

SHORT REPORT

Hypertension prevalence and control among community-dwelling lebanese older adults

Ghina Fakhri MD¹ | Sarah Assaad MPH^{2,3}  | Monique Chaaya DrPH³ 

¹Faculty of Medicine, American University of Beirut, Beirut, Lebanon

²Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK

³Department of Epidemiology and Population Health, Faculty of Health Sciences, American University of Beirut, Beirut, Lebanon

Correspondence

Monique Chaaya, DrPH, Department of Epidemiology and Population Health, Faculty of Health Sciences, American University of Beirut, PO Box: 11-0236, Riad El Solh 1107 2020, Beirut, Lebanon.
Email address: mchaaya@aub.edu.lb

Funding information

The study was funded by the Fogarty International Center, American National Institute of Health and National Institute of Aging, grant number 1R21AG039333-01 under the program "Brain Disorders in the Developing World: Research Across Lifespan (BRAIN)." The content is solely the responsibility of the authors and does not necessarily represent the official views of the funders.

Abstract

There is a high prevalence of hypertension among Lebanese adults, but no evidence is available on its prevalence and control exclusively among older adults (65 + years). This study provides the first evidence on a representative sample of 502 community elderly and presents the basis for future research and policy implications. Results show an overall prevalence of 52% with a significantly higher female-to-male ratio. Factors independently associated with hypertension were older age, body mass index, and dementia. More than a third of those with a positive history of hypertension had uncontrolled blood levels. Uncontrolled hypertension was higher among women. Increasing awareness about medication adherence and controlling multimorbidities constitute promising measures to lowering the burden of hypertension among Lebanese older adults, especially women.

1 | INTRODUCTION

Hypertension is one of the most important causes of cardiovascular mortality as it increases the risk of strokes and heart attacks.¹ The burden of hypertension is especially high among adults aged 65 + years ranging from 42% to almost 80% in low- and middle-income countries.²

In Arab countries, such as Lebanon, where the increase in the proportion of older adults is prominent, knowledge about hypertension prevalence and control is limited in the absence of updated national registries. Nonetheless, available evidence shows an increasing prevalence of hypertension throughout the years and low levels of awareness and control in the general Lebanese adult population.³⁻⁵ With the lack of data from an exclusive elderly population,

the re-examination of the burden of hypertension and the level of management of the disease is needed to allow for better prevention.

This study is the first in Lebanon to assess hypertension in the elderly population aged 65 + years. It also investigates the association of socio-demographic, economic, and health-related characteristics with hypertension diagnosis and control.

2 | METHODS

2.1 | Population and study design

The data are drawn from the 2013 Lebanese cross-sectional dementia study on community-dwelling older adults (65 + years).

Participants were selected from Beirut, the capital, and Shouf and Aley, two districts in Mount Lebanon, using a multi-stage random cluster sampling. Trained interviewers collected data from consenting participants and their informants during home visits. Other details on recruitment are presented in Phung et al.⁶

2.2 | Study measures

2.2.1 | Outcomes

The study focused on two outcomes: high blood pressure and hypertension control. Participants were asked about their history of hypertension, as diagnosed by a doctor, and antihypertensive medication intake using yes/no questions. Additionally, three consecutive measurements of blood pressures were taken using a SClan Digital Blood Pressure Monitor (Model LD-581). Short time intervals were allowed between each measurement taken while participants were seated. A mean systolic blood pressure (SBP) of 140 mmHg or higher, or a mean diastolic blood pressure (DBP) of 90 mmHg or higher indicated high blood pressure.⁷ Consequently, hypertension status was categorized into uncontrolled (positive history, medication intake, and high measured blood pressure), controlled (positive history, medication intake, and low measured blood pressure), and undiagnosed (negative history and high measured blood pressure).

