

Assessment of Health Related Quality of Life and Associated Factors among Hypertensive Patients on Treatment at Public Hospitals in Mekelle, North Ethiopia

Alemayehu Hailu Jufar^{1*}, Fiseha Girma Nuguse² and Haftom Ghiwot Misgna²

¹Department of Physiology, College of Health Sciences, Mekelle University, Mekelle, Ethiopia

²School of Nursing, College of Health Sciences, Mekelle University, Mekelle, Ethiopia

*Corresponding author: Jufar AH, Department of Physiology, College of Health Sciences, Mekelle University, P.O.BOX 1871, Mekelle, Ethiopia, Tel: +251911172095; E-mail: alemayehuhailu62@yahoo.com

Received date: February 16, 2017; Accepted date: February 26, 2017; Published date: February 28, 2017

Copyright: © 2017 Jufar AH, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License; which permits unrestricted use; distribution; and reproduction in any medium; provided the original author and source are credited.

Abstract

Introduction: Hypertension is a prevalent and often asymptomatic chronic disease. Health related quality of life is emerging as an important outcome in hypertension. It can be adversely affected by hypertension itself and side-effects of antihypertensive drugs. It is a multi-dimensional element of well-being affected by the physical, mental, emotional and social status of patients. The ability to identify indicators of poor health-related quality of life is crucial for both improving clinical care and determining targets of intervention for the prevention and treatment of disease.

Objective: The aim of this study was to assess health related quality of life and identify associated factors.

Methods: A cross sectional study was conducted to assess health related quality of life of hypertensive patient. A total of 243 hypertensive patients were included in the study. The study assessed the health related quality of life using a generic tool short form-36. Socio-demographic and clinical variables were used as explanatory variables. In the multivariate analysis the level of significance was set at $p < 0.05$.

Result: The current study revealed that a very similar physical component (64.83) and mental component (64.88) summary mean score. This study has also shown that health related quality of life was significantly influenced by marital status, level of education of the study participants, duration of hypertension, blood pressure status and presence of health complaints.

Conclusion: Health related quality of life in hypertensive patients is still suboptimal. Because of the fact that, patient education and enhanced information can lead to better health related quality of life in hypertension patient, health care professionals should pay due emphasis in educating the patient about the importance of controlling their blood pressure.

Keywords: Health related quality of life; Hypertension short form-36; Blood pressure

Abbreviations

HRQOL: Health Related Quality of Life; BP: Blood Pressure; PCS: Physical Component Summary; MCS: Mental Component Summary

Introduction

The overall burden of hypertension related diseases is rapidly rising in the developing world [1]. Hypertension is a prevalent and often asymptomatic chronic disease. A systematic review of prevalence and associated factors in Ethiopia indicates the prevalence of hypertension in Ethiopia ranges from 0.8- 31.5% [2].

Despite effective medical therapy and evidence based treatment guidelines for managing high blood pressure, uncontrolled hypertension remains common [3,4]. Low antihypertensive medication adherence has been proposed as an important barrier to achieving hypertension control. Demographic, treatment, clinical and

behavioural factors have been shown to be associated with medication adherence, and previous studies have indicated that psychosocial factors are important determinants of antihypertensive medication adherence in older adults [5-8]. Also, the low rate of controlled hypertension may be associated with worsened quality of life and a high incidence of adverse effects of blood-pressure-lowering drugs [9].

The concept quality of life refers to “the degree to which a person enjoy in the areas of being (who one is: physical being, psychological being, spiritual being), belonging (connections with one’s environments: physical belonging, social belonging, community belonging) and becoming (achieving personal goals, hopes, and aspirations: practical becoming, leisure becoming, growth becoming) the important possibilities of his or her life” [10]. It is a broad ranging concept affected in a complex way by the person’s physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment [11].

Health related QOL (HRQOL) is emerging as an important outcome in hypertension. On the individual level, this includes

physical and mental health perceptions and their correlates-including health risks and conditions, functional status, social support, and socioeconomic status. At the community level, HRQOL includes resources, conditions, policies, and practices that influence a population's health perceptions and functional status [12]. HRQOL can be adversely affected by hypertension itself and side-effects of antihypertensive drugs [13]. It is often considered to be equally, if not more important than quantity of life. It is a multi-dimensional element of well-being affected by the physical, mental, emotional and social status of patients, which is increasingly used to assess the health status of the general public and patients, as well as the impact of health care interventions [14].

