

**Short Communication**

**Effect of angiotensin converting enzyme inhibitors on health related quality of life in Libyan patients with hypertension**

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## **Abstract**

Hypertension is a public health issue that significantly increases the risk of health problems and decreases health quality of life of the patients. Angiotensin converting enzyme inhibitors are used to control hypertension by preventing production of angiotensin II in turn decrease blood pressure, thus it may enhance the quality of life. This study aims to assess the effect of angiotensin converting enzyme inhibitors on the quality of life of patients with hypertensive aging 40 years or older in Benghazi city in comparison with other classes of hypertension medications. A case control observational study was conducted, adopting the structured face-to-face interviewing survey technique. Over 150 patients who visited Benghazi medical center during the study period (November, 2019 to March, 2020), to follow up their chronic disease. The investigators used a pre-validated, pre-piloted questionnaire that has been adopted from SF 36 and modified according to the updated literature review; responses to each question were coded and analyzed. The results display that antihypertensive medications were found to be significantly related to the limitation on the physical activity domain and found that medications decrease the limitation on the activity with about 20% of the patients who taking angiotensin receptor blockers (20%) and 30% of the patients taking angiotensin converting enzyme inhibitors, 40% of the patients had no limitations on bending kneeling and stooping. Moreover, on the limitations on walking more than one kilometre, the results were about 15% of the patients taking angiotensin receptor blockers and 30% of the patients taking angiotensin converting enzyme inhibitors had a slightly or no limitation on walking more than a kilometre. Thus, the findings indicate that antihypertensive medications have a positive effect on quality of life of the patient in limitation on activity domain but no conclusive difference was found between angiotensin converting enzyme inhibitors and angiotensin receptor blockers medications.

**Keywords:** Angiotensin converting enzyme inhibitor, antihypertensive, hypertension, quality of life, Libya, SF 36

## Introduction

Hypertension or elevated blood pressure (BP) is a common cardiovascular condition and is considered as a major public health issue that significantly increases the risk of health problems such as coronary heart disease, stroke and heart failure [1, 2]. The overall goal of BP management is to reduce the risk of cardiovascular diseases and target organ damage such as myocardial infarction, heart failure, stroke and kidney disease associated morbidity and mortality. There are different treatment strategies that should be used to achieve those goals, which include pharmacological and non-pharmacological therapy [3]. Non pharmacological pathway in lifestyle modifications such as: adjusting weight, follow the Dietary Approaches to Stop Hypertension (DASH) eating plan, adjusting the daily salt intake to 1.5 gm per day (3.8 gm/day sodium chloride), regular physical activity, reducing alcohol consumption and smoking cessation. Non pharmacological treatment could alone be sufficient in case of prehypertension but in more serious cases, it is inadequate and the added of pharmacological treatment is needed such as cases of patients with hypertension and additional cardiovascular risk factors or hypertension associated target organ damage [4]. There are different anti-hypertensive medications classes including diuretics, beta-blockers, angiotensin converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs) and calcium channel blockers which are considered primary antihypertensive agents. Health related quality of life (HRQoL) consider as a multi-dimensional concept that includes domains related to the effect of physical and mental health perceptions (energy level, mood) and their correlate such as health risks and conditions, social support, functional and socioeconomic status. The focusing on HRQoL as an outcome can shows the relation between disciplines and social, mental, medical services. It can also help determine the burden of preventable disease and disabilities and can provide valuable novel insights into the relationships between HRQoL and risk factors [5, 6]. Thus, the aim of the current study is to assess the effect of ACEIs on the HRQoL of Libyan patients with hypertensive aging 40 years or older in comparison with the other classes of hypertension medications.

## Materials and methods

A case control observational study was conducted in Benghazi Medical Center (BMC) located in Benghazi city from November, 2019 to March, 2020. Ethically, researchers acquired written agreement to collect data from the BMC's head of human resources development and head of Internal Medicine at BMC, also researchers got verbal approval from all participants before filling the questionnaire. Also, covering letter explaining the purpose of the study and assuring the confidentiality of information was provided to BMC administration, an approval was granted and then the patients were asked for verbal consent to participate in the study. Patients were interviewed using pre-piloted questionnaires asking about the limitations the diseases or medicines have on their daily activities.

