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Original Research Article

# Understanding Patients' Beliefs about Hypertension in Primary Health Care in Bahrain: A Cross-Sectional Study

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## Abstract

Hypertension is a major cause of morbidity and mortality worldwide. Patients' beliefs and knowledge about hypertension have a strong influence on compliance to treatment and control of the disease. Up to date, there is no previous data on hypertension health beliefs in Bahrain. Therefore, this research was conducted to study patients' beliefs and explore the association between patients' characteristics and their beliefs. ***Aim:*** To understand Bahraini patients' beliefs about hypertension in primary health care in Bahrain. ***Objectives:*** To explore patients' beliefs about hypertension in primary health care in Bahrain; to study the association between personal characteristics (demographic, socioeconomic and medical) and patients' beliefs. ***Study design*:** Cross-sectional study. ***Settings:*** Data was collected from two primary care health centers in each health region in Kingdom of Bahrain using validated questionnaire. Participants 454 hypertensive adult Bahraini patients ≥18 years, who were attending primary care within 10 days period in February 2018 ($1^{st}$ – $14^{th}$ February), were recruited. Pregnant women, patients with psychotic disorder or cognitive impairment, and patients who are unable to communicate were excluded. Data was analyzed qualitatively for themes using SPSS version 23.0. ***Results:*** Patients' mean age was 58.2 ± 11.697 years with females constituting 58.4%. Based on the Health Beliefs Model, participants have strong beliefs regarding their susceptibility to the effects of hypertension, seriousness of its complications and the benefits of a proper and healthy management plan. On the other hand, they have weak beliefs in the efficacy of the barriers (i.e. alternative medicine and medication side effects) toward hypertension management. The most variables having the largest influence on patients' beliefs were duration of having hypertension and existence of other chronic medical problems. ***Conclusion:*** The findings suggest that participants were fairly knowledgeable about hypertension. We concluded that patients' perceptions are an important factor in hypertension care and should be deeply explored.

**Keywords:** Hypertension, Health beliefs, Alternative medicine, primary care.



## INTRODUCTION

Non-communicable diseases represent 43% of the disease burden globally and are expected to be responsible for 60% of the disease burden and 73% of all deaths by 2020 [1].

In Bahrain, non-communicable diseases account for 65% of all deaths in 2014 [2]. Among the non-communicable diseases recorded from April 2007 to December 2014 in primary health care centres in Bahrain, 26.2% of them were hypertensive [3].

Hypertension is a silent risk factor and asymptomatic in nature. It has been linked with major health problems such as stroke, myocardial infarction, chronic kidney disease, vascular diseases and retinopathy. It has been shown that poorly controlled blood pressure is associated with increased likelihood of developing these complications [4, 5]. Furthermore, hypertension complications affect patient's quality of life to the extreme; which in turn causes further problems or, in other circumstances, increases the severity of existing problems [6].

Moreover, patients might have misperceptions about hypertension, its severity, comorbidities and the significance of its management which could influence the adherence to anti-hypertensive medication. However, if patients believe that hypertension is a controllable disease, compliance to treatment maybe more likely [7]; and subsequently decreasing or controlling the complications.

A literature review on patient's beliefs and adherence revealed that several studies concluded that patients' subjective beliefs, convictions and understandings about hypertension negatively influence the adherence to treatment. Additionally, there is positive evidence that support targeting health beliefs as one component of interventions to improve disease outcome [5, 8-11]. Keeping in consideration that failure of drug adherence has been associated with potential serious consequences at the level of patient and health care system, in terms of, increasing the use of services, hospital admissions and wasting of resources [12]. Hence, recommendations were made to understand patients' beliefs aiming for improving the awareness and patients' attitude toward hypertension to yield greater rate of disease control. This can be achieved through proper counselling to eliminate the false beliefs regarding hypertension [13, 14]. Therefore; the first step in this process is studying patients' beliefs about their illness.

According to a systematic review done in 2012, people widely think that hypertension is a disease that is related to stress including all different types of stress such as work, family issues, economic status; even if the stressors occurred in the past [5]. The most common perceived symptoms of hypertension are, headache and dizziness, with a large number of people rely on the presence or absence of symptoms to decide whether their blood pressure is elevated or not [5]. Large number of patients report the use of alternative medicine or herbs to control their hypertension [5].

