

Chronic diseases among older people in Amirkola, northern Islamic Republic of Iran

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الأمراض المزمنة لدى المسنين في منطقة أميركولا، في شمال جمهورية إيران الإسلامية سيد رضا حسيني، روبرت ج. كامينج، بروين سجادي، علي بييجاني

الخلاصة: أجرى الباحثون هذه الدراسة الوصفية المستعرضة لوصف انتشار الأمراض غير السارية وعوامل اختطارها بين المسنين في منطقة أميركولا في جمهورية إيران الإسلامية. وقد أجروا تقييماً لمجموع 1019 من المسنين الذين تتجاوز أعمارهم 60 سنة باستخدام استبيان معياري وبمراجعة السجلات الطبية. وكان أكثر الأمراض المزمنة شيوعاً هو المرض القلبي الوعائي (29.5٪)، والاضطرابات الهضمية (28.5٪)، وفرط ضغط الدم (23.6٪)، والسكري (23.5٪)، بينما كان 44.4٪ من المسنين من مفرطي الوزن أو السُّبان. كما أن الغالبية العظمى (83.0٪) من عينة المسنين قد أبلغوا عن إصابتهم بمرض مزمن واحد على الأقل، في حين أبلغ 44.4٪ منهم عن إصابتهم بمرضين أو أكثر. وفي تحليل التحوف اللوجستي المصحح باحتساب العمر، ترابطَ فرط ضغط (نسبة الأرجحية 3.94، بفاصلة ثقة مقدارها 2.87-5.40) والسكري (نسبة الأرجحية 1.83، فاصلة الثقة 1.32-2.55) بالمرض القلبي الوعائي، في حين لم يُشاهد الترابط بينه وبين الجنس، أو التدخين، أو فرط الوزن، أو قلة المشي. وتقدم الدراسة معطيات قيمة للتخطيط للملائم للخدمات الصحية للمسنين في هذه المنطقة من جمهورية إيران الإسلامية.

ABSTRACT This descriptive cross-sectional study was undertaken to describe the prevalence of noncommunicable diseases and their risk factors in elderly people in Amirkola, Islamic Republic of Iran. A total of 1019 people aged 60+ years were assessed using a standard questionnaire and a review of medical records. The most common chronic diseases were cardiovascular disease (29.5%), digestive disorders (28.5%), hypertension (23.6%) and diabetes mellitus (23.5%), while 44.4% of subjects were overweight or obese. Overall, 83.0% of the sample reported at least 1 chronic disease and 64% had 2 or more diseases. In age-adjusted logistic regression analysis, hypertension (OR 3.94, 95% CI: 2.87-5.40) and diabetes mellitus (OR 1.83, 95% CI: 1.32-2.55) were associated with cardiovascular disease, but sex, smoking, overweight and lack of walking were not. The study provides valuable data for planning appropriate health services for elderly people in this area of the Islamic Republic of Iran.

Affections chroniques chez les personnes âgées à Amirkola (Nord de la République islamique d'Iran)

RÉSUMÉ La présente étude descriptive et transversale a été réalisée pour évaluer la prévalence des maladies non transmissibles et leurs facteurs de risque chez les personnes âgées à Amirkola (République islamique d'Iran). Le dossier médical de 1019 personnes au total, âgées d'au moins soixante ans, et leurs réponses à un questionnaire standard ont été examinés. Les affections chroniques les plus fréquentes étaient les maladies cardio-vasculaires (29,5 %), les troubles digestifs (28,5 %), l'hypertension (23,6 %) et le diabète (23,5 %), alors que 44,4 % des sujets étaient en surpoids ou obèses. Globalement, 83,0 % des participants étaient atteints d'une affection chronique et 64 % d'au moins deux affections. Selon l'analyse de régression logistique ajustée pour l'âge, l'hypertension (OR : 3,94 ; IC à 95 % : 2,87-5,40) et le diabète (OR : 1,83 ; IC à 95 % : 1,32-2,55) étaient associés aux maladies cardio-vasculaires, contrairement au sexe, au statut tabagique, au surpoids et à l'absence de pratique de la marche. La présente étude fournit des données précieuses pour la planification de services de santé adéquats destinés aux personnes âgées dans cette zone de la République islamique d'Iran.

