Prevalence of non-communicable diseases by age, gender and nationality in publicly funded primary care settings in Qatar

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ABSTRACT

Background In Qatar, as with other countries, non-communicable diseases (NCDs) have been the leading cause of death. This study aims to describe the prevalence of four NCD clusters (cardiovascular diseases (coronary heart disease, stroke and peripheral vascular disease), cancers, chronic obstructive pulmonary diseases (COPD) and type 2 diabetes (T2DM)) by age, gender and nationality (Qataris and non-Qataris) accessing publicly funded primary care services to inform healthcare planning and strategies.

Methods Cross-sectional study design was used. Data for individuals aged ≥18 and who visited a publicly funded primary health centre in Qatar during 2017 were extracted from electronic medical records and analysed.

Results The findings showed that approximately 16.2% of the study population (N = 68,421) had one or more of the four NCDs. The prevalence of NCDs showed an increasing trend with increasing age. Highest increases in the prevalence of NCDs were seen in a relatively young age group (30–49 years). The prevalence of all NCDs except cancers was higher in men. Prevalence rates of CHD and cancers in the study were found to be similar in both Qataris and non-Qataris; however, COPD and T2DM rates were higher in Qataris compared with non-Qataris. T2DM accounted for the highest prevalence of any NCD among both Qataris (230/1000) and non-Qataris (183/1000).

Conclusions Although not comprehensive and nationally representative, this study is suggestive of a higher prevalence of NCDs among a younger population, men and in Qatari, Western Asian, Southern Asian, Sub-Saharan Africans, South-Eastern Asians Northern African and Western European nationalities. Prevention, treatment and control of NCDs and their risk factors are a public health problem in Qatar, and resources need to be invested towards targeted interventions with a multisectoral approach.

INTRODUCTION

Non-communicable diseases (NCDs) are diseases or conditions which are non-transmissible and chronic in nature. The causes of NCDs are multifactorial; these diseases may arise from any combination of underlying, modifiable and non-modifiable risk factors. Research indicates that socio-economic, cultural, political and environmental determinants, including population ageing, globalisation, urbanisation and the accompanied nutrition transition, contribute to the increase in NCDs. Four common behavioural risk factors (poor diet, physical inactivity, tobacco use and excessive alcohol consumption) are associated with four disease clusters (cardiovascular diseases (coronary heart disease, stroke and peripheral vascular disease), cancers, chronic obstructive pulmonary diseases (COPD) and type 2 diabetes (T2DM)) that account for about 80% of deaths from NCDs.

The burden of NCDs is rising rapidly and has now become a major challenge to global development. This is despite the fact that NCDs are preventable through feasible and cost-effective public health interventions. Globally, NCDs are responsible for 40 million deaths each year, equivalent to 70% of all deaths. Eighty per cent of all NCD deaths (32 million) are caused by the four disease clusters (cardiovascular diseases, cancers, COPD and diabetes). Cardiovascular diseases accounts for the highest proportion of NCD deaths annually (17.7 million), followed by cancers (8.8 million), respiratory diseases (3.9 million) and diabetes (1.6 million).

In Qatar, as with other countries, NCDs have been the leading cause of death. In order to develop NCD-related action plans, policies and interventions, country-specific epidemiological information with regard to NCDs is essential. Studies such as the national STEP-wise survey have been conducted and provide valuable information, however, they include Qatari only. Given expatriates account for 88% of Qatar’s population, studies which also include them are required. This study aims to describe the prevalence of four NCDs clusters by age, gender and nationality (Qatari
and non-Qatari) accessing publicly funded primary care services to inform healthcare planning and strategies.

**METHODOLOGY**

**Study setting**
Qatar, a peninsular Arab country with a backed by the world’s third-largest natural gas and oil reserves, has been investing significantly in its healthcare system. This includes a universal publicly funded primary healthcare service delivered by the Primary Healthcare Corporation (PHCC). PHCC is the largest primary care provider in the country with publicly with 27 health centres (all accredited by Accreditation Canada International and distributed across three geographical regions).

**Study population and data collection**
The study population includes both Qatari and non-Qatari registered at a PHCC health centre, aged ≥18 and who visited a health centre between 1 January 2017 and 31 December 2017. Demographic and diagnosis data were extracted from the electronic medical records for the defined population.

