2. N/A

31. Do you suffer from any other disease?
   1. Yes (please specify)
   0. No
   2. Don’t know

D-Health services

I will now ask you questions about the health care services you receive.

Diabetes Mellitus Benefit Package: (if patient says yes to diabetes diagnosis)

32. During the past year, how many times did you see your GP/family doctor?
   _____________________

33. How many of these visits directly related to your diabetes?
   _____________________

34. Were you referred to – and then attended appointments with – other specialists?

| Specialist | Referred (1.Yes/0.No) | Reason for referral (routine / other: please specify) | Attended |
|------------|-----------------------|-----------------------------------------------------|----------|
1. Endocrinologist
2. Ophthalmologist
3. Other specialties (Cardio/Nephro/Vascular)
4. Dentist
5. Clinical dietician

35. Now let me ask you about the immunizations and diagnostic tests you receive.

| Test                                | Received (1.Yes/0.No) | Any other information (e.g. do they receive it here? Do they co-pay?) |
|-------------------------------------|-----------------------|---------------------------------------------------------------------|
| 1. Hepatitis B vaccine              |                       |                                                                     |
| 2. Flu Vaccine                      |                       |                                                                     |
| 3. Fasting Blood Sugar              |                       |                                                                     |
| 4. Hba1c                            |                       |                                                                     |
| 5. Lipid profile                    |                       |                                                                     |
| 6. Other blood tests (CBC)          |                       |                                                                     |
| 7. Platelets                        |                       |                                                                     |
| 8. Creatinine – (for kidney function)|                       |                                                                     |
| 9. SGPT (for liver function)        |                       |                                                                     |
| 10. SGOT (for liver function)       |                       |                                                                     |
| 11. Urine test (Urinalysis)         |                       |                                                                     |
| 12. Urine test (spot urine microalbumin) |                 |                                                                     |
| 13. EKG                             |                       |                                                                     |

36. Now I would like to ask you what usually happens during your examinations. Does the physician or the nurse check:

| Consultation element                | Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never) |
|-------------------------------------|----------------------------------------------------------------------------------------|
| 1. Height                           |                                                                                        |
| 2. Weight                           |                                                                                        |
| 3. Blood pressure                   |                                                                                        |
| 4. Foot examination (for ulcers etc) |                                                                                        |

36. Does your health care provider offer you any advice on: (I would like to stress again the confidentiality and privacy of the information)
**Consultation element**

| Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never) | Do you find this advice relevant? (1.very relevant, 2.relevant, 3.moderately relevant, 4.slightly relevant, 5.not relevant) |
|---|---|
| 1.Smoking |
| 2.Healthy nutrition (sugar) |
| 3.Exercise |
| 4.Alcohol consumption |
| 5.Managing your diabetes |

**Hypertension Benefit Package:**

*If patient says yes to hypertension diagnosis*

37. During the past year, how many times did you see your GP/family doctor?  
____________________

38. How many of these visits directly related to your hypertension?  
____________________

39. Were you referred to – and then attended appointments with – other specialists?

| Specialist       | Referred (1.Yes/0.No) | Reason for referral (routine / other: please specify) | Attended |
|------------------|-----------------------|------------------------------------------------------|----------|
| 1.Cardiologist   |                       |                                                     |          |
| 2.Ophthalmologist|                       |                                                     |          |
| 3.Other specialties (Nephro/Vascular) | | | |
| 4.Dentist        |                       |                                                     |          |
| 5.Clinical dietician |                  |                                                     |          |

40. Now let me ask you about the immunizations and diagnostic tests you receive.

| Test                          | Received (1.Yes/0.No) | Any other information (e.g. do they receive it here? Do they co-pay?) |
|-------------------------------|-----------------------|---------------------------------------------------------------------|
| 1.Hepatitis B vaccine         |                       |                                                                     |
| 2.Flu Vaccine                 |                       |                                                                     |
| 3.Fasting Blood Sugar         |                       |                                                                     |
| 4.HbA1c                       |                       |                                                                     |
| 5.Lipid profile               |                       |                                                                     |
| 6.Other blood tests (CBC)     |                       |                                                                     |
| 7.Platelets                   |                       |                                                                     |
| 8.Na                          |                       |                                                                     |
9. K
10. Ca
11. Uric acid
12. Creatinine – (for kidney function)
13. SGPT (for liver function)
14. Urine test (Urinalysis)
15. Urine test (spot urine microalbumin)
16. EKG

41. Now I would like to ask you what usually happens during your examinations. Does the physician or the nurse check:

Consultation element Frequency (1. every visit, 2. almost every visit, 3. some visits, 4. almost never, 5. never)
1. Height
2. Weight
3. Blood pressure

42. Does your health care provider offer you any advice on: (I would like to stress again the confidentiality and privacy of the information)

Consultation element Frequency (1. every visit, 2. almost every visit, 3. some visits, 4. almost never, 5. never) Do you find this advice relevant? (1. very relevant, 2. relevant, 3. moderately relevant, 4. slightly relevant, 5. not relevant)
1. Smoking
2. Healthy nutrition (salt)
3. Exercise
4. Alcohol consumption
5. Managing your hypertension

E. Patient self-management

43. Do you feel you have enough knowledge to manage your diabetes at home?
   1. disagree
   2. partially disagree
   3. neutral
   4. partially agree
   5. agree
   6. N/A

44. Do you feel you have enough knowledge to manage your hypertension at home?
   1. disagree
   2. partially disagree
   3. neutral
   4. partially agree
   5. agree
45. What challenges do you face?

____________________

INVENTORY OF MEDICINES AND DRUGS

We are interested in knowing about the availability and use of certain medicines and drugs. Remember that whatever information you give me is confidential and will only be used for research purposes.

46. During the past year, the last time you sought care for diabetes or hypertension did the health care provider prescribe any medicine for you?

a. Diabetes:
   1. Yes
   0. No
   2. N/A

b. Hypertension:
   1. Yes
   0. No
   2. N/A

47. If yes: which medicines were they?

____________________

48. Of the medicines that were prescribed for you, how many of them were you able to get?

   1. All of them
   2. Most
   3. Some
   4. Very few
   5. None of them

49. Were these medications provided to you from the PHCC or did you have to get them yourself?

____________________

50. Which reason best explains why you did not get all the medicines you were prescribed?

   1. Could not afford
   2. Could not find all medicines
   3. Did not believe all the medications were needed
   4. Started to feel better
   5. Already had some of the medicines at home
   6. Other

F- Outcome (hospitalizations, glycemic episodes...)

51. When was the last time that you checked the HbA1C in the past year?

   1. Date:
   2. Never
   3. Don’t know

52. What was the HbA1C reading?

   1. Value:
2. Don’t know
3. N/A

53. How many times were you hospitalized for conditions related to diabetes in the past year?
   1. Number of times:
   2. Don’t know
   3. N/A

54. During the past four weeks, did you experience any symptoms of hypoglycemia? (shakiness, dizziness, sweating, hunger, irritability or moodiness, anxiety or nervousness)

55. When was the last time that you checked your blood pressure in the past year?
   1. Date
   2. Never
   3. Don’t know

56. What was the blood pressure value?
   1. Values
      a- Systolic BP:

      b- Diastolic BP:

   2. Don’t know
3. N/A

57. How many times were you hospitalized for conditions related to hypertension in the past year?
   1. Number of times:
   2. Don’t know
   3. N/A

58. Were you exposed to any of the following complications? (Tick all that apply)
   1. Heart disease
      a- Myocardial infarction or heart attack
      b- CABG – surgery
      c- Percutaneous Coronary Intervention

   2. Stroke

   3. Peripheral Artery disease
      a- Ulcers of the lower limbs (or toes)
      b- Amputation of the lower limbs (or toes)

   4. Diseases of the eye (retina)

   5. Kidney disease

   6. Thyroid problems
7. Other (specify):

59. Were you diagnosed with DM and/or HTN during these complications?
____________________

60. Did these complications happen in the past year?
____________________

G-Patient satisfaction and other factors affecting utilization

61. During the past year, when you needed health care for diabetes or hypertension did you get health care?

1. Always
2. Very Often
3. Sometimes
4. Rarely
5. Never

62. During the past year, did you visit this particular PHCC for the health care for diabetes or hypertension?

1. Always
2. Very Often
3. Sometimes
4. Rarely
5. Never

63. If you did not receive the health care, which reasons explain why you did not get health care? (tick all that apply)

1. Cost
    - A. Could not afford the cost of the visit
    - B. Could not afford the cost of transport

2. Knowing where to go
    - A. You did not know where to go
    - B. No PHCC nearby?
    - C. Traffic

3. Physical access
    - A. No transport
    - B. No PHCC nearby?
    - C. Traffic

4. Previous experience of receiving care
    - A. The health care provider’s drugs or equipment were inadequate
    - B. The health care provider’s skills were inadequate
    - C. You were previously badly treated

5. Could not take time off work or had other commitments

6. You thought you were not sick enough

7. You tried but were denied health care

8. Other
Now I would like to ask you about how important some notions are to you

Would you say it is:
not important (1), slightly important (2), important (3), moderately important (4), very important (5) Skip (9)

