ORIGINAL RESEARCH

Health-related quality of life and its predictors among hypertensive adults 45 years and older in rural Malawi: a population-based study

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Abstract

Background

Hypertension is associated with impaired Health-Related Quality of Life (HRQOL), but its assessment is rarely done in the management of hypertension in Malawi. This study aimed to evaluate the HRQOL of hypertensive adults compared to normotensive individuals and suggest possible predictors of HRQOL in hypertensive adults in rural Malawi.

Methods

This was a cross-sectional study utilizing data from the 2017 Mature Adults Cohort of the Malawi Longitudinal Study for Families and Health (MLSFH-MAC). The study included 1489 adults aged 45 and above from Rumphi, Mchinji, and Balaka districts. HRQOL was measured using the Short Form 12-item (SF-12) questionnaire. Univariable logistic regression, followed by multivariable logistic regression, was used to identify independent predictors of HRQOL in hypertensive adults. A p-value of <0.05 was considered statistically significant.

Results

The prevalence of hypertension was 44.1%. Hypertensive participants had significantly lower physical and mental HRQOL than their normotensive counterparts ($p<0.05$). Multiple regression analysis showed that female sex, age, presence of comorbidities, and use of antihypertensive medications were significant predictors of poor physical HRQOL. Being female was a significant predictor of poor mental HRQOL (all p-values <0.05).

Conclusion

In rural Malawi, hypertensive adults presented with lower physical and mental HRQOL. Interventions aimed at improving HRQOL should focus on hypertensive adults who are female, older, on antihypertensive medications, and with comorbidities.

Keywords: Malawi; Health-related quality of life; Hypertension; Short Form 12-item Health Survey; SF-12; MLSFH-MAC Study

Introduction

Hypertension is a major public health problem worldwide. It is a leading risk factor for cardiovascular diseases, which include chronic kidney disease, coronary artery disease, stroke, arrhythmias, and retinopathy[1,2]. Globally, nearly 1.13 billion people were affected in 2015, representing 22% of adults aged 18 years and older. Across WHO regions, hypertension was highly prevalent in Africa, affecting 27% of the population in 2015[3]. In sub-Saharan Africa, high blood pressure increased significantly to among the highest in the world between 1975 and 2015, with the population affected predicted to increase to 125 million by 2025[3,4]. Similar to most sub-Saharan countries, hypertension is highly prevalent in Malawi, with nearly 32.9% of adults having raised blood pressure or taking antihypertensive medications[5]. The increasing prevalence of hypertension in Malawi is attributable to urbanization processes, increased life expectancy, and changes in lifestyle[4].

In chronic conditions such as hypertension, Health-Related Quality Of Life (HRQOL) is a vital outcome, given their lifelong nature and the need for daily self-management [6]. HRQOL refers to the "measure of value assigned to the duration of life as modified by impairment, functional states, perceptions, and opportunities influenced by disease, injury, treatment, and policy"[7]. It involves assessment of how an individual's physical, mental, and social wellbeing is affected over time by a disease, disability, or disorder[8]. Hence, HRQOL evaluates health status based on the modern concept of health care as it takes into account not only the disease but incorporates physical, psychological, social, and emotional wellbeing of the individuals[9]. Despite other health indicators like morbidity and mortality, measurement of HRQOL has become a widely accepted method of assessing people's health status, quality of care, and effectiveness of interventions[10]. Previous studies from high- and low-income countries examining the relationship between HRQOL and hypertension report conflicting results. Some studies found worse HRQOL in hypertensive patients compared to the general population,[11-14] while others reported no impact of hypertension on HRQOL[15]. Several factors, such as blood pressure, the presence of comorbidities, age, gender,

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education, income, obesity, and lifestyle habits, i.e., alcohol consumption and smoking, have been reported to influence the HRQOL of hypertensive individuals[16-19].

