

Prevalence and sociodemographic determinants of selected noncommunicable diseases among the general population of Cyprus: A large population-based cross-sectional study

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Abstract

Background: Noncommunicable diseases (NCDs) are the leading cause of morbidity and mortality worldwide. The aim of this study was to determine the prevalence of NCDs among the population of Cyprus and to identify the distribution of the socioeconomic and demographic determinants among individuals with the most frequent NCDs.

Methods: A cross-sectional study was conducted using stratified sampling. Socioeconomic and demographic characteristics and the presence of NCDs were collected through a standardized questionnaire. The diseases were classified using the 10th revision of the International Classification of Diseases (ICD-10).

Results: In total, 1140 individuals participated in the study, among whom 590 (51.7%) had at least one chronic disease. The most prevalent NCDs were hyperlipidemia (17.4%), hypertension (12.9%), and thyroid diseases (8.4%). We identified more males than females with hyperlipidemia aged 25–44 years old and >65 years old ($p = 0.024$), more males compared to females with hypertension ($p = 0.001$) and more females compared to males with thyroid diseases ($p < 0.001$). Individuals with hypertension and hyperlipidemia were more likely to be married, to have completed a higher education, and to have a high annual income.

Discussion: In Cyprus, the majority of the general population had at least one NCD. Hyperlipidemia, hypertension, and thyroid disease are relatively common, even at younger ages, highlighting the need for the development of public health programs aimed at addressing and preventing NCDs.

KEYWORDS

chronic diseases, hyperlipidemia, hypertension, noncommunicable diseases, prevalence

Key points

- There were 1140 people in total who took part in the study, with 51.7% having at least one noncommunicable disease (NCD).
- Hyperlipidemia, hypertension, and thyroid diseases were the most common NCDs among the population of Cyprus.

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- Hypertension affects more men than women, and thyroid disorders affect more women than men.
- Those who had hypertension and hyperlipidemia were more likely to be married, have a higher education, and have a high annual income.

1 | INTRODUCTION

According to the World Health Organization (WHO), noncommunicable diseases (NCDs), often known as chronic diseases, are diseases that have a lengthy duration and are caused by a combination of genetic, physiological, environmental, and behavioral factors.¹ NCDs are a major cause of morbidity and mortality worldwide.² Many deaths worldwide are caused by the most common NCDs, such as cardiovascular diseases, cancer, respiratory disorders, and diabetes.^{1,3-5} NCDs were responsible for more than half of all fatalities globally in 2005,³ and almost 72% of the total global deaths in 2015² while the corresponding figure in 2021 was 71%.¹ Approximately 75% of all NCD-related deaths occur in low- or middle-income countries, as well as among people under the age of 70.²

Several NCDs are related to aging.⁶⁻⁸ Globally, a greater average life expectancy is connected with a higher frequency of NCDs.⁸⁻¹⁰ According to the WHO, life expectancy has increased from 66.8 years in 2000 to 73.4 years in 2019.¹¹ Furthermore, according to the most recent WHO data, Cyprus's life expectancy was 78.75 years in 2000 (80.99 years for women and 76.53 years for men), 81.02 years in 2010 (83.10 years for women and 78.93 years for men), 82.01 years in 2015 (84.12 years for women and 79.89 years for men), and 83.14 years in 2019 (85.12 years for women and 81.12 years for men).¹² Of interest, a recent study predicted that life expectancy in Cyprus will rise to 84 years for men and 87 years for women in 2050, and 90 and 94 years for men and women in 2100, respectively.¹³ Due to population growth and aging of the population, the number of years living with disability due to various chronic conditions, such as angina, arthritis, asthma, chronic back pain, diabetes, oral diseases, hearing problems, and visual impairments, is also rising.^{8,10} Undoubtedly, from a public health perspective, population aging brings a range of challenges to public health systems, since the prevalence of NCDs rises with age, with the prevalence of NCDs predicted to rise even more in the future.^{14,15}

NCDs are a major public health concern with serious adverse consequences to economies and societies.¹⁶ NCDs account for the vast bulk of health-care costs in developed countries.¹⁷⁻²⁰ Previous studies found many socioeconomic differences in morbidity and mortality rates as well as in the prevalence of NCDs in developed countries.²¹⁻²⁵ The European Social Survey (2014), which used data from 20 countries, found a social

gradient in health in 10 NCDs, including diabetes, heart/circulation problems, high blood pressure, and cancer.²⁶

Furthermore, people with lower socioeconomic status had worse health than people with higher socioeconomic status.²⁷ As of 2020, Cyprus has implemented a new general healthcare system,^{22,28} where all citizens have access to primary and secondary health-care services, either for free or at a low cost, while each physician of a public or private hospital or health center has access to a patient's medical history. However, there is a scarcity of epidemiological data on the prevalence of several NCDs in Cyprus. As a result, the goal of this large-scale population-based study was to determine the prevalence of NCDs in Cyprus's general population and to identify the distribution of socioeconomic and demographic determinants in individuals with the most common NCDs.

2 | METHODS

2.1 | Study design

This was a cross-sectional study.

2.2 | Sampling and procedure

The study's population included both males and females over the age of 18 who lived in the Republic of Cyprus's five government-controlled municipalities. Individuals who were institutionalized or in nursing homes were not eligible. From May 2018 to June 2019, eligible participants were recruited. To ensure that the study sample was representative of the Cypriot population in three key demographic characteristics, stratified sampling was used. We used the most recent census data (2011) to divide the referent population into five municipalities in Cyprus. The population was then stratified by the type of residence (urban and rural, as defined by the National Bureau of Statistics), gender (male and female), and age group (18-24, 25-44, 45-64, more than 65 years old). Face-to-face interviews were conducted by trained investigators. The trained researchers approached the individuals in public places such as kiosks, supermarkets, malls, restaurants, village squares, public services, and universities, as well as knocking on people's doors at their homes. The final sample was representative of the general population of Cyprus in terms of region, age, and gender (all *p* values > 0.05).

[Nicosia (43%), Limassol (27%), Larnaca (15%), Paphos (10%), and Ammochostos (5%)].

2.3 | Participants' characteristics

For data collection, a standardized questionnaire was used. The questionnaire included sections on socio-demographic characteristics and medical history.

2.3.1 | Sociodemographic characteristics

The age was given in years, and the gender was recorded as male or female. According to the age categorization of the Statistical Service of Cyprus, age was classified into four categories (18–24, 25–44, 45–64, and 65+ years old).²⁹ Residency was classified as either urban or rural, whilst marital status was recorded as married, unmarried, and divorced/widowed. The educational level was classified as follows: primary education (participants who completed only primary school—7 years of schooling); secondary education (participants who completed middle or high school—7–12 years of schooling); and higher education (participants who have a university degree—>12 years of schooling).³⁰ Using the annual income calculator, the annual income was classified as low (≤ 6500 euros per year), medium (6500–19,500 euros per year), and high ($\geq 19,500$ euros per year).