64. How important is "respectful treatment" to you. (meaning: being shown respect when greeted by and when talking to health care providers and having physical examinations conducted in a way that respects your cultural norms)

65. How important is "confidentiality of personal information" to you. (meaning: having information about your health and other personal information kept confidential and having conversations with health care providers without other people overhearing)

66. How important is "convenient travel and short waiting times" to you. (meaning: having short travel times and convenient access to health care facilities and having short waiting times for consultations and hospital admissions)

67. How important is "choice of health care providers" to you. (meaning: being able to choose your health care provider (place or person) and being able to consult for a second opinion or with a specialist if so desired)

68. How important is "involvement in decision making" to you. (meaning: being involved as much as you want in deciding about your health care and freedom to discuss other treatment options or care regimes if you want)

69. How important are "good quality surroundings" to you? (meaning: having enough space, seating and fresh air in the waiting rooms, examination rooms and hospital wards and having a clean facility (including clean toilets))

70. How important is "contact with the outside world" to you? (meaning: having family and friends visit you as much as you want when you are a patient in hospital and being able to keep in contact with family and friends and to have information about what is happening outside the hospital)

71. How important is "clarity of communication" to you. (meaning: having the health care providers explain things in a way you can understand and having enough time to ask questions if you don’t understand something)

Now I would like to ask you about the care you received

72. During the last year, which type of health provider have you seen most frequently?
   1. Medical doctor
   2. Nurse
   7. Other

73. How would you rate your satisfaction regarding:
   Topic                                      Rating (1 lowest to 5 highest)
   During consultation                        1. Provider skills
2. Being spoken to respectfully
3. Privacy during consultation
4. Explanations about treatment options and alternatives
5. Time availability for questions and clarifications
6. Clarity of explanations during consultation
7. Involvement in decision making your health and treatment (e.g. plan)
8. Confidentiality of your personal information
9. Availability of equipment
10. Condition of the equipment (e.g. cleanliness, functionality)
11. Availability of medicines
12. Examination room space
13. Examination room cleanliness

Facility
14. Waiting time for appointment scheduling
15. Waiting time in facility (for receiving services)
16. Waiting space (availability, crowdedness)
17. Facility cleanliness (including toilets)
18. Staff greetings
19. Provider choice (within the centre)
20. Provider choice (between clinics/facilities)

74. On average, per visit, how much did you or your household pay for (local currency): [Interviewer: only write 0 if the service was free. If a person did not have tests or drugs, circle “Not applicable, not have”]

| Amount | Don’t know | Not applicable, not have |
|--------|------------|--------------------------|
| 1. [Health care provider's] fees |
| 2. Medicines |
| 3. Tests |
| 4. Transport |
| 5. Other |

75. Do you have any health coverage? (please tick what applies)
   1. National Social Security Fund (NSSF)
   2. Civil Servants Cooperative (CSC)
   3. Military schemes
   4. Private insurance
   5. No health coverage

76. In the past year did you feel that you were treated worse by health care providers for any of the following reasons. Because of your:

| Yes | No |
|-----|----|
| 1. Sex |
| 2. Age |
| 3. Lack of money |
| 4. Social class |
| 5. Type of illness |
| 6. Nationality |
STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

| Item No | Recommendation | Page No |
|---------|----------------|---------|
| **Title and abstract** | 1  
(a) Indicate the study’s design with a commonly used term in the title or the abstract  
(b) Provide in the abstract an informative and balanced summary of what was done and what was found | 1 |
| **Introduction** | 2  
Explain the scientific background and rationale for the investigation being reported | 4 |
| **Objectives** | 3  
State specific objectives, including any prespecified hypotheses | 4 |
| **Methods** | 4  
Present key elements of study design early in the paper | 5 |
|  | 5  
Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 5 |
| **Participants** | 6  
(a) Give the eligibility criteria, and the sources and methods of selection of participants | 5 |
| **Variables** | 7  
Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 5 |
| **Data sources/measurement** | 8*  
For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 5-6 |
|  | 9  
Describe any efforts to address potential sources of bias | 12 |
|  | 10  
Explain how the study size was arrived at | 5 |
| **Quantitative variables** | 11  
Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | 5-6 |
| **Statistical methods** | 12  
(a) Describe all statistical methods, including those used to control for confounding  
(b) Describe any methods used to examine subgroups and interactions  
(c) Explain how missing data were addressed  
(d) If applicable, describe analytical methods taking account of sampling strategy  
(e) Describe any sensitivity analyses | 5-6 |
| **Results** | 13*  
(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed  
(b) Give reasons for non-participation at each stage  
(c) Consider use of a flow diagram | 6 |
| **Descriptive data** | 14*  
(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders  
(b) Indicate number of participants with missing data for each variable of interest | 6-7 |
| **Outcome data** | 15*  
Report numbers of outcome events or summary measures | N/A |
| **Main results** | 16  
(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 9-17 |
(b) Report category boundaries when continuous variables were categorized

(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period

| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | N/A |

| Discussion |
| Key results | 18 | Summarise key results with reference to study objectives | 6-13 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 14 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 13-14 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | 14 |

| Other information |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 15 |

*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at [http://www.plosmedicine.org/](http://www.plosmedicine.org/), Annals of Internal Medicine at [http://www.annals.org/](http://www.annals.org/), and Epidemiology at [http://www.epidem.com/](http://www.epidem.com/)). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).
Outpatient Utilization Patterns and Experiences among Diabetic and Hypertensive patients in Fragile Settings: A Cross-Sectional Study from Lebanon

| Journal: | BMJ Open |
|----------|----------|
| Manuscript ID | bmjopen-2021-054564.R2 |
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Outpatient Utilization Patterns and Experiences among Diabetic and Hypertensive patients in Fragile Settings: A Cross-Sectional Study from Lebanon

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ABSTRACT

Objective
Assess and describe the health service utilization and delivery patterns for NCD services in two contrasting fragility contexts and by other principal equity-related characteristics including: gender, nationality, and health coverage.

Setting
Primary Healthcare Centers located in the urbanized 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
1,700 Lebanese and Syrian-refugee patients seeking primary care for hypertension and diabetes.

Primary and Secondary Outcome
The main outcome is the comprehensiveness of service delivery comparing differences in utilization and service delivery patterns by fragility setting, gender, nationality, and health coverage.

Results
Compliance with routine NCD care management (e.g., counselling, immunizations, diagnostic testing, and referral rates) was significantly better in Beirut compared to Beqaa. Women were significantly less likely to be offered lifestyle counseling advice and referral to cardiologists (58.4% vs 68.3% in Beqaa and 58.1% vs 62% in Beirut) and ophthalmologists, compared to 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 compared to Syrian refugees. Immunization and diagnostic testing were significantly higher in Beirut among those who have health coverage compared to Beqaa.

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

Funding
The National Institute for Health Research

Keywords: fragility, diabetes, hypertension, refugees, gender, nationality, equity
Strengths and limitations of the study

- The first study of its kind to examine outpatient utilization 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 centers 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.(1) NCDs disproportionately affect people in low- and middle-income countries (LMICs), where 78% of all NCD deaths and 85% of premature deaths occur.(2) The rising burden of NCDs exacerbates health inequalities and worsens poverty, especially in fragile contexts marked by weak health systems and poor governance. (3)

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.(4) Fragility therefore leaves populations vulnerable to a range of threats. The 2020 OECD State of Fragility Report notes that in fragile contexts, which are home to over two billion people, 460 million (76.5%) live in extreme poverty and lack access to essential services.(4)

Lebanon is a small country on the Eastern Mediterranean, with a population of 6 million people,(5) 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 struggles. As a consequence, the country had several episodes of economic downturns with economic growth sharply declining in recent years.(5, 6) 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.(7) As a consequence, Lebanon has been experiencing a growing burden of NCDs, exacerbated by high levels of fragility.(8) In 2018, NCDs accounted for 91% of all deaths in the country, with hypertension and diabetes being the most prevalent NCDs.(2)

Healthcare in Lebanon is highly fragmented and provided predominantly by the private sector.(9) The long years of civil war and political conflict have taken its toll on the financial capacities of the public healthcare system,(10) and have led to inequitable concentration of specialized health services in highly urbanized areas (e.g. Greater Beirut) as compared to poorly resourced rural areas such as the Beqaa (a fertile valley in eastern Lebanon). (2) Although the country runs six social insurance funds, close to half the population have no formal health coverage,(11) and out-of-pocket household expenditures remains a main contributor to health financing,(12) In 2015, in order to strengthen primary care delivery and respond to the increasing NCD burden in the country, the Ministry of Public Health in collaboration with the World Bank launched the Emergency Primary Health Care 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 Program (NPTP). (13) The program offers six types of health packages,(13) and prioritizes NCD services for diabetes mellitus and hypertension. These packages support access to: immunizations, follow-up diagnostic tests, consultations (including pertinent counseling and health education), and medication prescriptions. By 2018, the project had delivered services to 101,454 beneficiaries, of whom 61,887 were adults.(14)

A recent study from Lebanon on health service utilization among patients seeking care for diabetes and hypertension among the Lebanese host community members and Syrian refugees identified significant gaps in care-seeking behavior and reported that host community members had better access to care and fewer reports of medication interruption compared to refugees (15). Lack of health coverage and affordability were found to be significant barriers with 39% of Syrian refugees in Lebanon reporting not receiving needed care due to unaffordable treatment
and medication costs (16, 17, 18). Lebanese and Syrian community members further identified several barriers to health seeking, including limited availability of services and perceptions of poor-quality care (7).