Despite the high prevalence of hypertension in Malawi, it remains undiagnosed and poorly controlled[5,20]. Due to its asymptomatic nature, low rates of diagnosis, treatment, and control are associated with worsened Quality of Life (QOL) due to an increased risk of complications[1]. Studies done in Malawi indicate screening for hypertension, poor blood pressure control, adherence to treatment, knowledge of hypertension, and the presence of complications or comorbidities as factors affecting the management of hypertensive patients[21-23]. Despite the increased prevalence of hypertension, coupled with the rise in the population of older adults in Malawi, there is a paucity of literature on the HRQOL of hypertensive adults and its predictors. Identifying indicators of poor HRQOL is imperative for improving clinical care and determining targets of intervention for the prevention and treatment of disease. Therefore, this study aimed to evaluate the HRQOL of hypertensive adults compared to normotensive individuals and suggest possible predictors of HRQOL in hypertensive adults in rural Malawi.

Materials and methods

Study design and setting

This is an analytical cross-sectional study that utilized data from the Mature Adults Cohort of the Malawi Longitudinal Study for Families and Health (MLSFH-MAC) collected in 2017. The MLSFH is one of very few long-standing longitudinal cohort studies in sub-Saharan Africa. It was established in 1998 with the aim of understanding social network influences on fertility behaviors, HIV risk perceptions, and mechanisms used by Malawians to cope with multiple shocks such as HIV infections and mortality. It is conducted in three districts in rural Malawi: Rumphi (northern region), Mchinji (central region), and Balaka (southern region). The target sample for the initial MLSFH round in 1998 consisted of married women aged 15–49 and their spouses. The initial target sample was established using cluster sampling strategy (Mchinji and Rumphi) and random selection of respondents from an earlier representative population survey (Balaka)[24]. In 2012, the MLSFH focused on a sub-sample of 1266 adult MLSFH respondents aged 45 and above and established the Mature Adults Cohort[25,26]. A detailed description of the MLSFH-MAC, including migration and mortality, is provided in Kohler et al[26].

Study population and sample size

Our analysis includes adults aged 45 years and older from Rumphi, Mchinji, and Balaka districts. We define hypertension based on WHO standards: systolic blood pressure equal to or above 140 mm Hg and/or diastolic blood pressure equal to or above 90 mm Hg[1]. In line with previous studies, hypertension status was also derived from a self-reported diagnosis[27]. Participants who responded yes to the question "Has the doctor ever diagnosed you with hypertension?" were categorized as hypertensive. Respondents on antihypertensive medications were also classified as hypertensive, even though they had normal blood pressure measurements. The comparison group consisted of normotensive individuals (individuals with blood pressure < 120/90 mmHg, who did not take antihypertensive medications, and who were not diagnosed by a medical health care professional as hypertensive).

The sample size was determined using data from a previous study[14]. Assuming a Confidence Interval (CI) of 95% and a power of 90% with a ratio of 1:3, the minimum sample size was estimated at 328 participants (82 hypertensives and 246 normotensives). The MLSFH-MAC interviewed 1819 participants in 2017. We restricted our analysis to participants aged 45 and above. Therefore, participants with a reported age of less than 45 years and those with missing age values were excluded (n=295). Participants with missing values on any of the Short Form 12-item (SF-12) questions (n=5) and systolic and diastolic blood pressure values (n=30) were also excluded. The final sample size included in the study is 1489, including 657 hypertensives and 832 normotensives.

Data collection

The MLSFH-MAC study collected data through structured questionnaires administered during household interviews. Data on socio-demographic characteristics as well as health indicators, including HRQOL, blood pressure, HIV/AIDS, and lifestyle habits such as alcohol consumption, smoking, and medication use, were collected. Surveys were conducted by trained interviewers. Only de-identified data that cannot be linked to identifiable personal information was used for these analyses.

