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Predictors of Multimorbidity among the Iranian Kurdish Population

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Research article

Keywords: Prevalence, Multimorbidity, Sociodemographic, Lifestyle, Kurdish people

Posted Date: October 16th, 2019

DOI: https://doi.org/10.21203/rs.2.16106/v1

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Version of Record: A version of this preprint was published on July 11th, 2020. See the published version at https://doi.org/10.1186/s12889-020-09214-2.

Abstract

Background: There is limited information about the predictors of multimorbidity (MM) among ethnic minority older adults in Iran. This study aimed to examine the impact of sociodemographic and lifestyle factors on the prevalence of MM, among older Kurdish people living in the Northwest of Iran.

Methods: sociodemographic and lifestyle factors as well as self-reported chronic conditions, was obtained by trained interviewers. Descriptive analysis and logistic regression were performed to compare the prevalence of MM according to different factors. Results: Over a third of the participants (36.6%) had ≥2 chronic conditions and 15.7% had ≥3 chronic conditions. Hypertension, diabetes, musculoskeletal conditions, fatty liver, and heart diseases were common chronic conditions. In a fully adjusted logistic regression model, older age (ORadj=1.92, 95% CI: 1.48-2.48), being female (ORadj=1.49, 95%CI: 1.14-1.94), living without a spouse (ORadj=1.81, 95%CI: 1.34-2.44), and inadequate consumption of fruit and vegetables (ORadj=1.33, 95%CI: 1.06-1.67) were associated with the higher prevalence of MM.

Conclusion: This study found that the prevalence of MM is relatively high among older Kurdish adults. Sociodemographic differences in the prevalence of MM might be of interest to the health care system, and the prevalence of common chronic conditions in this study may highlight the need for lifestyle modifications in this community.

Background

Population ageing has led to concerns about increased multimorbidity (MM) which is defined as the “coexistence of two or more chronic diseases in the same individual” (1). It affects both individuals and health care systems, making this a global health challenge (2, 3).

A range of studies have investigated the prevalence and predictors of MM in different countries and reported the variable prevalence of MM ranging from 13.1% to 71.8% around the world (4). Results of a systematic review of studies conducted in primary care settings published between 1961 and 2013 included a total of 70,057,611 patients in 12 countries reported a variable prevalence ranging from 12.9% to 95.1% (5). This variation might be explained by the heterogeneity in the data collection methods and the operational definition of MM (4, 6). MM has been reported to be associated with poor quality of life (6), increase health care costs and utilization (7), functional decline (8) and death (9).

In Iran the proportion of older adults is growing rapidly, it is predicted that by 2050 the percentage of the aged population will increase to 29.4% and be comparable with that of the United States (10). Non-communicable diseases (NCDs) are a leading cause of morbidity and mortality in Iran (11, 12). However, research about MM in Iran is scarce. The results of two studies based on data from the Golestan cohort study; a large-scale cohort study in a high incidence area of oesophageal cancer in northern Iran mainly among the Turkmen ethnic group, reported a prevalence of MM of 19.4%. Moreover, the study showed that women were more likely to present with MM (13, 14). The most common chronic diseases reported in Golestan studies were gastroesophageal reflux disease, cardiovascular diseases, diabetes and chronic

obstructive pulmonary disease. Apart age and sex, other factors associated with a higher prevalence of MM were ethnicity, low socioeconomic status, physical inactivity, overweight/ obesity, former smoking, opium and alcohol use (13, 14).

Iran is a multi-ethnic country which includes Persians, Kurds, Lurs, Arabs, Baluchs, Turkmen and Turkic tribes with different sociocultural values influencing their lifestyles. Kurds are ranked as the third-largest ethnic groups following Persians and Azari people compromising about 10% of the population. They live mostly in the Northwest and West of Iran, which borders Iraq and Turkey. There is little known about the health and wellbeing of older Kurdish adults, especially as no published data is available about the prevalence of MM among this population (15).

The current study sought to redress this lack of evidence by investigating the prevalence of the MM and to examine the association between a range of sociodemographic, lifestyle factors and the prevalence of the MM in the Kurdish population. Previous data regarding the prevalence of MM and its related factors are based on the Golestan cohort study, which includes a specific minority group; Turkmen people mainly reside in rural areas. The current analysis was based on the information from the baseline of the Bukan Ageing Study (BAS) which was conducted among urban residents of Bukan, West Azerbaijan Province, in the Northwest of Iran with an estimated population of 194,846 in 2017. To the best of our knowledge this is the first study of its kind in the world to look at the prevalence of MM amongst Kurds living in Iran.