**Data analysis**
All data were analysed using the ‘Statistical Package for the Social Sciences’ statistical software package. Basic descriptive statistics were used to analyse the population characteristics (age, gender and nationality; see online supplementary file for classification) and four NCDs clusters (cardiovascular diseases, chronic obstructive pulmonary disease, stroke and peripheral vascular disease), cancers, COPD and T2DM).

Crude prevalence rates for NCDs by age, gender and nationality were calculated. Age-adjusted prevalence rates were also calculated using the WHO World Standard Population (2000–2025) to allow comparisons.

**Ethical considerations**
The study presented a minimal risk of harm to its subjects, and the data collected for it were anonymised. None of the subjects’ personal information was available to the research team. Overall, the study was conducted with integrity according to generally accepted ethical principles and was approved by the PHCC’s independent ethics committee (PHCC/RS/18/02/003).

**RESULTS**

**Population characteristics**
The study found a total of 421,283 individuals accessed primary healthcare services in 2017 (table 1). Individuals in the 30–39 year age group accounted for approximately 33% of the population. 50.6% of the study population was women. 25.6% of the population was Qatari and 74.4% non-Qatari. The largest non-Qatari nationalities were represented by Southern Asian (30.4%), Northern African (17%) and Western Asian (13.6%). They accounted for 61% of the total study population.

**Prevalence of NCDs by age and gender**
Approximately 16% (N=68,421) of the total study population had one or more NCD. The overall age-adjusted prevalence of CHD, stroke, PVD, cancers, COPD and T2DM in the population was 16, 1, 0.3, 6.1, 3 and 201.4 per 1000 population, respectively (table 2). Increasing age-adjusted prevalence rates with increasing age are observed. Higher rates were seen in men compared with women for all NCDs except cancers.

**Prevalence of NCDs by nationality**
Age-adjusted prevalence rates for CHD, strokes and PVD were similar in Qataris (CHD=15.07/1000; strokes=1.3/1000; PVD=0.27) and non-Qatars (CHD=16.59/1000; strokes=0.91/1000; PVD=0.29) (table 3). Among non-Qatari, CHD was most common in Southern Asians (19.3/1000) and Western Asians (17.3/1000); strokes were most common in Sub-Saharan Africans (1.65/1000) and Western Asians (0.97/1000); and PVD was most common in South-Eastern Asians (0.54/1000) and Western Asians (0.41/1000).

Age-adjusted prevalence rates for cancers were similar between Qataris (6.37/1000) and non-Qatari (6.01/1000) (table 4). Among non-Qatari, cancers were most common in Australian and New Zealanders (15.09/1000) and Northern Europeans (9.88/1000).

Qatar has a slightly higher (3.95/1000) age-adjusted prevalence rate for COPD compared with non-Qatari (2.64/1000) (table 5). Western Europeans (8.01/1000) and Western Asians (3.09/1000) had the highest prevalence among non-Qatari.

T2DM was higher in Qataris (230.4/1000) compared with non-Qatari (188.3/1000) (table 6). Southern Asians (219/1000) and Northern Africans (184/1000) were found to have the highest prevalence among non-Qatari.

**DISCUSSION**

Globally, the prevalence of risk factors, morbidity and mortality associated with NCDs is on the rise. Prevalence of NCD-related risk factors in the Gulf Cooperation Council (GCC) states has been reported to be among the highest in the world. Therefore, in Qatar, a member of the GCC, epidemiological information to facilitate healthcare planning and strategies are much needed. This study is potentially the first comprehensive study describing the prevalence of NCDs which includes both Qatari and non-Qatari populations in publicly funded primary care settings. The study found 16.2% of the overall population in publicly funded primary care settings in Qatar had one or more NCD. This highlights the burden of NCDs in the country.