Participants blood pressure in the MLSFH-MAC was measured using an upper arm automated blood pressure Omron HEM-780N monitor and following the procedures of the Health and Retirement Study (HRS) in the United States. It was measured a total of three times, with measurements taken about 1 minute apart. In this analysis, systolic and diastolic blood pressure values were based on the average of the three blood pressure measurements[28]. Body Mass Index (BMI) was calculated using the formula weight (Kg)/ height (m^2). Stratification as per the WHO International Classification of BMI was used: < 18.5 underweight, 18.5-24.9 normal, 25.0-29.9 overweight, and 30.0-39.9 (greater than 30) obese[29]. The variable presence of comorbidities was assessed from responses to the question(s), "Have you ever been diagnosed with or told you have [a chronic condition]? Comorbidity was defined as any diagnosis reported by respondents other than hypertension. Other covariates include current use of antihypertensive medications, alcohol consumption, tobacco use, and socio-demographic variables such as age, gender, marital status, income status, education level, and place of residence.

HRQOL measurement

The dependent variable was assessed using the SF-12 questionnaire, a generic measure of HRQOL. It is a shortened version of the well-validated Short Form 36-Item Health Survey (SF-36). The 12-item questionnaire is categorized into physical and mental components and distributed into eight domains. It measures the following domains: physical functioning, role limitations due to physical health, bodily pain, general health perception, vitality, social functioning, role limitations because of emotional problems, and mental health[30,31]. The 12 items can be aggregated into two summary scores, the SF-12 Physical Health Composite Score (PCS) and the SF-12 Mental Health Composite Score (MCS), each ranging from 0 to 100. Higher scores in PCS or MCS indicate better HRQOL[31]. The questionnaire was validated for use in the Malawian setting. It was reported to have good responsiveness, and its reliability coefficient, as measured

by Cronbach's alpha, was estimated at 0.9, which indicates a high rate of internal consistency[32].

Ethical considerations

The MLSFH-MAC study was approved by the Institutional Review Board (IRB) at the University of Pennsylvania (IRB Protocol 815016) and the College of Medicine Research Ethics Committee (COMREC Protocol P.01/12/1165). Authorization to carry out the secondary analysis was obtained from the principal investigator of the MLSFH-MAC study and COMREC (certificate number P.04/20/3044). Importantly, as part of the MLSFH-MAC study protocol requirements, respondents identified by interviewers as being in poor mental health were provided with detailed information about local hospital support for mental health problems and depression. Regarding physical health, if one of the three obtained blood pressure readings was higher than 140 mmHg systolic or 90 mmHg diastolic, respondents were given referral letters for further assessment by a healthcare provider. In addition, respondents were also provided with a list of clinics or health care centers in their proximity.

Table 1: Socio-demographic characteristics of study participants

Variables	Total (n=1489)	Normotensive (n=832)	Hypertensive (n=657)	*P-value
Gender				
Male	596 (40.03)	344 (41.35)	252 (38.36)	0.242
Female	893 (59.97)	488 (58.65)	405 (61.64)	
Age				
45-54	599 (40.23)	416 (50.00)	183 (27.85)	<0.001
55-64	426 (28.61)	232 (27.88)	194 (29.53)	
65-74	262 (17.60)	109 (13.10)	153 (23.29)	
75-84	150 (10.07)	56 (6.73)	94 (14.31)	
85 and above	52 (3.49)	19 (2.28)	33 (5.02)	
Marital status				
Married/Living together	1074 (72.13)	610 (73.32)	464 (70.62)	0.055
Separated/Divorced	140 (9.40)	85 (10.22)	55 (8.37)	
Widowed	275 (18.47)	137 (16.47)	138 (21.00)	
Place of residence				
Mchinji	489 (32.89)	285 (34.30)	204 (31.10)	0.204
Balaka	500 (33.62)	264 (31.77)	236 (35.98)	
Rumphi	498 (33.49)	282 (33.94)	216 (32.93)	
Missing=2				
Education				
None	440 (29.55)	228 (27.40)	212 (32.27)	0.088
Primary	952 (63.94)	552 (66.35)	400 (60.88)	
Secondary or higher	97 (6.51)	52 (6.25)	45 (6.85)	
Annual income (MK)				
<250,000	1,318 (88.52)	727 (87.38)	591 (89.95)	0.235
250,00-499,999	94 (6.31)	60 (7.21)	34 (5.18)	
500,000 or greater	77 (5.170)	45 (5.41)	32 (4.87)	

*χ^2 test Abbreviations: MK, Malawi Kwacha

Data analysis

The data was analyzed using Stata version 14 (Stata Cooperation, Texas, USA). Continuous variables were summarized using means and standard deviations, or median and Interquartile range (IQR). Categorical variables were expressed as proportions or percentages. For continuous variables, comparison of mean values among groups was made by the T-test. Categorical variables were compared using the Chi-square test.