Methods

- Study Population

The current study was conducted in Bukan city, which is located in West Azarbaijan province in the Northwest of Iran. Its population was about 195,000 based on the 2017 official estimation. People in this area are almost entirely from the Kurdish-speaking community. Kurdish people follow their sociocultural values and mostly belong to the Sunni brach of Islam. The data for this study was based on the enrolment phase of the BAS which is the first comprehensive longitudinal study on ageing among the Kurdish population aged 50–94 years in Iran aims to investigate the health status of older Kurdish adults over time. Stratified random sampling was used to select the study population from eight health centres in Bukan from Oct 2017 to Dec 2018. There was a recently updated list of people aged 50 years and older in these health centres from which we selected the study population. The study staff invited them through a phone call. An interview was scheduled for those who accepted to participate in health centres during official hours. In overall, they contacted 2000 persons, of whom 341 (57% men and 43% women) were not interested in taking part in the study. Of those who accepted 166 were not eligible for and were not included. The overall response rate was 75% (N = 1493).

The study outcome was the percentage of the population who reported having MM (≥ 2 chronic diseases). This was based on the study participant's response to the question 'Has a doctor ever told you that you have any of the following health problems? We included a list of 36 diseases/conditions in this

analysis including: gastrointestinal conditions (peptic ulcer, Chron's disease, ulcerative colitis, fatty liver) heart diseases and hypertension, neurologic diseases (stroke/Transient Ischemic Attack (TIA), epilepsy, Parkinson, migraine, headache, Alzheimer/dementia, MS), musculoskeletal (arthritis, osteoporosis), endocrine conditions (diabetes mellitus, hypo/hyperthyroidism), respiratory diseases (Chronic Ostructive Pulmonary Diseases (COPD), asthma), cancer, and mental disorder (depression, anxiety), and psychological disorders. Because selected non-communicable diseases (NCDs) such as diabetes, hypertension are recorded for national prevention and control of NCDs programs we were able to validate some of the respondents self-reported medical conditions against their medical records by interviewers under the supervision of a General Practitioner. However, because we used a more comprehensive list of chronic conditions in the survey than are recorded in the medial records we were not able to do this for all conditions.

- Data collection and preparation

Information for this study was collected via an interviewer administered questionnaire. Interviewer also measured BMI via anthropometric height and weight. In analyses, a range of demographic, socioeconomic, lifestyle and clinical factors were examined. Age provided as a continuous variable also was categorised as 50–59, 60–69 and 70 years and over. Marital status was classified into two groups: married/living with a partner and divorced/separated/single/widow. Socioeconomic status indicators included educational qualification categorised as illiterate, and literate. Self-reported income adequacy was classified in 3 groups: I don't have a problem, it is enough for basic needs, or it is not enough for basic needs. Smoking behaviour was basd on whether respondents to identified themselves as a regular smoker or not. The Physical Activity Scale for the Elderly (PASE) was used to estimate the level of physical activity. It has been validated in previous studies in Iran (16). The PASE is a brief and specific instrument which has been designed for older adults to estimate physical activity recalled throughout one week (17). Frequency and time spent in a variety of activities including leisure time activities (walking; light activities, moderate, or strenuous intensity and muscle-conditioning activities) as well as work-related activities (in paid or volunteer work) and household activities such as light house-work, yard work, and caring for others were also recorded. After considering the weight for each activity, the final PASE score for the week was calculated based on the sum of all activities, and the mean score was presented. While, there are no specific cut points to categorize activity levels, our data were separated into tertile to categorize physical activity levels as high (≥121), medium (56.5–120.9) or low (<56.5) within each group for descriptive purposes; however the continuous score was used in regression analysis

Body Mass Index (BMI, kg/m2) was categorised as normal weight (<25), overweight (25–29.9), obese (≥30) based on WHO-defined standard cut off points (12). Self-rated health status was categorized as excellent/very good/good, fair/poor. Adequate consumption of fruit and vegetables; was measured by asking this question, "How many times do you eat fruits and vegetables a day?". It was subsequently categorised into two categories: inadequate 5-A-day; adequate 5-A-day.

- Statistical methods

Differences in the characteristics of people with and without MM were determined with the use of Student's t-test for continuous variables and the chi-square test for categorical variables. We calculated the odds ratios (ORs) and 95% confidence intervals (CIs) for multimorbidity by sociodemographic and lifestyle factors, and built two models; crude, and adjusted for socioeconomic and lifestyle factors (age, sex, education, marital status, income, BMI, physical activity, smoking, adequate fruit and vegetable intake, self-rated health status). Data were analysed using the STATA statistical package Version14, all estimates were reported with 95% confidence interval and a significance level 0.05.