A study done in the United Kingdom in 2004 looking into the role of illness perceptions and treatment beliefs revealed that patients believe that hypertension is a long term illness and it can be controlled, but surprisingly, for beliefs in serious consequences the responses were low [9]. Furthermore, patients perceived the cause of hypertension is psychological or related to risk factors such as smoking and obesity [9].

Various researches studied the association between health beliefs and different patients' factors, such as demographic, socioeconomic and medical characteristics of the patients [15-20]. One research was conducted in United States in 2007, and it concluded that hypertension awareness and treatment are lower among the young (20–39 years), the uninsured, individuals reporting fewer health risk factors, and adults with less exposure and utilization of health care [17].

Another study conducted in Turkey in 2012 concluded that, significant relationships were observed between knowledge score and age, gender, educational level and history of hypertension, while no correlation was observed between knowledge score and having an income-generating job [18]. Sabouhi *et al.,* reported that there were significant relationships between knowledge score, age and education level, while there was no relationship in terms of gender [19]. Martins *et al.,* also reported a relationship between knowledge level and history of hypertension and education level [20].

Health beliefs mediate the relationship between demographic variables, such as age and gender, and compliance; suggesting that this could explain the differences seen in studies of compliance; as age, gender and other demographic variables may lead patients to have different health beliefs in different populations. It also has found that older patients and female patients were noticeably more compliant [15]. Currently, this is the first attempt to explore patients' beliefs about hypertension and the association between patients' personal factors and these beliefs in Bahrain.

## METHODS

**Study type:** Cross sectional study.

### Patient and Public Involvement

### Research Question Development

Our research question was developed in regard to the high prevalence of hypertension in the Kingdom of Bahrain; therefore, we conducted this research to understand patients' health beliefs and attitude toward hypertension and the resultant amplitude of these beliefs on the disease course.

### Participants and Sample Size

454 Participants were recruited from a total of ten health centres; randomly selecting two health centres from each of the five health regions in Kingdom of Bahrain by concealed envelope (Figures 1 & 2). Bahraini hypertensive patient's ≥18 years old who were attending primary care within 10 days period in February 2018 (1$^{st}$ – 14$^{th}$ February) were included. Participants were conveniently selected from the general clinic and non-communicable disease clinics. Exclusion criteria: (1) pregnant women; (2) patients with psychiatric disorders or cognitive impairment; and (3) patients who are unable to communicate in Arabic or English.

### Dissemination of the results among study participants

The research is targeting the whole hypertensive population through health care system; thereby, the results will be used and disseminated during doctor visits aiming at improving these beliefs and correcting the wrong ones.

### Investigation tools

### Demographic, Socioeconomic and Medical Characteristics

A form was designed containing demographic (gender and age), socioeconomic (level of education, marital status, employment and smoking) and medical

characteristics (duration of having hypertension, number of anti-hypertensive medications and pre-existing medical problems, i.e. diabetes mellitus, kidney problems and heart problems) that may possibly have influence on the patients' beliefs; collectively referred to as the patients' characteristics. For the ease of analysis; age, duration of having hypertension, and number of medications were divided individually into groups using parametric and non-parametric tests for analysis. Age, in years, was divided to four groups (<45, 45-54, 55-64, 65+); duration of having hypertension was divided into four groups (<5, 5-<10, 10-<15, 15+); and number of medications was divided into two groups (<2, 2-4).

**Health Beliefs Model (HBM) Questionnaire**

Health Beliefs Model (HBM) Questionnaire has been widely used to measure participants' beliefs and attitudes, and the responses are measured on a 6-point Likert scale (1=strongly disagree, 2=moderately disagree, 3=slightly disagree, 4=slightly agree, 5=moderately agree, 6=strongly agree) [21]. It has four sections constructing the model with each section has a number of questions: (1) perceived susceptibility to the effect of hypertension which consists of 5 questions, studying the participants' understanding about the effect of hypertension and its complications; (2) perceived seriousness of the effect of high blood pressure composed of 6 questions, exploring participants' understanding about the effect of hypertension on their lives; (3) perceived barriers to high blood pressure management containing 8 questions, which looks into the obstacles that interfere with proper hypertension management, i.e. alternative medicine and medications side effect; and (4) perceived benefits to the management of high blood pressure which includes 6 questions, digging into the participants' knowledge regarding the importance of adherence to hypertension management, i.e. lifestyle and medications.