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 aims to examine the equitable delivery of services in the context of fragility. Specifically, it assesses and describes the outpatient health service utilization patterns for NCD services in two contrasting fragility contexts: The Greater Beirut and the Beqaa Valley (Figure 1) (19-22) 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 was comprised of 2 phases, in the first phase literature review was conducted in order to synthesize the extant literature and identify the gaps in knowledge and 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 socio-economic and financial crisis and underdeveloped health systems, it is inevitable to investigate the equity in delivering health care services among its population. Our study explores these differences between two contrasting settings in Lebanon. Our results showed that NCDs management and health care services are higher in Beirut compared to the Beqaa region and are more delivered to Lebanese than to the 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 program to achieve equity between in 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 urbanized 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 center.

Data collection

In preparation for data collection, the study utilized a team of 8 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 (23). 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 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 are (1) older than 40 years and (2) diagnosed with diabetes or hypertension (as based on personal self-reporting following a confirmed diagnosis). Anyone not meeting the above-mentioned 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 Appendix 1). Assuming an average 90/100 and 85/100 score on this index per population group (Lebanese or Syrian respectively) and per setting (Beirut or Beqaa), and 80% power and 5% error, a total of 1,800 persons would need to be recruited. Overall, we recruited 1,700, 94.4% of the intended sample size.

Data sources

All eligible patients consenting to participation were surveyed using a standardized tool which comprises 12 questions on demographics, 11 on disease risk factors, 26 on itemized accounts of services received at accessed Primary HealthCare Center (PHCC) or via referral, 10 on disease outcomes, 13 on perceptions of patient satisfaction with services and also patient self-management, 2 questions on general access and affordability of NCD services and care coverage (Complete tool in Appendix 2). In the development of the study tool we have drawn on the World Health Surveys,(24) the Patient Satisfaction questionnaire of the Royal College of General Practitioners(25) ‘The National Survey of People with Diabetes’,(26) and the WHO individual questionnaire.(27) The questions on service delivery match those outlined in the service packages designed/outlined by the Lebanese Ministry of Public Health (MoPH) at the primary health care 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 (e.g., weight and BP monitoring), life-style advice received (e.g., nutrition), immunizations 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 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 analyzed in SPSS V27. Means and standard deviations were used to summarize 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-square when comparing differences in proportions. The significance level was set at p < 0.05.

Role of the funding source

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Ethics

The study protocol was reviewed and approved by the Ethics Research Panel of Queen Margaret University, Edinburgh and the Ethics Review Committee of the American University Beirut.

RESULTS

A total of 1,700 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 to setting 1 [55.90 (SD=10.11) vs 60.04 (SD=10.09)]. Two-thirds of the patients were females, 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 received 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 to 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).

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 | 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 (%)                |
| Age (mean±SD)        | 58.1±10.01      | 54.88±9.62*          | 60.4±10.01      | 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%)          | 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%)      | 31 (30.7%)           | 31 (30.7%)      | 86 (36.9%)           | 83 (30.7%)       | 473 (33.1%)          |
| Nationality          |                 |                      |                 |                      |                 |                      |                 |                      |
| Lebanese             | 42 (70.0%)      | 155 (38.9%)*         | 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%)      | 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%)          | 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%)      | 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%)*         |

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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) |
|---------------------|------------------|----------------------|-------------------|----------------------|
| **BMI**             |                  |                      |                   |                      |
| Underweight         | 0 (0.0%)         | 0 (0.0%)             | 1 (1.0%)          | 0 (0.0%)*            |
| Normal              | 14 (25.0%)       | 65 (17.5%)           | 22 (22.9%)        | 117 (15.6%)          |
| Overweight          | 20 (35.7%)       | 160 (43.1%)          | 42 (43.8%)        | 302 (40.4%)          |
| Obese               | 22 (39.3%)       | 146 (39.4%)          | 31 (32.3%)        | 325 (43.4%)          |
| **Smoking status**  |                  |                      |                   |                      |
| Yes, daily          | 21 (35.0%)       | 111 (27.9%)*         | 43 (39.4%)        | 179 (22.5%)*         |
| Yes, but not daily  | 8 (13.3%)        | 14 (3.5%)            | 5 (4.6%)          | 38 (4.8%)            |
| No                  | 31 (51.7%)       | 273 (68.6%)          | 61 (56.0%)        | 580 (72.8%)          |
| Alcohol (yes)       | 4 (6.7%)         | 0 (0.0%)*            | 10 (9.2%)         | 4 (0.5%)*            |
| *p-value<0.05       |                  |                      |                   |                      |

*Crowding index is the number of people per room.

Health services delivered by setting and health condition

The most consistently offered check-up items were blood pressure monitoring (for 91.2% of patients) and nutritional advice (for 78.2%). Assessment of weight was carried out less frequently in setting 1 vs. 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 blood pressure 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 compared to setting 2 (22.8% vs 9.4%) and comorbid patients (22.1% vs 14.8%) (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 to those in setting 1. However, patients reported receiving smoking and alcohol advice more frequently in setting 1 compared to setting 2 (50.6% vs 42.8%) and (16.7% vs 6.6%); respectively (Table 2). Compared to setting 2, a significantly higher proportion of patients in setting 1 received hepatitis B (37.4% vs 2.2%) and flu vaccines (12.6% vs 2.2%). Diagnostic testing rates were generally high, with FBS (fasting blood sugar), Hba1c (Hemoglobin 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 to setting 2. Overall, rates of referrals were significantly higher in setting 1 compared to setting 2 (Table 2).
| Check-up items | 165 (41.8%) | 301 (38.3%) | 61 (62.2%)* | 95 (40.9%) | 154 (58.3%)* | 561 (39.7%)* |
|----------------|-------------|-------------|-------------|-----------|--------------|--------------|
| Height         | 35 (59.3%)* | 60 (55.6%)* | 65 (66.3%)  | 172 (74.3%)| 159 (60%)*   | 1094 (77.4%) |
| Weight         | 313 (79.2%) | 609 (77.4%) | 83 (84.7%)  | 212 (91.8%)| 216 (81.8%)* | 1335 (94.5%) |
| Blood pressure | 367 (92.9%) | 756 (96.1%) | 83 (84.7%)  | 212 (91.8%)| 216 (81.8%)* | 1335 (94.5%) |
| Foot examination| 37 (9.4%)   | 26 (5.3%)   | 20 (21.1%)  | 34 (14.8%) | 37 (18.5%)*  | 97 (8.7%)    |

**Life-style advice**

| Smoking         | 142 (39.2%) | 298 (43.8%) | 53 (54.6%) | 93 (46%)   | 132 (30.6%)* | 533 (42.8%)*  |
| Nutrition       | 376 (95.2%) | 532 (79%)   | 81 (81.8%)*| 218 (95.2%)| 204 (79.4%)* | 1126 (86.8%) |
| Exercise        | 273 (68.9%) | 535 (67.6%) | 61 (62.2%)*| 176 (75.9%)| 148 (56.5%)* | 984 (69.3%)*  |
| Alcohol         | 18 (17.5%)* | 16 (16.3%)  | 17 (9.1%)  | 43 (16.7%)*| 76 (6.6%)    |
| DM management   | 298 (75.4%) | 155 (32.9%) | 61 (61.6%)*| 182 (78.8%)| 111 (55%)    |
| HP management   | 75 (39.7%)  | 59 (55.7%)* | 599 (75.3%)| 58 (60.4%)*| 180 (77.9%)  |

**Immunizations**

| Hepatitis B     | 7 (1.8%)    | 13 (1.6%)   | 46 (45.5%)*| 11 (4.7%)  | 101 (37.4%)*| 31 (2.2%)    |
| Flu vaccine     | 10 (2.5%)   | 16 (2.0%)   | 20 (19.8%)*| 6 (2.6%)   | 34 (12.6%)* | 32 (2.2%)    |