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Introduction

With declining fertility and increasing life expectancy, the world's population is ageing at an unprecedented rate [1]. The population aged 80 years and older is estimated to increase by 233% between 2008 and 2040 and the population aged 65 years and over will increase by 160%, compared with an overall population increase across all age groups of only 33% [2]. Ageing is now a challenge that affects developed and developing countries throughout the world. In the Islamic Republic of Iran, the proportion of elderly people is increasing due to a decreasing birth rate and access to better health care. The proportion of the population aged 60 years and older in 2005 was approximately 7.3% [3] and is projected to rise to 11.6% in 2025 and 30.8% by 2050 [4]. In parallel with this, the frequency of noncommunicable diseases such as diabetes mellitus, coronary heart disease, cancer, pulmonary diseases, cerebrovascular diseases and osteoporosis are rising worldwide [5]. Risk factors such as smoking, high blood pressure, cholesterol, obesity, physical inactivity and unhealthy diet are common to many of these chronic diseases. Primary prevention of even a few of these factors can lead to a reduction in health care expenditures [5].

Despite progress in their diagnosis and treatment, chronic diseases necessitate a long period of care and rehabilitation [6]. Therefore up-to-date data about chronic diseases and their risk factors are needed to plan health services for elderly people. To our knowledge, there is little or no published information on the prevalence of noncommunicable diseases in older people in the Islamic Republic of Iran. This lack of information inhibits accurate predictions of the future health care needs of this age group. The aims of this study were to describe the prevalence of noncommunicable diseases and related risk factors among elderly

people in an area of northern Islamic Republic of Iran.

Methods

Sample

This descriptive cross-sectional community-based study was done in Amirkola, a small town in the north Islamic Republic of Iran that has a population of 25 000, with around 2000 people aged above 60 years. By considering $\alpha = 0.05$, $P = 0.35-0.40$ and the formula: $N = Z^2 \times P(1-P)/d^2$, the sample size was calculated as $N = 971-1024$. The required sample size was based on an estimated prevalence of cardiovascular disease of 35%, with a 95% confidence interval (CI) of 30%–40% [7,8]. All elderly people living in Amirkola are registered with one of 2 health care centres. Participants were randomly selected from the health centre contact lists.

Data collection

The selected people were visited at their house and were interviewed using a face-to-face standardized questionnaire [9], which took about 1 hour to deliver. All of the elderly people were known to the local health care workers, so the participation rate was 100%. The data collected included sociodemographic characteristics, noncommunicable diseases and their risk factors and type of health insurance. The study interviewers were final year medical students, who informed participants about the details of the study and then completed the study questionnaires by interview with the elderly people or with an informant.

The presence of noncommunicable diseases was determined by asking the question "Have you suffered from any of these health problems (based on physician diagnosis)?" The possible health problems were: cardiovascular diseases, digestive disorders, hypertension, type 2 diabetes mellitus, arthritis, kidney and urinary tract diseases,

fractures, ear problems (hearing loss), eye problems (cataract, glaucoma), lung diseases, stroke, cancer, liver and gallbladder disorders, thyroid disorders, migraine headache, depression, epilepsy and convulsions, breast problems and bladder control problems. If a subject reported a health problem, the subject's medical records were reviewed. Self-reported conditions not confirmed by medical record review were considered negative.

Smoking status was determined by asking the question "Are you a smoker and, if so, how many per day?"