Mean score for each section was calculated independently by summing up the scores of each question divided by the number of total questions in the section itself. Mean scores were categorized in one of three categories: (1) Weak beliefs (scoring less than 50% of mean score = less than 3 on 6-point Likert scale); (2) Average beliefs (scoring 50% - 70% of mean score = 3 – 4.2 on 6-point Likert scale); and (3) Strong beliefs (scoring more than 70% of mean score = more than 4.2 on 6-point Likert scale). These percentages were chosen based on a previous conducted study using the Health Beliefs Model Questionnaire [14]. Finally, the total score and the mean for each section collectively were calculated for all participants to get a final score for each section (Table-1).

**Table-1: Mean score interpretation**

| Scoring | Agreement level |
|---|---|
| 1.00 – 1.83 | Strongly disagree |
| 1.84 – 2.67 | Moderately disagree |
| 2.68 – 3.51 | Slightly disagree |
| 3.52 – 4.35 | Slightly agree |
| 4.36 – 5.19 | Moderately agree |
| 5.20 – 6.00 | Strongly agree |

Cronbach's α coefficient for each subscale of the questionnaire in this study was as follows: perceived susceptibility (0.811), perceived seriousness (0.620), perceived barriers (0.773) and for perceived benefits (0.855).

**Statistical Analysis**

SPSS 23.0 software was used for data entry and analysis. Frequencies and percentages were computed for categorical variables. For the ease of analysis; marital status, employment and smoking were categorized into groups marked with numbers. Means and standard deviations were computed for all items in Health Beliefs Scale. Overall means and standard deviations scores with 95% confidence interval were computed for Health Beliefs subscales. t-test was used for categorical variables, to explore the difference in mean scores between two groups. ANOVA test with Post hoc test comparisons applying Tukey HSD estimation was used for all ordinal data, age, education, marital status, employment, years of hypertension and smoking status. Multiple linear regression was used to explore the factors that affect Health Beliefs subscales when other variables have been controlled for. P-value < 0.05 was considered significant among all tests. Scales missing information were not included in the analysis.

## RESULTS

Five-hundred and forty-eight patients were approached. Of these, 471 individuals were eligible (Figure-1). Of these, 17 participants refused to be enrolled in the study.

A total of 454 participants were included in the study from both the non-communicable disease clinic and the general clinic in the primary health care from the five health regions in kingdom of Bahrain. From health region 1, we recruited 80 patients; 104 patients from health region 2; 151 patients from health region 3; 25 patients from health region 4; and 94 patients from health region 5 (Figure-2). Of the 454 participants, 360 (79%) were selected from non-communicable diseases clinic giving a response rate of 96.4%.

**Demographic, socioeconomic and health status**

The patients' characteristics of the study population were studied (Table-2). More than half of the patients (58.4%) were females. The age of respondents ranged from 21 to 91 years old with mean (SD) age was 58.2 (11.7) years. There was no

difference in the mean (SD) age. The majority of the study population were married (80.8%), 32.2% had secondary education, and 24.9% had higher education. 44.1% were unemployed. Majority of the participants were non-smokers (76%). Most participants had hypertension for mean (SD) 9.8 years (7.5). Most of our study population (66.8%) were using < 2 antihypertensive medications, of these; the majority were using one medication either in a single or combined form. Of the 454 hypertensive patients sampled, 317 (69.8%) had concomitant diabetes, 29 (6.4%) had kidney problems and 79 (17.4%) had heart problems.

**Table-2: Demographic, socioeconomic and health status. (Values are numbers (%) *n = 454)***

| | | |
|---|---|---|
| Gender | Male | 189 (41.6) |
| | Female | 265 (58.4) |
| Age* (n = 448) | Mean age for all | 58.2 (SD 11.7) |
| | <45 | 55 (12.3) |
| | 45-54 | 109 (24.3) |
| | 55-64 | 159 (35.5) |
| | 65+ | 125 (27.9) |
| Level of Education | Illiterate | 93 (20.5) |
| | Primary / Intermediate | 102 (22.5) |
| | Secondary | 146 (32.2) |
| | Higher education | 113 (24.9) |
| Marital Status | Single | 19 (4.2) |
| | Married | 367 (80.8) |
| | Divorced | 14 (3.1) |
| | Widow | 54 (11.9) |
| Employment | Working | 113 (24.9) |
| | Unemployed | 200 (44.1) |
| | Retired | 141 (31.1) |
| Smoking | Yes | 47 (10.4) |
| | No | 345 (76.0) |
| | Ex-smoker | 62 (13.7) |
| Duration of having hypertension* (n = 449) | <5 | 122 (27.2) |
| | 5-<10 | 115 (25.6) |
| | 10-<15 | 100 (22.3) |
| | 15+ | 112 (24.9) |
| Number of anti-hypertensive medications* (n = 452) | <2 | 302 (66.8) |
| | 2-4 | 150 (33.2) |
| Medical problems | Diabetes mellitus | 317 (69.8) |
| | Kidney problems | 29 (6.4) |
| | Heart problems | 79 (17.4) |
| *Indicates different sample size due to missing values. | | |