Results

A total of 1493 participants responded to the baseline questionnaire and agreed to be followed up for the further waves of the study. The mean age of participants was 61.6±9.5, a majority (70%) were less than 65 years of age. Of whom 62% were women, 82.5% were married and living with their spouses, 65.6% were illiterate, (only 6% had an education level of Diploma and higher), only 21.7% reported that they have no financial difficulties and only 38.5% were involved in in-paid work. The majority of participants were overweight/obese (79%), about 11.7% reported that they were current smokers, 58% reported inadequate consumption of fruit and vegetables (less than five serving per day), 25.5% reported their general health as fair/poor. The mean score of PASE was 93.3± 61.7 ranged from 0 to 361.

Table 1 shows the baseline characteristics of the study participants who were with or without chronic conditions. The overall prevalence of multimorbidity (≥2 chronic conditions) was 36.6%, and 15.8% (≥3 chronic conditions). As it can be seen relative to those without any chronic conditions, participants with two or more conditions were older (P value<0.001), women (P<0.001), single/divorced/widowed (P<0.001), had more income difficulties (P = 0.001) and had a higher frequency of overweight/obesity (P = 0.094). Compared to those without any chronic conditions, participants with MM reported more frequently their health as fair/poor (P <0.001) (Table 1).

TABLE 1. ABOUT HERE

The results of a logistic regression adjusted for age and sex indicate that age, marital status, smoking, inadequate consumption of fruit and vegetables, and physical activity were associated with the prevalence of MM (≥2 chronic diseases). In a fully adjusted model, older age (Odds $Ratio_{adj}$ = 1.92, 95% Confidence Interval: 1.48–2.48), being female (OR_{adj} = 1.49, 95%CI: 1.14–1.94), living without a spouse (OR_{adj} = 1.81, 95%CI: 1.34–2.44), and inadequate consumption of fruit and vegetables (OR_{adj} = 1.33, 95%CI: 1.10–1.67) were associated with a higher prevalence of MM. In a fully adjusted model including MM ≥3 chronic diseases as a dependent variable, only age (OR_{adj} = 2.30, 95%CI: 1.66–3.18) and sex (OR_{adj} = 1.90, 95%CI: 1.32–2.72) remained significant (data not shown).

TABLE 2. ABOUT HERE

We reported the prevalence of certain chronic diseases to identify multimorbidity in this study population. We found that hypertension (31.5%), diabetes (17.3%), fatty liver (14.2%) and musculoskeletal conditions (21%) were the four chronic conditions most commonly reported. We found that women had higher rates of the majority of chronic diseases, while men had higher rates of cancer and stroke. We also found that except thyroid conditions, older adults (≥65 years old) had higher rates of classified chronic diseases (Table 3).

TABLE 3. ABOUT HERE

Discussion

The current study aimed to estimate the prevalence of multimorbidity and the factors associated with it among older Kurdish people in the Northwest of Iran. To the best of our knowledge this is the first such study of its kind. The overall prevalence of multimorbidity (≥2 chronic diseases) was 36.6 % (95% CI: 34.2–39.1) and the prevalence of ≥3 chronic diseases was 15.7% (95% CI:14–17.7) among people aged 50 and over. Previous studies reported the variable prevalence of MM, ranging from 13.1% to 71.8% around the world (4). Our prevalence was higher that the Golestan cohort study, which reported a prevalence of 19.4% (11). As mentioned previously, the variation in the prevalence of multimorbidity might be explained by the heterogeneity in the data collection methods and the operational definition of the MM (4, 6). In the current study, the longer list of chronic conditions was included than Golestan study. Other possible explanation might be differences between urban and rural lifestyle; our study population were urban residents while the majority were from rural areas in Golestan study.

There was a significant association between age and multimorbidity, many studies also reported the same results (18, 19), but our study found that it was about 30% of participants aged 50–59 years reported ≥2 coexisting chronic conditions and 11% reported ≥3 coexisting chronic conditions which merit attention. In this study, MM was higher among women than men who are in line with many studies (4). However, some studies reported no gender differences in patients attending primary care (20–22). This can be explained by the difference in the study population and the list of diseases included, for example in a study conducted in Switzerland; a list of 75 chronic conditions derived from the International Classification for Primary Care was used.

Overweight/obesity was not associated with MM in the current study, which is opposite to other studies (12, 23). That might be because the majority (79%) of our participants were overweight/obese. Overweight/obesity has become a global concern in recent years and is associated with a range of non-communicable diseases such as cardiovascular, diabetes, certain types of cancer and respiratory disease (24).