Weight was measured using a balance (Beurer GmbH) with a minimum of clothes to the nearest 100 g, and height was measured using a stretchless tape metre (an anthropometric rod) to a minimum of 0.5 cm. Body mass index (BMI) was calculated as weight in kilograms divided by the square of height in metres. $BMI \geq 30 \text{ kg/m}^2$ was considered as obese, $25 \leq BMI \leq 29.9 \text{ kg/m}^2$ as overweight, $18.5 \leq BMI \leq 24.9 \text{ kg/m}^2$ as normal weight and $BMI < 18.5 \text{ kg/m}^2$ as underweight, based on World Health Organization criteria [10].

Data about health insurance was obtained by asking "Are you covered by health insurance?"

Analysis

The data were analysed using SPSS, version 14. The statistical tests used in this study were chi-squared test, *t*-test and logistic regression. Logistic regression analysis was performed to assess the relationship between risk factors and presence of noncommunicable diseases; odds ratios (OR) and 95% CI are presented. A *P*-value ≤ 0.05 was considered statistically significant.

Results

Demographic data

A total of 1019 people aged 60 years and over were assessed. The mean age was 70 (SD 7) years (range 60–97 years).

Table 1 Characteristics of of the elderly population in Amirkola by sex

Characteristic	Male (n = 604)		Female (n = 415)		Both sexes (n = 1019)	
	No.	%	No.	%	No.	%
Age group (years)						
60–64	91	15.1	75	18.1	166	16.3
65–74	335	55.5	234	56.4	569	55.8
75–84	149	24.7	83	20.0	232	22.8
≥ 85	29	4.8	23	5.5	52	5.1
Educational status						
Illiterate	359	59.5	317	76.6	676	66.9
Primary	152	25.2	80	19.3	232	23.0
Secondary	49	8.1	10	2.4	59	5.8
High school	31	5.1	6	1.4	37	3.7
University	12	2	1	0.2	13	1.3
Employment status						
Housewife	4	0.7	371	95.6	375	37.1
Employed	376	65.1	2	0.5	378	37.4
Retired	198	34.3	15	3.9	213	21.1
Marital status						
Never married	0	0.0	1	0.2	1	0.1
Married	516	85.6	284	68.4	800	79.2
Divorced	3	0.5	2	0.5	5	0.5
Widowed	84	13.9	128	30.8	212	21.0

Most subjects (55.8%) were between 65–74 years and 5.1% were over 85 years old. There were 604 (59.3%) male subjects and 415 (40.7%) females (Table 1). Women had generally lower education levels ($P < 0.001$), were more likely to be single (unmarried, widowed, divorced or separated) ($P < 0.001$) and had higher unemployment levels ($P < 0.001$). One-quarter (25.0%) of subjects reported having no health insurance.

Chronic diseases

The most frequent self-reported noncommunicable diseases were cardiovascular disease (29.6%), digestive disorders (28.5%), hypertension (23.6%), type 2 diabetes mellitus (23.5%), arthritis (22.2%), kidney and urinary tract diseases (16.6%), fractures (16.2%) and lung diseases (12.8%) (Table 2). The prevalence of stroke was 4.9% and cancer was 1.7%. Hypertension ($P = 0.07$), diabetes (P

< 0.001) and psychiatric diseases ($P < 0.001$) were all more frequent in females than males, while lung diseases ($P = 0.015$) were more frequent in males.

Overall, 83.0% of subjects reported at least 1 diagnosed disease and 64% reported 2 or more chronic diseases. The mean number of diseases per person was 2.6 (SD 2.2). The mean numbers of diseases in women [2.7 (SD 2.3)] was significantly higher than in men [2.4 (SD 2.1)] ($P < 0.001$).

Cardiovascular risk factors

The frequencies of reported cardiovascular risk factors were overweight and obesity (42.8%), smoking (18.5%), lack of walking (67.0%), hypertension (23.6%) and type 2 diabetes mellitus (23.5%) (Table 3). Hypertension ($P = 0.07$), diabetes ($P < 0.001$), lack of activity ($P < 0.001$) and obesity ($P < 0.001$) were more common in females than males, while smoking was much more

common in males (29.0%) than females (3.5%) ($P < 0.001$). Among smokers, the mean number of cigarettes smoked per day was 7.2 (SD 6.4).