At ageing, many more people are exposed to the risk factors for long periods until the complications develop and they experience the clinical syndromes of NCDs. Similar increasing trends were seen in the prevalence of NCDs with age in this study. Highest increases in the prevalence of NCDs were seen in a relatively young age group.
| Nationality                      | 18–29 years | 30–39 years | 40–49 years | 50–59 years | ≥60 years | Total |
|---------------------------------|-------------|-------------|-------------|-------------|-----------|-------|
|                                 | Female      | Male        | Female      | Male        | Female    | Male   | %   |
| Qatar (total)                   |             |             |             |             |           |       |     |
| 18–29 years                     | 20 569      | 16 863      | 9 469       | 7 224       | 9 084     | 5 973  | 7 673 | 107 707 (25.6%) |
| 30–39 years                     | 14 049      | 12 863      | 10 707      | 7 724       | 8 004     | 7 724  | 7 724 | 107 707 (25.6%) |
| 40–49 years                     | 9 084       | 9315        | 3 300       | 2 339       | 2 500     | 3 300  | 3 300 | 107 707 (25.6%) |
| 50–59 years                     | 5 973       | 6 004       | 3 393       | 3 393       | 3 393     | 3 393  | 3 393 | 107 707 (25.6%) |
| 60–70 years                     | 7 673       | 8 004       | 4 573       | 4 573       | 4 573     | 4 573  | 4 573 | 107 707 (25.6%) |
| Total                           | 62 804      | 45 230      | 25 267      | 29 001      | 16 048    | 19 900 |       |             |

| Non-Qatari                      |             |             |             |             |           |       |     |
|                                 | Female      | Male        | Female      | Male        | Female    | Male   | %   |
| Northern Africa                 | 9 753       | 5 404       | 14 109      | 12 883      | 6 142     | 9 315  | 1 585 | 71 596 (17.0%) |
| Sub-Saharan Africa              | 2 185       | 778         | 2 860       | 1 227       | 9 42      | 7 57   | 1 54  | 9 796 (2.3%) |
| Latin America and the Caribbean | 39          | 20          | 96          | 37          | 55        | 35     | 16   | 383 (0.1%) |
| Northern America                | 308         | 161         | 284         | 157         | 302       | 277    | 1 26  | 2424 (0.6%) |
| Eastern and Central Asia        | 129         | 24          | 128         | 46          | 61        | 27     | 11   | 473 (0.11%) |
| South-Eastern Asia              | 5 605       | 443         | 14 975      | 1 368       | 8 846     | 1 056  | 487   | 39 353 (8.6%) |
| Southern Asia                   | 11 963      | 15 279      | 18 295      | 26 547      | 9 978     | 19 047 | 276 4 | 128 016 (30.4%) |
| Western Asia (excluding Qatar)  | 11 177      | 5 605       | 10 226      | 7 224       | 5 407     | 5 210  | 3 073 | 57 164 (13.6%) |
| Eastern Europe                  | 135         | 26          | 232         | 54          | 31        | 22     | 18   | 678 (0.2%) |
| Northern Europe                 | 263         | 94          | 457         | 220         | 364       | 206    | 1 102 | 2 360 (0.6%) |
| Southern Europe                 | 97          | 49          | 197         | 99          | 119       | 113    | 1 8  | 838 (0.2%) |
| Western Europe                  | 58          | 18          | 120         | 49          | 66        | 50     | 70   | 566 (0.1%) |
| Australasia                     | 44          | 21          | 51          | 31          | 31        | 31     | 12   | 389 (0.1%) |
| Non-Qatari (total)              | 42 233      | 28 366      | 62 447      | 50 376      | 36 054    | 23 026 | 13 804 | 313 564 (74.4%) |
| Unknown                         | 2           | 1           | 3           | 1           | 0         | 2      | 0    | 13 (0.0%) |
| Total All                       | 62 804      | 45 230      | 76 498      | 59 846      | 42 899    | 43 790 | 25 267 | 29 001 | 16 048 | 19 900 | 421 283 (100.0%) |
Table 2  Prevalence of four NCDs by age and gender in publicly funded primary health settings