The assessment of HRQL is a particularly interesting endeavour in patients with hypertension as this condition is traditional risk factor for cardiovascular disease and therefore has a significant impact on the physical, social and mental domains that determine the patients' overall well-being and status. Hypertension is highly correlated with other chronic diseases, such as diabetes and kidney disease [15]. Moreover, assessing HRQOL of Hypertension patients take accounts of their perceived physical and mental health and function which become an important component of health surveillance and are generally considered valid indicators of service needs and intervention outcomes [16]. In addition, the ability to identify indicators of poor health-related quality of life (HRQoL) is crucial for both improving clinical care and determining targets of intervention for the prevention and treatment of disease [12]. Furthermore, assessing health status also proved to be more powerful predictor of mortality and morbidity than many objective measures of health [17].

However, the impact of hypertension on individual's physical and mental quality of life is less clear. We couldn't find published article that addresses this issue in the country. Therefore, the aim of this study is to assess the HRQoL profile of the hypertensive patients, and to determine the socio-demographic and clinical characteristics associated with poor HRQoL.

Materials and Methods

Study area

The study was carried out in Mekelle town, a capital city of Tigray regional state, northern Ethiopia, which is located at 780 km from Addis Ababa, capital of Ethiopia. There are three general hospitals and one referral hospital, which provides a broad range of medical services to both in and out patients of all age groups.

Study design

An institution based cross sectional study design was employed.

Study population

All hypertensive patients on follow up at chronic clinics who met the inclusion criteria were included in the study.

Eligibility criteria and inclusion criteria

Patients with age 18 years and above.

Exclusion criteria

Patients who denied consent for the interview.

In-patients.

Sample size and sampling technique

Sample size calculation: Sample size was determined using data from a previous study, where the SD for HRQOL scores in hypertensive patients was 15.61 and assuming an alpha of 0.01 and a 2 tailed test with CI of 5 points. The total sample size was 255 [18].

Sampling technique: To get the number of patient to be taken from each hospital, proportionate allocation formula was employed. Patient's card number was used as a sampling frame and individual patients were selected by using simple random sampling technique from each hospital.

Study variables

Dependent variable

- HRQOL of hypertensive patients
- Physical health component
- Mental health component

Independent variable

Socio-demographic and clinical factors variables are shown in Table 1.

Socio demographic	Clinical factors
Age	
Gender	Number of symptoms
Religion	Duration of hypertension
Marital status	Duration of hypertension
Number of children	Blood pressure
Educational level	Number of comorbidities
Monthly family income	Number of antihypertensive drugs
Occupation	History of admission
Distance from the hospital	

Table 1: Independent variables.

Operational definition

Physical health subscales: Includes physical functioning, role limitations due to physical health problems, bodily pain, and general health perception.

Mental health subscales: Includes social functioning, role limitations due to emotional problems, mental health and vitality.

Low HRQOL: Because no previously established cut points for defining the scores are available, participants were categorized as having low HRQOL if their score is in the lowest tertile of the distribution for the current study population.

Data collection instrument

Health related quality of life was measured using a generic tool SF-36. The tool is comprised of 36 questions that measure four physical health subscales (physical functioning, role limitations due to physical health problems, bodily pain, and general health perception) and four mental health's subscales (social functioning, role limitations due to emotional problems, mental health and vitality) and has previously been used to measure health related quality of life in similar populations.

Data collection procedure

Data were collected when the patient comes for follow up by using a pre tested structured questionnaire, and by reviewing patient chart. Patients were approached after they finished consultation with physician. Their socio demographic characteristics and clinical data were noted. The items were formulated in a manner that elicits the required data from the chart.

Data analysis procedure

Scores on each of the eight subscales were calculated. Subscales were weighted and aggregated to create PCS and MCS summary scores. Quantitative variables were expressed as mean and standard deviation. Qualitative variables were expressed as absolute numbers and percentages. Multivariate analysis was performed by constructing a model for each outcome. The HRQOL score was considered as outcome. Socio-demographic and clinical variables were used as explanatory variables and were considered a candidate for multivariate analysis when they had p values <0.20 in the bivariate analysis. In the multivariate analysis the level of significance was set at p<0.05.