2.3.2 | Participants' medical history

The questionnaire's medical history section included 47 NCDs of all human systems coded according to the International Classification of Diseases (ICD-10) and the option other (Supporting Information File 1). This section was completed by the researchers upon asking "Have you ever been diagnosed by a physician with any of the following non-communicable diseases? Select all that apply".

2.4 | Statistical analysis

The Shapiro–Wilk normality test was used to examine the distribution of continuous variables. The mean and standard deviation of continuous variables with normal distributions were presented (SD). Absolute (n) and relative (%) frequency were used to represent categorical variables. To assess any relationship between NCDs and gender or age groups, the χ^2 test of independence was used. We used Fisher's exact test of independence if the expected number was less than 5. Logistic regression analysis was used to examine the association between sociodemographic and the presence of NCDs. All the statistical tests were two-sided, with a statistical

significance level of $\alpha = 0.05$. STATA 14.0 was used for statistical analysis (Stata Corp.).

3 | RESULTS

3.1 | Participants' characteristics

There were a total of 1140 individuals who participated in the study, among whom 590 (51.7%) had at least one NCD. The mean age of the respondents overall was 40.8 years old (SD = 16.9 years old) while the mean age of the individuals with at least one NCD was 47.5 years old (SD = 17.5 years old) (Table 1). Among the total sample, 14.7% ($n = 167$) were between the ages of 18 and 24, 46.0% ($n = 524$) were 25–44 years old, 27.5% ($n = 314$) were 45–64 years old, and 11.8% ($n = 135$) were more than 65 years old. Among those with at least one NCD, 7.6% ($n = 45$) were 18–24 years old, 36.1% ($n = 213$) were 25–44 years old, 35.6% ($n = 210$) were 45–64 years old, and 20.7% ($n = 122$) were more than 65 years old.

The majority of participants ($n = 642$, 56.4%) were female, residents of Nicosia ($n = 493$, 43.3%) and urban areas ($n = 864$, 76.7%), married ($n = 616$, 54.4%), had a higher education ($n = 729$, 64.4%), and had an annual income ranging from €6,500 to €19,500 ($n = 562$, 49.7%). Similarly, among the respondents with at least a NCD, the majority of the participants were females ($n = 344$, 58.3%), residents of Nicosia ($n = 261$, 44.2%) of urban regions ($n = 457$, 77.7%), married ($n = 373$, 63.8%), had completed a higher education ($n = 338$, 57.8%) and had an annual income from €6,500 to €19,500 ($n = 273$, 46.6%) (Table 1).

3.2 | Characteristic differences among individuals with at least a chronic disease

The number of NCDs increased significantly with age ($p < 0.001$) (Table 1). Specifically, individuals with at least 5 NCDs were significantly older (mean = 63.4 years old, SD = 14.6) than individuals with four NCDs (mean = 53.8 years old, SD = 19.5), three (mean = 53.7 years old, SD = 17.3), two (mean = 48.8 years old, SD = 17.6) or one (mean = 42.2 years old, SD = 15.3) NCDs. In addition, those aged 18–24 ($n = 32$, 71.1%), 25–44 ($n = 129$, 60.6%) and 45–64 ($n = 107$, 51.0%) years old had one NCD while 25.4% of the individuals greater than 65 years of age had two NCDs ($p < 0.001$).

We found a statistically significant association of being males or females with the number of NCDs ($p = 0.008$). More than half of the males ($n = 134$, 54.5%) had one NCD, and nearly 24% ($n = 58$) had two, while females had 47.4% ($n = 163$) and 20.6% ($n = 71$). We also reported statistically significant differences in marital status ($p < 0.001$) and education level ($p < 0.001$) categories and the number of NCDs per individual. In

TABLE 1 Demographics characteristics overall, and by number of diseases categories.

Characteristics	Overall (<i>n</i> = 1140)	At least a chronic disease (<i>n</i> = 590)	Number of chronic diseases					<i>p</i> Value
			1(<i>n</i> = 297)	2(<i>n</i> = 129)	3(<i>n</i> = 70)	4(<i>n</i> = 53)	≥5(<i>n</i> = 41)	
Mean age, mean ± SD	40.8 ± 16.9	47.5 ± 17.5	42.2 ± 15.3	48.8 ± 17.6	53.7 ± 17.3	53.8 ± 19.5	63.4 ± 14.6	<0.001 ^a
<i>Age group</i>								
18–24 years	167 (14.7)	45 (7.6)	32 (71.1)	7 (15.6)	2 (4.4)	4 (8.9)	0	<0.001 ^b
25–44 years	524 (46.0)	213 (36.1)	129 (60.6)	47 (22.1)	18 (8.4)	15 (7.0)	4 (1.9)	
45–64 years	314 (27.5)	210 (35.6)	107 (51.0)	44 (21.0)	30 (14.3)	15 (7.1)	14 (6.6)	
65+ years	135 (11.8)	122 (20.7)	29 (23.8)	31 (25.4)	20 (16.4)	19 (15.6)	23 (18.8)	
<i>Sex</i>								
Men	497 (43.6)	246 (41.7)	134 (54.5)	58 (23.6)	22 (8.9)	12 (4.9)	20 (8.1)	0.008^b
Women	642 (56.4)	344 (58.3)	163 (47.4)	71 (20.6)	48 (14.0)	41 (11.9)	21 (6.1)	
<i>Geographical area</i>								
Nicosia	493 (43.3)	261 (44.2)	130 (49.8)	56 (21.5)	31 (11.9)	28 (10.7)	16 (6.1)	0.064 ^b
Limassol	311 (27.3)	175 (29.7)	86 (49.1)	36 (20.6)	23 (13.1)	11 (6.3)	19 (10.9)	
Larnaca	171 (15.0)	78 (13.2)	42 (53.8)	18 (23.1)	11 (14.1)	6 (7.7)	1 (1.3)	
Paphos	113 (9.9)	52 (8.8)	30 (57.8)	15 (28.8)	2 (3.8)	2 (3.8)	3 (5.8)	
Ammochostos	50 (4.5)	24 (4.1)	9 (37.5)	4 (16.7)	3 (12.5)	6 (25.0)	2 (83.3)	
<i>Residency</i>								
Urban	864 (76.7)	457 (77.7)	229 (50.0)	105 (23.0)	57 (12.5)	35 (7.7)	31 (6.8)	0.293 ^b
Rural	269 (23.7)	131 (22.3)	67 (51.2)	24 (18.3)	13 (9.9)	17 (13.0)	10 (7.6)	
<i>Marital status</i>								
Married	616 (54.4)	373 (63.8)	179 (48.0)	85 (22.8)	54 (14.4)	32 (8.6)	23 (6.2)	<0.001 ^b
Unmarried	421 (37.2)	148 (25.3)	98 (66.2)	28 (18.9)	6 (4.1)	12 (8.1)	4 (2.7)	
Divorced/widowed	96 (8.4)	64 (10.9)	18 (28.1)	15 (23.5)	10 (15.6)	8 (12.5)	13 (20.3)	
<i>Educational level</i>								
Primary education	66 (5.8)	58 (9.9)	10 (17.2)	12 (20.7)	10 (17.2)	11 (19.0)	15 (25.9)	<0.001 ^b
Secondary education	338 (29.8)	189 (32.3)	102 (54.0)	45 (23.8)	21 (11.1)	14 (7.4)	7 (3.7)	
Higher education	729 (64.4)	338 (57.8)	181 (53.5)	71 (21.0)	39 (11.5)	28 (8.3)	19 (5.7)	
<i>Annual income</i>								
Low (≤€6,500)	241 (21.3)	110 (18.8)	57 (51.8)	18 (16.4)	15 (13.6)	12 (10.9)	8 (7.3)	0.459 ^b
Middle (€6500–19,500)	562 (49.7)	273 (46.6)	129 (47.3)	73 (26.7)	30 (11.0)	24 (8.8)	17 (6.2)	
High (≥€19,501)	328 (29.0)	203 (34.6)	108 (53.2)	38 (18.7)	24 (11.8)	17 (8.4)	16 (7.9)	

