Prevalence and Correlates of Major Chronic Illnesses among Older Kuwaiti Nationals in Two Governorates

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Key Words

Hypertension prevalence • Diabetes prevalence • Heart disease prevalence • Kuwait • Chronic illnesses

Abstract

Objective: To provide community-based information on the prevalence of diabetes, hypertension and heart disease and to highlight their significant correlates. **Materials and Methods:** Data were collected in a cross-sectional household survey of 2,487 Kuwaiti nationals aged 50 and over in 2005/2006. A proportionately representative sample of 1,451 respondents from a relatively more urban area (Capital) and 1,036 respondents from a relatively less urban area (Ahmadi) were interviewed. A proxy respondent was used in 5.4% of cases. Among the 2,605 potentially eligible persons approached, 2,487 (95.5%) participated. **Results:** Doctor-diagnosed prevalences of hypertension, diabetes and heart disease in the two governorates were reported to be 53.4, 50.6 and 17.5%, respectively. If the prevalence in the two governorates is reflective of the nation, a remarkable increase seems to have occurred since 1996. The prevalence of each of the three diseases increased linearly by age among both sexes. Comorbidity of the three diseases increased from 3.6 to 9.4 and to 20.9% among those aged 50–59, 60–69 and ≥ 70 years, re-

spectively. Logistic regression showed the prevalence of chronic illnesses to be significantly higher among persons who were older, retired, non-Bedouin, less educated, had higher income, were less socially active, were obese and had poorer exercise behavior. The prevalence of diabetes and heart disease was significantly lower among women than men. **Conclusion:** Judging from data on two governorates, the prevalence of diabetes, hypertension and heart disease is likely to have increased to alarmingly high levels among older Kuwaitis, highlighting the need for focused intervention programs in order to reduce morbidity and increase healthy life years.

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Introduction

Lifestyles in Kuwait have changed rapidly since the country has developed over a period of 50–60 years from a simple desert tribal community to a wealthy, modern society founded on an oil-based economy, with rapid advancements in the educational and health sectors. Kuwaiti nationals younger than 40 years are now almost all literate with practically no gap between the sexes [1]. In the past 35 years, the total fertility rate has declined from

about 7 to 4.1 per woman. Life expectancy has been assessed to be about 77 years, while infant mortality is now 8.1/1,000 live births [2].

With the increase in life expectancy of more than 10 years during the last four decades, the salience of chronic illnesses as contributors to morbidity among older Kuwaitis has increased. If the prevalence of chronic illnesses among older persons is high, this limits the number of years that are lived in a healthy or disability-free state. A community should therefore try to add healthy years to life expectancy by controlling the incidence of chronic illnesses. Within the above context, the objective of this paper is to provide community-based information on the prevalence of three major chronic illnesses, namely diabetes, hypertension and heart disease, among older Kuwaitis aged 50 and over in two governorates, Capital and Ahmadi. The second objective is to draw an epidemiological picture of the significant sociodemographic and behavioral patterns associated with such illnesses. A better understanding of such correlates is necessary for identifying those groups that are especially prone to develop ill health, both for providing health services and devising health education messages for the future.

The above three diseases constitute some of the major sources of morbidity and mortality in the country. Diseases of the circulatory system, including hypertension, constituted the leading cause of death accounting for 39% while diabetes mellitus accounted for 4.4% of all deaths among Kuwaiti nationals in 2005 [2]. Information on the prevalence of various chronic illnesses is not available in a systematic manner over time due to the lack of an ongoing system of health surveys, making comparative analyses difficult. Previous studies following different methodologies provide divergent results on the prevalence of chronic illnesses. A national health survey conducted in 1996 indicated the self-reported prevalence of diabetes, hypertension and heart disease among persons aged 50 and over to be 34, 27 and 12%, respectively [3]. Among volunteers measured during a 2-year period in mobile vans in the late 1990s, 44.4% of males and 58.3% of females aged ≥ 60 years were found to be hypertensive [4]. A study of two health regions, Mubarak and Farwaniya, reported the prevalence of type 2 diabetes to be 26.3% among Kuwaitis aged ≥ 60 years [5]. Among children and youths aged 6–18 years, the prevalence of type 2 diabetes was reported to be 34.9/100,000 in 2000–2002 [6].

