Original Paper

Risk Factors of Chronic Non-Communicable Diseases in Urban and Rural areas in Kerbala Governorate

Hassan Ali Abood Nassrullah^*

^Department of medicine/ College of medicine/University of Kerbala/ Kerbala/ Iraq.

Abstract

Background: Urban and rural population have different life style, including diet, physical activity, habits, and this can have an influence on the prevalence of chronic none communicable diseases.

Objectives: To compare the prevalence of risk factors for chronic non-communicable diseases between urban and rural population sin Kerbala governorate in Iraq.

Methods: A cross-sectional survey was conducted from 16th Jan throughout Feb 2006 on the prevalence of none communicable diseases risk factors using the world health organization STEPS instrument. Data collected by direct interview with the 150 individuals adults (25-65 years old) from different parts of Kerbala governorate, 100 living in urban areas and 50 living in rural areas with nearly equal age and gender distribution. Data collected include demographic characteristics, lifestyle and risk factors (tobacco use, dietary habits regarding fruits and vegetables and oil or fat consumption, physical activity, and history of hypertension or diabetes mellitus). Physical examinations performed to measure blood, height, weight, body mass index, and waist circumference. Biochemical analysis tested the levels of glucose, high-density-lipoprotein cholesterol, low-density lipoprotein cholesterol, total cholesterol, and triglycerides.

Results: Income was lower in rural respondents. Smoking was more prevalent in rural respondents (35.4% vs. 19.4%). Fruits and vegetables consumption was higher in rural respondents. Participants consuming ≥ 5servings /day 27% in rural areas vs. 22.4% in urban areas. Low physical activity was high in both urban and rural participants 37.8% in urban and 43.8% in rural areas. Obesity and overweight was more prevalent in urban participants 70.8% vs 43.8% in rural participants. Hypertension was more prevalent in urban respondents 40% vs. 34% in rural. Fasting blood glucose showed impaired blood glucose and diabetes mellitus in urban respondents respectively 32.6% and 9.5% vs. 25% and 4.5% in rural. Hypercholesterolemia was more prevalent in urban participants 54% vs. 29.4% in rural while high-density lipoprotein cholesterol was lower in rural than urban participants (51.3% vs. 38%). Serum triglyceride was nearly the same in both urban and rural participants.

Conclusion: Risk factors in urban participants that were higher than those in rural participants were, low consumption of fruits and vegetables, high prevalence of overweight and obesity, HT, impaired blood glucose and DM, and hypercholesterolemia.

Smoking and low HDL cholesterol in rural participants were higher than those in urban participants.

Keywords: Chronic; Non-Communicable; Diseases; Risk Factors; Urban; Rural; Kerbala;

Abbreviations: NCDs (Non Communicable; Diseases), CVDs (cardiovascular diseases), WHO (World Health Organization)

Introduction

Chronic non-communicable diseases (NCDs) prevalence is increasing and

*For Correspondence: E-Mail Hassan.a.abood@gmail.com

cardiovascular diseases (CVDs) have a major share in these NCDs[1].

The epidemiological transition and adoption of western life-style by population e.g. Low physical activity, high-energy food and substance abuse e.g. Tobacco and alcohol. However, this life-style is adopted faster by the urban population than the rural population. Difference in the prevalence of CVDs has been notified in various studies with higher prevalence rate in urban areas[2].

Population in rural areas lead a healthier lifestyle compared to those in urban areas. Urban areas are equipped with the modern-day facilities including shopping malls, supermarkets, unhealthy food with high calories. Access to public transport does not incline them to take daily walks. In rural areas lack of sports facilities and a lower income, which often limits access to healthy food and an active way of spending their spare time. To have a healthy lifestyle depends on various environmental factors, such as the level of nutrition education, access to sports facilities, and eating habits. Little researches been conducted on comparisons of eating habits and physical activity between the urban and rural environments [3, 4]. Increase in urbanization of rural areas in most developing countries raises concerns of possibility of a major increase in nuggets in these countries[5]. Socio-economic status of rural population is lower than that of urban population[6, 7]. Smoking is more prevalent in urban population [8].

There are differences in dietary habits as increased consumption of fresh vegetables and fruits in urban population and the use of saturated fat, and in physical activity as rural population are more physically active[9].

Overweight and obesity, hypertension (HT), and diabetes mellitus (DM) were more prevalent in urban population [9-11]. Hypercholesterolemia and hypertriglyceridemia were more prevalent in urban residents [12].

The aim of this study was to compare risk factors for chronic NCDs in urban and rural population.

Subjects And Methods

This study representing in part a secondary review of data collected in Kerbala within the WHO/ STEP survey conducted in from 16th Jan till the end of Feb 2006 by the Ministry of Health with collaboration with the WHO all over Iraq.