| NCD                                      | 18–29 years | 30–39 years | 40–49 years | 50–59 years | ≥60 years | Total |
|------------------------------------------|-------------|-------------|-------------|-------------|-----------|-------|
| Cardiovascular disease                  |             |             |             |             |           |       |
| Coronary heart disease and its complications | 12          | 100         | 458         | 1144        | 2457      | 4171  |
| Crude rate (/1000)                      | 0.11        | 0.73        | 5.28        | 21.08       | 68.3      | 9.9   |
| Age-adjusted rate (/1000) Male          | 0.15        | 1.22        | 8.6         | 32.5        | 89.9      | 16    |
| Age-adjusted rate (/1000) Female        | 0.08        | 0.4         | 1.9         | 8           | 41.7      | 8.86  |
| Thrombotic/haemorrhagic stroke          |             |             |             |             |           |       |
| N                                        | 6           | 15          | 49          | 69          | 150       | 289   |
| Crude rate (/1000)                      | 0.06        | 0.11        | 0.6         | 1.27        | 4.2       | 0.69  |
| Age-adjusted rate (/1000) Male          | 0.1         | 0.2         | 0.7         | 1.9         | 5.1       | 1.4   |
| Age-adjusted rate (/1000) Female        | 0.1         | 0.1         | 0.4         | 0.6         | 3         | 0.7   |
| Peripheral vascular disease             |             |             |             |             |           |       |
| N                                        | 4           | 8           | 17          | 19          | 38        | 86    |
| Crude rate (/1000)                      | 0.01        | 0.1         | 0.2         | 0.4         | 1.1       | 0.2   |
| Age-adjusted rate (/1000) Male          | 0.1         | 0.1         | 0.3         | 0.5         | 1.5       | 0.4   |
| Age-adjusted rate (/1000) Female        | 0.1         | 0.2         | 0.2         | 0.5         | 0.5       | 0.1   |
| Cancers                                 |             |             |             |             |           |       |
| N                                        | 290         | 698         | 653         | 448         | 347       | 2436  |
| Crude rate (/1000)                      | 2.7         | 5.12        | 7.5         | 8.26        | 9.7       | 5.8   |
| Age-adjusted rate (/1000) Male          | 2           | 3.26        | 4           | 5.07        | 9.9       | 4.4   |
| Age-adjusted rate (/1000) Female        | 3.2         | 6.58        | 11.2        | 11.91       | 9.4       | 7.7   |
| Chronic obstructive airway disease      |             |             |             |             |           |       |
| N                                        | 37          | 78          | 145         | 192         | 418       | 870   |
| Crude rate (/1000)                      | 0.3         | 0.57        | 1.7         | 3.5         | 11.6      | 2     |
| Age-adjusted rate (/1000) Male          | 0.7         | 1           | 2.7         | 5.5         | 16.2      | 4.5   |
| Age-adjusted rate (/1000) Female        | 0.1         | 0.2         | 0.7         | 1.3         | 6         | 1.4   |

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| NCD                | Total | Male | Female | Male | Female | Male | Female | Male | Female |
|--------------------|-------|------|--------|------|--------|------|--------|------|--------|
| Type 2 diabetes mellitus | 1681  6996 | 15.6 | 51.3  | 11.2 | 38.8  | 16.6 | 66.8  | 20.8 | 40.7   |
| Age-adjusted rate (1000) |       |       |       |      |        |      |        |      |        |
| Male              | 16.6 | 66.8 | 20.8  | 40.7 |        |      |        |      |        |
| Female            | 15.6 | 51.3 | 11.2  | 38.8 |        |      |        |      |        |

*Table 2 Continued*

(30–49 years). These findings suggest the early onset of NCDs in the population that needs to be addressed.

Previous research has reported significant differences in health status and NCD prevalence between men and women. These can be attributed to the different levels of exposure and vulnerability to NCD risk factors. Research findings show women compared with men are more likely to report worse overall health globally. The findings of this study, however, found higher prevalence rates of NCDs (except cancers) in men compared with women. This can be attributed to a lower overall life expectancy in men in Qatar and their higher probability of dying between the ages of 15 and 60 years of age compared with women. These findings suggest that gender differences in Qatar may be different to other countries and together highlight gender inequalities which need to be studied further.

Prevalence rates of CHD and cancers in the study were found to be similar in both Qatars and non-Qatars; however, COPD and T2DM rates were higher in Qatars compared with non-Qatars. In terms of non-Qatars by region, 7 of the 14 regional populations accounted for a majority of the NCDs. Qatars, North Americans, Australian and New Zealanders, Western Asian, Southern Asian, Northern African and Northern Europeans. T2DM accounted for the highest prevalence of any NCD among both Qatars (230/1000) and non-Qatars (183/1000). These findings are similar to those from other countries with a large number of migrants, for example, there is evidence from the UK suggesting differences in NCDs based on an individual’s country of birth and ethnicity.

Metabolic syndrome (MS) defined a combination of individual modifiable risk factors (abdominal obesity, raised blood pressure, raised fasting blood glucose, raised triglycerides and reduced high-density lipoprotein cholesterol) that are associated with NCDs. In a previous study from Qatar, the prevalence of MS was found to be 28% among Qatars. The study also reported the prevalence of MS to significantly increase with age and higher in Qatari men compared with women. These findings are in line with the findings of this study as the prevalence of NCD is attributable to the prevalence of MS. They suggest a need for a focused approach to addressing modifiable risk factors to reduce NCD prevalence in Qatar.