High rates of diabetes and hypertension have also been reported from other Arab populations. A household survey in Saudi Arabia reported the prevalence of diabetes among those aged 30–70 years to be 23.7%, 26.2% among

males and 21.5% among females [7]. Among Israeli Arabs with a mean age of 38.4 years the level of hypertension was reported to be 26.7% [8], while it was reported to be 32.7% among national women aged 65–69 years in Abu Dhabi [9].

Materials and Methods

Data on prevalence and correlates of chronic illnesses were collected by a cross-sectional survey of Kuwaiti households conducted during April 2005 to December 2006 where 2,487 men and women aged 50 and over were interviewed by trained Arabic-speaking interviewers. Non-Kuwaitis were not included in the study. Kuwait is divided administratively into six different areas (governorates). Our survey was conducted in two governorates, representing both extremes in terms of urbanization in a country that may virtually be described as a city state. Capital was chosen to represent the most urbanized area and Ahmadi to represent one of the two least urbanized areas. In January 2005, these two governorates had 41,205 persons aged ≥ 50 years, about 60% in Capital and 40% in Ahmadi. A proportionately representative sample was therefore chosen from each governorate. Our objective was to interview about 800 persons from each group aged 50–59, 60–69 and ≥ 70 years. The target number was chosen on the basis of the belief that this number would give us reliable estimates of the prevalence of major chronic illnesses. Based on previous research we assumed the prevalence rates to be about 35–40%. In order to find a prevalence rate of 35% at an accuracy level of 0.05, we would have needed a sample of 364 persons. We targeted more than twice that number in order to find reliable estimates disaggregated by sex and other sociodemographic characteristics.

In order to reach the above target number, we used a multi-stage cluster sampling technique. Within each governorate, residential areas (mantaqas) were randomly selected. Each mantaqa comprises subareas or qitaas that were randomly selected at the next stage. Within each selected qitaa, all households were visited and households with at least 1 person aged ≥ 50 years were included. Of the 1,903 eligible households 78.3% agreed to participate. These households had a total of 2,605 persons aged ≥ 50 , of whom 2,487 (95.5%) participated in the study. A total of 1,451 individuals from the Capital and 1,036 from Ahmadi were successfully interviewed. Thus, 6% of the population aged ≥ 50 was covered in our survey. A proxy respondent, usually a close relative, was used in 5.4% of the cases where the respondent was not able to answer, primarily due to old age or functional impairment. The prevalence of the three diseases was higher among persons where a proxy was used, significantly so in case of diabetes and heart disease.

Approval for the study was received from the Ethics Committee of the Faculty of Medicine, Kuwait University. Verbal approval was sought from each respondent before interviewing him/her.

A questionnaire to measure the psychosocial health, physical health, disability and networks of social support was developed in English and then translated into Arabic. To assess the prevalence of chronic illnesses, the respondent was asked to report whether he/she had been diagnosed to be suffering from various illnesses,

Table 1. Self-reported doctor-diagnosed prevalence of major chronic illnesses among males and females by age

	Diabetes	Hypertension	Heart disease	n
Males				
50–59 years	65 (27.0)	74 (30.7)	22 (9.1)	241
60–69 years	172 (51.7)	169 (50.8)	53 (15.9)	333
≥70 years	252 (64.5)	262 (67.0)	131 (33.5)	391
All ages	498 (50.7)	505 (52.3)	206 (21.3)	965
Females				
50–59 years	214 (34.1)	201 (32.0)	43 (6.8)	628
60–69 years	304 (63.7)	263 (55.1)	77 (16.1)	477
≥70 years	321 (77.0)	289 (69.3)	108 (25.9)	417
All ages	839 (55.1)	753 (49.5)	228 (15.0)	1,522
Total				
50–59 years	279 (32.1)	275 (31.6)	65 (7.5)	869
60–69 years	476 (58.8)	432 (53.3)	130 (16.0)	810
≥70 years	573 (70.9)	551 (68.2)	239 (29.6)	808
All ages	1,328 (53.4)	1,258 (50.6)	434 (17.5)	2,487
Capital	762 (52.5)	738 (50.9)	268 (18.5)	1,451
Ahmadi	566 (54.6)	520 (50.2)	166 (16.0)	1,036

Figures in parentheses represent percentages.

a list of which was read out to him/her. This paper analyzes the self-reported, doctor-diagnosed prevalence of hypertension, diabetes and heart disease. Three types of explanatory factors were examined in relation to the prevalence of the above three diseases: (1) Seven sociodemographic variables including age, sex, marital status, working status, educational level, household income and ethnic background measured in terms of Bedouin or non-Bedouin self-identity; Bedouins constituted 16% of the Capital and 86% of the Ahmadi sample. (2) Three lifestyle factors included obesity level, smoking behavior and frequency of exercise; physical exercise was measured by a single question on the frequency of such activity during a week/month. (3) Social network support as measured by the respondent's frequency of participation in social activities, using a single question.