In this study, hypertension, diabetes, fatty liver, musculoskeletal conditions and heart diseases were prominent conditions. Globally, hypertension as the leading preventable cause of death affects more than 30% of the adult population (25), and diabetes is an emerging health problem with an estimated about half billion prevalent cases in 2017 which is on the rise throughout the world (26). Some studies included

hypertension in the list of diseases for classification of MM (20) and some not (19). This is because there is no consistency in the operational definition of MM yet, but diabetes and arthritis have been in the list of common comorbid conditions in published research (13, 20, 21).

Limitations

Despite its strengths of being the first report of MM based on a population-based study among Kurdish ethnicity, this study has some limitations; mainly because of the definition of the chronic conditions and its verification. Although we attempted to verify the self-reported chronic conditions with the medical records in health centres, a degree of missing information still exits due to undiagnosed conditions. Besides, the difference between the quality of medical records in health centres between developing and developed countries is also another consideration. Comparability between the results of MM in men and women might be used with caution due to the more willingness of women than men to participate in the study and due to the timeframe of the data collection which was during official hours. This might be difficult for some men to attend the health centre and we did not have facilities to extend the working hours or arrange a home visit for them.

Conclusions

This study found that the prevalence of MM is relatively high among Kurdish older adults. Sociodemographic differences in the prevalence of MM might be of interest to the health care system, and the prevalence of common chronic conditions in this study may highlight the need for lifestyle modification in this community.

Abbreviations

MM: Multimorbidity; NCDs: Non-communicable diseases; BAS: Bukan Aging Study; TIA: Transient Ischemic Attack; BMI: Body Mass Index; CI: Confidence Intervals; COPD: Chronic Ostructive Pulmonary Diseases; PASE: Physical Activity Scale for the Elderly; OR: Odds Ratio; ORadj: Adjusted Odds Ratio; ORcrude: Crude Odds Ratio

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the declaration of Helsinki and had ethics approval from the Tabriz University of Medical Science Ethical Review Committee (Ethical ID numbers: IR.TBZMED.REC.1395.1355) which is a nationally recognized Ethics Committee in Northwest of Iran, once the approval is received from one of the Ethics Committees, the further approval is not required. At the beginning of the study, informed consent was obtained in written forms from all of the participants after thorough explanation of the procedures involved.

Consent for publication

Not applicable.

Availability of data and materials

The data or analysis generated during this study is available from the corresponding author upon request.

Competing interests

Authors have no conflict of interest to declare.

Funding

The present study is funded by Tabriz University of Medical Sciences. The funding body had no role in the design, data collection, analysis, and interpretation of data and in writing the manuscript.

Authors' contributions

The author's contributions were as follows: All authors were involved in design of the protocol and preparation of the Human Research Ethics Committee application and all drafts of the manuscript. NA, LR, SMS, PS and MH were responsible for data preparation and analysis and SG supported data collection. All authors reviewed and contributed to all drafts of the manuscript.

Acknowledgements

This analysis was performed under a thesis grant for the Master's degree from the Department of Statistics and Epidemiology, Tabriz University of Medical Sciences. We gratefully acknowledge people who participated in this study and also the district health department for their collaboration.

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Tables

Table 1. General Characteristics of older Kurdish people living in the Northwest of Iran, the Bukan Ageing Study (BAS)

Prevalence of ≥3 chronic diseases, % row	Prevalence of ≥2 chronic diseases, % row	Number (%) total	Variable
65.8±10.6	63.8±10.3	61.6±9.5	**Age group (mean+- SD)**
10.5	30.2	771 (51.6)	50-59
16.0	36.8	419 (28.1)	60-69
28.7	52.5	303 (20.3)	≥70
			Sex
11.1	29.6	567 (38.0)	Men
18.6	40.8	926 (62.0)	Women
			Marital status
13.7	33.0	1232 (82.5)	Married*
25.6	53.4	262 (17.5)	Single/divorce/widow
			Education
17.8	38.5	980 (65.6)	Illiterate
12.1	32.9	513 (34.4)	Literate
			Family income
22.7	48.3	172 (11.5)	With major difficulties
14.8	34.0	994 (66.7)	Just enough
15.4	38.6	324 (21.7)	No difficulties
			Job status
10.1	28.7	575 (38.5)	In-paid work
20.8	40.7	221 (14.8)	Retired/no job
18.9	41.8	698 (46.7)	Housewife
			BMI
15.4	32.5	311 (20.9)	Less than 25
18.0	39.8	556 (37.3)	25-29.9
14.1	36.1	624 (41.9)	≥30
			Smoking (current)
18.9	41.7	175 (11.7)	*Yes*
15.4	35.9	1319 (88.3)	*No*
			Fruit and vegetables
17.6	40.4	846 (58.1)	<5 serving a day
13.8	31.4	611 (41.9)	≥5 serving a day
			Self-rated health
12.0	31.5	1113(74.6)	Excellent/very good/good
27.1	51.3	380 (24.5)	Fair/poor
92.1±61.9	96.9±62.2	93.3±61.6	**Physical activity (Mean ±SD)**
17.4	33.9	511 (34.2)	Low (<56.5)
14.0	37.1	485 (32.5)	Medium (56.5-120.9)
15.9	39.0	498 (33.3)	High (>=121)