Data quality management

An English version of SF-36 is adopted and was translated to Tigrigna and retranslated back into English. Four BSc nurse data collectors were trained ahead of the actual data collection period. The training was focused on familiarizing interviewers with the questionnaire and giving them the opportunity to practice using it. At time of data collection filled questionnaires were checked for completeness and consistency of information by the supervisor on daily basis and typographic errors were manually edited.

Ethical Consideration

Before the data collection, ethical clearance letter was obtained from ethical review committee of Mekelle University College of health science. Respondents were informed about the purpose of the study, and their oral consent was obtained. The respondents' right to refuse or withdraw from participating in the interview was fully maintained and the information provided by each respondent was kept strictly confidential.

Results

Socio-demographic characteristics

Out of the total 255 study participants planned, 243 study participants were interviewed using structured questionnaires with a response rate 95.3%. From the 243 study participant 93 (38.3%) of them were male and 150 (61.7%) of them were female. The mean age of

the participants was 55 years. Majority of the respondent 231 (95.1%) of them were orthodox followers followed by Muslim 8 (3.3%). Most, 223 (91.8%) of the participant were Tigray in their ethnicity. One hundred forty nine (61.3%) and 53 (21.8%) of subjects were married and widowed respectively. Regarding their educational status, 91 (37.9%) of them were illiterate and 43 (17.9%) were with diploma and above educational level. Majority of the participants 161 (66.3%) of them they can access health care with less than 1 hour time and for 82 (33.7%) of the participants more than one hour is needed to access treatment (Table 2).

Variable	Category	Frequency	Percentage
Age	Less than 55	96	39.5
	55 and above	147	60.5
Sex	male	93	38.3
	female	150	61.7
Ethnicity	Tigray	223	91.8
	Amhara	19	7.8
	Others	1	0.4
Religion	Orthodox	231	95.1
	Muslim	8	3.3
	Protestant	4	1.6
Marital status	Single	11	4.5
	Married	149	61.3
	Divorced	30	12.3
	Widowed	53	21.8
Number of children	Less than four	143	59.1
	5 and above	100	40.9
Occupation	Government employee	45	18.5
	Farmer	19	7.8
	Daily laborer	17	7
	Merchant	35	14.4
	House wife	75	30.9
	Student	4	1.6
Level of education	illiterate	91	37.9
	Grade 1-6	29	12.1
	Grade 7-12	77	32.1
	Diploma and above	43	17.9
Family income	Less than 500	70	29.4
	500-1000	84	34.3
	Above 1000	84	34.3

Distance	Less than 1 hour	161	66.3
	Greater than 1 hour	82	33.7

Table 2: Socio-demographic characteristics of the study participants (n=243), in government hospital, Mekelle, 2016.

Clinical factor

From the study participants, 96 (39.9%) of them knew they have hypertension less than one year period while 59 (24.3%) have been diagnosed for the last three years and above. 10 (4.1%), 11 (4.5%) of them have the complaint of swelling and kidney problem respectively. Majority of them, 156 (64.2%) took only one medication and 87 (35.8%) took two and more medication with frequency of 188 (77.4%) took once a day and 55 (22.6%) of them twice and more per day (Table 3).

Variable	Category	Frequency	Percentage
Year since diagnosis	Less than 1 year	96	39.9
	1-2 year	46	18.9
	2-3 year	41	16.9
	Above 3 years	59	24.3
Presence of any health complaint	Yes	66	27.2
	No	177	72.8
Number of drug	One	156	64.2
	Two and above	87	35.8
Frequency of drug	Once	188	77.4
	More than twice	55	22.6
BP status	Controlled	72	29.6
	Uncontrolled	171	70.4
Previous history of admission	Present	26	10.7
	Absent	117	89.3
Co-morbidity	None	198	81.5
	One or more	45	18.5

Table 3: Distribution of study participants by clinical characteristics (n=243), in government hospital, Mekelle, 2016.

Regarding type of medication, Enalapril was a part of treatment regimen for 98 (40.3%) of the study participant, next to Enalapril. Nifedipine (32.1%) and Hydrochlorothiazide (32.1%) were drugs prescribed frequently (Table 4).