**Health beliefs measures**

**Perceived susceptibility to the effect of hypertension**

Eighty percent (95% CI = 77.8-84.3) of respondents strongly perceived their susceptibility to the effects of hypertension, mean (SD) 4.88 (1.1) (95% CI = 4.8 - 5.0) (Tables 3 and 4).

**Table-3: Distribution of study population based on strength of health beliefs in each section**

| | Susceptibility | | Seriousness | | Barrier | | Benefit | |
|---|---|---|---|---|---|---|---|---|
| | N (%) | 95% CI | N (%) | 95%CI | N(%) | 95% CI | N(%) | 95% CI |
| Weak | 32 (7) | 4.9 - 9.8 | 29 (6.4) | 4.3 - 9.0 | 296 (65.2) | 60.8 - 69.6 | 13 (2.9) | 1.5 - 4.9 |
| Moderate | 56 (12.3) | 0.3 - 15.4 | 118 (26.0) | 22.0 - 30.0 | 124 (27.3) | 23.2 - 31.4 | 14 (3.1) | 1.7 - 5.1 |
| Strong | 366 (80.6) | 77.8 - 84.3 | 307 (67.6) | 63.3-72.0 | 34 (7.5) | 5.2 - 10.3 | 427 (94.1) | 91.5 - 96.0 |

**Table-4: Means and standard deviations (SD) and 95% confidence interval of health beliefs sections: susceptibility, seriousness, barriers, benefits**

| | | 95% Confidence interval | |
|---|---|---|---|
| | Mean (SD) | Lower | Upper |
| Perceived susceptibility to the effects of hypertension | 4.88 (1.1) | 4.8 | 5.0 |
| Perceived seriousness of the effects of high blood pressure | 4.55 (1.0) | 4.5 | 4.6 |
| Perceived barriers to high blood pressure management | 2.48 (1.1) | 2.4 | 2.6 |
| Perceived benefits to the management of high blood pressure | 5.48 (0.9) | 5.4 | 5.6 |
| *n = 454, SD = standard deviation* | | | |

Table-5 shows independent sample t-test. There was no significant difference in mean scores for gender, respondents with diabetes and kidney problem, $p > 0.05$, with very small effect size. A significant difference was observed in the mean score for respondents with heart problem and respondents taking hypertensive drugs p 0.005 and 0.007 respectively with small effect size $\eta^2$ 0.03 and 0.02 respectively.

**Table-5: t-test for perceived susceptibility to the effect of hypertension**

| Variable | | Mean score | Mean Difference | 95% Confidence interval | | Sig. 2 tailed | Effect size $\eta^2$ |
|---|---|---|---|---|---|---|---|
| | | | | Upper | Lower | | |
| Gender | Male | 4.85 | -0.046 | 0.16 | -0.25 | 0.67 | 0.0004 |
| | Female | 4.9 | | | | | |
| Diabetes | Yes | 4.9 | 0.07 | 0.3 | -0.16 | 0.55 | 0.0007 |
| | No | 4.8 | | | | | |
| Kidney problem | Yes | 5.2 | 0.35 | 0.73 | -0.03 | 0.07 | 0.008 |
| | No | 4.9 | | | | | |
| Heart problem | Yes | 5.2 | 0.4 | 0.62 | 0.18 | 0.005 | 0.03 |
| | No | 4.8 | | | | | |
| Number of hypertension drugs | < 2 | 4.8 | -0.28 | -0.08 | -0.48 | 0.007 | 0.02 |
| | > 2 | 5.1 | | | | | |
| *Effect size Cohen's $\Pi^2$ Small effect 0.01, Moderate effect 0.06, Large effect 0.14* | | | | | | | |

A one way ANOVA test between ordinal variables was performed. As shown in [Table 6], there was no significant difference in mean score observed for Age, education, marital status and employment $p > 0.05$ with small effect size $\eta^2 < 0.01$. On the other hand, there was a significant difference at p 0.005 in the mean score for the number of years of having hypertension for the four groups. The effect size was small $\eta^2$ 0.03. Post hoc test comparisons using Tukey HSD estimation indicated that the mean score for group < 5 years was significantly different from group 10-14 years and group >15 years $p < 0.05$. A significant difference was observed in the mean score for smoking status of respondents p 0.02, the main difference was between non-smokers and ex-smokers p 0.02 with a small effect size, Cohen's $\Pi^2$ 0.02 (Table-6).