**Diagnostic testing**

| FBS            | 383 (96.2%) | 378 (47.3%) | 90 (89.1%) | 217 (93.1%)| 205 (75.9%)*| 978 (68.4%)*  |
| HbA1c          | 377 (94.7%) | 285 (35.7%) | 96 (96%)*  | 206 (88.8%)| 231 (86.5%)*| 868 (60.8%)*  |
| Lipid profile  | 256 (64.3%) | 538 (67.3%) | 90 (90%)*  | 187 (80.6%)| 221 (82.8%)*| 981 (68.6%)*  |
| CBC            | 164 (41.2%) | 382 (47.8%) | 61 (60.4%) | 137 (58.8%)| 148 (54.8%)*| 683 (47.8%)*  |
| Platelets      | 112 (28.1%) | 283 (35.5%) | 70 (70%)*  | 102 (44.2%)| 170 (63.9%)*| 497 (34.8%)*  |
| Na             | 64 (58.7%)* | 67 (66.3%)* | 56 (24%)   | 149 (55.2%)| 209 (14.6%)|
| K              | 60 (63.8%)* | 64 (70.3%)* | 44 (23.2%) | 141 (65.3%)| 162 (15.7%)|
| Ca             | 64 (58.7%)* | 65 (64.4%)* | 44 (18.9%) | 148 (54.8%)| 153 (10.7%)|
| Uric Acid      | 63 (65.6%)* | 57 (64.8%)* | 56 (30.3%) | 133 (61.9%)| 285 (27.9%)|
| Creatinine     | 95 (23.9%)  | 70 (69.3%)* | 65 (27.9%) | 159 (58.9%)| 246 (17.2%)|
| SGPT           | 38 (9.5%)   | 43 (41.0%)* | 32 (4.0%)  | 44 (44.9%)*| 28 (12.1%)  | 108 (41.1%)*  |
| SGOT           | 17 (32.1%)* | 10 (2.0%)   | 44 (45.4%)*| 23 (10.0%) | 84 (40.0%)* | 68 (6.0%)     |
| Urine test     | 79 (72.5%)* | 69 (68.3%)  | 153 (65.7%)| 192 (71.1%)| 865 (60.5%)|
| EKG            | 126 (31.7%) | 73 (77.7%)* | 74 (74.7%)*| 123 (53.3%)| 181 (71.5%)| 523 (42.2%)  |

**Referral to Specialists**

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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 to 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 (e.g., lipid tests, uric acid, creatinine and EKG) compared to men. Compared to 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 to Lebanese vs. Syrian patients, we observe that Lebanese patients received significantly more advice on nutrition and diabetes management when compared to 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 CBC test), although this was more pronounced in facilities in setting 2. This trend was particularly marked for EKG, SGPT and SGOT. Compared to 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 checkups (58.4% and 15.7%) compared to those in setting 2 (39.5% and 11.6%), while those in setting 2 had more weight and blood pressure checkups (76.9% vs 59.6% and 93.6% vs 83.3%; respectively), the results showed a similar pattern for Syrians. Similarly, a higher proportion of Lebanese and Syrian patients residing in setting 1 received hepatitis B and flu vaccines compared to 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 to those with no coverage, those patients had more weight and blood pressure checkups (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 checkups (65.8% vs 36.7% and 10.5% vs 8.1%; respectively), compared to those reporting no health coverage. In terms of diagnostic testing, overall, laboratory testing was significantly higher in setting 1 compared to the setting 2 among those who have health coverage compared to those who do not. As for referrals, those patients who reported having health coverage were referred more frequently to cardiologist and endocrinologist in setting 2 in comparison to those who are not covered (Table 3).

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1: FBS: fasting blood sugar, Hba1c: Hemoglobin A1C, Na: Sodium, K: potassium, Ca: calcium, SGPT: Serum glutamic pyruvic transaminase, SGOT: serum glutamic-oxaloacetic transaminase, EKG: electrocardiography

*: p-value<0.05  +p-value<0.10
|                  | Gender | Nationality | Health coverage |
|------------------|--------|-------------|-----------------|
|                  | Female | Male | Lebanese | Syrians | Yes | No |
|                  |        |      |         |         |     |    |
| Check-up items   |        |      |         |         |     |    |
| Height           | 107 (59.1%) | 366 (38.8%) | 47 (56.6%) | 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%) | 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%) | 419 (93.6%) | 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%) | 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%) |
| Life-style advice|        |      |         |         |     |    |
| Smoking          | 91 (50.8%) | 316 (39.0%) | 41 (50.0%) | 218 (50.0%) | 95 (48.0%) | 205 (45.1%) | 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%) | 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%) | 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%) | 395 (55.5%) | 34 (58.6%) | 322 (57.2%) | 75 (54.0%) | 312 (58.5%) |
| HP management    | 95 (58.6%) | 582 (70.4%) | 32 (47.1%) | 273 (70.2%) | 93 (53.1%) | 294 (70.0%) | 561 (70.5%) | 39 (55.7%) | 472 (73.8%) | 87 (55.1%) | 382 (66.7%) |
| Immunizations    |         |      |         |         |     |    |
| 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%) |

1. Check-up items: Height, Weight, Blood pressure, Foot examination, Life-style advice, Smoking, Nutrition, Exercise, Alcohol, DM management, HP management, Immunizations.
| Flu 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%) | 212 (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 (17.1%) | 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%) | 41 (8.7%) | 91 (45.7%) | 57 (11.4%) | 17 (26.6%) | 41 (44.4%) | 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 (58.0%) |
| 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%) |
| Medical Profession | Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6 | Group 7 | Group 8 | Group 9 |
|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 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%) |
| 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%) |
| 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%) |
| 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%) |

*Indicates statistical difference between the fragility settings with a p-value<0.05

1 Indicates statistical difference between gender groups within fragility settings with a p-value<0.05

2 Indicates statistical difference between nationality groups within fragility settings with a p-value<0.05

3 Indicates statistical difference between health coverage groups within fragility settings with a p-value<0.05

4: FBS: fasting blood sugar, Hba1c: Hemoglobin A1C, Na: Sodium, K: potassium, Ca: calcium, SGPT: Serum glutamic pyruvic transaminase, SGOT: serum glutamic-oxaloacetic transaminase, EKG: electrocardiography.
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 urbanized area of Greater Beirut) as manifested by the higher rate of check-up provision, patient education, immunization, diagnostic testing and referral rates when compared to 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 to Syrians. The findings also showed that health coverage status can impact the service delivery provided.

Our findings that the urbanized 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.(7) Furthermore, a recent national facility assessment conducted across primary healthcare centers in Lebanon identified significant regional disparities between rural and urbanized areas,(28) 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 taskforce to be in major need for health institutional support,(5) whereas setting 1 includes some of the most advanced medical services and facilities,(29) with a lower percentage of Syrian refugees’ settlement (26%), (30) 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 (e.g. 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 underutilize necessary healthcare,(31) and less likely to be instructed on secondary prevention strategies compared to men. (32) Several studies highlighted gender inequalities in utilization of healthcare services. (33, 34) 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 to men. (33, 34) In addition, this could be also attributed to the fact that women tend to seek help less frequently, (35) or at more advanced stages compared to men. (36) 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 programs to restore equitable access to NCD services. The findings further call on policy and decision makers, to work collaboratively with underprivileged and refugee communities, to design, implement and evaluate evidence-based targeted programs 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 utilization. Earlier studies reported underutilization of NCD services among Syrian refugees compared to Lebanese community members.(37, 38) The highly privatized 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. (39) 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 to refugees. (37),(38) 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 prioritize the provision of equitable access to NCD care for refugees since the poor detection and control of NCDs does not only increase the number of patients seeking care services but also increases 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.

The study further highlights the importance of considering the various aspects that would further exacerbate and compound the fragility of NCD patients. For example, Syrian refugees are more fragile compared to host communities, female patients are more fragile compared to males, and patient in setting 2 are more fragile compared to 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 programs 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 details 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 three 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, 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 endeavors towards the achievement of universal health coverage such as the national unified long-term primary healthcare subsidization protocol (LPSP).
CONTRIBUTORSHIP STATEMENT

SS has made substantial contributions to the analysis, interpretation of the data, write up and revising the manuscript.

DM has made substantial contributions to the acquisition, analysis, interpretation of the data, drafting the original manuscript and revising it.

AN has made substantial contributions to the acquisition, analysis, interpretation of the data and the revision the manuscript.

RH have made substantial contributions to the interpretation of the data and the revision of the manuscript. HD has made substantial contributions to the analysis, interpretation of the data, and revising the manuscript. KD has made substantial contributions to the conception and design of the work, analysis, interpretation of the data, and revising the manuscript.

SA has made substantial contributions to the analysis and interpretation of the data, and the revision of the manuscript.

AA have made substantial contributions to the interpretation of the data and the revision of the manuscript.

MA has made substantial contributions to the conception and design, supervision of the work, write up and revision of the manuscript.

All authors have read and approved the submitted version of the manuscript.

DECLARATION OF INTERESTS

The authors declare no competing interests.

DATING SHARING

As per the ethical approval protocol, deidentified data could be shared by special request to the senior authors on this manuscript.

ETHICAL APPROVAL

The study protocol was reviewed and approved by the Ethics Research Panel of Queen Margaret University, Edinburgh (Protocol number QMU: REP 0201) and the Ethics Review Committee of the American University Beirut (protocol number AUB: SBS-2018-0514).