In this study, 5.4% of people were obese, 38.7% overweight, 55.1% were normal weight, and $< 1\%$ were underweight (Table 5). There was a statistically significant difference by sex ($P < 0.001$), with the mean BMI in women [25.6 (SD 3.3) kg/m²] being higher than in men [24.5 (SD 2.7) kg/m²].

Overall, 59.2% of respondents reported 2 or more cardiovascular risk factors (Table 4). The mean number of risk factors in females [1.92 (SD 0.97)] was significantly higher than in males [1.70 (SD 0.9)] ($P < 0.001$).

Multiple logistic regression analysis

Table 6 shows the distribution of cardiovascular disease risk factors in the 302 elderly people with cardiovascular disease. The results of age-adjusted and

Table 2 Distribution of physician-diagnosed noncommunicable diseases in older people in Amirkola by age and sex

Disease	60–64 years				65–74 years				75–84 years				≥ 85 years				All ages	
	Males (n = 91)	Females (n = 75)	%	%	Males (n = 335)	Females (n = 234)	%	%	Males (n = 149)	Females (n = 83)	%	%	Males (n = 29)	Females (n = 23)	%	%	Females (n = 415)	Both sexes (n = 1019)
Cardiovascular disease	16.5	25.3	27.8	29.9	27.8	29.9	27.8	36.2	34.9	34.9	41.4	43.5	28.8	30.8	29.6	29.6	30.8	29.6
Digestive tract disorder	24.2	22.7	25.7	25.6	25.7	25.6	35.6	35.6	33.7	33.7	44.8	47.8	28.8	28.0	28.5	28.5	28.0	28.5
Hypertension	18.7	32.4	20.8	24.3	20.8	24.3	27.4	27.4	25.6	25.6	17.2	34.8	21.9	26.7	23.6	23.6	26.7	23.6
Type 2 diabetes mellitus	4.4	36.0	17.9	31.2	17.9	31.2	28.9	28.9	24.1	24.1	13.8	39.1	18.4	31.1	23.5	23.5	31.1	23.5
Arthritis	12.1	24.0	20.6	18.4	20.6	18.4	32.2	32.2	27.7	27.7	37.9	13.0	23.0	21.0	22.2	22.2	21.0	22.2
Kidney and urinary tract disorder	12.1	6.7	24.2	9.0	24.2	9.0	17.4	17.4	9.6	9.6	17.2	8.7	22.0	8.7	16.6	16.6	8.7	16.6
Fracture	4.4	8.0	17.9	18.4	17.9	18.4	26.2	26.2	16.9	16.9	10.3	30.4	15.4	17.3	16.2	16.2	17.3	16.2
Ear problem ^a	6.6	4.0	12.5	9.4	12.5	9.4	15.4	15.4	14.5	14.5	41.4	21.7	16.4	10.6	14.0	14.0	10.6	14.0
Lung disease	14.3	5.3	14	8.5	14	8.5	19.5	19.5	24.1	24.1	13.8	26.2	14.9	9.9	12.8	12.8	9.9	12.8
Eye problem ^b	5.5	9.3	7.2	12.0	7.2	12.0	19.5	19.5	24.1	24.1	13.8	26.2	10.3	14.7	12.1	12.1	14.7	12.1

^aHearing loss; ^bCataract, glaucoma.

multiple logistic regression models of associations between risk factors and presence of cardiovascular disease (Table 7) showed that hypertension (OR 3.94, 95% CI: 2.87–5.40, $P < 0.001$) and diabetes mellitus (OR 1.83, 95% CI: 1.32–2.55, $P < 0.001$) were strongly associated with presence of cardiovascular disease, but sex, smoking, overweight and lack of activity were not.