2.2.2 | Covariates

The socio-demographic variables included age, sex, place of residence, marital status, and education. The latter was dichotomized into formal (school/technical institute, university, or postgraduate level) and informal (illiterate, reads, and writes) education. The behavioral characteristics included physical activity, tobacco smoking, and alcohol drinking. Physical activity was assessed as having done (or not) any walks of half a kilometer or more in the past month. Tobacco smoking was measured as ever smoking (or not) any tobacco product. As for alcohol drinking, participants were grouped into never-drinkers, ex-drinkers, and drinkers (currently having at least one drink per week) based on their past and current consumption. Chronic health conditions included dementia, which was assessed using the 10/66 dementia algorithm,⁸ and depression, which was determined using the Geriatric Mental State instrument.⁹ Body mass index (BMI) was calculated from the measured weight (in Kg) and height (in cm) and further categorized into normal (18-24.9 kg/m²), overweight (25-29.9 kg/m²), and obese (>30 kg/m²) according to guidelines.¹⁰

2.3 | Data analysis

Analysis was conducted using SPSS (version 25). Means and standard deviations and counts and percentages were used to summarize continuous and categorical variables, respectively. Bivariate

associations were tested using the chi-square test for categorical variables and the non-parametric Mann-Whitney U test for continuous ones. *P*-values were reported, and significance was set at alpha of 0.05. Binary logistic regression was used to determine adjusted associations. Odds ratios and 95% confidence intervals were reported.

3 | RESULTS

The sample consisted of 502 elderly people with 56% women and an average age of 72.5 ± 7.2 years. Around half (52%) reported a positive history of hypertension with a significantly higher prevalence among women (57%) compared to men (46%). All diagnosed participants were currently on treatment except for two. The overall mean systolic and diastolic blood pressures were 139.8 ± 18.2 and 80.5 ± 12.1 mm Hg, respectively, with no significant sex differences in the overall sample. Based on the 140/90 mm Hg cutoff, 52% of all participants had an elevated blood pressure with no sex differential. Consequently, the prevalence of uncontrolled hypertension was 35%, controlled hypertension and undiagnosed hypertension were 17% each, and the rest was normal. Significantly more women than men had uncontrolled hypertension (41 vs. 28%, respectively), while more men than women had undiagnosed hypertension (22 vs. 13%, respectively).

Factors associated with a positive history of hypertension included age, BMI, and dementia (Table 1). The odds of hypertension were 2.4 times significantly higher among the 75-84 age-group compared to the lowest one (64-74 years). Moreover, the odds of hypertension were 1.9 times significantly higher among those in the obese vs normal BMI category. The model also showed higher odds of having hypertension among those who had dementia compared to those who had not.

Further analysis was conducted among the sample of hypertensive participants ($N = 256$) to examine factors associated with hypertension control at the bivariate level (Table 2). The results show that uncontrolled hypertension was more pronounced among women, those with informal education, those with depression, and those with dementia.

4 | DISCUSSION

This is the first study in Lebanon that examines hypertension prevalence and control among a community-based elderly population aged 65 + years. The results revealed a high prevalence of diagnosed hypertension among older adults and, more importantly, a significant proportion of those having uncontrolled hypertension, especially among women. Adding to this, hypertensive participants were more likely to be of older age and have dementia.

These results are in line with previous evidence from the literature that shows an increasing trend in hypertension prevalence among the general adult population with a higher burden among

TABLE 1 History of hypertension and associated factors

Elderly's characteristics	Total	Positive history of hypertension	Unadjusted estimates	Adjusted estimates
	N (%)	n (%)	OR (95% CI)	OR (95% CI)
Age-group				
64-74 y	323 (66)	140 (43)	1.0	1.0
75-84 y	136 (28)	95 (70)	3.0* (2.0-4.6)	2.4* (1.5-4.0)
≥85 y	32 (07)	22 (69)	2.9* (1.3-6.3)	2.4 (0.9-5.7)
Sex				
Female	277 (56)	158 (57)	1.0	1.0
Male	214 (44)	99 (46)	0.6* (0.5-0.9)	0.9 (0.6-1.5)
Marital status				
Never married	19 (4)	8 (42)	1.0	1.0
Married	304 (62)	138 (45)	1.1 (0.4-2.9)	1.1 (0.4-3.2)
WDS	137 (34)	111 (66)	2.7* (1.0-7.2)	2.0 (0.7-5.8)
Education				
Informal	97 (20)	63 (65)	1.0	1.0
Formal	394 (80)	194 (49)	0.5* (0.3-0.8)	0.9 (0.5-1.6)
Walks (≥0.5 Km) in the past month				
No	285 (58)	171 (60)	1.0	1.0
Yes	206 (42)	86 (42)	0.5* (0.3-0.7)	0.7 (0.5-1.1)
Body mass index				
Normal	86 (18)	41 (48)	1.0	1.0
Overweight	267 (55)	129 (48)	1.0 (0.6-1.7)	1.2 (0.7-2.1)
Obese	131 (27)	84 (64)	1.9* (1.1-3.4)	1.9* (1.1-3.5)
Depression				
No	440 (90)	221 (50)	1.0	1.0
Yes	51 (10)	36 (71)	2.4* (1.3-4.5)	1.7 (0.8-3.5)
Dementia				
No	457 (93)	228 (50)	1.0	1.0
Yes	34 (07)	29 (85)	5.8* (2.2-15.3)	2.9* (1.1-8.1)