Type of drug	Yes		No	
	Freq	%	Freq	%
Frusemide	11	4.5	232	95.5
Hydrochlorothiazide	78	32.1	165	67.9

Nifedipine	78	32.1	165	67.9
Enalapril	98	40.3	145	59.7
Atenolol	6	2.5	237	97.5
Spironlactone	3	1.2	240	98.8

Table 4: Type and number of drugs study participants taking currently, government hospital, Mekelle, 2016.

Health related quality of life of hypertension patient

Using the generic tool SF-36 this study assessed the eight domain of HRQOL. Though the scores of all domains found to be above average, there is a marked difference between the eight domains.

The physical functioning and general health mean score were found to be little above average. The bodily pain mean score (87.77) was recorded to be the highest score from all physical and mental component domains. The current study revealed that a very similar physical component (64.83) and mental component (64.88) summary mean score. The mental health subscales mean score ranges from 53.29 (Vitality) to 78.86 (social functioning) (Table 5).

Domains	Mean	SD
Physical functioning	53.37	36.3
Role limitations due to physical problems	60.39	47.16
Bodily Pain	87.77	22.12
General Health	57.77	22.19
Social functioning	78.86	21.58
Role limitations due to emotional problems	61.73	46.97
Vitality	53.29	19.21
Mental health	65.66	21.58
PCS	64.83	18.79
MCS	64.88	21.3
HRQOL	64.86	19

Table 5: Mean and standard deviation of study participant's (HRQOL) domain score, (n=243), in government hospital, Mekelle, 2016.

Factors associated with HRQOL

To identify predictor variables, logistic regression has been done. At the beginning, the association of all independent variables with quality of life has been assessed using bivariate logistic regression. Among socio-demographic variables, age of the respondent, marital status, occupation, level of education, monthly family income and distance from health care facility were found to be associated with HRQOL (Table 6).

Variable	Category	HRQOL		COR(CI)	P-Value
		Good	Low		
Age	Less than 55	78	18	3.16 (1.7-5.8)	0

	55 and above	85	62	1	0.69
Sex	Male	61	32	0.89 (0.52-1.55)	
	Female	102	48	1	0.48
Ethnicity	Tigray	151	72	1.40 (0.55-3.57)	
	Amhara and others	12	8	1	0.55
Religion	Orthodox	154	77	0.67 (0.17-2.53)	
	Others	9	3	1	
Marital status	Married	113	36	1	0.654
	Single	9	2	1.43 (0.3-6.94)	0.001
	Divorced	13	17	0.24 (0.11-0.55)	0.002
	Widowed	28	25	0.36 (0.19-0.69)	0.04
Number of children	Less than four	103	40	1.75 (1.02-3.00)	
	5 and above	59	40	1	
Occupation	Government employee	43	2	1	0.001
	Farmer	11	8	0.06 (0.01-0.35)	0.04
	Daily laborer	13	4	0.15 (0.03-0.92)	0.002
	Merchant	22	13	0.08 (0.01-0.38)	0.001
	House wife	46	29	0.07 (0.02-0.33)	0
	Others	28	23	0.05 (0.01-0.25)	
Level of education	Illiterate	48	43	1	0.381
	Grade 1-6	18	11	1.47 (0.62-3.45)	0.014
	Grade 7-12	55	22	2.24 (1.18-4.26)	0
	Diploma and above	40	3	11.94 (3.45-41.41)	0.077
Family income	Less than 500	46	24	0.52 (0.26-1.07)	0.005
	500-1000	49	35	0.38 (0.19-0.75)	
	Above 1000	66	18	1	0.044
Distance	Less than 1 hour	115	46	1.77 (1.02-3.09)	

	Greater than 1 hour	48	34	1	
--	---------------------	----	----	---	--

Table 6: Association of socio-demographic factors with HRQOL, government hospital, Mekelle, 2016.

Bivariate analysis also showed significant association between duration of hypertension, presence of health complaint, Blood pressure status and presence of co morbidity and HRQOL (Table 7).