Discussion

Population ageing is a well recognized phenomenon in developed countries, but developing countries now are ageing much faster than industrialized countries. In 2008 313 million people in the world, 62% of those aged 60 years and over, lived in developing countries. Reduction in fertility rates, improvements in life expectancy, urbanization, access to better health care and rising income and educational levels have led to this dramatic increase in the ageing population. Noncommunicable diseases are now the major causes of death in the world [2]. As part of the effort to prevent and treat health problems in elderly people, we conducted a study to identify common chronic diseases of elderly people in the town of Amirkola in northern Islamic Republic of Iran.

We found that 83.0% of people aged 60 years and older in Amirkola had at least 1 diagnosed chronic disease. This is similar to other studies of older people using self-report data, which found that the prevalences of at least 1 chronic disease in Turkey [6], South Korea [11] and India [12] were 80%, 78% and 89% respectively. In a nationally representative study in the United States, the prevalence of at least 1 chronic disease in people aged 65 years and over was 82% [13]. In a study in Ireland, based on a pharmacy database, 86% of those aged 70 years and over had at least 1 chronic disease [14]. In our study in the Islamic Republic of Iran, 64% of the subjects had at least 2 chronic diseases, a result similar to that found in South Korea (47%) [11], but lower than in a study in India (83%) [12]. Caution is needed when comparing the prevalence of chronic diseases between studies because of differences in the age groups studied and sociodemographic characteristics of subjects, differences in the racial and ethnic origins of the study populations and the rates of unreported illnesses. In particular the prevalence of diagnosed disease will depend on the availability and accessibility of health services in an area.

As in other studies [6,11] women had a higher rate of reported morbidity than men in our study. This may be due to elderly women being more likely to be unemployed, widowed and inactive than men; women also tend to be more interested in their health and consequently seek more help for illness than men [6,11,14].

Table 3 Distribution of cardiovascular risk factors in older people in Amirkola

Risk factor	Males (n = 604)		Females (n = 415)		Both sexes (n = 1019)		P-value
	No.	%	No.	%	No.	%	
Hypertension	131	21.7	109	26.3	240	23.6	0.07
Diabetes mellitus	111	18.4	128	30.8	239	23.5	< 0.001
Smoking	174	28.8	14	3.4	188	18.4	< 0.001
Overweight and obesity	222	36.8	214	51.6	436	42.8	< 0.001
Lack of activity	376	62.3	307	74.0	683	67.0	< 0.001

In this study the most common chronic disease was cardiovascular disease, found in 29.6% of the sample. A previous study in the Islamic Republic of Iran found that the prevalence of cardiovascular disease in the northern Gulf region was 14.7% overall (age range 25–64 years) and 28.4% in the oldest age group studied (55–64 years) [15]. In a study in Turkey, the prevalence of reported cardiovascular disease was 28.5% in people aged 65 years and over [6]. The prevalence of reported hypertension in Amirkola was 23.6%. This is much lower than in studies of people aged 60 years and over in Turkey

(75.4%) [16], Taiwan (60.4%) [17] and India (48%) [18]. In the United States National Health and Nutrition Examination Survey (NHANES) the prevalence of hypertension was 70.8% in people aged 65 years and over [19]. The lower prevalence of diagnosed hypertension in Amirkola may be explained by poorer access to health care and the lack of a hypertension screening programme. It could also be due to dietary factors.

The frequency of diagnosed type 2 diabetes mellitus in Amirkola was 23.5%. This is similar to the prevalence of diabetes mellitus in studies

based on self-reports in Turkey (27%) [16] and South Korea (15%) [11]. The prevalence of diabetes in the age group 65 years and over was 13.7% in Australia [20] and 21% in the United States [19], based on blood glucose measurement. Urbanization, physical inactivity, unhealthy diet and obesity have been implicated in the etiology of diabetes [21].

Cancer was relatively infrequent in this sample of older people in Amirkola, which is possibly attributable to the risk of early death in this age group, leading to low prevalence, rather than low incidence, of cancer.