There are evidence that show NCD-related healthcare interventions are cost-effective if provided early compared with costly procedures at advanced stages of diseases. Based on the observations of this study, any preventive strategies will require identifying socio-demographic and environmental correlates (particularly those influencing men and specific nationalities) and addressing risk factors. Primary care is for most patients the gateway to the healthcare system, yet in resource-limited settings, most primary healthcare is focused on acute episodic care and chronic disease is often deferred to specialist care delivered at secondary and tertiary centres. The findings of the study call for improvement and greater investment in the prevention and control of NCDs.
### Table 3  Prevalence of cardiovascular disease by nationality in publicly funded primary health settings

| NCD                                      | Nationality     | 18–29 years | 30–39 years | 40–49 years | 50–59 years | ≥60 years | N   | Crude rate (/1000) | Age-adjusted rate (/1000) |
|-------------------------------------------|-----------------|-------------|-------------|-------------|-------------|-----------|-----|-------------------|----------------------------|
| Cardiovascular disease                    | Qatari          | 0.16        | 0.68        | 4.96        | 18.33       | 65.15     | 1284 | 11.92             | 15.07                      |
|                                          | Northern Africa | 0.2         | 1           | 5.37        | 22.57       | 55.72     | 590  | 8.24              | 14.19                      |
|                                          | Sub-Saharan Africa | 0          | 0.24        | 2.35        | 5.98        | 44.97     | 26   | 2.65              | 9.16                       |
|                                          | Latin America and the Caribbean | 0         | 0           | 0           | 0           | 66.67     | 2   | 5.22              | 11.59                      |
|                                          | Northern America | 0          | 0           | 6.91        | 18.71       | 69.16     | 39   | 16.09             | 15.99                      |
|                                          | Eastern and Central Asia | 0       | 0           | 11.36       | (0)         | (47.82)   | 2   | 4.23              | (10.37)                    |
|                                          | South-Eastern Asia | 0       | 0.24        | 2.22        | 4.41        | 24.43     | 57   | 1.57              | 5.35                       |
|                                          | Southern Asia | 0.04        | 0.94        | 6.61        | 26.63       | 81.05     | 1447 | 11.3              | 19.35                      |
|                                          | Western Asia (excluding Qatar) | 0.11    | 0.55        | 5.77        | 22.56       | 74.28     | 700  | 11.73             | 17.37                      |
|                                          | Eastern Europe | 0          | 0           | 0           | 0           | (105.26)  | 4   | 5.9               | (18.29)                    |
|                                          | Northern Europe | 0          | 0           | 1.46        | 6.77        | 15.08     | 7    | 2.97              | 3.87                       |
|                                          | Southern Europe | 0          | 0           | 0           | 8.47        | (46.51)   | 3   | 3.58              | (9.3)                      |
|                                          | Western Europe | 0          | 0           | 5.68        | 0           | (88.89)   | 5   | 8.73              | (16.49)                    |
|                                          | Australasia | 0          | 0           | 0           | 28.3        | (46.51)   | 5   | 12.85             | (12.16)                    |
| Non-Qatari (total)                        | Qatari          | 0.08        | 0.74        | 5.37        | 22.14       | 70.34     | 2887 | 9.21              | 16.59                      |
|                                          | Northern Africa | 0.05        | 0.13        | 0.73        | 1.26        | 5.45      | 112  | 1.04              | 1.3                        |
|                                          | Sub-Saharan Africa | 0        | 0.24        | 1.18        | 0           | 7.94      | 6    | 0.61              | 1.65                       |
|                                          | Latin America and the Caribbean | 0         | 0           | 0           | 0           | (0)       | 0   | 0                 | (0)                        |
|                                          | Northern America | 0          | 0           | 0           | 0           | 0         | 0    | 0                 | 0                          |
|                                          | Eastern and Central Asia | 0       | 0           | 0           | (0)         | (0)       | 0   | 0                 | (0)                        |
|                                          | South-Eastern Asia | 0       | 0           | 0.61        | 0.29        | 1.53      | 8    | 0.22              | 0.42                       |
|                                          | Southern Asia | 0.11        | 0.16        | 0.41        | 1.74        | 3.4       | 84   | 0.66              | 0.98                       |
|                                          | Western Asia (excluding Qatar) | 0.06    | 0.05        | 0.47        | 1.2         | 3.9       | 40   | 0.67              | 0.97                       |
|                                          | Eastern Europe | 0          | 0           | 0           | 0           | (0)       | 0   | 0                 | (0)                        |
|                                          | Northern Europe | 0          | 0           | 2.26        | 0           | 1         | 1    | 0.42              | 0.33                       |
|                                          | Southern Europe | 0          | 0           | 0           | 0           | (0)       | 0   | 0                 | (0)                        |
|                                          | Western Europe | 0          | 0           | 0           | 0           | (0)       | 0   | 0                 | (0)                        |
|                                          | Australasia | 0          | 0           | 0           | 0           | (0)       | 0   | 0                 | (0)                        |
| Non-Qatari (total)                        | 0.06           | 0.11        | 0.52        | 1.28        | 3.38        | 177       | 0.56 | 0.91              |                             |
### Table 3 Continued