A standardized WHO/ stepwise approach to surveillance questionnaire was adapted and used to obtain information about demographic characteristics (age, sex, education, employment, and household income), lifestyle and risk factors (tobacco use, dietary habits of fruits and vegetables and oil or fat consumption, physical activity, and history of HT or DM.

In Kerbala governorate approval of the general directorate of the health department to join in this survey was taken. Data collected by direct interview with the 150 individuals adults (25-65 years old) from different parts of Kerbala governorate, 100 living in urban areas and 50 living in rural areas.

Current daily smokers are labeled as smokers and ex-smokers are those who stopped smoking for any time.

For dietary habits, the respondents were asked the number of days per week they consumed fruits or vegetables and the number of serving each day, and fat used, vegetable oil or vegetable fat or animal fat or none.

Physical activity was assessed by asking the respondents the time spent doing different activities work, travel to and from places (transportation), and recreation [13].

The intensity of physical activity is categorized into:

a. Vigorous-intensity activity: defined as the activity, which causes large increases in breathing or heart rate, and sweating for at least 10 minutes continuously.

b. Moderate-intensity activity: defined as the activity, which causes small increase in breathing or heart rate for at least 10 minutes continuously.
c. Low-intensity physical activity: the remaining respondents who were not included in the previous categories.

Physical examinations performed to measure blood pressure 2 or 3 times, height, weight, body mass index (BMI), and waist circumference.

Within same survey further information were collected and blood sample taken, biochemical analysis (fasting for 12 hours) tested the levels of glucose, high-density-lipoprotein cholesterol (HDL), low-density lipoprotein cholesterol (LDL), total cholesterol, and triglycerides (TG). In the original survey, only total cholesterol was done, but we have added total lipid profile to the biochemical tests. An informed consent was taken from the respondents before the interview.

Normal blood glucose below 5.5mmol/l, impaired 5.5-7mmol/l, and diabetic above 7mmo/l.

Normal serum cholesterol considered below 5.2 mmol/l, normal HDL cholesterol above 1.04 mmol/l. Normal serum triglyceride ≥ 2.26 mmol/l.

Data analysis done using the SPSS version 17, Qualitative data expressed in numbers (No.) and percentages (%) while quantitative data expressed in means ± standard deviations. Chi square and t test used for statistical analysis of qualitative and quantitative variables respectively, and statistical significance considered when p value is less than 0.05.

Results

Out of the planned sample, 146 (97.3%) took part in the study. In urban areas, 2 were missing and 2 in rural areas. In urban areas there were57 (57%) men and 30 (60%) men in rural areas (Table 1).

The mean age for all the participants was (39.99±11.74), (40.35±11.79) in urban areas and (39.27±11.34) in rural areas. Ages in the both groups were comparable.

Mean income of the study group was318, 671±304024 Iraqi Dinar (ID)/month. The mean of urban individuals was 347, 900±334301, and of rural individuals was254, 512±213541 ID. Income was higher for urban individuals but statistically was not significant.

Smokers were36 individuals with a prevalence of 24.7%, being much higher in rural population statistically was significant (35.4% vs. 19.3%) (Table 2).

Results showed that the majority reported low frequency of fruit or vegetable consumption of <5servings per day (76%) (Table 2). The number of servings consumed by rural respondents was 3.7±1.4 vs3.4±1.4 for urban respondents, and for the total respondents was 3.5±1.7.

Most of the respondents households used vegetable gee (82%), 81% in urban and 85.4% in rural individuals. Rural responders use more vegetable gee and less vegetable oil than urban respondents but statistically was not significant (Table 2).

Regards the total daily physical activity, it was found that (14.4%) of the respondents practiced vigorous activity; 44.5% practiced moderate intensity activity. The remaining population (39%) reported low activity. Vigorous activity was more prevalent inurbane respondents (16.7% vs. 10.4%), and low activity was more prevalent in rural respondents (43.8% vs. 38.5%) (Table 2).

Table 1. Gender distribution according to residence

Gender	Urban No (%)	Rural No. (%)	Total No. (%)
Male	56(57.1%)	29(60.4%)	85(58.2%)
Female	42(42.9%)	19(39.6%)	61(41.8%)
Total	98(67.1%)	48(32.9%)	146(100%)