Overall 18.5% of participants in our study smoked (28.8% of men and 3.4% of women). The rate of smoking was 28% in Lebanon [22], 20% in Turkey [16] and 61% in men in Korea [23] and 22% in men and 17% in women in Canada [24]. Since smoking is an important cause of chronic disease, education of the community about the adverse effects of smoking may help to reduce the occurrence of chronic diseases. Education should target all age groups, including older people.

In our study, 0.8% of elderly people were underweight and 44.1% were overweight or obese. This is lower than in the United States, where in the NHANES 70% of people aged 60 years and over were overweight or obese [25]. In contrast, in a national study in Turkey 49% of people aged 60–69 years and 38% of people aged 70 years and over were overweight or obese [26].

Table 4 Distribution of number of cardiovascular risk factors present in older people in Amirkola

No. of risk factors ^a	No. (n = 976) ^b	%
0	54	5.5
1	344	35.2
2	377	38.6
3	159	16.3
4	40	4.1
5	2	0.2

^aRisk factors were hypertension, diabetes mellitus, cigarette smoking, body mass index ≥ 25 kg/m² and lack of walking; ^bData were missing for 43 subjects.

Table 5 Distribution of body mass index (BMI) in older people in Amirkola

BMI category	Males (n = 593)		Females (n = 395)		Both sexes (n = 988)	
	No.	%	No.	%	No.	%
Underweight	4	0.7	4	1.0	8	0.8
Normal weight	368	62.0	177	44.8	545	55.1
Overweight	200	33.7	182	46.1	382	38.7
Obese	21	3.5	32	8.1	53	5.4

Table 6 Presence of cardiovascular disease by cardiovascular disease risk factor in older people in Amirkola

Risk factor present	Cardiovascular disease present		P-value
	Yes (n = 302) %	No (n = 717) %	
Smoking	15.6	19.0	0.186
Hypertension	44.0	15.4	< 0.001
Diabetes mellitus	33.8	19.2	< 0.001
BMI > 25 kg/m ²	11.6	8.2	0.095
Lack of activity	67.4	67.3	0.958

BMI = body mass index.

Table 7 Multiple logistic regression analysis of the association between cardiovascular risk factors and cardiovascular disease in older people in Amirkola

Risk factor	Age-adjusted OR	95% CI	P-value	Multiple logistic regression ^a		P-value
				OR	95% CI	
Age	1.04	1.02–1.06	< 0.001	1.04	1.02–1.06	< 0.001
Sex	1.12	0.85–1.48	0.41	0.96	0.69–1.33	0.81
Smoking	0.84	0.58–1.21	0.35	0.89	0.59–1.33	0.57
Hypertension	4.39	3.22–5.98	< 0.001	3.94	2.87–5.40	< 0.001
Diabetes mellitus	2.08	1.53–2.83	< 0.001	1.83	1.32–2.55	< 0.001
BMI ≥ 25 kg/m ²	1.06	0.80–1.39	0.68	1.04	0.76–1.42	0.78
Lack of activity	0.94	0.71–1.26	0.67	0.95	0.68–1.32	0.76

^aCombining all variables in the model.

OR = odd ratio; CI = confidence interval; BMI = body mass index.

Our study had several limitations. First, Amirkola is a small town in the northern region and so we are not able to generalize these findings to the national population of the Islamic Republic of Iran. A related issue is that undiagnosed conditions would not have been captured by our data collection method. Finally, in a cross-sectional study, the cause and effect relationship between risk factors and disease is difficult to assess. To resolve this problem, we are planning a cohort

study of the entire older population of Amirkola.

Conclusion

This study provides a valuable insight into chronic diseases among older people in this part of northern Islamic Republic of Iran. Given the high prevalence of chronic diseases, especially cardiovascular diseases, a national policy on the health of older people is needed that includes a

screening programme for hypertension and diabetes among older people.

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