Note: Data are presented as *n* (%). Bold values indicate statistically significant associations ($p < 0.05$).

Abbreviation: SD, standard deviation.

^aDifferences between the number of diseases were tested using ANOVA test.

^bDifferences between the number of diseases were tested using χ^2 test.

particular, 48.0% ($n = 179$) of married participants had one NCD and 6.2% ($n = 23$) had more than 5 NCDs, whereas divorced/widowed participants had 28.1% ($n = 18$) and 20.3% ($n = 13$) ($p < 0.001$). Furthermore, the majority of those who completed only primary education had more than 5 NCDs ($n = 15$, 25.9%) while

most of those who completed a secondary ($n = 102$, 54.0%) or a higher education ($n = 181$, 53.5%) had one NCD ($p < 0.001$). We did not find statistically significant differences for the number of NCDs among the geographical areas ($p = 0.064$), residency ($p = 0.293$) and the annual income ($p = 0.459$) (Table 1).

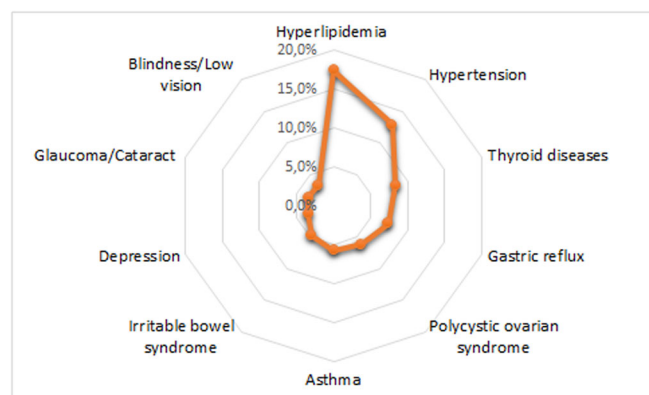


FIGURE 1 Distribution of noncommunicable diseases among the population of Cyprus.

3.3 | Prevalent NCDs

The most common NCDs were hyperlipidemia (17.4%), hypertension (12.9%), thyroid diseases (8.4%), gastric reflux (7.4%), polycystic ovarian syndrome (6.1%), asthma (5.7%), irritable bowel syndrome (4.8%), depression (3.4%), glaucoma/cataract (3.4%), and blindness/low vision (3.3%) (Figure 1). The prevalence of all NCDs included in the study is presented in Table 2 and Supporting Information: Table 1.

We reported a larger number of males than females with hyperlipidemia who were 25–44 years old ($n = 26$, 59.1% vs. $n = 18$, 40.9%) and more than 65 years old ($n = 35$, 56.5% vs. $n = 27$, 43.5%) ($p = 0.024$). On the other hand, we found that there were more females than males with hyperlipidemia aged 45–64 years old ($n = 50$, 57.5% vs. $n = 37$, 42.5%). We also found a larger percentage of males ($n = 83$, 56.5%) compared with females ($n = 64$, 43.5%) with hypertension ($p = 0.001$) (Table 2). In contrast, we reported a larger percentage of females ($n = 79$, 82.3%) compared to males ($n = 17$, 17.7%) with thyroid diseases. Moreover, we observed more females than males with irritable bowel syndrome ($n = 47$, 85.5% vs. $n = 8$, 14.5%) ($p < 0.001$) and depression ($n = 29$, 74.4% vs. $n = 10$, 25.6%) ($p = 0.021$). We also noted a larger prevalence of glaucoma/cataract among males ($n = 24$, 61.5%) compared to females ($n = 15$, 38.5%) ($p = 0.022$). The largest differences between males and females with blindness/low vision among the age groups of the study were identified among those aged 25–44 years old ($n = 9$, 90.0% vs. $n = 1$, 10.0%) ($p = 0.024$). More information about the prevalence of NCDs among the study participants overall, by gender and by age group are presented in Table 2.

We found that the majority of the individuals with hyperlipidemia ($n = 100$, 50.5%), thyroid diseases ($n = 79$, 82.3%), irritable bowel syndrome ($n = 47$, 85.5%), depression ($n = 29$, 74.4%) and blindness/low vision ($n = 22$, 57.9%) were females, while most of the individuals with hypertension ($n = 83$, 56.5%), gastric

reflux ($n = 50$, 59.5%), asthma ($n = 35$, 53.8%) and glaucoma/cataract ($n = 24$, 61.5%) were males (Table 3). In addition, a larger number of individuals with the most prevalent NCDs lived in the capital of Cyprus, Nicosia and were residents of urban regions. Similarly, the majority of the individuals with the most prevalent NCDs with the exception of asthma were married.