**Table-6: One way ANOVA test for perceived susceptibility to the effect of hypertension**

| Variable | | Mean (SD) | 95% confidence interval | | Sig | Effect size $\eta^2$ |
|---|---|---|---|---|---|---|
| | | | Upper | Lower | | |
| Age (years) | < 45 | 4.6 (1.03) | 4.9 | 4.3 | > 0.05 | 0.01 |
| | 45-54 | 4.38 (1.3) | 5.0 | 4.5 | | |
| | 55-64 | 5.0 (1.0) | 5.1 | 4.9 | | |
| | > 65 | 4.9 (0.99) | 5.1 | 4.7 | | |
| Education | Illiterate | 5.01 (0.9) | 5.3 | 4.9 | 0.1 | 0.01 |
| | Primary/Inter. | 4.7 (1.3) | 5.0 | 4.5 | | |
| | Secondary | 4.8 (1.2) | 5.0 | 4.6 | | |
| | Higher education | 5.0 (1.0) | 5.1 | 4.8 | | |
| Marital status | Single | 4.7 (1.0) | 5.1 | 4.2 | 0.2 | 0.01 |
| | Married | 4.8 (1.2) | 5.0 | 4.7 | | |
| | Divorced | 5.0 (0.6) | 5.4 | 4.7 | | |
| | Widow | 5.2 (0.8) | 5.4 | 4.9 | | |
| Employment | Working | 4.7 (1.2) | 5.0 | 4.5 | 0.24 | 0.006 |
| | Unemployed | 4.9 (1.1) | 5.1 | 4.8 | | |
| | Retired | 5.0 (1.0) | 5.1 | 4.8 | | |
| Duration of having hypertension (years) | < 5 | 4.6 (1.3) | 4.9 | 4.4 | 0.005 | 0.03 |
| | 5-9 | 4.8 (1.1) | 5.0 | 4.6 | | |
| | 10-14 | 5.1 (0.9) | 5.2 | 4.9 | | |
| | > 15 | 5.1 (1.0) | 5.3 | 4.9 | | |
| Smoking | Yes | 5.1 (1.0) | 5.4 | 4.8 | 0.02 | 0.02 |
| | Non-smoker | 4.8 (1.1) | 5.0 | 4.7 | | |
| | Ex-smoker | 5.2 (1.0) | 5.4 | 5.0 | | |
| *Effect size Cohen's $\Pi^2$ Small effect 0.01, Moderate effect 0.06, Large effect 0.14* | | | | | | |

Multiple linear regressions were used to assess the participant's characteristic on perceived susceptibility to the effects of hypertension. Our model which includes age, marital status, gender, education, occupation and smoking explains 1.8% of variance in susceptibility to the effects of hypertension. Marital status makes the largest contribution Beta = 0.100, $p < 0.05$ (Table-7).

Hierarchical multiple regression was used to assess the ability of age, educations, occupation, smoking and gender to predict the level of susceptibility to the effects of hypertension. After controlling for marital status, at step 1 marital status explained 1% of variance in susceptibility to effects of hypertension, after entering the remaining independent variables at step 2 the total variance explained by the model as a whole was 1.9%, $p > 0.55$. In the final model marital

status was statically significant P < 0.05 with marital status recording a higher Beta value = 0.100 than the other variables (Table-7).

**Table-7: Multiple Linear Regression of patients characteristics on perceived susceptibility to the effects of high blood pressure**

| Variable | Beta | p |
|---|---|---|
| Age | 0.056 | 0.357 |
| Gender | 0.011 | 0.827 |
| Marital status | 0.100 | 0.05 |
| Education | 0.053 | 0.37 |
| Occupation | 0.053 | 0.302 |
| Smoking | 0.034 | 0.827 |

**Perceived Seriousness of the Effect of High Blood Pressure**

Three hundred and seven (67.6%) (95% CI = 63.3 - 72) of respondents perceived the seriousness of the effect of hypertension (Table-3). The mean (SD) perceived seriousness score was 4.55 (1.0) with 95% CI = 4.5 - 4.6 (Table-4).

