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(OR=1.7, CI %95 = 1.42 – 2.09) [illegible] (OR=1.8, CI %95 = [illegible] .(1.70 – 1.20 = %95 CI ;1.4=aOR) [illegible] (2.96 – 09.1 CI ;1.2=OR) [illegible] – 1.14 = %95 CI ;1.3=OR) [illegible] (1.49 – 1.08 = %95 = [illegible] .(1.91 – 0.78 = %95 CI ;1.22=OR) [illegible] (53.1 [illegible] .[illegible]

ABSTRACT This study was conducted to examine the relationship between urbanization and risk factors of noncommunicable diseases (NCDs) according to the World Health Organization stepwise approach to surveillance of NCDs. This study is part of a NCD risk factor surveillance of 10 069 individuals in all provinces of the Islamic Republic of Iran, aged over 20 years, during 2011. By utilizing 2011 census data, urbanization levels were determined in all provinces and logistics regression was used to examine the relationship between urbanization and risk factors. Among males, urbanization had a positive correlation with low physical activity (OR=1.7; 95% CI: 1.42-2.09), low fruit and vegetable consumption (OR=1.8; 95% CI: 1.09-2.96), and high BMI (OR=1.4; 95% CI: 1.20-1.70). Among females there was a positive and significant correlation with low physical activity (OR=1.2; 95% CI: 1.08-1.49), low fruit and vegetable consumption (OR=1.22; 95% CI: 0.78-1.91) and high BMI (OR=1.3; 95% CI: 1.14-1.53). Thus, urbanization has a significant correlation with increases in NCD factors in the Islamic Republic of Iran.

Urbanisation et facteurs de risque de maladies non transmissibles (MNT) : approche STEPwise de l’OMS pour la surveillance des facteurs de risque de MNT en République islamique d’Iran en 2011

RÉSUMÉ La présente étude a été menée afin d’examiner la relation entre l’urbanisation et les facteurs de risque de MNT, selon le modèle de l’approche STEPwise de l’OMS pour la surveillance des maladies non transmissibles. L’étude s’inscrit dans la surveillance des facteurs de risque de MNT opérée sur 10 069 personnes âgées de plus de 20 ans dans l’ensemble des provinces de la République islamique d’Iran en 2011. À l’aide de données du recensement de 2011, les niveaux d’urbanisation ont pu être déterminés pour toutes les provinces, et la régression logistique a été utilisée afin d’examiner la relation entre l’urbanisation et les facteurs de risque. Parmi les hommes, l’urbanisation avait une corrélation positive avec une faible activité physique (OR = 1,7, IC à 95 % : 1,42-2,09), une faible consommation de fruits et légumes (OR = 1,8, IC à 95 % : 1,09-2,96) et un indice de masse corporelle élevé (OR = 1,4, IC à 95 % : 1,20-1,70). Parmi les femmes, il existait une corrélation positive et significative avec une faible activité physique (OR = 1,2, IC à 95 % : 1,08-1,49), une faible consommation de fruits et légumes (OR = 1,22, IC à 95 % : 0,78-1,91) et un indice de masse corporelle élevé (OR = 1,3, IC à 95 % : 1,14-1,53). L’urbanisation a donc une corrélation significative avec l’augmentation des facteurs de MNT en République islamique d’Iran.

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Introduction

It has been predicted that over 60% of the world population in low- and middle-income countries will be living in cities by 2030 (1). Certain lifestyle and environmental factors related to urbanization have a significant effect on health and noncommunicable diseases (NCDs). Urbanization is one of the main socioenvironmental factors which has a relationship with changing lifestyles as an important risk factor for NCDs (2). Previous research in low- and middle-income countries has indicated that NCD risk factors are more common in urban than in rural areas (3). In recent years, the increase in NCDs has been a common concern as a major cause of morbidity and mortality worldwide (4). It has been estimated that 33 million deaths in 2008 were due to NCDs, and this is predicted to reach 52 million by 2030 (5). Urbanization has an association with lifestyle and behavioural risk factors such as unhealthy diet and low physical activity (6–8). Evidence from South-East Asia has indicated that urbanization has a is associated with NCD risk factors such as low physical activity, unhealthy diet, overweight and high blood pressure (9,10). In the past few decades, traditional communities in low- and middle-income countries have experienced rapid, unplanned urbanization, which changed lifestyles and resulted in unhealthy diets, a sedentary lifestyle and smoking (11). In the past, urban and rural environments were significantly different; however, the distinction is less clear now due to recent advances (12). Many definitions of urbanization only use the simple dichotomous variable of urban and rural, making it difficult to understand the specific changes within the urbanization process that have led to changes in the main risk factors for NCDs (13).