SF-12 scores were calculated using procedures described by the instrument developers[30,33]. Overall HRQOL scores were summarized into PCS and MCS. The summary scores are scored on a scale of 0 to 100; hence, binary variables were created with scores less than 50 representing poor HRQOL and those greater than or equal to 50 representing good HRQOL. The cut-off of 50 is based on the fact that scores summarized above or equal to 50 represent better health status[34]. Univariable binary logistic regression was used to identify factors associated with PCS and MCS. Multivariable logistic regression was used to model the influence of predictor variables on each HRQOL composite scale (PCS and MCS). All independent variables were fitted into the final models of the regression analyses. The results of the multivariable analyses were presented as adjusted odds ratios (aOR) with corresponding 95% CI. Variables with p-values less than 0.05 were considered statistically significant.

Results

Characteristics of study participants

Table 1 presents the socio-demographic characteristics of hypertensive and normotensive participants. Most participants, 59.97% (893), were female. The median age of participants was 58, with an IQR of 50–67. The prevalence of hypertension was 44.1%. Hypertensive participants were significantly older than normotensives (p<0.001). There was no statistically significant difference in the occurrence of hypertension based on gender, marital status, place of residence, education, or annual income (all p values >0.05).

The majority of hypertensive participants had never smoked (75.34%) or consumed alcohol (75.65%). Comorbidities were reported by 7.15% of hypertensive respondents, with heart disease (3.65%) and stroke (2.28%) being the most common. Current use of antihypertensive medications was reported by 18.72% of the respondents (Table 2).

HRQOL of study participants

Respondents with hypertension had significantly lower PCS (P=0.001) and MCS (P=0.0016) in comparison to their normotensive counterparts (Table 3).

Table 2: Clinical characteristics and lifestyle habits of hypertensive participants

Alcohol consumption	
No	497 (75.65)
Yes	160 (24.35)
Smoking	
No	495 (75.34)
Yes	162 (24.66)
Presence of Comorbidities (Self-reported)	
No	610 (92.85)
Yes	47 (7.15)
Type of conditions (Self-reported)	
Stroke	15 (2.28)
Heart disease	24 (3.65)
Diabetes	9 (1.37)
Heart attack	5 (0.76)
Use of antihypertensive medications	
No	534 (81.28)
Yes	123 (18.72)
Body Mass Index (Kg/m^2)	
Underweight (<18.5)	116 (17.85)
Normal (18.5-24.9)	384 (59.08)
Overweight (25-29.9)	99 (15.23)
Obese (≥30)	51 (7.85)
(Missing=7)	

Table 3: Health-Related Quality of Life (HRQOL) of hypertensive and normotensive participants

	Normotensive (Mean ± sd)	Hypertensive (Mean ± sd)	Test statistic	P-value
PCS	46.94 ± 9.37	43.86 ± 10.57	5.84	<0.001
MCS	50.13 ± 10.26	48.43 ± 10.36	3.16	0.002

Abbreviations: PCS,SF-12 Physical Health Composite Score; MCS, SF-12 Mental Health Composite Score

The majority of hypertensive respondents (64.59%) (425) had worse PCS and MCS (54.64%) (359). (Figure 1).

Predictors of HRQOL among hypertensive participants

Table 4 shows the results of univariable and multivariable logistic regression of factors associated with poor physical HRQOL among hypertensive study participants. In univariable analysis (Table 4, column "crude odds ratio"), characteristics that were significantly associated with poor PCS were age of respondents, presence of comorbidities, female gender, marital status, use of antihypertensive medications, alcohol consumption, education, and annual income (all P-values <0.05).