Table 2. Predictors of multimorbidity among older Kurdish people living in the Northwest of Iran, the Bukan Ageing Study (BAS)

OR_3*** (CI 95%)	OR_2** (CI 95%)	OR_1* (CI 95%)	Variable
			Age (Ref group 50-64)
1.92 (1.48-2.48)	2.16 (1.72-2.71)	2.12 (1.69-2.66)	≥65
<0.001	<0.001	<0.001	P value
			Sex (Ref Men)
1.49 (1.14-1.94)	1.67 (1.34-2.10)	1.63 (1.30-2.03)	Women
0.003	<0.001	<0.001	P value
			Marital status (Ref Married/living with spouse
1.81 (1.34-2.44)	1.79 (1.27-2.27)	2.32 (1.78-3.05)	Single/divorce/widow
<0.001	<0.001	<0.001	P value
			Education (Ref Illiterate)
0.98 (0.76-1.26)	1.02 (0.80-1.29)	0.79 (0.63–.98)	Literate
0.885	0.895	0.035	P value
			Income (Ref with major difficulties)
0.86 (0.61-1.22)	0.75 (0.54-1.05)	0.58 (0.42-0.80)	Just enough / No difficulties
0.402	0.094	0.001	P value
			***BMI*¥ (Ref less than 25)**
1.18 (0.89-1.57)	1.15 (0.88-1.62)	1.26 (0.97-1.65)	≥25
0.257	0.311	0.084	P value
			Smoking (current) (Ref No)
1.40 (0.97-2.01)	1.44 (1.01-2.05)	1.28 (0.93-1.76)	Yes
0.074	0.044	0.137	P value
			Fruit and vegetable (Ref ≥5serving a day)
1.33 (1.06-1.67)	1.33 (1.06-1.66)	1.48 (1.19-1.84)	<5 serving a day
0.015	0.014	<0.001	P value
			Physical activity
1.00 (1.00-1.004)	1.002 (1.00-1.004)	1.002 (1.00-1.003)	Continuous variable
0.034	0.019	0.082	P value

*OR_1: Crude Odds Rati **OR_2: Age & sex adjusted Odds Ratio ***OR_3: Fully adjusted Odds Ratio

¥ BMI; Body Mass Index (Weight (kg)/Height^2 (m)

Table 3. Prevalence of common chronic conditions according to gender and age among older Kurdish people living in the Northwest of Iran, the Bukan Ageing Study (BAS)					
Prevalence (%)					Chronic disease
Age>=65, %	Age<65, %	Women, %	Men, %	Total	
41.3	27.2	33.4	28.4	31.5	Hypertension
18.5	16.8	18.1	16.0	17.3	Diabetes
2.9	1.5	1.9	1.9	1.9	Heart Attack
11.5	8.6	9.1	10.2	9.5	Other heart conditions *
16.6	13.2	16.3	10.7	14.2	Fatty Liver
29.6	17.1	25.3	13.9	21.0	Musculoskeletal conditions +
10.6	4.7	8.0	4.1	6.5	Depression/ anxiety
3.1	0.6	1.3	1.4	1.3	Stroke
3.3	2.6	3.2	2.1	2.8	Respiratory conditions**
1.8	4.3	4.6	1.8	3.6	Hypo/Hyperthyroidism
4.4	2.7	2.3	4.8	3.2	Cancer (any type)
1.3	0.6	1.1	0.4	0.8	Kidney failure
9.9	4.4	6.8	4.9	6.1	Neurological conditions***

*Including Angina, Heart failure, Abnormal heart rhythm

** Asthma, Chronic Obstructive Pulmonary Disease, Chronic bronchitis

+Arthritis/ osteoarthritis/ osteoporosis

*** Epilepsy, Multiple Sclerosis, Parkinson, Migraine, Headache, Alzheimer