Variable	Category	HRQOL		COR	P-Value
		Good	Low		
Year since diagnosis	Less than 2 years	92	51	0.46 (0.22-0.95)	0.035
	2-3 years	24	17	0.36 (0.148-0.88)	0.024
	Above 3 years	47	12	1	
Presence of any health complaint	Yes	33	33	1	
	No	130	47	2.77 (1.54-4.97)	0.001
Number of drug	One	106	50	1.17 (0.67-2.06)	0.566
	Two and above	54	30	1	
Frequency	Once	127	61	1.1 (0.58-2.07)	0.77
	BID or more	36	19	1	
BP status	Controlled	59	13	2.92 (1.49-5.74)	0.002
	Uncontrolled	104	67	1	
Previous history of admission	Present	15	11	1	
	Absent	148	69	1.57 (0.69-3.6)	0.28
Co morbidity	None	139	59	2.06 (1.07-3.99)	0.032
	One or more	24	21	1	

Table 7: Association of clinical factors with HRQOL, government hospital, Mekelle, 2016.

Multivariate logistic regression was performed by constructing a model for HRQOL as an outcome variable. Socio-demographic and clinical variables were used as explanatory variables and considered when they had <0.2 P-values in bivariate analysis.

When assessing the effect of Socio-demographic factors on the HRQOL, it was revealed that HRQOL was significantly influenced by marital status and level of education of the study participants.

The findings of this study showed that those patients who got divorced had less chance (OR=0.21 CI=0.08-0.55) of having good quality of life compared to those who are married. Regarding level of education the current study demonstrated that those who are illiterate were found to have lower quality of life than those who completed at least grade 7 to 12 (OR=3.25 CI=1.47-7.2) and have a college diploma

and above(OR=23.1 CI=5.5-97.2). Regarding clinical factors, HRQOL was found to be influenced by, duration of hypertension, Presence of health complaint and blood pressure status.

The findings of this study showed a significant association between duration of hypertension and quality of life, in which the odds of good HRQOL was lower in those who were diagnosed with in the past three years compared with those who have known their diagnosis before 3 years.

On the topic of blood pressure status, our study revealed those participants who had controlled their blood pressure had 4.2 (OR=4.2 CI=4.2 (1.88-9.33) times higher chance of having good quality of life than those who didn't control their blood pressure.

Based on the finding of the study, participants who had no health complaint like, paralysis of the limb, visual impairment, swelling/edema and other had higher (OR=4.2) chance of having good quality of life than their counterpart (Table 8).

Variable	Category	HRQOL		COR(CI)	AOR (CI)
		Good	Low		
Year since diagnosis	Less than 2 year	56	41	0.46 (0.22-0.95)	0.4 (0.16-0.97)
	2-3 year	24	17	0.36 (0.148-0.88)	0.3 (0.1-0.91)
	Above 3 years	47	12	1	
Level of education	Illiterate	48	43	1	
	Grade 1-6	18	11	1.47 (0.62-3.45)	1.4 (0.53-3.67)
	Grade 7-12	55	22	2.24 (1.18-4.26)	3.25 (1.47-7.2)
	Diploma and above	40	3	11.94 (3.45-41.41)	23.1 (5.5-97.2)
Presence of any health complaint	Yes	33	33	1	
	No	130	47	2.77 (1.54-4.97)	4.22 (2.03-8.75)
Marital Status	Married	113	36	1	1
	Single	9	2	1.43 (0.3-6.94)	0.55 (0.09-3.23)
	Divorced	13	17	0.24 (0.11-0.55)	0.21 (0.08-0.55)
	Widowed	28	25	0.36 (0.19-0.69)	0.71 (0.33-1.52)
BP status	Controlled	59	13	2.92 (1.49-5.74)	4.2 (1.88-9.31)
	Uncontrolled	104	67	1	

Table 8: Multivariate analyses show predictor variables of HRQOL, government hospital, Mekelle, 2016.

Discussion

For many chronic diseases like hypertension assessing Health related quality of life can help in evaluating the physical and

psychosocial impact of these diseases on the affected population. It could be also used as important outcome measure for different therapeutic interventions (Figure 1).