***Subject sampling and study design:*** the target sample of the study was 250 patients but due to COVID-19 pandemic, the study was forced to settle with 152 patients. The sample was collected mainly from patients who visited BMC outpatient clinic (cardiology clinic) to follow up their diseases. A quantitative type of research was conducted, adopting the structured interview survey methodology. 152 questionnaires were filled using face to face interview technique and data was obtained from each patient but not their companion.

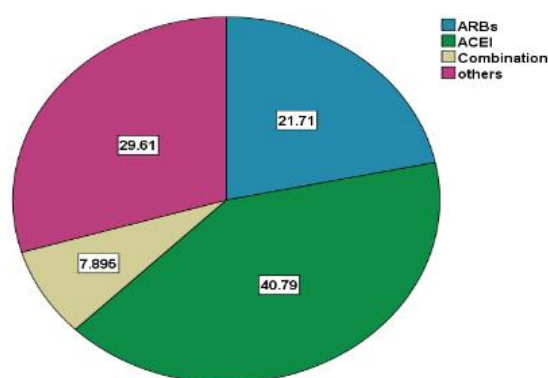
***Inclusion criteria:*** the patients who allowed to participate in this study were: Libyan hypertensive patient, aged 40 years and over and taking anti-hypertension medications.

***Exclusion criteria:*** the excluded participants were hypertensive patients who do not take medications and dependent on lifestyle changes only, also people who are below 40 years old and people from other ethnic groups.

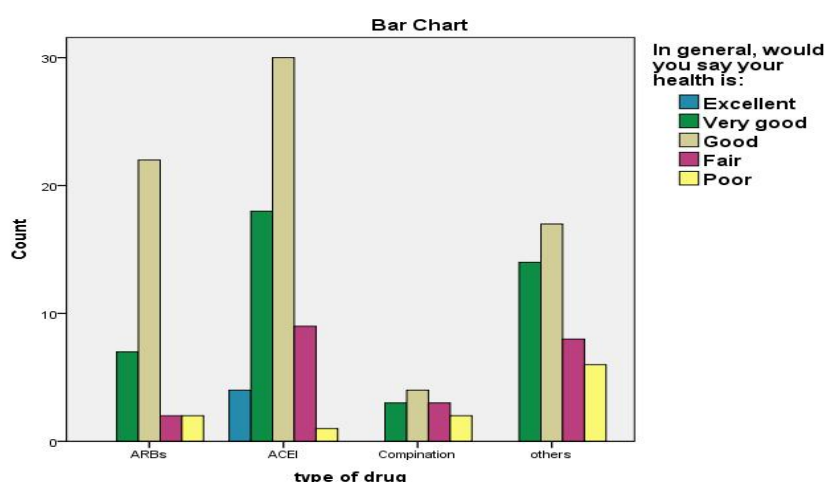
***The research instrument:*** the research used 36-Item Short Form Survey (SF-36) which is often used, well-researched, self-reported measure of HRQoL all diseases in general and hypertension in specific, the questionnaire was modified and some questions were added for more comprehension after conducting different literature reviews. In addition, the questionnaire was printed in both languages: Arabic and English. The questionnaire was piloted on a convenience sample of 5% (n = 13) of the targeted sample, after piloting, further necessary modifications to the questionnaire were made.

## Results

Along the study period, total of 163 hypertensive patients were reached, 11 of them were excluded because they refused to participate due to the lack of time or lack of trust in giving their information. The mean age was  $65.38 \pm 9.7$  years (mean  $\pm$  SD) where the youngest patient was 44 years old and the oldest patient was 90 years old. The number of participants included in the study is 152 with a response rate of 93%. With regard to the gender, the percentage of female was 56.5% ( $n = 86$ ) and male was 43.4% ( $n = 66$ ). In **Figure 1**, the distribution of medicines used by hypertensive patients is shown. Thus, about 40% of the patients were used only ACEIs, about 20% on ARBs, 30% of the patients were on other classes of antihypertensive. Only 10% were on combination therapy for hypertension control. The percentage of daily salt intake used by hypertensive patients included in the study, where 55% of the patients ( $n = 84$ ) are moderate use and 35% of the patients ( $n = 52$ ) are on minimal use and about 10% of the patients ( $n = 16$ ) are on excessive use. In **Figure 2**, health evaluation by patients on antihypertensive medications scaled as an excellent, very good, good, fair or poor is shown. Thus, ACEIs and ARBs were the most positive effect whereas a combination therapy showed a lower effect.