We also found that more than half of those who had glaucoma/cataract had completed only primary education ($n = 20$, 51.3%). On the other hand, most of the participants with hyperlipidemia, hypertension, thyroid diseases, gastric reflux, polycystic ovarian syndrome, asthma, irritable bowel syndrome, depression, and blindness/low vision had completed a higher education. Also, 43% of individuals with hyperlipidemia and hypertension had an annual income of more than 19,500 euros while most of the participants with thyroid diseases, gastric reflux, polycystic ovarian syndrome, asthma, irritable bowel syndrome, depression, glaucoma/cataract, and blindness/low vision had an annual income between €6,500 to €19,500 (Table 3). Apart from this, the prevalence of NCDs was stratified by income and education level among the four study age groups (Supporting Information: Table 2).

To identify independent socioeconomic determinants of each NCD separately, logistic regression modeling was applied (Table 4). We found that males had a statistically significant 79% and 78% lower probability of having thyroid diseases ($p < 0.001$) and irritable bowel syndrome ($p < 0.001$), respectively, and a 3.03 times higher probability of having Type I diabetes mellitus ($p = 0.040$) compared to females. In addition, divorced/widowed individuals had a 2.54- and 4.33-times lower probability of having irritable bowel syndrome ($p = 0.021$) and inflammatory bowel disease/chronic enteritis/ulcerative colitis ($p = 0.001$), respectively, compared to married participants. Furthermore, individuals who had a high annual income had a 1.86 times higher probability of having hyperlipidemia ($p = 0.039$), while individuals who had a middle annual income had 72% lower probability of having rheumatoid arthritis, compared to those who had a low annual income.

4 | DISCUSSION

Our study represents a comprehensive effort to assess the prevalence of NCDs in the general population of Cyprus and to identify the distribution of socioeconomic and demographic determinants among people with the most common NCDs. We discovered that 51.7% of the study population suffered from at least one NCD, with 50.3% having one, 21.9% having two, 11.9% having three, 9.0% having four, and 6.9% having more than five. Hyperlipidemia (17.4%), hypertension (12.9%), and

TABLE 2 Prevalence of noncommunicable diseases (NCDs) overall, by gender and among the four study age groups.

NCDs	Overall ^a	Gender		<i>p</i>	<i>p</i> ^b
		Female ^a	Male ^a		
<i>Hyperlipidemia</i>					
Overall	198 (17.4)	100 (50.5)	98 (49.5)	0.067 ^c	
18–24 years	5 (2.6)	5 (100.0)	0	0.021^d	0.043
25–44 years	44 (22.2)	18 (40.9)	26 (59.1)		0.014
45–64 years	87 (43.9)	50 (57.5)	37 (42.5)		0.913
65+ years	62 (31.3)	27 (43.5)	35 (56.5)		0.670
<i>Hypertension</i>					
Overall	147 (12.9)	64 (43.5)	83 (56.5)	0.001^c	
18–24 years	0	0	0	0.686 ^c	–
25–44 years	15 (10.2)	5 (7.8)	10 (12.0)		0.046
45–64 years	68 (42.3)	31 (48.4)	37 (44.6)		0.020
65+ years	64 (43.5)	28 (43.8)	36 (43.4)		0.694
<i>Thyroid diseases</i>					
Overall	96 (8.4)	79 (82.3)	17 (17.7)	<0.001^c	
18–24 years	2 (2.0)	2 (100.0)	0	0.178 ^d	0.204
25–44 years	38 (39.6)	33 (86.8)	5 (13.2)		<0.001
45–64 years	40 (41.7)	34 (85.0)	6 (15.0)		<0.001
65+ years	16 (16.7)	10 (62.5)	6 (37.5)		0.146
<i>Gastric reflux</i>					
Overall	84 (7.4)	50 (59.5)	34 (40.5)	0.544 ^c	
18–24 years	3 (3.6)	2 (66.7)	1 (33.3)	0.837 ^d	0.699
25–44 years	33 (39.3)	21 (63.6)	12 (36.4)		0.528
45–64 years	25 (29.8)	13 (52.0)	12 (48.0)		0.529
65+ years	23 (27.3)	14 (60.9)	9 (39.1)		0.104
<i>Polycystic ovarian syndrome</i>					
Overall	69 (6.1)	–	–	–	
18–24 years	8 (11.6)	–	–	–	–
25–44 years	49 (71.0)	–	–	–	–
45–64 years	10 (14.5)	–	–	–	–
65+ years	2 (2.9)	–	–	–	–
<i>Asthma</i>					
Overall	65 (5.7)	35 (53.8)	30 (46.2)	0.678 ^c	
18–24 years	14 (21.5)	8 (57.1)	6 (42.9)	0.846 ^d	0.892
25–44 years	29 (44.6)	14 (48.3)	15 (51.7)		0.255
45–64 years	16 (24.6)	10 (62.5)	6 (37.5)		0.706
65+ years	6 (9.3)	3 (50.0)	3 (50.0)		0.822
<i>Irritable bowel syndrome</i>					
Overall	55 (4.8)	47 (85.5)	8 (14.5)	<0.001^c	
18–24 years	4 (7.3)	3 (75.0)	1 (25.0)	0.650 ^d	0.431

TABLE 2 (Continued)