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PATIENT AND PUBLIC ENGAGEMENT

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.
REFERENCES

1. World Health Organization. Noncommunicable diseases country profiles 2018 [Available from: https://www.who.int/nmh/publications/ncd-profiles-2018/en/. 2018.
2. World Health Organization WHO. Noncommunicable diseases country profiles 2018 [Available from: https://www.who.int/nmh/publications/ncd-profiles-2018/en/.
3. WHO. NCDs and development.
4. OECD. States of Fragility 2020 [Available from: https://www.oecd.org/dac/states-of-fragility-fa5a6770-en.htm.
5. United Nations. Lebanon Crisis Response Plan 2017–2020 (2019 update) [Available from: https://www.unhcr.org/lb/wp-content/uploads/sites/16/2019/04/LCRP-EN-2019.pdf.
6. Trinh HT, Nguyen HT, Pham VT, Ba HL, Dong PT, Cao TT, et al. Hospital clinical pharmacy services in Vietnam. International Journal of Clinical Pharmacy. 2018;40(5):1144-53.
7. Zablith N, Diaconu K, Naja F, El Koussa M, Loffreda G, Bou-Orm I, et al. Dynamics of non-communicable disease prevention, diagnosis and control in Lebanon, a fragile setting. Conflict and Health. 2021;15(1):4.
8. Naja F, Shatila H, El Koussa M, Mehlo L, Ghandour L, Saleh S. Burden of non-communicable diseases among Syrian refugees: a scoping review. BMC Public Health. 2019;19(1):637.
9. World Health Organization WHO. Regional Health Systems Observatory- EMRO. Health Systems Profile- Lebanon. 2006 [Available from: https://rho.emro.who.int.
10. Ammar W. Health system and reform in Lebanon: Ministry of Public Health; 2003.
11. Ajluni S, Kawar M. Towards decent work in Lebanon: Issues and challenges in light of the Syrian refugee crisis: ILO; 2015.
12. Ministry Of Public Health. National Health Statistics Report in Lebanon 2012 [Available from: https://www.usj.edu.lb/intranet/annonce/files/pdf/175_pdf_1.pdf.
13. World Bank. Lebanon Health Resilience Project 2017 [Available from: https://www.worldbank.org/en/news/loans-credits/2017/06/26/lebanon-health-resilience-project.
14. Hamadeh R, Kdouh O, Hammoud R, Haddad I. Non-Communicable Diseases Epidemiology And Response in Lebanon. HUMAN & HEALTH. 2019;47.
15. Lyles E, Burnham G, Chlela L, Spiegel P, Morlock L, Doocy S, et al. Health service utilization and adherence to medication for hypertension and diabetes among Syrian refugees and affected host communities in Lebanon. Journal of Diabetes & Metabolic Disorders. 2020;19(2):1245-59.
16. UNHCR. Refugees in Lebanon caught in vicious debt cycle..[Available from: https://www.unhcr.org/news/briefing/2015/11/564ef96f6/refugees-lebanon-caught-vicious-debt-cycle.html. 2015.
17. Doocy S, Lyles E, Robertson T, Akhu-Zaheya L, Oweis A, Burnham G. Prevalence and care-seeking for chronic diseases among Syrian refugees in Jordan. BMC public health. 2015;15(1):1-10.
18. 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(3):566-89.
19. UNHCR. Total Registered RefugeesJSON. 2020.
20. Giovetto O. The humanitarian impact of the Beirut explosion. 2020.
21. MOPH. National PHC Network. 2019.
22. Lebanon SoHi. List of Hospitals.
23. KoboToolbox. ,2012.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
24. World Health Organization. WHO Multi-Country Studies Data Archive 2018 [Available from: http://apps.who.int/healthinfo/systems/surveydata/index.php/catalog/whs.

25. Royal College of General Practitioners. Patient Satisfaction Questionnaire (PSQ) - old WPBA programme 2019 [Available from: https://www.rcgp.org.uk/training-exams/training/mrcgp-workplace-based-assessment-wpba/psq-for-workplace-based-assessment.aspx.

26. Harris J, McGee A, Andrews F, D'Souza J, Sproston K. The National Survey of People with Diabetes 2007 [Available from: http://www.nhssurveys.org/Filestore/documents/Diabetes_key_findings_rpt.pdf.

27. World Health Organization. World Health Survey - Individual Questionnaire, Long Version, Rotation A 2002 [Available from: https://www.who.int/healthinfo/survey/whslongindividuala.pdf.

28. Hemadeh R, Kdouh O, Hammoud R, Jaber T, Khalek LA. The primary healthcare network in Lebanon: a national facility assessment. East Mediterr Health J. 2020;26(6):700-7.

29. Ammar W. Health beyond politics 2009 [Available from: 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 from: http://data.unhcr.org/syrianrefugees/regional.php

31. Azad AD, Charles AG, Ding Q, Trickey AW, Wren SM. The gender gap and healthcare: associations between gender roles and factors affecting healthcare access in Central Malawi, June-August 2017. Archives of public health, 78 119. 2020;78(1):119.

32. Caulin-Glaser T, Blum M, Schmeizl R, Prigerson HG, Zaret B, Mazure CM. Gender differences in referral to cardiac rehabilitation programs after revascularization. J Cardiopulm Rehabil. 2001;21(1):24-30.

33. Peters SA, Woodward M, Jha V, Kennedy S, Norton R. Women's health: a new global agenda. BMJ global health. 2016;1(3):e000080.

34. Langer A, Meleis A, Knaul FM, Atun R, Aran M, Arreola-Ornelas H, et al. Women and health: the key for sustainable development. The Lancet. 2015;386(9999):1165-210.

35. Parr JD, Lindeboom W, Khanam MA, Pérez Koehlmoos TL. Diagnosis of chronic conditions with modifiable lifestyle risk factors in selected urban and rural areas of Bangladesh and sociodemographic variability therein. BMC Health Services Research. 2011;11(1):309.

36. Baschieri F, Acciarresi M, Caso V. Gender-Based Approaches for the Prevention and Control of Noncommunicable Diseases. Stroke. 2018;49(12):2810-1.

37. Lyles E, Burnham G, Chlela L, Spiegel P, Morlock L, Doocy S. Health service utilization and adherence to medication for hypertension and diabetes among Syrian refugees and affected host communities in Lebanon. Journal of Diabetes & Metabolic Disorders. 2020;19(2):1-15.

38. United Nations High Commissioner for Refugees. Refugees in Lebanon caught in vicious debt cycle 2015 [Available from: https://www.unhcr.org/news/briefing/2015/11/564ef96f6/refugees-lebanon-caught-vicious-debt-cycle.html.

39. Hanna-Amadio C. Syrian refugee access to healthcare in Lebanon 2020 [Available from: https://reliefweb.int/report/lebanon/syrian-refugee-access-healthcare-lebanon.
Setting information

338x190mm (96 x 96 DPI)
Appendix A – Facility Assessment

Date of assessment:

Persons involved in completing assessment:

Eligibility assessment

| Criteria                                                                 | Number | Yes | No |
|--------------------------------------------------------------------------|--------|-----|----|
| Facility is located in Greater Beirut or Beqaa                           | NA     |     |    |
| Facility delivers NCD services (as reported by the head of the facility – | NA     |     |    |
| consultations for diabetes and hypertension)                            |        |     |    |
| Facility offers services to both Lebanese and Syrian refugees: at minimum 50 consultations for Lebanese and 20 consultations for Syrians per month |        |     |    |
| Facility has a minimum patient load for diabetes of 20 outpatient consultations and 20 hypertension outpatient consultations per week |        |     |    |
| Consent to participate                                                   | NA     |     |    |

Eligibility

|                       | Eligible | Ineligible |
|-----------------------|----------|------------|
| Affiliation of the PHC:|          |            |
| • Government          |          |            |
| • Non-governmental   |          |            |

Location (Greater Beirut or Beqaa):

ID number:
A. Service availability

What type of services is available?

1. Yes 0. No  Comment on why resources are/are not available

1. Reproductive, Maternal, Newborn, and Child Health (RMNCH)

2. Communicable disease services

3. Non-communicable diseases

4. Minor and major injury services

5. Ear, Nose, and Throat (ENT) services

6. Ophthalmology

7. Other

B. Health information systems

What is available at clinic level?

1. Yes 0. No  Comment on why resources are/are not available

1. Health information technology resources and systems

2. Does the facility have electronic stock card or log books for medicine?

3. Does the facility have electronic stock card or log books for consumables (e.g. syringes, bandages)?

4. Does the facility keep a record of all the patient visits?

5. Are the records kept in a registry system?

6. Are patient files retrieved and consulted each time they visit the facility?

7. Are medical records of diabetic/hypertensive patients computerized?
8. Is the Internet used for communication and information exchange regarding diabetic/hypertensive patients?

9. Are there magnetic cards developed for diabetic/hypertensive patients/user identification?

10. Is there an electronic scheduling system for diabetic/hypertensive patients’ appointments?

11. Is there an electronic scheduling system for diabetic/hypertensive patients’ examinations?

12. Is there an electronic scheduling system for diabetic/hypertensive patients’ admissions?

13. Are there any computerized protocols for diagnosis and treatment support of diabetic/hypertensive patients?

C. Human resources

What type of human resources are available? How many?