An independent sample t-test showed no significant difference in mean scores for gender, respondent with diabetes, kidney disease, heart problems, and numbers of hypertensive medication taken by respondents P > 0.05. Although insignificant, history of diabetes mellitus had a moderate effect size η2 0.07 (Table-8).

**Table-8: t-test for perceived seriousness of the effect of high blood pressure**

| Variable | | Mean score | Mean Difference | 95% Confidence interval | | Sig. 2 tailed | Effect size η2 |
|---|---|---|---|---|---|---|---|
| | | | | Upper | Lower | | |
| Gender | Male | 4.528 | 0.031 | 0.156 | 0.218 | 0.746 | 0.01 |
| | Female | 4.559 | | 0.157 | 0.218 | 0.746 | |
| Diabetes | Yes | 4.558 | 0.086 | 0.463 | 0.292 | 0.656 | 0.07 |
| | No | 4.518 | | 0.471 | 0.309 | 0.661 | |
| Kidney problem | Yes | 4.626 | 0.086 | 0.463 | 0.292 | 0.656 | 0.02 |
| | No | 4.541 | | 0.471 | 0.309 | 0.661 | |
| Heart problem | Yes | 4.711 | 0.199 | 0.442 | 0.044 | 0.107 | 0.05 |
| | No | 4.512 | | 0.430 | 0.031 | 0.090 | |
| Number of hypertension drugs | < 2 | 4.534 | 0.046 | 0.141 | 0.243 | 0.643 | 0.03 |
| | > 2 | 4.580 | | 0.147 | 0.239 | 0.637 | |
| *Effect size Cohen's $\eta^2$ Small effect 0.01, Moderate effect 0.06, Large effect 0.14* | | | | | | | |

Upon performing a one way ANOVA test between variables it was found that there is no significant difference in mean score observed for age, education, marital status, employment, duration of having hypertension and smoking; as the p-values were > 0.05; with small effect size η2 < 0.01 for all variables except for education level showing moderate effect size η2 = 0.08 (Table-9).

**Table-9: One way test for perceived seriousness of the effect of high blood pressure**

| Variable | | Mean (SD) | 95% confidence interval | | Sig | Effect size $\eta^2$ |
|---|---|---|---|---|---|---|
| | | | Upper | Lower | | |
| Age (years) | < 45 | 4.352 (0.985) | 4.6 | 4.1 | 0.412 | 0.032 |
| | 45-54 | 4.546 (0.997) | 4.7 | 4.4 | | |
| | 55-64 | 4.677 (0.944) | 4.8 | 4.5 | | |
| | > 65 | 4.443 (1.062) | 4.6 | 4.3 | | |
| Education | Illiterate | 4.554 (1.047) | 4.8 | 4.3 | 0.213 | 0.080 |
| | Primary/Inter. | 4.441 (1.044) | 4.6 | 4.2 | | |
| | Secondary | 4.679 (0.932) | 4.8 | 4.5 | | |
| | Higher education | 4.463 (1.001) | 4.6 | 4.3 | | |
| Marital status | Single | 4.746 (0.181) | 5.1 | 4.4 | 0.173 | 0.033 |
| | Married | 4.523 (0.054) | 4.6 | 4.4 | | |
| | Divorced | 4.500 (0.191) | 4.9 | 4.1 | | |
| | Widow | 4.648 (0.126) | 4.9 | 4.4 | | |
| Employment | Working | 4.532 (1.036) | 4.7 | 4.3 | 0.682 | 0.054 |
| | Unemployed | 4.510 (1.056) | 4.7 | 4.4 | | |
| | Retired | 4.609 (0.889) | 4.8 | 4.5 | | |
| Duration of having hypertension (years) | < 5 | 4.504 (1.080) | 4.7 | 4.3 | 0.196 | 0.042 |
| | 5-9 | 4.558 (1.068) | 4.8 | 4.4 | | |
| | 10-14 | 4.483 (0.852) | 4.7 | 4.3 | | |
| | > 15 | 4.631 (0.968) | 4.8 | 4.4 | | |
| Smoking | Yes | 4.560 (0.984) | 4.8 | 4.3 | 0.768 | 0.002 |
| | Non-smoker | 4.537 (1.013) | 4.6 | 4.4 | | |
| | Ex-smoker | 4.586 (0.955) | 4.8 | 4.3 | | |
| *Effect size Cohen's $\eta^2$ Small effect 0.01, Moderate effect 0.06, Large effect 0.14* | | | | | | |