**Figure 1:** Percent of each medicine used by Libyan patients with hypertension



**Figure 2:** Health evaluation by Libyan patients using medications

**Table 1** shows that out of 22% patients use ARBs, only 0.7% of the patients have a limitation. Patients on ACEIs (41%), about 10% have limitations of activities (bending, kneeling or stopping). However, both medications (ARBs and ACEIs) have a limited little (less than 5%). Overall, the patients with anti-hypertensive medications have about 10% of limited a little but about 65% have no limited activity at all. About 20% of the patients on anti-hypertensive have limited activity.

**Table 1:** Limitations of activities: bending, kneeling or stooping

Class of medication			limitations of activities: bending, kneeling or stooping			Total
			not limited at all	yes, limited	limited a little	
1	ARBs	the total of % within type of drug and % within limitations of activities bending, kneeling or stooping	17.8%	0.7%	03.3%	21.7%
2	ACEIs		27.0%	9.9%	03.9%	40.8%
3	Combination		06.6%	0.7%	00.7%	07.9%
4	Others		15.8%	10.5%	03.3%	29.6%
	Total		67.0%	21.8%	11.2%	100.0%

## Discussion

In this study, although there is a slight difference between female and male ratio, with 10% of female more than male patients. Similarly, previous studies had the same findings as in a study conducted in Nigeria where 55% of the study population was females and 44% was males [7] also, another study in China where females are 63% and males are 47% [8]. This is may be due to dramatic changes in hypertension incidence post-menopause and the sample population of the study was mostly postmenopausal women. The findings of medication distribution across the sample is not identical due to personal preference of the physicians, the cost of ACEIs is less than ARBs or the fact that ACEIs is more effective than the other classes of medication in decreasing BP and enhancing HRQoL. Similarly, in a randomized controlled clinical research ACEIs was found to have a slightly more favorable effect on QoL of patients with hypertensive than other medications [9, 10]. The effect of salt intake on the QoL was moderate in most cases taking ACEIs while less patients using ARBs were moderate in their salt consumption. The reason can be referred to the local food restricted amount of it. An improvement in the limitation on physical activity according to bending kneeling or stooping aspect with similarity between ACEIs and ARBs, moreover in walking more than a kilometer aspect, the findings were not conclusive to differentiate between ARBs and ACEIs. Most of the patients taking the two medications found to have no limitation at all or a slight limitation on walking was limited a little. This is may be due to the comorbidities that limit physical activity in patients, or poor adherence on anti-hypertensive medications. For instance, in Nigeria, the effect of hypertension on HRQoL lower scores in mobility, self-care and usual activity [7], establishing that controlling hypertension may lead to enhanced mobility and physical activity. In another study performed in China showed that captopril is not only effective in lowering BP, but also effective in improving QoL in mild hypertensive [6, 10]. These results are in contrast to a study performed in Sweden, which showed that QoL is not affected by the treatments [11]. The primary and most affecting limitation of the current study is COVID-19 pandemic that prevented a larger data collection. Data was collected from the same area which may affect medication class prescribed since most of the patients were treated in the same clinic. Therefore, it is difficult to generalize the current findings due to lack of enough data. Last, recall bias could have affected self-reports of QoL.

**Conclusion:** ACEIs have a greater effect than ARBs on the limitation of the physical activity in Libyan patients with hypertension, while, the ARBs more influence on the limitations of activities than ACEIs. However, the effect of both medications is almost the same and have positive impact on the HRQoL.

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**Competing Interests:** The authors have declared no competing interests.

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**Author contributions:** All authors contributed equally.

**Please if not correct, make it as they sent to you.**



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