NCDs	Overall ^a	Gender		<i>p</i>	<i>p</i> ^b
		Female ^a	Male ^a		
25–44 years	23 (41.8)	19 (82.6)	4 (17.4)		0.016
45–64 years	21 (38.2)	18 (85.7)	3 (14.3)		0.008
65+ years	7 (12.7)	7 (100.0)	0		0.003
<i>Depression</i>					
Overall	39 (3.4)	29 (74.4)	10 (25.6)	0.021^c	
18–24 years	5 (12.8)	4 (80.0)	1 (20.0)	0.284 ^d	0.267
25–44 years	14 (35.9)	9 (64.3)	5 (35.7)		0.650
45–64 years	16 (41.0)	14 (87.5)	2 (12.5)		0.014
65+ years	4 (10.3)	2 (50.0)	2 (50.0)		0.855
<i>Glaucoma/cataract</i>					
Overall	39 (3.4)	15 (38.5)	24 (61.5)	0.022^c	
18–24 years	0	0	0	0.155 ^d	–
25–44 years	3 (7.7)	0	3 (100.0)		0.040
45–64 years	4 (10.3)	3 (75.0)	1 (25.0)		0.487
65+ years	32 (82.0)	12 (37.5)	20 (62.5)		0.296
<i>Blindness/low vision</i>					
Overall	38 (3.3)	22 (57.9)	16 (42.1)	0.847 ^c	
18–24 years	5 (13.2)	3 (60.0)	2 (40.0)	0.018^d	0.844
25–44 years	10 (26.3)	9 (90.0)	1 (10.0)		0.041
45–64 years	7 (18.4)	5 (71.4)	2 (28.6)		0.465
65+ years	16 (42.1)	5 (31.2)	11 (68.8)		0.222
<i>Rheumatoid arthritis</i>					
Overall	32 (2.8)	22 (68.8)	10 (31.2)	0.152 ^c	
18–24 years	1 (3.1)	1 (100.0)	0	0.119 ^d	0.371
25–44 years	4 (12.5)	1 (25.0)	3 (75.0)		0.174
45–64 years	13 (40.6)	11 (84.6)	2 (15.4)		0.047
65+ years	14 (43.8)	9 (64.3)	5 (35.7)		0.136
<i>Inflammatory bowel disease/chronic enteritis/ulcerative colitis</i>					
Overall	32 (2.8)	21 (65.6)	11 (34.4)	0.284 ^c	
18–24 years	1 (3.1)	1 (100.0)	0	0.812 ^d	0.371
25–44 years	9 (28.1)	7 (77.8)	2 (22.2)		0.234
45–64 years	12 (37.5)	7 (58.3)	5 (41.7)		0.979
65+ years	10 (31.3)	6 (60.0)	4 (40.0)		0.339
<i>Chronic sinusitis</i>					
Overall	29 (2.5)	19 (65.5)	10 (34.5)	0.314 ^c	
18–24 years	3 (10.3)	2 (66.7)	1 (33.3)	0.299 ^d	0.699
25–44 years	14 (48.3)	8 (57.1)	6 (42.9)		0.923
45–64 years	11 (37.9)	9 (81.8)	2 (18.2)		0.103
65+ years	1 (3.5)	0	1 (100.0)		0.359

(Continues)

TABLE 2 (Continued)

NCDs	Overall ^a	Gender		<i>p</i>	<i>p</i> ^b
		Female ^a	Male ^a		
<i>Type II diabetes mellitus</i>					
Overall	25 (2.2)	13 (52.0)	12 (48.0)	0.656 ^c	
18–24 years	0	0	0	0.486 ^d	–
25–44 years	4 (16.0)	2 (50.0)	2 (50.0)		0.732
45–64 years	7 (37.5)	5 (71.4)	2 (28.6)		0.465
65+ years	14 (54.1)	6 (42.9)	8 (57.1)		0.832
<i>Chronic bronchitis</i>					
Overall	25 (2.2)	13 (52.0)	12 (48.0)	0.656 ^c	
18–24 years	3 (12.0)	2 (66.7)	1 (33.3)	0.470 ^d	0.699
25–44 years	11 (44.0)	7 (63.6)	4 (36.4)		0.722
45–64 years	6 (24.0)	3 (50.0)	3 (50.0)		0.690
65+ years	5 (20.0)	1 (20.0)	4 (80.0)		0.243
<i>Type I diabetes mellitus</i>					
Overall	24 (2.1)	8 (1.3)	16 (3.2)	0.021^c	
18–24 years	1 (4.2)	1 (100.0)	0	0.357 ^d	0.371
25–44 years	1 (4.2)	0	1 (100.0)		0.236
45–64 years	9 (37.5)	4 (44.4)	5 (55.6)		0.405
65+ years	13 (54.1)	3 (23.1)	10 (76.9)		0.087
<i>Heart failure</i>					
Overall	16 (1.4)	8 (50.0)	8 (50.0)	0.605 ^c	
18–24 years	1 (6.3)	1 (100.0)	0	1.0 ^d	0.371
25–44 years	0	0	0		–
45–64 years	5 (31.2)	2 (40.0)	3 (60.0)		0.412
65+ years	10 (62.5)	5 (50.0)	5 (50.0)		0.768
<i>Atrial fibrillation</i>					
Overall	11 (1.0)	5 (45.5)	6 (54.5)	0.548 ^d	
18–24 years	0	0	0	0.416 ^d	–
25–44 years	2 (18.2)	2 (100.0)	0		0.232
45–64 years	1 (27.3)	1 (33.3)	2 (66.7)		0.385
65+ years	5 (54.5)	2 (33.3)	4 (66.7)		0.540
<i>Chronic kidney disease</i>					
Overall	11 (1.0)	7 (63.6)	4 (36.4)	0.765 ^d	
18–24 years	0	0	0	0.758 ^d	–
25–44 years	2 (18.2)	2 (100.0)	0		0.232
45–64 years	5 (45.4)	3 (60.0)	2 (40.0)		0.926
65+ years	4 (36.4)	2 (50.0)	2 (50.0)		0.855
<i>Breast cancer</i>					
Overall	11 (1.0)	–	–	–	–
18–24 years	0	–	–	–	–

TABLE 2 (Continued)

NCDs	Overall ^a	Gender		<i>p</i>	<i>p</i> ^b
		Female ^a	Male ^a		
25–44 years	1 (9.1)	–	–		–
45–64 years	6 (54.5)	–	–		–
65+ years	4 (36.4)	–	–		–

Note: NCDs with frequency less than 10 are presented in the Supporting Information: Table 1. Bold values indicate statistically significant associations ($p < 0.05$).

^aData are presented as n (%).

^bDifferences between each group separately were evaluated using χ^2 test.

^cDifferences were evaluated using χ^2 test.

^dDifferences were evaluated using Fisher's exact test of independence.

thyroid diseases (8.4%) were the most common NCDs. We found more males than females with hyperlipidemia between the ages of 25 and 44. In addition, we found a larger number of males greater than 65 years old with hyperlipidemia compared to females aged 65 years and over. There were also more men than women with hypertension, and more women than men with thyroid disease.

According to our findings, hyperlipidemia was the most common NCD (17.4%). Hyperlipidemia is also known as hypercholesterolemia and hypertriglyceridemia, depending on the type of elevated lipids.^{30–33} Our findings are consistent with previous studies that looked at the most common NCDs in different populations and identified hyperlipidemia as a common NCD. For example, studies conducted in the United States³⁴ and Iran³⁵ estimated that more than half of the adult population has lipid abnormalities (i.e., high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, triglycerides) and high cholesterol levels. In addition, two large population-based studies in Brazil³⁶ and Indonesia¹⁹ found that hypercholesterolemia was among the most prevalent NCDs. Also, a cross-sectional study in Papua New Guinea, that included individuals aged 15–65 years old reported a relatively high prevalence of elevated levels of cholesterol.²⁵ Our findings suggest some disparities in the frequency of hyperlipidemia between females and males across the study's age categories. We reported five people between the ages of 18 and 24 with hyperlipidemia and we noted that all of them were females. This finding is in contrast with a study that examined the prevalence of hyperlipidemia among Colombian university students and discovered that the prevalence of any form of hyperlipidemia was higher in males than in females.³⁷ We also reported more females aged 45–64 years with hyperlipidemia compared to males in the same age group. In contrast, we discovered a higher percentage of males aged 25–44 years old or older than 65 years old with hyperlipidemia than females in the comparable age groups. Males over the age of 45 years and females over the age of 55 years are at a higher risk of developing hyperlipidemia due to

changes in the body caused by aging.^{38,39} In our study, the prevalence of hyperlipidemia was 31.3% among people over the age of 65, with females accounting for 56.5% and males accounting for 43.5%. In contrast, a cross-sectional study conducted in Iran reported that the prevalence of hyperlipidemia was 50.6% among elders over the age of 60, with 56.3% among women and 44.53% among males.³⁶ Our findings could be explained by the fact that changes in the body affect females later than males because females have higher cholesterol levels throughout menopause.⁴⁰