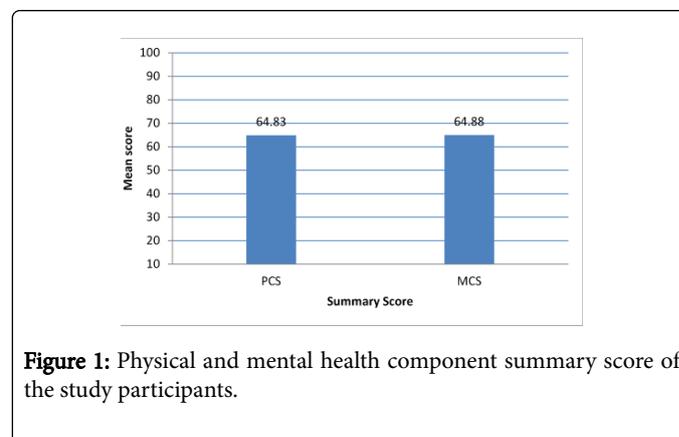


Figure 1: Physical and mental health component summary score of the study participants.

The SF- 36 scale is a generic instrument available in different language and had been used to assess quality of life in many chronic disease conditions.

In this study the physical health component summary mean score and mental health summary mean scored are 64.83 and 64.88 respectively. This finding is consistent with similar studies conducted in Nigeria and Brazil [18,19]. The lowest scores from the SF-36 domains were Physical function and vitality. The lower quality of life on this physical domain may be explained by the fact that the SF-36 scale is more associated with physical illness. In addition, the lower score in Vitality domain may be explained by lack of disposition and enthusiasm and because of the association of hypertension with symptoms such as headache, anxiety and the effects of antihypertensive drugs such as fatigue and sleep disorders.

In this study there is a positive association between educational level and quality of life. This finding agree with other similar studies conducted in Nigeria, Brazil and Pakistan which showed study participants with a higher educational level also had a higher HRQOL [18-20]. This association may be explained by the fact that education develops a level of interest and concern in patients related to improving their own health, which is a key determinant of successful medical treatment. In addition, it is a common observation that better-educated people are less likely to develop complications to chronic conditions, or are often in the "controlled" status. In addition to pharmacotherapy, better-educated patients are more likely to adapt to life style modification and preventive measures which result in an improvement in HRQOL.

Regarding other Socio-demographic characteristics our study revealed a statistically significant association between marital status and quality of life. Those participants who got divorced had a lower chance of having good quality of life than those who were married. This finding is in not in accordance with many studies, which showed no significant association between these variables. But few studies showed an association between physical function domain and any of the eight domains respectively [19-21].

Evidence from this study showed a good HRQOL among participants who had no health complaint/symptoms. The finding is consistent with previous studies done in Nigeria and India which shows a positive correlation between number of symptoms and quality of life [22].

Our study found out that there is a positive association between duration of hypertension and quality of life, showing a good quality of life among participants who knew their diagnosis before 3 years. This is in disagreement between many studies which showed no statistically significant association between these variables [18,19,22-25].

The relationship between blood pressure status of the participant and HRQOL was also found to be statistically significant, in which participants having increasing/uncontrolled blood pressure were less likely to had good quality of life than their counterparts. The result is consistent with similar studies [18,21-25]. Even though patients with elevated blood pressure mostly have no physical symptoms but may have behavioural or emotional impairment which lowers their quality of life.

Conclusion

From the results of our study, HRQOL in hypertensive patients was still suboptimal. In this study we found that education, marital status had marked effect on HRQOL in hypertensive patients. HRQOL was significantly better in the group of hypertensive that had controlled blood pressure. Duration of hypertension, presence of health compliant were also found as major predictor of HRQOL among hypertension patient.

Acknowledgments

First of all we would like to thank Mekelle University College of health science for funding this project. Also we would like to appreciate health professional working in chronic follow up clinic at Ayder referral hospital, Mekelle hospital and Quiha hospital for their unreserved cooperation during data collection.

Finally, we would like to show our gratitude to all data collectors, facilitator and study participants involved in this study.