Abbreviations: CI, confidence interval; N, n, number; OR, odds ratio; WDS, widowed/divorced/separated.

*P-value is significant at the .05 level.

women, notably in the 70 + age-group.³⁻⁵ A possible explanation is the reduction in health care seeking behavior among women toward older age and, thus, a decrease in their hypertension management and control.¹¹ Adding to this, men are more likely to seek health care for their comorbidities leading to better hypertension detection and control among this group.^{12,13}

Recent evidence from Lebanon showed a high proportion of uncontrolled hypertension among adults suggesting a growing trend in uncontrolled hypertension.^{12,14,15} Our findings suggest that female sex, depression, dementia, and no formal education could be potentially associated factors with uncontrolled hypertension. While Noubani et al.⁵ did not find significant predictors of uncontrolled hypertension, our findings were consistent with results from other studies.¹²⁻¹⁵ Almost all diagnosed participants were on antihypertensive medication. Yet, the majority were found to have uncontrolled hypertension which indicates that

adequate management of the disease is still lacking at the population level.

Consequently, there is a need to increase awareness toward having regular check-ups for blood pressure levels and improve the adherence to medication to decrease the burden of hypertension in Lebanon. Other factors such as socioeconomic status, education, and comorbidities have been shown to affect the level of adherence to medication and, thus, should be considered when planning interventions.^{12,14,15}

4.1 | Limitations

The study has some limitations. The measurement of blood pressure was limited to one visit. Yet, an average of three recordings was used to decrease error and the risk of a "white-coat" effect. Also, efforts

TABLE 2 Controlled vs uncontrolled hypertension profiles

Elderly's characteristics	HTN control among participants with a positive history of HTN						Chi-square <i>P</i> -value
	Total sample		Controlled HTN		Uncontrolled HTN		
	N	%	n	%	n	%	
Socio-demographic variables							
Age-group							
64-74 y	139	54	43	31	96	69	.635
75-84 y	95	37	35	37	60	63	
≥85 y	22	9	7	32	15	68	
Sex							
Female	158	62	46	29	112	71	.078
Male	98	38	39	40	59	60	
Place of residence							
Beirut	165	64	53	32	112	68	.621
Shouf/Aley	91	36	32	35	59	65	
Marital status							
Never married	8	3	3	37	5	63	.949
Married	137	53	46	34	91	66	
WDS	111	44	36	32	75	68	
Education							
Informal	63	25	16	25	47	75	.130
Formal	193	75	69	36	124	64	
Health and behavioral variables							
Body mass index							
Normal	41	16	12	29	29	71	.782
Overweight	129	51	45	35	84	65	
Obese	84	33	27	32	57	68	
Tobacco smoking							
No	154	60	52	34	102	66	.814
Yes	102	40	33	32	69	68	
Alcohol drinking							
Drinkers	16	6	6	37	10	63	.144
Never-drinkers	226	89	71	31	155	69	
Ex-drinkers	12	5	7	58	5	42	
Walks (≥0.5 Km) in the last month							
No	171	67	60	35	111	65	.364
Yes	85	33	25	29	60	71	
Chronic health conditions							
Depression							
No	220	86	75	34	145	66	.456
Yes	36	14	10	28	26	72	
Dementia							
No	227	89	79	35	148	65	.129
Yes	29	11	6	21	23	79	

Abbreviations: HTN, hypertension; N, n, number; WDS: widowed/ divorced/separated.

were done to reduce the risk of a recall bias by having trained interviewers and using well-formulated questions. Finally, the results, although generalizable to the populations from where the sample

was drawn, do not necessarily extend to other governorates. Hence, more studies are needed to provide a national estimate and allow for regional comparisons.