In recent years, there has been a rapid change in lifestyle and demographic and socioeconomic status in the Iranian community due to the escalation in urbanization and industrialization. The aim of this study was to investigate the association between urbanization and the risk factors for NCDs, which may lead to the identification of new, more effective interventions in the prevention of chronic diseases.

Method

Study population and sampling

We assessed the association between urbanization and NCD risk factors using the data from the 2011 survey of NCD risk factor surveillance (STEPS) conducted by the Ministry of Health and Medical Education in the 31 provinces of the Islamic Republic of Iran (14). The study population was 10 069 people aged 20–70 years. A multistage random cluster sampling method

with probability proportional to size sampling was used.

Measuring urbanization

Principal component analysis is a multivariate statistical method to reduce the number of variables (15). This method was used to create the urbanization variable; overall score is based on the score obtained using the xtile quint command in SPSS (percentiles of 33.3 and 66.7) in 3 categories low, medium and high.

There is no global standard indicator to measure urbanization because the factors associated with urbanization in one region of a country are different from those of others countries. From analysis of previous studies, the indices that had the greatest effect on urbanization were identified and included in this study (13,16,17). Data on 24 variables measuring multiple aspects of urbanization (e.g. demographic and socioeconomic indices, human resources, communication, energy, the human development index for the province, and health and treatment indicators) were used to extract their underlying constructs. The principal components analysis-based index is a simple and robust measure whose values and groupings can only be moderately affected by changes in the urbanization landscapes. This multivariate statistical technique is used to reduce the number of variables in a data set into a smaller number of “dimensions” that are linear combinations of the original variables. Principal components analysis provides an objective way of aggregating the indicators so that variation in the data can be accounted for as concisely as possible. The urbanization index for all 31 provinces was calculated using this method and every province was classified into 3 urbanization levels. Variables such as average household size, population density, urbanization rate, average floor area of the dwelling unit per family member, economic participation rate, unemployment rate, employment in agriculture and industry, internet penetration, telephone and mobile penetration rate, percentage of villages with telephone communication, gas and electricity energy use per 1000 population, percentage of cities and rural areas with gas facilities, proportion of physicians per 1000 population, proportion of nurses per 1000 population, proportion of specialist physicians per 1000 population, and the human development index for each province were included in the analysis.

Risk factors

The data from the first and second stages of the 6th survey of risk factors for NCDs in 2011 in the Islamic Republic of Iran were used in this study (14). The NCD risk factors suggested by WHO such as demographic (residential location, age, gender, education, and job), nutrition (fruit and vegetable consumption), behavioural (smoking and physical activity), and anthropometric and blood pressure measurements were used in this survey. Anthropometric measurements include height, weight and body mass index (BMI) as an indicator of obesity. Blood pressure was measured 3 times at 3 minute intervals in a sitting position using an Omron electronic sphygmomanometer with an accuracy of 1 mmHg. Smoking was defined as daily cigarette

and/or water-pipe consumption, low fruit and vegetable consumption as 90 mmHg (16).

Outcome variable

We calculated the risk factor prevalence for each outcome within each level of urbanization. In addition, we investigated the relationship between risk factor and level of urbanization. Following WHO guidelines (19), we calculated the average consumption unit of fruits and vegetables a day, BMI, systolic and diastolic blood pressure, and age of starting smoking.

Statistical methods

The principal components analysis method was used to calculate the urbanization variable. Descriptive analysis was reported using descriptive statistics for every level of urbanization. The Kolmogorov–Smirnov test was utilized to assess the normality of variables. The 2-way Kruskal–Wallis test was used to assess the association between every continuous exposure variable and level of urbanization. Binary logistic regression analysis was used to explore the association between NCD risk factors and urbanization level. P-value

Results

Urbanization index

Urbanization scores ranged from –1.34 to 3.83 (Table 1). These were divided based on the scores obtained from xtile quint command (percentile of 33.3 and 66.7) into 3 categories: low, medium and high. Table 1 shows the distribution of provinces according to urbanization index. In the principal components analysis, variables such as internet penetration and provincial human development index achieved the greatest weight in comparison with other variables related to urbanization.