Multiple linear regression model of patients' characteristics on perceived seriousness of the effect of high blood pressure explains 1.8% of variance p > 0.718. Level of education made the largest contribution (Beta 0.08, p > 0.197) and smoking made the least contribution (Beta 0.002, p > 0.959). Hierarchical multiple regression was used to assess the ability of level of education to predict the seriousness of hypertension perceived by respondents, after controlling for all other independent variables. The impact of level of education explained 1% of variance after entering the remaining independent variables, 1.8% of variance was explained, although not significant p > 0.69. In the final model, the level of education was not significant but it contributed a higher Beta value 0.08 and smoking contributed the least Beta 0.002 (Table-10).

**Table-10: Multiple Linear Regression of patients characteristics on perceived seriousness of the effects of high blood pressure**

| | Beta | Sig. |
|---|---|---|
| (Constant) | 4.823 | 0.000 |
| Gender | 0.012 | 0.816 |
| Age | -0.032 | 0.604 |
| Level of Education | 0.080 | 0.197 |
| Marital Status | 0.033 | 0.527 |
| Occupation | 0.054 | 0.306 |
| Smoking | -0.002 | 0.959 |
| Duration of having hypertension | 0.042 | 0.427 |
| Number of anti-hypertensive medications | 0.033 | 0.521 |
| Diabetes mellitus | -0.068 | 0.170 |
| Kidney problems | -0.020 | 0.686 |
| Heart problems | -0.050 | 0.327 |

**Perceived Barriers to High Blood Pressure Management**

Majority of respondents, 67.2% (95% CI= 60.8 - 69.6) did not perceive any barriers to hypertension management (Table-3). The mean (SD) perceived barrier score was 2.48 (1.1) with 95% CI = 2.4 to 2.6 (Table-4).

An independent sample t-test was conducted. There was no significant difference in mean scores for gender, respondent with diabetes, kidney disease, heart problems, and numbers of hypertensive medication taken by respondents P > 0.05. Although not significant, history of diabetes mellitus and kidney problems had moderate effect size η2 0.07 and 0.06 respectively (Table-11).

**Table-11: t-test for perceived barrier for high blood pressure management**

| Variable | | Mean score | Mean Difference | 95% Confidence interval | | Sig. 2 tailed | Effect size η2 |
|---|---|---|---|---|---|---|---|
| | | | | Upper | Lower | | |
| Gender | Male | 2.427 | -0.0913 | 0.1098 | -0.292 | 0.373 | 0.02 |
| | Female | 2.518 | | 0.1095 | -0.292 | 0.372 | |
| Diabetes | Yes | 2.421 | -0.1961 | 0.0194 | -0.411 | 0.074 | 0.07 |
| | No | 2.617 | | 0.0217 | -0.414 | 0.077 | |
| Kidney problem | Yes | 2.806 | 0.3484 | 0.753 | -0.056 | 0.091 | 0.06 |
| | No | 2.458 | | 0.825 | -0.129 | 0.146 | |
| Heart problem | Yes | 2.552 | 0.0876 | 0.349 | -0.174 | 0.511 | -0.04 |
| | No | 2.465 | | 0.344 | -0.169 | 0.501 | |
| Number of hypertension drugs | < 2 | 2.479 | -0.0111 | 0.200 | -0.223 | 0.918 | 0.03 |
| | > 2 | 2.490 | | 0.209 | -0.231 | 0.921 | |
| *Effect size Cohen's η²  Small effect 0.01,  Moderate effect 0.06,  Large effect 0.14* | | | | | | | |

A one way ANOVA (Table-12) showed no significant difference in the mean scores for categories of age, education, marital status, employment, years of having hypertension P > 0.05 with small effect size for education (η2 = 0.02) and moderate effect size for marital status, employment, years of having hypertension (η2 = 0.08, 0.06, 0.06, respectively). The only large effect size observed was for age (η2 = 0.15). Post hoc test comparison using Tukey HSD estimation indicated that the mean score for ex-smoker is significantly different between smokers and non-smokers with moderate effect size p < 0.05 (η2 = 0.07) (Table-12).