Hypertension was the second most prevalent NCD in our study population, with a prevalence of 13%. This is comparable to other epidemiological studies in Israel⁴¹ and Switzerland,⁴² but lower than the corresponding prevalence in Vietnam,⁴³ India,⁴⁴ Greece,¹⁸ Colombia,⁴⁵ Papua New Guinea,²⁵ Saudi Arabia⁴⁶ and in south India.⁴⁷ We also reported a significantly higher prevalence of hypertension in males compared with females. Similarly, the EMENO epidemiological study found that the prevalence of hypertension was higher in Greek men than in women,¹⁸ while a systematic review and meta-analysis in Vietnam suggested that the pooled prevalence of hypertension is significantly higher in males.⁴³ Furthermore, the results from a community-based cross-sectional study among individuals aged 18–69 in the Kathmandu district indicated that the odds of raised blood pressure were higher among older individuals.⁴⁸ Furthermore, the prevalence of hypertension was reported to be higher in men than in women before the age of 45, whereas after that age, the predominance shifts to females,¹⁶ which is consistent with our findings. This could be because the changes in female hormones such as estrogen and androgen may influence the risk of postmenopausal hypertension.^{49–51}

In general, we observed a low prevalence of hypertension among the adult general population (12.9%). According to the Global Innovation Index 2020, Cyprus has a high-income economy, which could potentially explain our study's findings.⁵² In particular, the WHO reported that two thirds of individuals with hypertension reside in low- and middle-income

TABLE 3 Most prevalent noncommunicable diseases by the demographic and socioeconomic characteristics of the study.

Characteristics	Hyperlipidemia	Hypertension	Thyroid diseases	Gastric reflux	Polycystic ovarian syndrome	Asthma	Irritable bowel syndrome	Depression	Glaucoma/cataract	Blindness/low vision
Mean age, mean ± SD	55.2 ± 16.8	60.9 ± 13.6	47.9 ± 15.4	49.5 ± 17.5	35.1 ± 11.9	38.1 ± 16.8	44.3 ± 15.1	43.1 ± 14.7	72.0 ± 12.0	52.7 ± 22.1
<i>Sex</i>										
Male	98 (49.5)	83 (56.5)	17 (17.7)	50 (59.5)	-	35 (53.8)	8 (14.5)	10 (25.6)	24 (61.5)	16 (42.1)
Female	100 (50.5)	64 (43.5)	79 (82.3)	34 (40.5)	-	30 (46.2)	47 (85.5)	29 (74.4)	15 (38.5)	22 (57.9)
<i>Geographical area</i>										
Nicosia	90 (45.4)	64 (43.5)	46 (47.9)	38 (45.3)	24 (34.8)	36 (55.4)	28 (50.9)	15 (38.5)	14 (35.8)	19 (50.0)
Limassol	59 (29.8)	48 (32.7)	28 (29.2)	27 (32.1)	21 (30.4)	12 (18.5)	18 (32.7)	13 (33.3)	15 (38.5)	8 (21.1)
Larnaca	22 (11.1)	21 (14.3)	11 (11.5)	9 (10.7)	11 (15.9)	10 (15.4)	4 (7.3)	4 (10.3)	3 (7.7)	6 (15.8)
Paphos	14 (7.1)	8 (5.4)	6 (6.2)	8 (9.5)	8 (11.6)	4 (6.1)	4 (7.3)	4 (10.3)	3 (7.7)	2 (5.3)
Ammochostos	13 (6.6)	6 (4.1)	5 (5.2)	2 (2.4)	5 (7.3)	3 (4.6)	1 (1.8)	3 (7.7)	4 (10.3)	3 (7.8)
<i>Residency</i>										
Urban	155 (78.7)	118 (80.3)	75 (78.1)	67 (80.7)	54 (78.3)	52 (80.0)	42 (77.8)	29 (74.4)	27 (69.2)	23 (60.5)
Rural	42 (21.3)	29 (19.7)	21 (21.9)	16 (19.3)	15 (21.7)	13 (20.0)	12 (22.2)	10 (25.6)	12 (30.8)	15 (39.5)
<i>Marital status</i>										
Married	137 (69.5)	114 (78.1)	67 (69.8)	54 (65.1)	35 (52.2)	26 (40.6)	3 (54.5)	22 (57.9)	26 (66.7)	24 (63.2)
Unmarried	29 (14.7)	9 (6.2)	17 (17.7)	22 (26.5)	28 (41.8)	32 (50.0)	14 (25.5)	9 (23.7)	3 (7.7)	7 (18.4)
Divorced/widowed	31 (15.8)	23 (15.7)	12 (12.5)	7 (8.4)	4 (6.0)	6 (9.4)	11 (20.0)	7 (18.4)	10 (25.6)	7 (18.4)
<i>Education level</i>										
Primary education	32 (16.3)	30 (20.5)	8 (8.3)	8 (9.5)	3 (4.4)	6 (9.2)	4 (7.4)	2 (5.3)	20 (51.3)	14 (36.8)
Secondary education	64 (32.7)	50 (34.3)	28 (29.2)	23 (27.4)	15 (21.7)	18 (27.7)	12 (22.2)	12 (31.6)	6 (15.4)	8 (21.1)
Higher education	100 (51.0)	66 (45.2)	60 (62.5)	53 (63.1)	51 (73.9)	41 (63.1)	38 (70.4)	24 (63.1)	13 (33.3)	16 (42.1)
<i>Annual income</i>										
Low (≤€6,500)	35 (17.8)	25 (17.1)	18 (18.7)	12 (14.5)	9 (13.0)	15 (23.1)	10 (18.5)	9 (23.1)	8 (20.5)	7 (18.4)
Middle (€6,500–19,500)	79 (40.1)	58 (39.7)	45 (46.9)	39 (47.0)	39 (56.5)	34 (52.3)	27 (50.0)	19 (48.7)	24 (61.5)	25 (65.8)
High (≥€19,500)	83 (42.1)	63 (43.2)	33 (34.4)	32 (38.5)	21 (30.5)	16 (24.6)	17 (31.5)	11 (28.2)	7 (18.0)	6 (15.8)

Note: Data are presented as *n* (%).