The significance of bivariate associations between the various explanatory factors and chronic illnesses was tested by using the χ^2 test. Multivariate analysis was conducted by using step-wise binary logistic regression in order to ascertain the relative strength of association of various predictors with the three chronic illnesses. A p value of <0.05 was considered to be significant.

Results

Compared to the national health survey conducted in 1996, our survey of two governorates showed that the prevalence of these diseases had increased substantially. The prevalence of hypertension, diabetes and heart dis-

ease was found to be 53.4, 50.6 and 18%, respectively (table 1).

The prevalence of the three diseases increased linearly by age in both sexes. Among males aged ≥ 70 , about two thirds suffered from diabetes or hypertension while one third had heart disease. Among women aged ≥ 70 , the prevalence of hypertension and diabetes was higher than among men while the percentage with heart disease was lower among women than men (26 and 34%, respectively). The prevalence of the three diseases in the studied governorates was very similar and the difference was not statistically significant.

The three chronic illnesses addressed in this paper were significantly correlated with each other. With increasing age, comorbidity of the three diseases increased markedly. For example, among all persons aged 50–59, 11.4% had only diabetes and 12.0% had only hypertension while 15.3% had both hypertension and diabetes. Among those aged ≥ 70 , on the other hand, 8–10% had either diabetes or hypertension while 37% had both the diseases. The percentage of those with all three diseases increased from 3.6% among those aged 50–59 to 9.4% among those aged 60–69 and 20.9% among those aged ≥ 70 (detailed results available from the authors).

Bivariate Associations

Cross-tabulations of chronic illnesses with the explanatory factors described in the Materials and Methods section (detailed results available from the authors) provided the following results. Significantly larger percentages of the nonmarried women reported suffering from hypertension as well as heart disease than currently married women, while there was no difference between the two groups in case of diabetes. Non-Bedouins reported a consistently higher prevalence of all three diseases than Bedouins. A significant inverse, linear association existed between educational level and prevalence of each of the three diseases. For example, about 64.1% of those with no education reported to suffer from hypertension compared with only 29.6% among those who had achieved an education beyond high school ($p < 0.001$). There was a significant positive association between prevalence of the three illnesses and per capita income. Those who were employed at the time of survey reported significantly lower prevalences of each of the three diseases than the retired subjects and those who had never worked.

Bivariate associations between the lifestyle factors and reported chronic illnesses were less consistent. Obesity was positively associated with hypertension, as expected,

Table 2. Logistic regression of hypertension among Kuwaitis aged ≥ 50 years

	B	SE	Odds ratio	Significance	95% CI
Age					
50–59 years	ref.				
60–69 years	0.891	0.121	2.44	<0.001	1.921–3.093
≥ 70 years	1.257	0.146	3.55	<0.001	2.638–4.684
Work status					
Currently working	ref.				
Retired	0.503	0.221	1.65	0.023	1.072–2.552
Never worked	0.669	0.234	1.95	0.004	1.234–3.086
Exercise					
Every day	ref.				
Often	0.506	0.261	1.66	0.053	0.994–2.767
Occasionally	0.651	0.258	1.92	0.012	1.157–3.180
Never	0.219	0.243	1.25	0.368	0.773–2.005
BMI					
Normal	ref.				
Overweight	0.216	0.142	1.24	0.129	0.939–1.639
Obese	0.595	0.140	1.81	<0.001	1.378–2.387
Ethnic background					
Bedouin	ref.				
Non-Bedouin	0.491	0.109	1.63	<0.001	1.320–2.022
Participation in social activities					
Frequently/often	ref.				
Occasionally/never	0.400	0.121	1.49	0.001	1.178–1.889
Respondents' education					
Illiterate/read and write	0.822	0.224	2.28	<0.001	1.466–3.532
1–4 grades	0.707	0.249	2.03	0.004	1.246–3.303
5–8 grades	0.402	0.201	1.50	0.045	1.008–2.217
9–12 grades	0.426	0.205	1.53	0.038	1.024–2.289
≥ 13 grades	ref.				
Income per capita, KD/month					
<200	ref.				
200–299	0.378	0.144	1.50	0.009	1.100–1.936
300–449	0.339	0.138	1.40	0.014	1.070–1.841
≥ 450	0.438	0.141	1.55	0.004	1.152–2.083