1. Yes 0. No How many?

1. Physicians

2. Psychologists

3. Registered nurses

4. Registered midwives

5. Social workers

6. Occupational therapists

7. Pharmacists

8. Dietitians/nutritionists

9. Community health worker/health educator

10. Human Resources (available upon referral)

D. Facility infrastructure

Please tell us more about the facility infrastructure
1. The building is in a good state of repair (e.g. windows are not broken, paint is not peeling from the walls)

2. The building is accessible for persons with physical disabilities

3. The building’s lighting (artificial and natural), heating and ventilation provide a comfortable living environment

4. The physical equipment and supplies are sufficient and in good condition

5. Measures are in place to protect people against injury through fire

6. The toilet facilities are clean and working properly

7. The toilet facilities allow privacy, and there are separate facilities for men and women

8. The toileting needs of service users who have impaired mobility or other physical disabilities are accommodated

9. There are ample furnishings, and they are comfortable and in good condition

10. The layout of the facility is conducive to interaction between and among service users, staff and visitors

E. Equipment for NCDs

1. How often are blood pressure measuring devices (BPMDs) calibrated and checked for accuracy?

   1. Once a year or more
   2. Less than once a year
   3. Never
   4. Don’t know

2. How often are weight scales calibrated and checked for accuracy?
3. How often are glucometers calibrated and checked for accuracy?

1. Once a year or more
2. Less than once a year
3. Never
4. Don’t know

4. Are there any consumables that you need?

__________

5. Are they accessible?

__________

6. How is the equipment usually repaired and maintained?

1. Repaired at the facility
2. Sent back to manufacturer for repair
3. Other, specify _____________

7. What, if any, are the difficulties in getting repairs to equipment done?

..........................................................................................................................
..........................................................................................................................

F. Infrastructure/services

1. Are the following procedures being conducted at the facility when needed?

1. Yes 0. No, why not? ....................

1. Administration of oxygen (via mask or tube)
2. Administration of intravenous (IV) fluids/drip
3. IV injection
4. Intramuscular (IM) injection
5. Subcutaneous injection
6. Electrocardiography (ECG)
7. Cardiopulmonary resuscitation
8. Manual ventilation with a bag valve mask resuscitator (ambu-bag)
9. Visual acuity examination
10. Examination for neuropathy with knee hammer/tuning fork, etc.
11. Peak flow test
12. Ophthalmoscopy

2. Do you have a bed where you can stabilize a very ill patient before transfer to a referral institution?
   1. Yes
   0. No

3. If injections are provided at the facility, what type of needle is used?
   1. Disposable needles
   2. Reusable, sterilized needles.
   3. How are needles sterilized? .................................................................
   4. Injections not provided at the facility
   5. Don’t know

4. Is there a safe disposal for used needles available?
   1. Yes
   0. No

G. Utilization of services

1. What is the total number of visits to the health facility for outpatient services last month?
   1. Total number of visits last month: _______________________
   2. On average how many consultations were for diabetes? ____________

   This figure is based on:
   a. Register/record
   b. Estimation

   3. On average how many consultations were for hypertension? ____________

   This figure is based on:
   a. Register/record
   b. Estimation

2. What is the total number of visits to the health facility for outpatient services yesterday?
   1. Total number of visits yesterday: ______________
   2. On average how many consultations were for diabetes? ______________

   This figure is based on:
   a. Register/record
   b. Estimation
3. On average how many consultations were for hypotension? _______________
This figure is based on:
   a. Register/record
   b. Estimation

3. How many of the patient visits made yesterday were for:

   1. Number of visits made for hypertension: _______________
   This figure is based on:
      a. Register/record
      b. Estimation

   2. Number of visits made for diabetes: _______________
   This figure is based on:
      a. Register/record
      b. Estimation

4. How do patients access the facility?

   1. Walk-in only
   2. By appointment only
   3. Combination of appointments and walk-ins

H. Financing and administration

1. Do patients pay the facility for medicines?

   1. Yes, full payment
   2. Yes, partial payment
   0. No, medicines are provided for free
   3. Other…..

2. If medicines are provided for free or for partial payment, who subsidizes it?

   1. Specify: ................................................... Proportion paid by patient: ......%
   Specify: ................................................... Proportion paid by patient: ......%
   Specify: ................................................... Proportion paid by patient: ......%
   Specify: ................................................... Proportion paid by patient: ......%
   Specify: ................................................... Proportion paid by patient: ......%
   Specify: ................................................... Proportion paid by patient: ......%
   Specify: ................................................... Proportion paid by patient: ......%
   Specify: ................................................... Proportion paid by patient: ......%
   8. Don’t know
3. Do patients pay the facility for consultations?

1. Yes, full payment
2. Yes, partial payment
0. No, consultations are provided for free
3. Other: ___________________

4. If consultations are provided for free or for partial payment, who subsidizes it?

Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%

8. Don’t know

5. Do patients pay the facility for diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
0. No, diagnostic tests are provided for free
3. Other: ___________________

6. If diagnostic tests are provided for free or for partial payment, who subsidizes it?

Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%
Specify: ...................................................  Proportion paid by patient: ......%

8. Don’t know

I. Diabetes services - Financing

1. For how long have the diabetes services been provided at the clinic?

____________________

2. Do patients pay the facility for diabetes medicines?
1. Yes, full payment
2. Yes, partial payment
0. No, medicines are provided for free
3. Other:

3. If diabetes medicines are provided for free or for partial payment, who subsidizes it?

1. Specify: ................................................... Proportion paid by patient: ......% 
2. Specify: ................................................... Proportion paid by patient: ......% 
3. Specify: ................................................... Proportion paid by patient: ......% 
4. Specify: ................................................... Proportion paid by patient: ......% 
5. Specify: ................................................... Proportion paid by patient: ......% 
6. Specify: ................................................... Proportion paid by patient: ......% 
7. Specify: ................................................... Proportion paid by patient: ......% 
8. Don’t know

4. Do patients pay the facility for diabetes consultations?

1. Yes, full payment
2. Yes, partial payment
0. No, consultations are provided for free
3. Other:

5. If diabetes consultations are provided for free or for partial payment, who subsidizes it?

1. Specify: ................................................... Proportion paid by patient: ......% 
2. Specify: ................................................... Proportion paid by patient: ......% 
3. Specify: ................................................... Proportion paid by patient: ......% 
4. Specify: ................................................... Proportion paid by patient: ......% 
5. Specify: ................................................... Proportion paid by patient: ......% 
6. Specify: ................................................... Proportion paid by patient: ......% 
7. Specify: ................................................... Proportion paid by patient: ......% 
8. Don’t know

6. Do patients pay the facility for diabetes diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
0. No, diagnostic tests are provided for free

3. Other: __________

7. If diabetes diagnostic tests are provided for free or for partial payment, who subsidizes it?

| 1. Specify: | Proportion paid by patient: ......% |
| 2. Specify: | Proportion paid by patient: ......% |
| 3. Specify: | Proportion paid by patient: ......% |
| 4. Specify: | Proportion paid by patient: ......% |
| 5. Specify: | Proportion paid by patient: ......% |
| 6. Specify: | Proportion paid by patient: ......% |
| 7. Specify: | Proportion paid by patient: ......% |

8. Don’t know

J. Hypertension services - Financing

1. For how long have the hypertension services been provided at the clinic?

_______________________

2. Do patients pay the facility for hypertension medicines?

   1. Yes, full payment
   2. Yes, partial payment
   0. No, medicines are provided for free
   3. Other: __________

3. If hypertension medicines are provided for free or for partial payment, who subsidizes it?

| 1. Specify: | Proportion paid by patient: ......% |
| 2. Specify: | Proportion paid by patient: ......% |
| 3. Specify: | Proportion paid by patient: ......% |
| 4. Specify: | Proportion paid by patient: ......% |
| 5. Specify: | Proportion paid by patient: ......% |
| 6. Specify: | Proportion paid by patient: ......% |
| 7. Specify: | Proportion paid by patient: ......% |

8. Don’t know

4. Do patients pay the facility for hypertension consultations?
1. Yes, full payment
2. Yes, partial payment
3. Other:_______________

5. If hypertension consultations are provided for free or for partial payment, who subsidizes it?

1. Specify: ...................................................  Proportion paid by patient: ......%
2. Specify: ...................................................  Proportion paid by patient: ......%
3. Specify: ...................................................  Proportion paid by patient: ......%
4. Specify: ...................................................  Proportion paid by patient: ......%
5. Specify: ...................................................  Proportion paid by patient: ......%
6. Specify: ...................................................  Proportion paid by patient: ......%
7. Specify: ...................................................  Proportion paid by patient: ......%
8. Don’t know

6. Do patients pay the facility for hypertension diagnostic tests?

1. Yes, full payment
2. Yes, partial payment
3. No, diagnostic tests are provided for free
4. Other:__________

7. If hypertension diagnostic tests are provided for free or for partial payment, who subsidizes it?

1. Specify: ...................................................  Proportion paid by patient: ......%
2. Specify: ...................................................  Proportion paid by patient: ......%
3. Specify: ...................................................  Proportion paid by patient: ......%
4. Specify: ...................................................  Proportion paid by patient: ......%
5. Specify: ...................................................  Proportion paid by patient: ......%
6. Specify: ...................................................  Proportion paid by patient: ......%
7. Specify: ...................................................  Proportion paid by patient: ......%
8. Don’t know
Appendix B - Beneficiary Survey

“Please do not refer to the names of the people and facilities or provide any identifiable information”

A- Respondent’s socio-demographic characteristics

I would like to start by asking you some background questions before asking you questions on your health. This information is confidential and will only be used for research purposes.