Abbreviation: SD, standard deviation.

TABLE 4 Logistic regression modeling for sociodemographic characteristics and noncommunicable diseases (NCDs).

Characteristics	Hyperlipidemia		Hypertension		Thyroid diseases		Polycystic ovarian syndrome		Asthma		Irritable bowel syndrome		Depression		Glaucoma/Cataract		Blindness/Low vision	
	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value
Age	1.06	<0.001	1.09	<0.001	1.03	0.003	1.04	<0.001	0.96	0.002	0.99	0.378	1.00	0.792	1.16	<0.001	1.01	0.553
Sex																		
Female	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Male	1.07	0.698	1.33	0.205	0.21	<0.001	0.68	0.120	-	-	1.04	0.893	0.22	<0.001	1.39	0.483	0.79	0.532
Geographical area																		
Nicosia	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Limassol	0.91	0.659	1.07	0.768	0.90	0.678	0.93	0.797	1.41	0.282	0.53	0.063	0.95	0.874	1.59	0.326	0.67	0.372
Larnaca	0.86	0.679	1.68	0.109	0.75	0.429	0.79	0.556	1.17	0.700	0.82	0.610	0.41	0.110	0.99	0.987	1.08	0.882
Paphos	1.02	0.954	0.95	0.913	0.65	0.347	1.04	0.933	1.37	0.467	0.31	0.055	0.67	0.482	2.34	0.278	0.48	0.354
Ammochostos	2.59	0.024	1.59	0.410	1.00	0.998	0.56	0.455	2.55	0.103	0.93	0.919	0.22	0.153	7.36	0.030	0.78	0.736
Residency																		
Urban	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Rural	0.72	0.175	0.70	0.218	0.98	0.934	0.94	0.834	0.64	0.206	0.75	0.413	1.33	0.426	0.80	0.693	1.69	0.181
Marital status																		
Married	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Unmarried	1.20	0.519	0.70	0.384	0.64	0.192	1.55	0.206	0.70	0.286	1.85	0.098	0.83	0.655	7.67	0.017	0.75	0.610
Divorced/widowed	1.05	0.848	0.75	0.363	0.79	0.512	0.60	0.240	1.00	0.999	1.33	0.564	2.54	0.021	0.77	0.639	1.21	0.710
Education level																		
Primary	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Secondary	0.85	0.622	1.03	0.943	1.22	0.679	1.13	0.807	0.47	0.373	0.29	0.046	0.65	0.522	0.28	0.034	0.13	0.001
Higher	0.70	0.343	0.84	0.672	1.37	0.557	1.31	0.626	0.45	0.367	0.29	0.059	1.09	0.908	0.92	0.899	0.13	0.003
Annual income																		
Low	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Middle	1.05	0.856	1.10	0.772	1.32	0.384	1.67	0.174	2.07	0.080	1.08	0.824	1.34	0.490	1.76	0.358	2.25	0.110
High	1.86	0.039	1.75	0.122	1.48	0.293	2.09	0.087	2.56	0.058	1.24	0.646	1.37	0.535	0.54	0.437	1.15	0.840

(Continued)

TABLE 4 (Continued)

NCDs	Rheumatoid arthritis		Inflammatory bowel disease/ chronic enteritis/ ulcerative colitis		Chronic sinusitis		Type II diabetes mellitus		Chronic bronchitis		Type I diabetes mellitus		Heart failure		Atrial fibrillation		Chronic kidney disease		Breast cancer		
	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	OR	p Value	
Age	1.07	<0.001	1.03	0.041	1.04	0.021	1.06	0.005	1.00	0.948	1.05	0.008	1.08	0.001	1.07	0.007	1.01	0.771	1.07	0.006	
Sex																					
Female	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref
Male	0.55	0.185	0.77	0.538	0.54	0.150	1.06	0.908	1.14	0.765	3.03	0.040	0.83	0.755	0.93	0.921	0.32	0.160	-	-	
<i>Geographical area</i>																					
Nicosia	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref
Limassol	0.95	0.913	0.42	0.092	1.95	0.169	2.02	0.154	0.67	0.458	1.21	0.690	0.69	0.559	4.91	0.061	1.58	0.537	1.17	0.827	
Larnaca	0.54	0.444	0.89	0.810	1.30	0.682	2.38	0.192	0.87	0.829	-	-	0.48	0.497	-	-	-	-	1.17	0.892	
Paphos	5.59	0.002	1.13	0.855	1.81	0.358	-	-	0.89	0.886	0.49	0.519	0.93	0.952	2.98	0.399	3.86	0.158	-	-	
Ammochostos	0.57	0.624	0.49	0.535	0.84	0.881	-	-	2.20	0.374	-	-	0.94	0.964	3.20	0.432	-	-	13.18	0.097	
<i>Residency</i>																					
Urban	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref
Rural	2.40	0.048	0.87	0.778	2.30	0.068	1.73	0.283	0.69	0.520	1.90	0.231	1.25	0.754	1.30	0.774	2.30	0.244	0.15	0.192	
<i>Marital status</i>																					
Married	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref
Unmarried	0.58	0.468	0.73	0.615	3.87	0.013	-	-	0.53	0.310	1.01	0.991	0.87	0.910	-	-	-	-	8.30	0.028	
Divorced/ Widowed	1.50	0.426	4.33	0.001	0.47	0.484	0.96	0.948	0.74	0.702	2.12	0.185	1.83	0.348	1.90	0.435	1.26	0.794	1.03	0.977	
<i>Education level</i>																					
Primary	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref
Secondary	0.92	0.889	1.14	0.847	0.54	0.244	1.67	0.433	2.31	0.463	0.50	0.280	0.58	0.518	1.47	0.702	0.16	0.064	0.63	0.669	
Higher	1.41	0.616	1.60	0.516	-	-	0.72	0.701	1.42	0.771	0.29	0.115	1.37	0.722	1.43	0.749	0.08	0.038	0.22	0.226	
<i>Annual income</i>																					
Low	Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref		Ref
Middle	0.28	0.014	0.64	0.355	0.60	0.362	0.77	0.657	1.00	0.998	0.70	0.580	1.30	0.734	2.01	0.389	1.58	0.657	0.74	0.773	
High	0.34	0.071	0.43	0.167	1.21	0.761	0.65	0.558	0.89	0.871	0.90	0.891	0.80	0.814	-	-	4.03	0.224	5.82	0.079	