B = Regression coefficient; SE= standard error; CI = confidence interval; ref. = reference category. Model χ^2 364.181 (d.f. 18; $p < 0.001$).

but was not significantly associated with diabetes and was inversely associated with heart disease. Current smokers reported a lower prevalence of hypertension as well as heart disease in comparison with past and never smokers. Those who reported to exercise every day had a significantly lower prevalence of hypertension as well as diabetes compared with those who exercised less frequently or did not exercise at all. Finally, frequent par-

Table 3. Logistic regression of diabetes among Kuwaitis aged ≥ 50 years

	B	SE	Odds ratio	Significance	95% CI
Age					
50–59 years	ref.				
60–69 years	0.734	0.115	2.08	<0.001	1.663–2.608
≥ 70 years	1.273	0.126	3.57	<0.001	2.787–4.573
Exercise					
Every day	ref.				
Often	0.997	0.259	2.71	<0.001	1.630–4.502
Occasionally	1.038	0.258	2.82	<0.001	1.704–4.677
Never	0.488	0.245	1.63	0.046	1.009–2.631
Work status					
Currently working	ref.				
Retired	0.888	0.228	2.43	<0.001	1.556–3.799
Never worked	1.553	0.270	4.73	<0.001	2.782–8.027
Ethnic background					
Bedouin	ref.				
Non-Bedouin	0.497	0.098	1.64	<0.001	1.357–1.992
Gender					
Male	ref.				
Female	–0.570	0.184	0.57	0.002	0.394–0.810
Participation in social activities					
Frequently/often	ref.				
Occasionally/never	0.303	0.116	1.35	<0.01	1.078–1.701

B = Regression coefficient; SE= standard error; CI = confidence interval; ref. = reference category. Model χ^2 297.750 (d.f. 10; $p < 0.001$).

ticipation in social activities was inversely associated with each of the three illnesses.

Multivariate Associations

Logistic regression analyses of the significant predictors of the three illnesses are shown in tables 2–4. The tables are arranged according to the order in which the significant predictors entered the models. In case of hypertension, 8 of the 11 variables entered into the model were significantly associated with the prevalence of the disease (table 2). Compared with the youngest age group (50–59) the odds of suffering from hypertension were 2.4 times higher among those aged 60–69 and 3.6 times higher among those aged ≥ 70 . Retired persons and those who had never worked had significantly higher odds of suffering from hypertension than those who were currently working. Those who rarely exercised were almost twice as likely to suffer from hypertension as those who exercised every day. Obesity was significantly associated

Table 4. Logistic regression of heart disease among Kuwaitis aged ≥ 50 years

	B	SE	Odds ratio	Significance	95% CI
Age					
50–59 years	ref.				
60–69 years	0.595	0.180	1.81	0.001	1.274–2.583
≥ 70 years	1.113	0.189	3.04	<0.001	2.102–4.405
Smoking status					
Current smoker	ref.				
Past smoker	1.000	0.339	2.72	0.003	1.399–5.280
Never smoker	0.546	0.298	1.73	0.067	0.936–3.096
Respondents' education					
Illiterate/read and write	0.748	0.315	2.11	0.017	1.140–3.914
1–4 grades	0.170	0.356	1.19	0.633	0.590–2.383
5–8 grades	0.099	0.308	1.10	0.748	0.603–2.021
9–12 grades	0.279	0.322	1.32	0.386	0.704–2.482
≥ 13 grades	ref.				
Gender					
Male	ref.				
Female	–1.079	0.350	0.34	0.002	0.171–0.675
Ethnic background					
Bedouin	ref.				
Non-Bedouin	0.406	0.133	1.50	0.002	1.156–1.948
Work status					
Currently working	ref.				
Retired	1.079	0.444	2.94	0.015	1.233–7.027
Never worked	1.674	0.561	5.33	0.003	1.777–16.012

B = Regression coefficient; SE= standard error; CI = confidence interval; ref. = reference category. Model χ^2 172.931 (d.f. 12; $p < 0.001$).

with hypertension, with obese persons having a 1.8 times higher odds of suffering from the disease. Non-Bedouin respondents had a 1.6 times higher odds of suffering from hypertension than the Bedouin respondents. Those who occasionally or never participated in social activities were significantly more likely to suffer from hypertension than those who participated in such activities frequently or often. The odds of suffering from hypertension were inversely associated with the level of education. Those with no education were 2.3 times more likely to suffer from hypertension than those who had an education beyond high school. Finally, the relatively higher income respondents had higher odds of suffering from hypertension than the least affluent.