References

- Ogah OS (2006) Hypertension in sub-Saharan African population: the burden of Hypertension in Nigeria. *Ethn Dis* 16: 765.
- Mulugeta Molla (2015) Systematic reviews of prevalence and associated factors of hypertension in Ethiopia: Finding the evidence. *Science Journal of Public Health* 3: 514-519.
- Garfield FB, Caro JJ (1999) Compliance and hypertension. *Curr Hypertens Rep* 1: 502-506.
- Haynes RB, McDonald HP, Garg AX (2002) Helping patients follow prescribed treatment: Clinical applications. *JAMA* 288: 2880-2883.
- Trivedi RB, Ayotte B, Edelman D, Bosworth HB (2008) The association of emotional well-being and marital status with treatment adherence among patients with hypertension. *J Behav Med* 31: 489-497.
- DiMatteo MR, Lepper HS, Croghan TW (2000) Depression is a risk factor for noncompliance with medical treatment: Meta-analysis of the effects of anxiety and depression on patient adherence. *Arch Intern Med* 160: 2101-2107.
- Wang PS, Bohn RL, Knight E, Glynn RJ, Mogun H, et al. (2002) Noncompliance with antihypertensive medications: The impact of depressive symptoms and psychosocial factors. *J Gen Intern Med* 17: 504-511.
- Kim MT, Han HR, Hill MN, Rose L, Roary M (2003) Depression, substance use, adherence behaviors, and blood pressure in urban hypertensive black men. *Ann Behav Med* 26: 24-31.
- Goncalves CB, Moreira LB, Gus M, Fuchs FD (2007) Adverse events of blood-pressure-lowering drugs: evidence of high incidence in a clinical setting. *Eur J Clin Pharmacol* 63: 973-978.
- <http://sites.utoronto.ca/chp/bestp.html>
- The WHOQOL Group (1998) The World Health Organization Quality of Life Assessment (WHOQOL). Development and general psychometric properties. *Soc Sci Med* 46: 1569-1585.
- Kindig DA, Booske BC, Remington PL (2010) Mobilizing action toward community health (MATCH): Metrics, incentives, and partnerships for population health. *Prev Chronic Dis* 7: A68.
- Staquet MJ, Hays RD, Fayers PM (1998) Quality of life assessment in clinical trials-methods and practice. Oxford University Press, New York.
- Theodorou M, Kaitelidou D, Galanis P, Middleton N, Theodorou P, et al. (2011) Quality of life measurement in patients with hypertension in Cyprus. *Hellenic J Cardiol* 52: 407-415
- Schutta MH (2007) Diabetes and hypertension: Epidemiology of the relationship and pathophysiology of factors associated with these comorbid conditions. *J Cardiometa Syndr* 2: 124-130.
- No Authors Listed (2000) Measuring healthy days: Population assessment of health-related quality of life. Centers for Disease Control and Prevention, Atlanta, Georgia.
- Dominick KL, Ahern FM, Gold CH, Heller DA (2002) Relationship of health-related quality of life to health care utilization and mortality among older adults. *Aging Clin Exp Res* 14: 499-508.
- Ogunlana MO, Adedokun B, Dairo MD, Odunaiya NA (2009) Profile and predictor of health-related quality of life among hypertensive patients in south-western Nigeria. *BMC Cardiovascular Disorders* 9: 25.
- De carvalho MV, Jardim PC, Sousa AL (2013) A influência da hipertensão arterial na qualidade de vida. *Arq bras cardiol* 100: 164-174.
- Saleem F, Hassali MA, Shafie AA (2014) A crosssectional assessment of healthrelated quality of life (HRQoL) among hypertensive patients in Pakistan. *Health Expectations* 17: 388-395.
- Wang R, Zhao Y, He X, Ma X, Yan X, et al. (2009) Impact of hypertension on health-related quality of life in a population-based study in Shanghai, China. *Public Health* 123: 534-539.
- Oza BB, Patel BM, Malhotra SD, Patel VJ (2014) Health related quality of life in hypertensive patients in a tertiary care teaching hospital. *J Assoc Physicians India* 62: 22-29.
- Holt EW, Muntner P, Joyce CJ, Webber L, Krousel-Wood MA, et al. (2010) Health-related quality of life and antihypertensive medication adherence among older adults. *Age and ageing* 39: 481-487.
- Al-Jabi SW, Saed HZ, Sweileh WM, Wildali AH, Saleem HM, et al. (2014) Assessment of health-related quality of life among hypertensive patients: a cross-sectional study from Palestine. *Journal of Public Health* 22: 277-286.
- Youssef RM, Moubarak II, Kamel MI (2005) Factors affecting the quality of life of hypertensive patients. *East Mediterr Health J* 11: 109-118.