5 | CONCLUSIONS

Hypertension is highly prevalent among the Lebanese older population. Our study sheds light on the need for better prevention and control of hypertension, especially among women. Consequently, it is important to increase public awareness, promote healthy lifestyles, and improve early screening and adherence to treatment. More research is needed to identify the barriers to accessing health care, especially for women and those with dementia, that could inform tailored interventions.

ACKNOWLEDGMENTS

The authors acknowledge Dr. Kieu Phung and Dr. Gunhild Waldemar from the Danish Dementia Research Center, Department of Neurology, Copenhagen University Hospital Rigshospitalet, Denmark, for their valuable contribution in the conceptualization and implementation of the NIH study which provided the data for this paper.

CONFLICT OF INTEREST

None declared.

ORCID

Sarah Assaad  <https://orcid.org/0000-0002-8104-1546>

Monique Chaaya  <https://orcid.org/0000-0002-2695-8079>

REFERENCES

- O'Donnell MJ, Xavier D, Liu L, et al. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. *Lancet*. 2010;376(9735):112-123.
- Prince MJ, Ebrahim S, Acosta D, et al. Hypertension prevalence, awareness, treatment and control among older people in Latin America, India and China. *J Hypertens*. 2012;30(1):177-187.
- Tohme RA, Jurjus AR, Estephan A. The prevalence of hypertension and its association with other cardiovascular disease risk factors in a representative sample of the Lebanese population. *J Hum Hypertens*. 2005;19(11):861-868.
- Mouhtadi BB, Kanaan RMN, Iskandarani M, et al. Prevalence, awareness, treatment, control and risk factors associated with hypertension in Lebanese adults: a cross sectional study. *Glob Cardiol Sci Pract*. 2018;2018:6.
- Noubani A, Nasreddine L, Sibai AM, et al. Prevalence, awareness, and control of hypertension in greater Beirut Area, Lebanon. *Int J Hypertens*. 2018;2018:1-15.
- Phung KTT, Chaaya M, Prince M, et al. Dementia prevalence, care arrangement, and access to care in Lebanon: a pilot study. *Alzheimer's Dement*. 2017;13(12):1317-1326.
- James PA, Oparil S, Carter BL, et al. 2014 evidence-based guideline for the management of high blood pressure in adults. *JAMA*. 2014;311(5):507-520.
- Chaaya M, Phung K, Atweh S, et al. Socio-demographic and cardiovascular disease risk factors associated with dementia: Results of a cross-sectional study from Lebanon. *Prev Med Rep*. 2018;9:1-5.
- Phung KT, Chaaya M, Waldemar G, et al. Validation of the 10/66 dementia research group diagnostic assessment for dementia in Arabic. *J Geriatr Psychiatry Neurol*. 2014;27(4):282-290.
- Garvey WT, Garber AJ, Mechanick JI, et al. American association of clinical endocrinologists and american college of endocrinology position statement on the 2014 advanced framework for a new diagnosis of obesity as a chronic disease. *Endocr Pract*. 2014;20:977-989.
- Martin LR, Williams SL, Haskard KB, et al. The challenge of patient adherence. *Ther Clin Risk Manag*. 2005;1:189-199.
- Mallat SG, Samra SA, Younes F, et al. Identifying predictors of blood pressure control in the Lebanese population - a national, multi-centric survey - I-PREDICT. *BMC Public Health*. 2014;14:1142.
- Chen G, McAlister FA, Walker RL, et al. Cardiovascular outcomes in framingham participants with diabetes: the importance of blood pressure. *Hypertension*. 2011;57(5):891-897.
- Yassine M, Al-Hajje A, Awada S, et al. Evaluation of medication adherence in Lebanese hypertensive patients. *J Epidemiol Glob Health*. 2016;6:157-167.
- Matar D, Frangieh AH, Abouassi S, et al. Prevalence, awareness, treatment, and control of hypertension in Lebanon. *J Clin Hypertens*. 2015;17(5):381-388.

How to cite this article: Fakhri G, Assaad S, Chaaya M. Hypertension prevalence and control among community-dwelling lebanese older adults. *J Clin Hypertens*. 2020;22:1727-1731. <https://doi.org/10.1111/jch.13995>