As in the case of hypertension, persons who were relatively older, did not exercise every day, were not currently working, were non-Bedouin and participated less fre-

quently in social activities had significantly higher odds of suffering from diabetes (table 3). In addition, females were about 0.6 times less likely to suffer from diabetes than males.

In the case of heart disease, relatively older persons, those who had no education, those who were not currently employed, and the non-Bedouins had higher odds of suffering from heart disease compared with their respective counterparts (table 4). In addition, females had significantly lower odds of suffering from heart disease than males. Smoking behavior also emerged as a significant predictor of heart disease. Past smokers were 2.7 times more likely to suffer from heart disease than current smokers.

Discussion

An analysis of 2,487 persons aged ≥ 50 years residing in randomly selected households in two of the six administrative regions of Kuwait showed the prevalence rates for hypertension, diabetes and heart disease to be 53.4, 50.6 and 17.5%. Prevalence rates in our study are relatively much higher than those of the last national study conducted in 1996, reported by Alnesef et al. [3]. The trend in Kuwait is similar to that in the USA where it was reported that the prevalence of hypertension increased between 1988 and 2004 by 10% and was recorded to be 67% among US adults aged 60 and above [10].

Prevalence rates in our study are based on self-reported doctor-diagnosed illness. Some previous studies indicate that awareness of diseases, such as hypertension, may be quite low in the general population. El-Reshaid et al. [4] indicated that only 23% of the volunteers in their study were aware of their hypertension. Underdiagnosis of hypertension has also been reported from the UAE [11]. If true among older persons in our study, the prevalence of hypertension, as well as diabetes, may be considerably higher than was reported to our interviewers.

Several demographic and lifestyle factors were associated with the three illnesses. Age was the strongest predictor of each of the three illnesses, as reported earlier [3]. It should be emphasized, however, that even among the relatively youngest group aged 50–59 in our study, about one third were suffering from hypertension and/or diabetes, indicating that these diseases begin at fairly young ages among Kuwaitis.

Lack of participation in the workforce was associated with higher odds of suffering from hypertension, diabe-

tes and heart disease. It is possible that persons suffering from chronic illnesses retired earlier than those who remained nondiseased. Those in the labor force at the time of the survey may therefore consist of the healthiest persons we interviewed. Those who had never worked had an especially higher risk of suffering from chronic illnesses compared to those working at the time of survey. Their odds of suffering from hypertension, diabetes and heart disease were 1.9, 4.7 and 5.3 times higher than those of the former group. The routine of going to work and contributing to society may be personally satisfying and may have helped the currently employed to develop habits that kept them healthier than those who had never worked or were retired.

Non-Bedouins had significantly higher risks of each of the three diseases than Bedouins. No previous studies on differences between the two groups are available in Kuwait with which we may compare our results. Previous research has shown the non-Bedouins to demonstrate more 'modern' or urbanized characteristics [12]. It is possible that the non-Bedouins were better informed about their chronic illness than the Bedouins. Alternatively, they may have adopted lifestyles that elevated their risk of chronic illnesses. Thus, if we assume that non-Bedouins represent relatively more urban characteristics than Bedouins, our findings are consistent with previous research indicating the risk of diabetes to be higher in urban than rural areas in the Eastern Mediterranean region [13] and in Saudi Arabia [7].

Consistent with previous studies [4, 8], obesity had a significant positive association with the risk of hypertension. Unlike previous research, e.g. that of Abdella et al. [5], however, obesity was not significantly associated with diabetes in our study, nor was it significantly associated with heart disease. In a cross-sectional study like ours, we were limited to a measurement of weight and height at the time of survey. We do not know whether respondents made any effort to lose weight once they were diagnosed as diabetic or to have heart disease, and our findings are therefore limited.