The results of multivariable analysis (Table 4, column "adjusted odds ratio") showed that females were 1.74 times more likely to have poor PCS as compared to males (aOR 1.74, p=0.028, CI 1.06–2.84). Respondents in the age groups 65–74 years (aOR 2.29, p=0.001, CI 1.39–3.75), 75–84 years (aOR 6.22, p<0.001 CI 2.98–12.98), 85 years and above (aOR 15.36, p<0.001, CI 3.38–69.71) had increased odds of having poor PCS than those aged 45–54 years. Participants with comorbidities were four times more likely to have poor PCS compared to their counterparts without comorbidities (aOR 4.16, p=0.011, CI 1.38–12.51). The odds of poor PCS were also significantly higher in respondents using antihypertensive medications compared to those not using medications (aOR 1.75, p=0.033, CI 1.05–2.93).

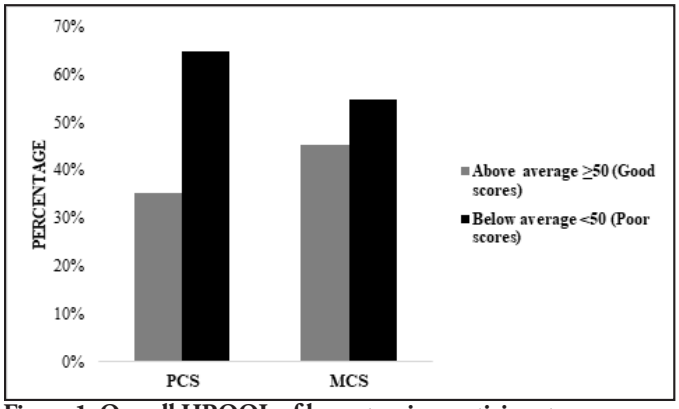

Figure 1: Overall HRQOL of hypertensive participants

Table 5 reports the corresponding analyses for poor MCS among hypertensive study participants. In univariable analysis, variables significantly associated with poor MCS include marital status, female gender, and age (all p values <0.05). Adjusting for other covariates, female respondents were 64% more likely to have poor MCS as compared to males (aOR 1.64, p=0.033, CI 1.04–2.57).

Discussion

Our study revealed that female sex, increasing age, presence of comorbidities, and use of antihypertensive medications were independent predictors of poor physical HRQOL. Being female was an independent predictor of poor mental HRQOL. Our findings also indicated that hypertensive adults had reduced HRQOL, with significantly lower scores in the physical and mental domains of the SF-12 questionnaire in comparison with normotensive individuals. Our findings are similar to those reported in other population- and hospital-based surveys[35-38]. This might suggest that hypertension causes alterations in people's HRQOL. Hence, interventions should aim at improving the HRQOL of the affected population.

Hypertensive participants had worse mean PCS than MCS (Table 3). These results concur with a meta-analysis that demonstrated that hypertensive patients present with worse HRQOL, mainly in the physical domain[12]. Similar studies found consistent results[37,39]. Better mental HRQOL could be due to psychological adaptation to having the disease overtime[40]. In contrast to these results, other studies reported poor HRQOL among hypertensive individuals, with profound effects on mental than physical HRQOL[15, 41-43].

The current study shows that increasing age was associated with PCS and MCS in univariable analysis. Older participants were more likely to have poor PCS and MCS than their younger counterparts. However, during multivariable analysis, age was a significant predictor of poor PCS but not MCS. This concurs with previous studies that demonstrated that as age increases, HRQOL scores decrease[37,44,45]. This may be because, as age increases, hypertension becomes more common[46]. Aging is characterized by the gradual accumulation of molecular and cellular damage, leading to progressive impairments in numerous body functions, an increased risk of chronic diseases, and functional decline, which have negative impacts on HRQOL[47-49].

The study revealed that the presence of comorbidities was a significant predictor of physical HRQOL.