| NCD                          | Nationality                  | 18–29 years | 30–39 years | 40–49 years | 50–59 years | ≥60 years | N  | Crude rate (/1000) | Age-adjusted rate (/1000) * |
|------------------------------|------------------------------|-------------|-------------|-------------|-------------|-----------|----|-------------------|-----------------------------|
| Peripheral vascular disease  | Qatari                       | 0.05        | 0.04        | 0.11        | 0.27        | 1.09      | 24 | 0.22              | 0.27                        |
|                              | Non-Qatari                   | 0.07        | 0.19        | 0.39        | 0.66        | 0.21      | 19 | 0.27              | 0.27                        |
|                              | Sub-Saharan Africa           | 0           | 0           | 0           | 0           | 0         | 0  | 0                 | 0                           |
|                              | Latin America and the Caribbean | 0           | 0           | 0           | 0           | (0)       | 0  | 0                 | (0)                         |
|                              | Northern America             | 0           | 0           | 0           | 1.7         | 0         | 1  | 0.41              | 0.25                        |
|                              | Eastern and Central Asia     | 0           | 0           | 0           | (0)         | (0)       | 0  | 0                 | (0)                         |
|                              | South-Eastern Asia           | 0           | 0.06        | 0           | 0           | 3.05      | 3  | 0.08              | 0.54                        |
|                              | Southern Asia                | 0           | 0           | 0.24        | 0.39        | 0.88      | 22 | 0.17              | 0.25                        |
|                              | Western Asia (excluding Qatar) | 0.06        | 0.05        | 0.19        | 0.15        | 1.87      | 17 | 0.28              | 0.41                        |
|                              | Eastern Europe               | 0           | 0           | 0           | 0           | (0)       | 0  | 0                 | (0)                         |
|                              | Northern Europe              | 0           | 0           | 0           | 0           | 0         | 0  | 0                 | 0                           |
|                              | Southern Europe              | 0           | 0           | 0           | 0           | (0)       | 0  | 0                 | (0)                         |
|                              | Western Europe               | 0           | 0           | 0           | 0           | (0)       | 0  | 0                 | (0)                         |
|                              | Australasia                  | 0           | 0           | 0           | 0           | (0)       | 0  | 0                 | (0)                         |
| Non-Qatari (total)           |                              | 0.03        | 0.06        | 0.22        | 0.38        | 1.04      | 62 | 0.2               | 0.29                        |

*Figures (rates) enclosed within parentheses were based (or one of its components) on <50 unweighted observations.
Table 4  Prevalence of cancer by nationality in publicly funded primary health settings