1. What is your nationality:
   1. Lebanese
   2. Syrian
   3. If Syrian, when did you come to Lebanon?
      Year:

2. Have you ever been diagnosed with Diabetes Mellitus?
   1. Yes
   0. No

3. Have you ever been diagnosed with Hypertension?
   1. Yes
   0. No

4. Gender
   Female
   Male

5. How old are you?
   (Years) _____________________

6. What is your weight?
   (Kilos) _____________________

7. What is your height?
   (Centimeters) _____________________

8. What is your current marital status?
   1. Never Married
   2. Currently Married
   3. Separated
   4. Divorced
   5. Widowed

9. What is the highest level of education that you have completed?
   1. No formal schooling
   2. Primary school completed
   3. Secondary school completed
   4. High school (or equivalent) completed
   5. University completed
6. Post graduate degree completed

10. What is your current employment status?
   1. Working
   2. Not working
   3. Unable to work

11. What is the number of rooms within the household you live in? (The kitchen and the toilets are excluded)

   ..... 

12. How many residents are there in the household? (Including the housekeepers?)

   ..... 

B. Risk Factors

I will now ask you questions about your daily life.

Tobacco consumption

13. Do you currently smoke any tobacco products such as cigarettes, cigars, or pipes?
   1. Daily
   2. Yes, but not daily
   3. No, not at all

14. For how many years have you been smoking daily? _____________________

15. On average, how many of the following products do you smoke each day?
   1. Cigarette
   2. Narguileh
   3. Other:

   Alcohol consumption (I understand this may be a sensitive topic, and I would like to stress again the confidentiality and privacy of the information. If the participant feels uncomfortable he/she can skip answering any of the addressed question(s))

16. Have you ever consumed a drink that contains alcohol (such as beer, wine, etc.)?
   1. Yes
   0. No

17. During the past 7 days, how many standard drinks of any alcoholic beverage did you have each day?
   1. Monday _____________________
   2. Tuesday _____________________
   3. Wednesday _____________________
   4. Thursday _____________________
   5. Friday _____________________
   6. Saturday _____________________
   7. Sunday _____________________

Nutrition (cards that illustrate what a serving means will be prepared)
Now I am going to ask you about the fruit and vegetables you usually eat.

18. How many servings of fruit do you eat on a typical day? _____________________

19. How many servings of vegetables do you eat on a typical day? _____________________

Physical Activity

Now I am going to ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Think about the activities you do at work, as part of your house and yard work, to get from places to place, and in your spare time for recreation, exercise or sport.

20. During the last 7 days, on how many days did you do vigorous physical activities? Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling. Think only about those physical activities that you did for at least 10 minutes at a time.

Days:

21. How much time did you usually spend doing vigorous physical activities on one of those days?

Minutes per day _____________________

Moderate Activity

Now think about activities which take moderate physical effort that you did in the last 7 days.

22. During the last 7 days, on how many days did you do moderate physical activities? Moderate physical activities make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace, or doubles tennis. Do not include walking.

Again, think about only those physical activities that you did for at least 10 minutes at a time.

Days:

23. How much time did you usually spend doing moderate physical activities on one of those days?

Minutes per day _____________________

Walking

Now think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

24. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

25. How much time did you usually spend walking on one of those days?

Minutes per day _____________________

C-History of Disease
Now I would like to read to you questions about some health problems or health care needs that you and the young children in this house may have experienced, and the treatment or medical care that you may have received.

26. Have you ever been diagnosed with diabetes or hypertension?
   Yes (diabetes) – continue
   Yes (hypertension) – skip to question 29
   Yes (both) – continue

27. When were you diagnosed with diabetes? Even an approximate answer is helpful.
   1. Year: ___________________
   2. Month: ___________________
   3. N/A

28. Where were you diagnosed with diabetes?
   1. ___________________
   2. N/A

29. When were you diagnosed with hypertension? Even an approximate answer is helpful.
   1. Year: ___________________
   2. Month: ___________________
   3. N/A

30. Where were you diagnosed with hypertension?
   1. ___________________
   2. N/A

31. Do you suffer from any other disease?
   1. Yes (please specify)
   0. No
   2. Don’t know

D-Health services

I will now ask you questions about the health care services you receive.

Diabetes Mellitus Benefit Package: (if patient says yes to diabetes diagnosis)

32. During the past year, how many times did you see your GP/family doctor?
    ___________________

33. How many of these visits directly related to your diabetes?
    ___________________

34. Were you referred to – and then attended appointments with – other specialists?

| Specialist | Referred (1.Yes/0.No) | Reason for referral (routine / other: please specify) | Attended |
|------------|-----------------------|------------------------------------------------------|----------|

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
1. Endocrinologist
2. Ophtalmologist
3. Other specialties (Cardio/Nephro/Vascular)
4. Dentist
5. Clinical dietician

35. Now let me ask you about the immunizations and diagnostic tests you receive.

| Test                          | Received (1.Yes/0.No) | Any other information (e.g. do they receive it here? Do they co-pay?) |
|-------------------------------|----------------------|---------------------------------------------------------------------|
| 1. Hepatitis B vaccine        |                      |                                                                     |
| 2. Flu Vaccine                |                      |                                                                     |
| 3. Fasting Blood Sugar        |                      |                                                                     |
| 4. Hba1c                      |                      |                                                                     |
| 5. Lipid profile              |                      |                                                                     |
| 6. Other blood tests (CBC)    |                      |                                                                     |
| 7. Platelets                  |                      |                                                                     |
| 8. Creatinine – (for kidney function) |                |                                                                     |
| 9. SGPT (for liver function)  |                      |                                                                     |
| 10. SGOT (for liver function) |                      |                                                                     |
| 11. Urine test (Urinalysis)   |                      |                                                                     |
| 12. Urine test (spot urine microalbumin) |                |                                                                     |
| 13. EKG                       |                      |                                                                     |

36. Now I would like to ask you what usually happens during your examinations. Does the physician or the nurse check:

| Consultation element | Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never) |
|----------------------|--------------------------------------------------------------------------------------------|
| 1. Height            |                                                                                           |
| 2. Weight            |                                                                                           |
| 3. Blood pressure    |                                                                                           |
| 4. Foot examination (for ulcers etc) |                                                                         |

36. Does your health care provider offer you any advice on: (I would like to stress again the confidentiality and privacy of the information)
Consultation element | Frequency | Do you find this advice relevant?
--- | --- | ---
1. Smoking | 1. every visit, 2. almost every visit, 3. some visits, 4. almost never, 5. never | 1. very relevant, 2. relevant, 3. moderately relevant, 4. slightly relevant, 5. not relevant
2. Healthy nutrition (sugar) |  | 
3. Exercise |  | 
4. Alcohol consumption |  | 
5. Managing your diabetes |  | 

**Hypertension Benefit Package:**

**Hypertension Benefit Package:** *(If patient says yes to hypertension diagnosis)*

37. During the past year, how many times did you see your GP/family doctor?

____________________

38. How many of these visits directly related to your hypertension?

____________________

39. Were you referred to – and then attended appointments with – other specialists?

| Specialist | Referred (1.Yes/0.No) | Reason for referral (routine / other: please specify) | Attended |
| --- | --- | --- | --- |
| 1. Cardiologist |  |  |  |
| 2. Ophthalmologist |  |  |  |
| 3. Other specialties (Nephro/Vascular) |  |  |  |
| 4. Dentist |  |  |  |
| 5. Clinical dietician |  |  |  |

40. Now let me ask you about the immunizations and diagnostic tests you receive.

| Test | Received (1.Yes/0.No) | Any other information (e.g. do they receive it here? Do they co-pay?) |
| --- | --- | --- |
| 1. Hepatitis B vaccine |  |  |
| 2. Flu Vaccine |  |  |
| 3. Fasting Blood Sugar |  |  |
| 4. Hba1c |  |  |
| 5. Lipid profile |  |  |
| 6. Other blood tests (CBC) |  |  |
| 7. Platelets |  |  |
| 8. Na |  |  |
9. K
10. Ca
11. Uric acid
12. Creatinine – (for kidney function)
13. SGPT (for liver function)
14. Urine test (Urinalysis)
15. Urine test (spot urine microalbumin)
16. EKG

41. Now I would like to ask you what usually happens during your examinations. Does the physician or the nurse check:

Consultation element Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never)
1. Height
2. Weight
3. Blood pressure

42. Does your health care provider offer you any advice on: (I would like to stress again the confidentiality and privacy of the information)

Consultation element Frequency (1.every visit, 2.almost every visit, 3.some visits, 4.almost never, 5.never) Do you find this advice relevant? (1.very relevant, 2.relevant, 3.moderately relevant, 4.slightly relevant, 5.not relevant)
1. Smoking
2. Healthy nutrition (salt)
3. Exercise
4. Alcohol consumption
5. Managing your hypertension

E. Patient self-management

43. Do you feel you have enough knowledge to manage your diabetes at home?
   1-disagree
   2-partially disagree
   3-neutral
   4-partially agree
   5-agree
   6-N/A

44. Do you feel you have enough knowledge to manage your hypertension at home?
   1-disagree
   2-partially disagree
   3-neutral
   4-partially agree
   5-agree
45. What challenges do you face?