Demographic characteristics

The study population was aged 20–70 [overall mean 43.00 (standard deviation 15.34)] years (Table 2). Individual education levels were higher with greater urbanization: 35.7% of those living in areas of low urbanization were illiterate while only 20.2% of those living in areas of high urbanization were illiterate. There was also a significant difference in terms of employment among different urbanization levels (P
Table 2
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Urbanization and noncommunicable disease risk factors

Tobacco

The prevalence of smoking among men was similar in all 3 urbanization levels (Table 3). In

univariate logistic regression analysis, there was no significant association between smoking and urbanization among men (OR = 1.02, 95% CI: 0.84–1.24 for medium and OR = 0.90, 95% CI: 0.74–1.10 for high versus low levels of urbanization) or women (OR = 0.70, 95% CI: 0.50–0.99 for medium and OR = 0.85, 95% CI: 0.61–1.19 for high versus low levels of urbanization) (Table 4). In multiple logistic regression analysis after adjustment for age, there was still no significant association between smoking and urbanization in men and women. Among those living in higher levels of urbanization, the average age of starting smoking was lower in both sexes, and smoking was more prevalent among women (Figure 1A).

Low physical activity

Urbanization had an inverse association with physical activity in both sexes: the prevalence of low physical activity increased significantly with increased urbanization (Table 3). In multiple logistic regression analysis after adjustment for age, there was a statistically significant association between low physical activity and urbanization in men (OR = 1.58, 95% CI: 1.30–1.91 for medium and OR = 1.72, 95% CI: 1.42–2.09 for high versus low levels of urbanization) and women (OR = 1.36, 95% CI: 1.15–1.60 for medium and OR = 1.26, 95% CI: 1.08–1.49 for high versus low levels of urbanization) (Table 4).

Low fruit and vegetable consumption

In both sexes, the prevalence of low fruit and vegetable consumption increased with increased urbanization, but this was significant only for men (Table 3). With increasing urbanization, the odds of low consumption of fruits and vegetables increased. Men who were living in provinces with a medium level of urbanization were 2.10 times more likely (crude OR = 2.10, 95%CI: 1.26–3.48) and those living in provinces with a high level of urbanization 1.81 times more likely (crude OR = 1.81, 95%CI: 1.10–2.98) to have low fruit and vegetable consumption in comparison with those living in areas with a low level of urbanization. This association did not change after adjustment for age in multiple logistic regression. This positive relationship was also seen in women, but it was not statistically significant (Table 4). We also found a small difference between the mean servings of fruits and vegetables consumed per day for both sexes at different levels of urbanization (P
Table 5
and
Figure 1B
).

High body mass index

The prevalence of higher BMI levels (obese and overweight) in both sexes was positively related to increased urbanization (Table 3). The odds of men having high BMI levels in medium and high levels of urbanization were 1.18 (crude OR = 1.18, 95% CI: 0.99–1.40) and 1.44 (crude OR = 1.44, 95% CI: 1.21–1.71) in comparison with lower levels of urbanization (Table 4). There was also a significant association between high BMI and urbanization in women (OR = 1.21, 95% CI: 1.05–1.29 for medium and OR = 1.30, 95% CI: 1.13–1.50 for high versus low levels of urbanization). These associations did not change after adjustment for age in multiple logistic regressions. Moreover, a statistically significant association was observed between urbanization and mean BMI in both sexes as a continuous variable (P Table 5 and Figure 1C).

High blood pressure

A higher prevalence of high blood pressure was observed in areas with medium levels compared with areas with low levels of urbanization for both sexes (Table 3). The same observation was not seen for areas with high levels of urbanization. In univariate logistic regression analysis, there was a significant association between high blood pressure and urbanization in men (OR = 1.25, 95% CI: 1.00–1.57) for medium versus low levels of urbanization and women for medium (OR = 1.29, 95% CI: 1.08–1.54) and for high (OR = 0.78, 95% CI: 0.64–0.94) versus low levels of urbanization. This association did not change after adjustment for age in multiple logistic regression (Table 4). In addition, using the Kruskal–Wallis test, mean systolic and diastolic blood pressure had a significant association with level of urbanization in both sexes (P