| NCD                  | Nationality          | 18–29 years | 30–39 years | 40–49 years | 50–59 years | ≥60 years | N   | Crude rate (/1000) | Age-adjusted rate (/1000) |
|----------------------|----------------------|-------------|-------------|-------------|-------------|-----------|-----|--------------------|---------------------------|
| Cancer               | Qatari               | 2.19        | 4.34        | 8.53        | 10.76       | 9.8       | 634 | 5.89               | 6.37                      |
|                      | Non-Qatari           | 3.17        | 6.78        | 9.7         | 8.88        | 9.66      | 509 | 7.11               | 7.09                      |
|                      | Northern Africa      | 3.37        | 9.05        | 11.77       | 7.47        | 18.52     | 79  | 8.06               | 9.36                      |
|                      | Sub-Saharan Africa   | 0           | 15.04       | 11.11       | 0           | (0)       | 3   | 7.83               | (5.27)                    |
|                      | Latin America and the Caribbean | 2.13 | 9.07 | 13.82 | 18.71 | 11.53 | 28 | 11.55 | 9.79 |
|                      | Northern America     | 6.54        | 0           | 0           | 0           | (0)       | 1   | 2.11               | (1.86)                    |
|                      | Eastern and Central Asia | 3.31 | 5.02 | 7.37 | 7.05 | 7.63 | 204 | 5.61 | 5.72 |
|                      | South-Eastern Asia   | 2.83        | 3.5         | 4.93        | 5.17        | 7.03      | 533 | 4.16               | 4.43                      |
|                      | Southern Asia        | 2.77        | 6.39        | 8.51        | 9.56        | 12.33     | 399 | 6.68               | 7.24                      |
|                      | Western Asia (excluding Qatar) | 0 | 10.49 | 7.14 | 18.87 | (0) | 5 | 7.37 | (6.28) |
|                      | Eastern Europe       | 5.6         | 10.34       | 11.7        | 9.03        | 15.08     | 24  | 10.17              | 9.88                      |
|                      | Northern Europe      | 0           | 3.38        | 17.02       | 25.42       | (0)       | 8   | 9.55               | (7.52)                    |
|                      | Southern Europe      | 0           | 5.92        | 5.68        | 10         | (22.22)   | 4   | 7.07               | (7.61)                    |
|                      | Western Europe       | 0           | 24.39       | 9.71        | 0           | (46.51)   | 5   | 12.85              | (15.09)                   |
|                      | Australasia          | 0           | 2.11        | 1.86        | 0           | 0         | 0   | 1.47               | (0.75)                    |
|                      | Eastern Europe       | 0           | 3.5         | 0           | 0           | (0)       | 1   | 1.69               | 2.29                      |
|                      | Northern Europe      | 0           | 0           | 2.92        | 0           | 10.05     | 4   | 1.69               | 2.29                      |
|                      | Southern Europe      | 0           | 0           | 0           | (23.26)     | 1         | 1.19 | (4.04)             |
|                      | Western Europe       | 0           | 5.92        | 0           | 20         | (22.22)   | 4   | 7.07               | (8.01)                    |
|                      | Australasia          | 0           | 0           | 0           | (0)        | 0         | 0   | 1.47               | (0.75)                    |
|                      | Non-Qatari (total)   | 2.95        | 5.28        | 7.27        | 7.29        | 9.56      | 1802 | 5.75               | 6.01                      |

Figures (rates) enclosed within parentheses were based (or one of its components) on <50 unweighted observations.

*Geographic regions as defined by the United Nations (see https://unstats.un.org/unsd/methodology/m49/).

Table 5  Prevalence of chronic obstructive airway disease by nationality in publicly funded primary health settings

| NCD                              | Nationality          | 18–29 years | 30–39 years | 40–49 years | 50–59 years | ≥60 years | N   | Crude rate (/1000) | Age-adjusted rate (/1000) * |
|----------------------------------|----------------------|-------------|-------------|-------------|-------------|-----------|-----|--------------------|---------------------------|
| Chronic obstructive airway disease | Qatari               | 0.59        | 0.77        | 3.07        | 4.25        | 14.09     | 353 | 3.28               | 3.96                      |
|                                  | Non-Qatari           | 0.26        | 0.67        | 1.75        | 2.85        | 9.25      | 120 | 1.68               | 2.55                      |
|                                  | Northern Africa      | 0           | 0.24        | 0.59        | 0           | 13.23     | 7   | 0.71               | 2.46                      |
|                                  | Sub-Saharan Africa   | 0           | 0           | 0           | 0           | (0)       | 0   | 0                  | (0)                       |
|                                  | Latin America and the Caribbean | 0 | 0 | 0 | 0 | (0) | 0 | 0 | (0) |
|                                  | Northern America     | 0           | 0           | 3.45        | 0           | 17.29     | 8   | 3.3                | 3.64                      |
|                                  | Eastern and Central Asia | 0 | 0 | 0 | 0 | (0) | 0 | 0 | (0) |
|                                  | South-Eastern Asia   | 0.17        | 0.37        | 0.1         | 0.88        | 3.05      | 13  | 0.36               | 0.81                      |
|                                  | Southern Asia        | 0.15        | 0.49        | 1.14        | 3.76        | 8.13      | 200 | 1.56               | 2.31                      |
|                                  | Western Asia (excluding Qatar) | 0.34 | 0.6 | 2.27 | 4.48 | 13.73 | 159 | 2.66 | 3.69 |
|                                  | Eastern Europe       | 0           | 3.5         | 0           | 0           | (0)       | 1   | 1.47               | (0.75)                    |
|                                  | Northern Europe      | 0           | 0           | 2.92        | 0           | 10.05     | 4   | 1.69               | 2.29                      |
|                                  | Southern Europe      | 0           | 0           | 0           | 0           | (23.26)   | 1   | 1.19               | (4.04)                    |
|                                  | Western Europe       | 0           | 5.92        | 0           | 20         | (22.22)   | 4   | 7.07               | (8.01)                    |
|                                  | Australasia          | 0           | 0           | 0           | 0           | (0)       | 0   | 1.47               | (0.75)                    |
|                                  | Non-Qatari (total)   | 0.21        | 0.53        | 1.31        | 3.26        | 10.1      | 517 | 1.65               | 2.64                      |