Table 2. Behavioral risk factors of the study population

Behavioral risk factor		Urban No. (%)	Rural No. (%)	Total No. (%)	P value
Smoking	Prevalence of Smoking	19(19.4%	17(35.4%)	36(24.7%)	0.034
	Ex- Smokers	5(5.1%)	1(2.1%)	6(4.1%)	
	None Smokers	72(75.5%)	29(62.5%)	101(71.2%)	
Vegetables & Fruits consumption	≥5 serving/day	22(23.2%)	13(27%)	35(25%)	0.027
	< 5 serving /day	73 (76.8%)	35 (72.9)	108 (75%)	
Fat consumption	Vegetable Oil	16(16.3%)	3(6.25%)	19(13%)	0.424
	Vegetable Gee	80(81%)	41(85.4%)	121(82.9%)	
	Animal Fat	1(1%)	2(4.2%)	3(2.1%)	
	None	1(1%)	2(4.2%)	3(2.1%)	
Physical Activity	Mild activity	36(37.9%)	21(43.8%)	57(39.8%)	0.32
	Moderate Activity	43(45.3%)	22(45.8%)	65(45.4%)	
	Vigorous Activity	16(16.8%)	5(10.4%)	21(14.8%)	
BMI	‹18.5	0	2(4.2%)	2	0.001
	18.5-24.9	28(29.2%)	25(52%)	53	
	25-29.9	38(39.6%)	15(31.3%)	53	
	≥30	30(31.2%)	6(12.5%)	36	

The BMI for the study group was 27.21±5.52, and for urban respondents 28.26±5.49 and for rural respondents 24.99±4.95statistically significant. More than half of the rural respondents had normal BMI vs. 29.2% of the urban respondents. Those differences were statistically significant (Table 2).

Thirty individual of the study group reported hypertension with a prevalence of 20.5% with equal prevalence in both urban and rural respondents. Mean blood pressure measurement results showed that 38% of the study group were hypertensive (SBP≥140 mmHg and/or DBP ≥90 mmHg), 40% of urban participants vs. 34% of the rural.

Based on medical notification, (4.1%) of the sample reported having diabetes mellitus with equal prevalence in both urban and rural respondents. Fasting blood glucose for the study group was5.61±2.4mmol/l, 5.78±2.7mmol/l in urban respondentsvs5.23±1.8mmol/l in rural. In spite of the difference but statistically was not significant (p value 0.213).Impaired blood glucose in the study group was 27.8% and 8.6% were diabetic. Impaired blood glucose was more prevalent in urban responders 30.2% vs. 22.7% in rural respondents. DM was more prevalent in urban respondents 9.4% vs 6.8% in rural but statistically was not significant (Table 3).

Lipid profile was missing in 16 participants of urban area and 10 of rural area. The prevalence of hypercholesterolemia (5.2mmol/l) in the study group was 46.4%, higher in urban respondents 54% vs. 29.4% in rural (Table 4).The mean serum cholesterol for the study group was5.22±1.2 mmol/l, 5.44±1.14 mmol/l for urban and 4.77±1.22 mmol/statistically significant (Table5).

The mean value of LDL for the study group was 2.9±1.2 mmol/l, higher in urban respondents3.2±1.3mmol/l vs2.2±0.97 mmol/l for rural respondents and it was highly significant (Table 5). Regard the HDL the mean value was higher in urban respondents and it was statistically significant (Table 5). Sixty-two percent of the urban participants had HDL cholesterol ≥ 1.04 mmol/l vs 48.7%.

Serum TG was above 2.26mmol/l in 22 individual in the study group, 17 in urban and 5 in rural responders (Table 4). The mean S TG for the study group was1.66±1.1mmol/l, 1.66±1.14mmol/l for urban and 1.64±0.9mmol/l for rural responders which was nearly similar (Table 5).

Table 3: Blood Glucose distribution according to residence

Blood Glucose	Residence		Total No. (%)
	Urban no. (%)	Rural No. (%)	
Normal(<5.5mmol/l)	55(57.9%)	31(70.5%)	86(61.9%)
Impaired(5.5-7mmol/l)	31(32.6%)	11(25%)	42(30.2%)
DM(>7 mmol/l)	9(9.5%)	2(4.5%)	11(7.9%)
	95	44	139

P = 0.134

Table 4. Frequency of abnormal serum lipids according to residence

	Urban No. (%)	Rural No. (%)	Total No. (%)
Total Serum cholesterol ≥5.2 mmol/l	52(54%)	13(29.4%)	65(46.4%)
HDL cholesterol ≥1.04 mmol/l	51(62%)	19(48.7%)	70(58.8%)
Serum Triglyceride>2.26mmol/l	17(20.7%)	5(13.5%)	22(18.5%)

Table 5. Mean Serum Lipids according to residence

Serum lipid	Urban	Rural	Total	P value
S. Cholesterol (mmol/l)	5.44±1.14	4.77±1.22	5.22±1.2	0.004
S. LDL cholesterol (mmol/l)	3.19±1.25	2.2±o.97	2.9±1.3	0.000
S. HDL cholesterol (mmol/l)	1.19±0.45	1.01±0.38	1.13±0.44	0.020
S. Triglyceride (mmol/l)	1.66±1.1	1.66±1.14	1.64±0.9	0.889

Discussion

This is the first study conducted in Kerbala governorate to compare risk factors for chronic NCDs in urban and rural residents. One third of Kerbala population live in rural areas according to the Ministry of planning in Iraq report published in 2006 [14].