____________________

INVENTORY OF MEDICINES AND DRUGS

We are interested in knowing about the availability and use of certain medicines and drugs. Remember that whatever information you give me is confidential and will only be used for research purposes.

46. During the past year, the last time you sought care for diabetes or hypertension did the health care provider prescribe any medicine for you?

a. Diabetes:
   1. Yes
   0. No
   2. N/A

b. Hypertension:
   1. Yes
   0. No
   2. N/A

47. If yes: which medicines were they?

____________________

48. Of the medicines that were prescribed for you, how many of them were you able to get?
   1. All of them
   2. Most
   3. Some
   4. Very few
   5. None of them

49. Were these medications provided to you from the PHCC or did you have to get them yourself?

____________________

50. Which reason best explains why you did not get all the medicines you were prescribed?
   1. Could not afford
   2. Could not find all medicines
   3. Did not believe all the medications were needed
   4. Started to feel better
   5. Already had some of the medicines at home
   6. Other

F- Outcome (hospitalizations, glycemic episodes...)

51. When was the last time that you checked the HbA1C in the past year?
   1. Date:
   2. Never
   3. Don’t know

52. What was the HbA1C reading?
   1. Value:
53. How many times were you hospitalized for conditions related to diabetes in the past year?
   1. Number of times:
   2. Don’t know
   3. N/A

54. During the past four weeks, did you experience any symptoms of hypoglycemia? (shakiness, dizziness, sweating, hunger, irritability or moodiness, anxiety or nervousness)____________________

55. When was the last time that you checked your blood pressure in the past year?
   1. Date
   2. Never
   3. Don’t know

56. What was the blood pressure value?
   1. Values
      a- Systolic BP:
      b- Diastolic BP:

   2. Don’t know
   3. N/A

57. How many times were you hospitalized for conditions related to hypertension in the past year?
   1. Number of times:
   2. Don’t know
   3. N/A

58. Were you exposed to any of the following complications? (Tick all that apply)
   1. Heart disease
      a- Myocardial infarction or heart attack
      b- CABG – surgery
      c- Percutaneous Coronary Intervention
   2. Stroke
   3. Peripheral Artery disease
      a- Ulcers of the lower limbs (or toes)
      b- Amputation of the lower limbs (or toes)
   4. Diseases of the eye (retina)
   5. Kidney disease
   6. Thyroid problems
7. Other (specify):

59. Were you diagnosed with DM and/or HTN during these complications?

60. Did these complications happen in the past year?

G-Patient satisfaction and other factors affecting utilization

61. During the past year, when you needed health care for diabetes or hypertension did you get health care?
   1. Always
   2. Very Often
   3. Sometimes
   4. Rarely
   5. Never

62. During the past year, did you visit this particular PHCC for the health care for diabetes or hypertension?
   1. Always
   2. Very Often
   3. Sometimes
   4. Rarely
   5. Never

63. If you did not receive the health care, which reasons explain why you did not get health care? (tick all that apply)
   1. Cost
      - A. Could not afford the cost of the visit
      - B. Could not afford the cost of transport
   2. Knowing where to go
      - A. You did not know where to go
   3. Physical access
      - A. No transport
      - B. No PHCC nearby?
      - C. Traffic
   4. Previous experience of receiving care
      - A. The health care provider’s drugs or equipment were inadequate
      - B. The health care provider’s skills were inadequate
      - C. You were previously badly treated
   5. Could not take time off work or had other commitments
   6. You thought you were not sick enough
   7. You tried but were denied health care
   8. Other
Now I would like to ask you about how important some notions are to you

Would you say it is:
not important (1), slightly important (2), important (3), moderately important (4), very important (5) Skip (9)

64. How important is "respectful treatment" to you. (meaning: being shown respect when greeted by and when talking to health care providers and having physical examinations conducted in a way that respects your cultural norms)

65. How important is "confidentiality of personal information" to you. (meaning: having information about your health and other personal information kept confidential and having conversations with health care providers without other people overhearing)

66. How important is "convenient travel and short waiting times" to you. (meaning: having short travel times and convenient access to health care facilities and having short waiting times for consultations and hospital admissions)

67. How important is "choice of health care providers" to you. (meaning: being able to choose your health care provider (place or person) and being able to consult for a second opinion or with a specialist if so desired)

68. How important is "involvement in decision making" to you. (meaning: being involved as much as you want in deciding about your health care and freedom to discuss other treatment options or care regimes if you want)

69. How important are "good quality surroundings" to you? (meaning: having enough space, seating and fresh air in the waiting rooms, examination rooms and hospital wards and having a clean facility (including clean toilets))

70. How important is "contact with the outside world" to you? (meaning: having family and friends visit you as much as you want when you are a patient in hospital and being able to keep in contact with family and friends and to have information about what is happening outside the hospital)

71. How important is "clarity of communication" to you. (meaning: having the health care providers explain things in a way you can understand and having enough time to ask questions if you don’t understand something)

Now I would like to ask you about the care you received

72. During the last year, which type of health provider have you seen most frequently?
   1. Medical doctor
   2. Nurse
   7. Other

73. How would you rate your satisfaction regarding:
   Topic                                  Rating (1 lowest to 5 highest)
   During consultation
   1. Provider skills
2. Being spoken to respectfully
3. Privacy during consultation
4. Explanations about treatment options and alternatives
5. Time availability for questions and clarifications
6. Clarity of explanations during consultation
7. Involvement in decision making your health and treatment (e.g. plan)
8. Confidentiality of your personal information
9. Availability of equipment
10. Condition of the equipment (e.g. cleanliness, functionality)
11. Availability of medicines
12. Examination room space
13. Examination room cleanliness

Facility
14. Waiting time for appointment scheduling
15. Waiting time in facility (for receiving services)
16. Waiting space (availability, crowdedness)
17. Facility cleanliness (including toilets)
18. Staff greetings
19. Provider choice (within the centre)
20. Provider choice (between clinics/facilities)

74. On average, per visit, how much did you or your household pay for (local currency): [Interviewer: only write 0 if the service was free. If a person did not have tests or drugs, circle “Not applicable, not have”]

| Amount | Don’t know | Not applicable, not have |
|--------|------------|--------------------------|
| 1. [Health care provider's] fees |
| 2. Medicines |
| 3. Tests |
| 4. Transport |
| 5. Other |

75. Do you have any health coverage? (please tick what applies)

1. National Social Security Fund (NSSF)
2. Civil Servants Cooperative (CSC)
3. Military schemes
4. Private insurance
5. No health coverage

76. In the past year did you feel that you were treated worse by health care providers for any of the following reasons. Because of your:

Yes
No

1. Sex
2. Age
3. Lack of money
4. Social class
5. Type of illness
6. Nationality
| Item No | Recommendation |
|--------|----------------|
| **Title and abstract** | |
| (a) | Indicate the study’s design with a commonly used term in the title or the abstract |
| (b) | Provide in the abstract an informative and balanced summary of what was done and what was found |
| **Introduction** | |
| 2 | Explain the scientific background and rationale for the investigation being reported |
| **Objectives** | |
| 3 | State specific objectives, including any prespecified hypotheses |
| **Methods** | |
| 4 | Present key elements of study design early in the paper |
| 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection |
| 6 | (a) Give the eligibility criteria, and the sources and methods of selection of participants |
| 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable |
| 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group |
| 9 | Describe any efforts to address potential sources of bias |
| 10 | Explain how the study size was arrived at |
| 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why |
| 12 | (a) Describe all statistical methods, including those used to control for confounding |
| (b) | Describe any methods used to examine subgroups and interactions |
| (c) | Explain how missing data were addressed |
| (d) | If applicable, describe analytical methods taking account of sampling strategy |
| (e) | Describe any sensitivity analyses |
| **Results** | |
| 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed |
| (b) | Give reasons for non-participation at each stage |
| (c) | Consider use of a flow diagram |
| 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders |
| (b) | Indicate number of participants with missing data for each variable of interest |
| 15* | Report numbers of outcome events or summary measures |
| 16 | (a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included |
(b) Report category boundaries when continuous variables were categorized.

(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period.

| Other analyses | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | N/A |

**Discussion**

| Key results | Summarise key results with reference to study objectives | 6-13 |

| Limitations | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 14 |

| Interpretation | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 13-14 |

| Generalisability | Discuss the generalisability (external validity) of the study results | 14 |

**Other information**

| Funding | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 15 |

*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.