*Figures (rates) enclosed within parentheses were based (or one of its components) on <50 unweighted observations.
of NCDs, in particular T2DM, by primary health institutions in Qatar. It must also be noted that appropriately qualified and trained public health professionals to have the appropriate expertise and skills to take the responsibility of planning and providing preventive interventions for NCD patients. Therefore, more investment in such professionals to manage the NCD epidemic in Qatar’s primary healthcare system is necessary.

The study has a number of strengths and limitations. Strengths include an up-to-date prevalence of NCDs in primary care in Qatar. This provides a baseline for future longitudinal studies to monitor NCDs and risk factors as well as in health planning and future strategies. The limitations are as follows: First, this was a cross-sectional study and provides a snapshot of the burden at a particular moment in time. Second, the study included only patients who were ≥18 years and those who attended a PHCC health centres in 2017; therefore, it is not comprehensive and nationally representative.

CONCLUSIONS

Although not comprehensive and nationally representative, this study is suggestive of a higher prevalence of NCDs among a younger population, men and in Qatari, Western Asian, Southern Asian, Sub-Saharan Africans, South-Eastern Asians Northern African and Western European nationalities. Prevention, treatment and control of NCDs and their risk factors is a public health problem in Qatar, and resources need to be invested towards targeted interventions with a multisectoral approach.

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**Table 6** Prevalence of type 2 diabetes mellitus by nationality in publicly funded primary health settings

| NCD                      | Nationality   | 18–29 years | 30–39 years | 40–49 years | 50–59 years | ≥60 years | N   | Crude rate (/1000) | Age-adjusted rate (/1000) |
|--------------------------|---------------|-------------|-------------|-------------|-------------|-----------|-----|-------------------|--------------------------|
| Type 2 diabetes mellitus | Qatari        | 22.52       | 68.03       | 198.2       | 424.92      | 642.97    | 21 248 | 197.28            | 230.4                    |
|                          | Non-Qatari    | 14.18       | 53.72       | 170.67      | 359.96      | 495.68    | 9999 | 139.66            | 184.95                   |
|                          |               | 7.76        | 27.99       | 123.01      | 252.62      | 388.89    | 662  | 67.58             | 134.78                   |
|                          |               | 0           | 15.04       | 55.56       | 112.68      | 200       | 21   | 54.83             | (64.44)                  |
|                          |               | 8.53        | 13.61       | 72.54       | 207.48      | 340.06    | 292  | 120.46            | 107.68                   |
|                          |               | 0           | 17.24       | 34.09       | (108.11)    | (95.24)   | 12   | 25.37             | (42.1)                   |
|                          |               | 5.95        | 17.44       | 68.98       | 208.52      | 354.2     | 1946 | 53.53             | 109.72                   |
|                          |               | 10.76       | 61.75       | 211.02      | 434.19      | 587.2     | 22 263 | 173.91            | 219.72                   |
|                          |               | 14.62       | 40.82       | 144.17      | 329.8       | 526.69    | 8113 | 135.92            | 178.48                   |
|                          |               | 11.87       | 47.83       | 164.17      | 365.48      | 528.39    | 43 570 | 138.95            | 188.3                    |

*Figures (rates) enclosed within parentheses were based (or one of its components) on <50 unweighted observations.
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