Note: Bold values indicate statistically significant associations ($p < 0.05$).
Abbreviation: OR, odds ratio.

countries.⁵³ Our study found a higher prevalence of hypertension among those who completed a higher or a secondary education compared to individuals who completed only a primary education, as well as among those with a high annual income. Similarly, a recent community-based study in 11 Colombian departments found that people with higher incomes were more likely to have several NCDs.⁴⁵ In contrast, low socioeconomic status is associated with increased hypertension.⁵⁴ An earlier study conducted in Cyprus in 2008 that investigated the determinants of NCDs among the Cypriot population included older adults, with the majority having completed high school. The prevalence of hypertension and hypercholesterolemia was found to be significantly inversely proportional to education level.⁵⁵ There are some possible explanations for this finding. Specifically, most of the participants with higher salaries were over 45 years old, and our data demonstrated that the prevalence of hypertension increased with age. Furthermore, because there was no public healthcare system in place during the study period and the National Health Scheme in Cyprus was only recently implemented, people with lower incomes may have lower rates of identified diseases due to fewer doctor visits. Also, individuals in higher socioeconomic groups are more likely to be inactive and consume more fat, salt, and processed foods, all of which are associated with an increased risk of NCDs.⁵⁶

Furthermore, about 8% of the study participants reported having thyroid diseases which comprised of 82.3% females and 17.7% males. The prevalence of thyroid diseases in the present study is slightly higher than what is reported in other large population-based studies, where the prevalence ranged from 2% to 6%.^{57,58} In addition, the National Health and Nutrition Examination Survey III estimated that 4.6% of Americans had unexplained hypothyroidism and 1.3% had unknown hyperthyroidism,¹⁷ while the corresponding numbers among Europeans were 4.94% and 1.72%,⁵⁹ respectively. In our study, the prevalence of thyroid diseases was nearly five times higher in females than in males. This finding is consistent with other studies, which found that thyroid problems are 5 to 8 times more common in women than in men.^{60,61} The difference in the prevalence of thyroid diseases between females and males can be explained by female sex hormones such as estrogens and progesterone.⁶²⁻⁶⁴ Estrogens, in particular, influence the growth of thyroid stem/progenitor cells, which may be linked to the creation of cells with a reduced function.⁶² In women, these cells can cause hypofunctioning or nonfunctioning thyroid nodules.⁶²

NCDs are responsible for a significant number of deaths worldwide.⁵ As a result, the WHO stated that governments and public health authorities must prevent and control NCDs.⁶⁵ Several countries have already implemented programs for the prevention of NCDs. For example, a national program for the prevention and

control of cardiovascular diseases, stroke and diabetes has been adopted in India,⁶⁶ China⁶⁷ and Pakistan.⁶⁸ In Cyprus, however, there is no national program or strategy for the prevention of NCDs. Our study found that more than half of the population studied had at least one NCD; therefore, a national plan of action for the prevention and control of NCDs, particularly hyperlipidemia, hypertension, and thyroid disorders, which are the most common NCDs, should be undertaken in Cyprus. There is also a lack of up-to-date epidemiological data on the prevalence of NCDs and their sociodemographic risk factors in Cyprus. Our study tried to fill in this gap hence the information presented important for the government in developing public health policies, interventions, and strategies to reduce and control the burden of NCDs. There is a specific need for the establishment of support programs aimed at raising awareness, as well as addressing and preventing NCDs. Because all Cypriots have free or low-cost access to primary and secondary healthcare, citizens should be encouraged to use services for preventive checkups or treatment. Programs targeting people of all ages should be implemented in a variety of settings, including schools, universities, and public areas. These programs suggest the need to improve the health education of the population to control and decrease the burden of NCDs by promoting healthier lifestyle choices such as healthy dietary habits, lower alcohol and tobacco consumption and physical activity.

This study has some limitations. First, it is not designed to find any causal associations but only relationships between the variables of interest due to the cross-sectional design of the study. In addition, the severity of the disease is not considered. Furthermore, the face-to-face interviews used to assess medical history may theoretically result in social desirability bias. However, the social desirability bias was reduced by having trained field workers conduct the interviews. Also, stroke was not included in the list of the 47 NCDs according to the International Classification of Diseases (ICD-10), however, we provided participants with the option to report any other NCDs. Despite these limitations, the research has several strengths. This is a large population-based survey with a representative sample of both males and females from various age groups and from all geographical areas of Cyprus, including urban and rural areas. Lastly, we collected thorough data using a validated questionnaire.

In conclusion, this is the first study to look at the distribution of socioeconomic and demographic determinants in people with the most common NCDs in Cyprus's adult population. More than half of the study population had at least one NCD, and about one fifth had two NCDs. The most prevalent NCDs in the adult Cypriot population were hyperlipidemia, hypertension, and thyroid diseases. There were more males than females with hyperlipidemia aged 25-44 years and older than 65 years. Furthermore, there were more males than females with hypertension

and more females than males with thyroid disorders. Our study serves as an update on the epidemiological data regarding the prevalence of NCDs in Cyprus and their sociodemographic risk factors. This information is important for the government and policymakers as they develop public health policies, support programs, interventions, and strategies to reduce and control the burden of NCDs.

AUTHOR CONTRIBUTIONS

Maria Kyprianidou: Conceptualization; methodology; software; validation; formal analysis; investigation; writing—original draft preparation; writing—review and editing; visualization; project administration. **Demosthenes Panagiotakos:** Methodology; formal analysis; writing—review and editing. **Konstantinos C. Makris:** Writing—review and editing. **Maria Kambanaros:** Writing—review and editing. **Costas A. Christophi:** Methodology; formal analysis; writing—review and editing. **Konstantinos Giannakou:** Conceptualization; methodology; validation; formal analysis; writing—original draft preparation; writing—review and editing; visualization; supervision. All authors have read and agreed to the published version of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data used to support the findings of this study are available from the corresponding author upon request.

ETHICS STATEMENT

The Cyprus National Bioethics Committee (CNBC) approved the study (EEBK EΠ 2018.01.123). Each potential participant was informed about the study's purpose. The researchers informed participants that the study had been approved by CNBC, that their participation would be anonymous, and that they could withdraw at any time. Furthermore, participants were informed that the questionnaire was self-report with the exception of the medical history section, which would be performed face-to-face in an interview. Following that, participants were asked to verbally consent to participate before being given the questionnaire to complete.

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