Table 4: Crude and adjusted odds ratios (and corresponding P-values) for predictors of poor PCS among hypertensive adults

Variables	Crude odds ratio (95% CI)	P-value	Adjusted odds ratio (95 % CI)	P-value
Gender		<0.001		0.028
Male	Reference		Reference	
Female	1.9 (1.37-2.64)		1.74 (1.06-2.84)	
Age		<0.001		<0.001
45-54	Reference		Reference	
55-64	1.61 (1.07-2.41)	0.023	1.52 (0.98-2.36)	0.062
65-74	2.38 (1.52-3.73)	<0.001	2.29 (1.39-3.75)	0.001
75-84	7.22 (3.69-14.13)	<0.001	6.22 (2.98-12.98)	<0.001
85 and above	16.37 (3.80-70.42)	<0.001	15.36 (3.38-69.71)	<0.001
Marital status		<0.001		0.278
Married/Living together	Reference		Reference	
Separated/Divorced	2.05 (1.09-3.86)	0.027	1.58 (0.79-3.16)	0.199
Widowed	2.88 (1.82-4.55)	<0.001	1.45 (0.81-2.41)	0.236
Place of residence		0.253		0.457
Mchinji	Reference		Reference	
Balaka	1.39 (0.94-2.05)	0.102	1.01 (0.64-1.59)	0.977
Rumphi	1.24 (0.83-1.84)	0.291	1.32 (0.83-2.11)	0.243
Education		0.004		0.221
None	Reference		Reference	
Primary	0.73 (0.51-1.04)	0.082	0.90 (0.57-1.42)	0.646
Secondary or higher	0.33 (0.17-0.69)	0.001	0.49 (0.21-1.13)	0.094
Annual income (MK)		0.034		0.742
<250,000	Reference		Reference	
250,00-499,999	0.51 (0.25-1.02)	0.055	0.87 (0.41-1.86)	0.719
500,000 or greater	0.52 (0.25-1.04)	0.063	1.32 (0.57-3.05)	0.519
Alcohol consumption		0.002		0.216
No	Reference		Reference	
Yes	0.56 (0.39-0.81)		0.73 (0.44-1.21)	
Smoking		0.676		0.193
No	Reference		Reference	
Yes	1.08 (0.75-1.57)		1.39 (0.85-2.29)	
Presence of comorbidities		<0.001		0.011
No	Reference		Reference	
Yes	6.42 (2.27-18.11)		4.16 (1.38-12.51)	
Use of antihypertensive medications		0.001		0.033
No	Reference		Reference	
Yes	2.23 (1.40-3.51)		1.75 (1.05-2.93)	
Body Mass Index (Kg/m^2)		0.465		0.752
Underweight(<18.5)	Reference		Reference	
Normal(18.5-24.9)	0.78 (0.50-1.22)	0.284	0.96 (0.58-1.59)	0.867
Overweight(25-29.9)	0.66 (0.38-1.16)	0.153	0.77 (0.41-1.46)	0.423
Obese(≥30)	0.98 (0.48-2.00)	0.965	1.13 (0.51-2.53)	0.761

The odds of poor physical HRQOL were significantly higher in respondents with comorbidities than in participants without comorbidities. Our findings agree with a similar population-based study conducted in Ghana[50]. Other studies reported that comorbidities were associated with reduced physical and mental HRQOL[39,40,50-53]. Comorbidities result in increased health care needs, costs of care, and a greater likelihood of disabilities[54]. Therefore, prompt diagnosis and effective treatment of chronic diseases are crucial to preventing the deterioration of HRQOL[39,52].