Three notes to be taken in consideration in comparing urban and rural population risk factors for chronic NCDs:

1. Urbanization of rural areas[15].
2. Many of the inhabitants in rural areas are non-farmers and in this study, 22 participants were non-farmers, some are governmental employee, and others had private work… etc., but the majority adopts rural life style.
3. Income is lowering in rural.

The results showed a high response rate (97.3%).

The income in this study was lower for rural participants though statistically was not significant consistent with other studies [6, 7].

Smoking was more prevalent in rural respondents, statistically was significant consistent with other study conducted by Msyamboza, et al. 2011in Sub-Saharan African countries and another in Indonesia by Nawi 2005 [16, 17]. In another study conducted by Peer, et al. in 2013 in South Africa smoking was more prevalent in urban candidates [8].

Seventy-six percent of the study group consumes less than 5 servings of fruits and vegetables daily. Twenty-four percent of our participants consume more than 5 servings daily of fruits and vegetables, slightly more for rural respondents (27% vs. 22.4%). Results of this study is compatible with a study conducted in South Africa in 2004 by Vorester [18].A study conducted by Aryal in 2015, in Nepal in which 99% of the respondents consume less than 5 servings per day [19].

Physical activity was nearly equal for both urban and rural respondents, this can be explained by urbanization of rural areas, and adopting the urban life style and the clue for that as 22 of the rural participants are non-farmers (government employee, shopkeepers, taxi drivers, etc). Forty percent have low activity, 45% moderate activity, and only 14% vigorous activity. In a study conducted in Sub Saharan African countries physical inactivity was more common in urban areas, and the

same result was found in a study conducted in India[16, 20].

More than 50% of rural respondents had normal BMI vs. 29.2% for urban respondents, and 44% were overweight or obese in rural respondents vs. 70% for urban respondents. The mean BMI was higher in urban participants statistically highly significant. Though the physical activity was nearly the same for both groups the BMI was much lower for rural participants, which can be explained by lower calories' consumption, as calories consumption was not included in the questioner of this survey. Lower calories' consumption can be due to lower income of rural participants, eating habits, and lack of fast-food restaurants in rural areas. In a study conducted in Japan by Anh, stated that food consumption, dietary habits and lipid status varied with income levels and these results are consistent with other studies [8, 20-22].

Hypertension was more prevalent in urban participants and it can be explained by the high prevalence of obesity and overweight in urban respondents [23]. Our results are consistent with other studies [21, 23, 24].A study conducted in China by Xu Liang in 2006 hypertension was more prevalent in rural areas[25].

Self-reported DM was equal in urban and rural participants (4%), 4in urban and 2 in rural respondents. After fasting blood glucose testing 5 more of the urban participants discovered to be diabetic, but none in the rural participants. The prevalence of impaired blood glucose was higher in urban participants and this can be explained by the higher prevalence of obesity and overweight in urban participants. Our results are compatible with the results of a study conducted in Benghazi, Libya in 2001 by Kadoka [26]. In a study conducted in Malawi in Africa by Msyamboza, in 2009 the prevalence of impaired blood glucose and diabetes mellitus was higher in rural population[27].

The total serum cholesterol was higher in urban participants and it was highly significant and the same for LDL cholesterol, and this can be explained by the high prevalence of obesity and overweight in urban participants consistent with other studies[21, 28]. In a study conducted in Finland in 1975 rural population has higher cholesterol than urban population and the same result was found in Sweden[29].

HDL cholesterol was higher in urban participants and statistically was significant, consistent with a study conducted in Iran in 2008 by Fesharakinia, and another in Venezuela in 2006 by Holst[30, 31].

The mean of serum TG in both the urban and rural participants was nearly equal but 20.7% of urban participants had hypertriglyceridemia vs. 13.5% for rural and this result is consistent with other studies [30-32].

It can be concluded from this study that risk factors in urban participants that were higher than those in rural participants were:

1. Low consumption of fruits and vegetables,
2. High prevalence of overweight and obesity,
3. HT,
4. impaired blood glucose and DM
5. Hypercholesterolemia.

Risk factors in rural participants that were higher than those in urban participants were:

1. Smoking
2. Low high density lipoprotein cholesterol

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In conclusion, rural participants had less risk factor than urban participants did.

Our health system should be developed towards prevention and primary health care rather than treatment. Programs are needed to target promoting health and healthy lifestyle. We need to raise public awareness about healthy lifestyle (healthy food, increase physical activity, avoidance of smoking) and early detection of risk factors rather than diseases.

New survey with larger number of participants is needed for proper assessment of risk factors in chronic NCDs in Kerbala governorate.

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