Physical exercise was found to be beneficial and those who did not exercise daily had a significantly higher risk of suffering from hypertension and diabetes than the ones who exercised daily. However, the pattern of association between the frequency of exercise and the prevalence of the two chronic illnesses was contrary to expectation. For example, respondents who exercised often or occasionally had higher odds (2.71 and 2.82) of suffering from diabetes than those who did not exercise at all (1.63). The preceding unexpected findings may have resulted

from the impreciseness of our measurement tools, or from biases in sampling.

The prevalence of hypertension was higher among women than men, which is consistent with previous studies from Kuwait [3, 4]. In the multivariate analysis, however, we found no difference in the prevalence of hypertension among women and men. Regarding gender differences in diabetes, prevalence was slightly higher among men than women in our study (52.3 and 49.5%, respectively). In the multivariate analysis, however, women had lower odds (0.57) of suffering from diabetes than men. Previous research presents mixed results on gender differences in diabetes prevalence among Kuwaitis. For example, Abdella et al. [14] reported the prevalence of diabetes to be higher among women in a clinic-based study of diabetics. The same authors reported in another study that the female-to-male ratio declined by age and in fact reversed [5]. Heart disease has been found to be higher among men than women in previous studies [3, 15], and our results are consistent with those studies. The adjusted odds of heart disease prevalence were about one third lower among women than men.

Frequent participation in social activities was associated with significantly lower odds of suffering from hypertension or diabetes. A circular association may exist between participation in social activities and experience of chronic illness. Those in better health may be socially more active since they are physically more able to do so. Conversely, prevalence of chronic illness may be lower in persons with greater social support implied by a larger participation in social activities, as found in earlier studies [16, 17].

The educational level of respondents was inversely associated with the odds of suffering from hypertension as well as heart disease. Those without any schooling were 2.3 times more likely to have hypertension and 2.1 times more likely to have heart disease than those with more than high school education. However, there was no significant net association between educational attainment and diabetes. Persons with a higher level of education are likely to have greater awareness of risk factors for chronic illnesses and may be better able to reduce the impact of such risk factors on their own health. A similar association between hypertension and illiteracy was reported by Sabri et al. [18], from a study among adults aged 20–65 in Al-Ain City, UAE.

Contrary to our expectation, those with a relatively higher level of per capita income had a higher risk of suffering from hypertension while no association between income and diabetes or heart disease was found in the

multivariate analysis. Our findings are not consistent with those of Sabri et al. [19], who found hypertension to be significantly higher among the low-income group in the UAE. The study by Sabri et al. [19] included UAE nationals as well as nonnationals, which might explain the contradictory results found in our study which was based only on Kuwaiti nationals.

Finally, past smokers had a 2.7 times higher risk of heart disease than current smokers, which seems contrary to expectation. It is possible that past smokers gave up smoking due to ill health after being diagnosed with heart disease. The changes in smoking behavior after diagnoses were not measured in our cross-sectional study.

Some limitations of our study are as follows. Our measurement of chronic illness was based on self-reports of doctor-diagnosed illness. While self-reports are regarded as a reliable means of collecting such information [20, 21], it is likely that cases where the respondent had no symptoms, or mild symptoms, would not have been discovered to be diabetic or hypertensive, as suggested previously by El-Reshaid et al. [4]. It is possible that groups with different income levels and ethnic backgrounds utilized health care services differentially, resulting in different levels of disease awareness that was then reported in our survey. Actual measurement of blood pressure and blood glucose would have rendered a more accurate picture but this was not possible, given the resources available for the study. In addition, our measurement tools such as exercise and smoking behavior may have suffered from imprecision. Finally, the findings of our study based on two governorates may not accurately reflect the prevalence of chronic illnesses in the country as a whole, even though we believe that the average estimates of the two governorates would be close to national estimates.

Conclusion

Hypertension and diabetes are not only a cause of death but are pathways to very serious illnesses including heart disease. Increased rates of these three chronic illnesses call for very urgent attention. Previous studies have lamented the weakness of existing public health programs to combat the rising prevalence of these diseases. Some efforts have been made to rectify this situation in the case of diabetes [22]. A major international conference on coronary heart disease held in Kuwait in 2001 highlighted the role of screening and identification of persons at a higher risk of developing heart disease and discussed public health measures to reduce such risks [23]. We would like to re-emphasize the importance of preventing or delaying the onset of these chronic illnesses and a recognition of the higher prevalence among older, nonworking and non-Bedouin citizens. Our specific recommendation is for the concerned authorities to increase their efforts aimed at controlling obesity, changing exercise habits and instituting focused programs to detect hypertension and diabetes at early ages.

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