Table 5: Crude and adjusted odds ratios (and corresponding P-values) for predictors of poor MCS among hypertensive adults

Variables	Crude odds ratio (95% CI)	P-value	Adjusted odds ratio (95 % CI)	P-value
Gender		0.007		0.033
Male	Reference		Reference	
Female	1.54 (1.12-2.12)		1.64 (1.04-2.57)	
Age		0.015		0.074
45-54	Reference		Reference	
55-64	1.45 (0.97-2.17)	0.074	1.55 (1.01-2.36)	0.043
65-74	1.37 (089-2.10)	1.155	1.35 (0.85-2.15)	0.202
75-84	1.86 (1.12-3.09)	0.017	1.77 (0.99-3.14)	0.053
85 and above	3.60 (1.54-8.41)	0.003	3.07 (1.23-7.68)	0.017
Marital status		0.004		0.585
Married/Living together	Reference		Reference	
Separated/Divorced	1.36 (0.77-2.39)	0.292	1.03 (0.56-1.88)	0.928
Widowed	1.95 (1.31-2.90)	0.001	1.28 (0.80-2.06)	0.305
Place of residence		0.528		0.660
Mchinji	Reference		Reference	
Balaka	1.24 (0.85-1.81)	0.265	1.15 (0.76-1.75)	0.514
Rumphi	1.16 (0.79-1.70)	0.457	1.20 (0.78-1.85)	0.398
Education		0.457		0.365
None	Reference		Reference	
Primary	0.81 (0.58-1.13)	0.213	0.96 (0.64-1.47)	0.855
Secondary or higher	0.90 (0.47-1.73)	0.761	1.59 (0.71-3.53)	0.257
Annual income (MK)		0.110		0.501
<250,000	Reference		Reference	
250,00-499,999	0.62 (0.31-1.24)	0.179	0.82 (0.40-1.68)	0.582
500,000 or greater	0.54 (0.26-1.11)	0.093	0.63 (0.28-1.45)	0.278
Alcohol consumption		0.419		0.453
No	Reference		Reference	
Yes	0.86 (0.60-1.23)		1.20 (0.75-1.91)	
Smoking		0.931		0.727
No	Reference		Reference	
Yes	1.02 (0.71-1.45)		1.08 (0.70-1.67)	
Presence of comorbidities		0.109		0.270
No	Reference		Reference	
Yes	1.67 (0.88-3.12)		1.47 (0.74-2.91)	
Use of antihypertensive medications		0.966		0.458
No	Reference		Reference	
Yes	0.99 (0.67-1.47)		0.85 (0.55-1.31)	
Body Mass Index (Kg/m^2)		0.561		0.646
Underweight(<18.5)	Reference		Reference	
Normal(18.5-24.9)	0.81 (0.53-1.23)	0.313	0.87 (0.55-1.36)	0.532
Overweight(25-29.9)	0.70 (0.41-1.19)	0.188	0.72 (0.41-1.28)	0.259
Obese(≥30)	0.71 (0.37-1.37)	0.308	0.71 (0.35-1.44)	0.336

Our study showed that the use of antihypertensive medications was a significant predictor of poor physical HRQOL. Hypertensive adults using medications were 1.75 times more likely to have poor PCS than those not on medications. Previous studies reported similar results[14,35,51]. Our findings may be attributed to the limited drug options available to most people in this environment, especially hydrochlorothiazide, a diuretic that has side effects. This suggests that health professionals should emphasize monitoring patients for drug side effects, as patients

experiencing poor HRQOL due to prescribed medications may not adhere to treatment, leading to an exacerbation of disease[14,55]. Other studies have reported contrasting findings. The use of antihypertensive medications improved both the physical and mental domains of HRQOL[56].

Most published studies report that female gender is associated with lower physical and mental HRQOL[35,37, 51,52]. Our study found similar results, female gender was associated with poor PCS and MCS in multivariable analysis. This may be because men tolerate chronic diseases better, hence being less emotionally affected than women[15,37]. Furthermore, women often report feelings of dissatisfaction and depression, which influence the mental domain of HRQOL[57,58]. Therefore, identifying strategies to improve the physical and mental HRQOL of hypertensive adults, especially among rural women, is of great importance.

Previous studies report that high education attainment is associated with better HRQOL scores[59-62]. In univariable analysis, we found that education was associated with only physical HRQOL. Participants with high education were less likely to have poor PCS. A plausible reason for this observation could be that higher educated individuals are more likely to adapt to lifestyle modifications and preventive measures, which lead to improvements in HRQOL [50, 61, 63]. Most studies indicate that married hypertensive participants have better HRQOL scores than their widowed or divorced counterparts[38,43,62]. This study found that divorced and widowed respondents were more likely to report poor MCS or PCS than their married counterparts in univariable analysis. The effects of marital status on HRQOL did not remain significant after adjusting for several covariates.

Our study found that annual income was associated with PCS in univariable analysis but had no significant effect on MCS. Participants with increased income were less likely to report poor PCS. Prior studies conducted in China, Nigeria, and Greece reported that reduced income is associated with lower HRQOL scores[14,18,64]. High income is directly related to better living conditions and access to health services, which are determinants of health. In Malawi, although care for chronic cardiovascular diseases is offered free of charge at the point of use, rural residents incur direct and indirect costs when accessing health services, which causes financial stress and aggravates poverty[65]. People with low-income suffering from chronic diseases often have high health care needs but lack the financial capacity to pay for health services, which has negative effects on their HRQOL[66,67].

Various studies show that alcohol consumption and smoking have negative effects on HRQOL[68]. Studies conducted in China and Lebanon show that hypertensive patients who smoked and consumed alcohol had lower HRQOL scores than their counterparts[37,44,45]. Our study found that alcohol consumption was associated with PCS but had no significant effects on MCS. Further, smoking was not associated with PCS or MCS. Nonetheless, there is an increase in the prevalence of alcohol consumption and tobacco smoking in Malawi[20,69]. These are known risk factors for the development of hypertension; hence, lifestyle modification interventions, including the prevention of harmful alcohol consumption and smoking cessation, could help improve the HRQOL of hypertensive adults[70].

High BMI has been reported to be associated with reduced HRQOL in most individuals with chronic diseases[71,72]. Prior studies report that hypertensive individuals with high BMI have reduced HRQOL scores[17,73,74]. Contrary to findings from other studies, we did not find an association between BMI and HRQOL. Our results may be due to the reduced prevalence of individuals with obesity in our study sample. This is not surprising, as studies conducted in Malawi report a lower prevalence of overweight or obesity among adults in rural areas compared to urban areas[5,20].

Our study found that the prevalence of hypertension was high (44.1%). It was higher than prevalence estimates reported in similar population-based studies conducted in Malawi[5,20]. This difference could be due to the fact that our study included adults aged 45 years and older whereas previous surveys included younger participants. Studies show that the prevalence of hypertension increases with advancing age[75]. Nonetheless, the high prevalence is surprising as rural Malawi is characterized by low exposure to traditional risk factors for hypertension, i.e., obesity and urbanization[28]. This high burden of hypertension implies high rates of cardiovascular disease-related morbidity and mortality[20].

Study limitations

Some limitations of the study are noteworthy. The present analysis focuses on cross-sectional data, and the study does not consider factors that could contribute to the observed patterns, such as duration of disease, adherence to antihypertensive medications, or type of antihypertensive medications. Further studies are needed to explore the impacts of these factors on HRQOL of hypertensive adults. Data on comorbidities were self-reported, which may result in reduced estimates of the prevalence of these conditions. Lastly, the study analyzed data collected from 3 districts in rural Malawi; therefore, results may be cautiously applied to similar settings.

Conclusion

The findings indicate the necessity for health care professionals to focus on hypertensive individuals, as they presented with lower physical and mental HRQOL than their normotensive counterparts. More attention should be given to hypertensive adults who are female, older, on antihypertensive medications, and with comorbidities. Further, health professionals need to strengthen the management or monitoring of hypertensive adults using antihypertensive medications and those with comorbidities to ensure effective treatment of hypertension and existing comorbidities or prevent worsening of HRQOL. In addition, as the prevalence of hypertension increases in Malawi, programs addressing the physical and mental health needs of the population should become a priority.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Author contributions

SB, SC, HPK, and IK contributed to study conception and design. SB prepared the analysis plan, analyzed the data, and wrote the manuscript. SC guided and reviewed the data analysis. HPK, IK and SC reviewed the manuscript critically. All authors approved the final manuscript.

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