**Table-12: One way test for perceived barrier for high blood pressure management**

| Variable | | Mean (SD) | 95% confidence interval | | Sig | Effect size $\eta^2$ |
|---|---|---|---|---|---|---|
| | | | Upper | Lower | | |
| Age (years) | <45 | 2.86 (1.04) | 3.2 | 2.6 | 0.54 | 0.15 |
| | 45-54 | 2.5 (1.12) | 2.7 | 2.3 | | |
| | 55-64 | 2.37 (1.04) | 2.5 | 2.1 | | |
| | >65 | 2.36 (1.04) | 2.6 | 2.2 | | |
| Education | Illiterate | 2.6 (1.1) | 2.9 | 2.4 | 0.83 | 0.026 |
| | Primary/Inter. | 2.26 (1.03) | 2.5 | 2.1 | | |
| | Secondary | 2.46 (1.04) | 2.6 | 2.3 | | |
| | Higher education | 2.6 (1.08) | 2.8 | 2.4 | | |
| Marital status | Single | 2.94 (0.99) | 3.4 | 2.5 | 0.1 | 0.08 |
| | Married | 2.4 (1.05) | 2.6 | 2.3 | | |
| | Divorced | 2.6 (1.2) | 3.3 | 1.9 | | |
| | Widow | 2.5 (1.2) | 2.9 | 2.2 | | |
| Employment | Working | 2.8 (0.1) | 2.9 | 2.6 | 0.85 | 0.06 |
| | Unemployed | 2.4 (0.08) | 2.6 | 2.3 | | |
| | Retired | 2.35 (0.09) | 2.5 | 2.2 | | |
| Duration of having hypertension (years) | <5 | 2.6 (1.07) | 2.8 | 2.4 | 0.928 | 0.06 |
| | 5-9 | 2.6 (1.07) | 2.7 | 2.4 | | |
| | 10-14 | 2.3 (1.08) | 2.6 | 2.1 | | |
| | >15 | 2.39 (1.06) | 2.6 | 2.2 | | |
| Smoking | Yes | 2.65 (1.26) | 3.0 | 2.3 | 0.05 | 0.07 |
| | Non-smoker | 2.5 (1.05) | 2.6 | 2.4 | | |
| | Ex-smoker | 2.2 (1.05) | 2.5 | 2.0 | | |

*Effect size Cohen's $\eta^2$ Small effect 0.01, Moderate effect 0.06, Large effect 0.14*

Multiple linear regression analysis for the dependent variable for barrier to hypertension management which included all the independent variables explains 5.6% variance in perceived barrier to hypertension management. The model reached statistical significance $p < 0.009$. Age made a significant contribution to the model (Beta -0.105, $p < 0.015$). Gender of respondents made the least contribution (Beta 0.023, $p > 0.647$). Hierarchical regression was used to assess the ability of all independent variables to predict barriers to management of hypertension after controlling for age. Age was entered in step 1 explaining 2.6% of variance, after entering all the other variables at step 2 the total variance explained by the model was 5.6%, $p > 0.183$, age explained an additional 3% of variance. In the final model, only age reached statistical significance recording a higher Beta value -0.150, $p < 0.015$. As age increases by 1 year, the awareness toward these barriers decreases by 0.15 (Table-13).

**Table-13: Linear Regression of patients characteristics on perceived barriers to high blood pressure management**

| Model | Beta | Sig. |
|---|---|---|
| (Constant) | | 0.000 |
| Gender | 0.023 | 0.647 |
| Age | -0.150 | 0.015 |
| Level of Education | -0.026 | 0.671 |
| Marital Status | 0.076 | 0.137 |
| Occupation | -0.064 | 0.221 |
| Smoking | -0.065 | 0.167 |
| Duration of having hypertension | -0.062 | 0.228 |
| Number of anti-hypertensive medications | 0.033 | 0.501 |
| Diabetes mellitus | 0.070 | 0.151 |
| Kidney problems | -0.059 | 0.213 |
| Heart problems | -0.044 | 0.382 |

**Perceived Benefits for High Blood Pressure Management**

Of the 454 respondents, 427 (94% with 95% CI = 91.5-96.5) perceived the benefit of hypertension management (Table-3). The mean (SD) perceived benefits score was 5.48 (0.9) with a 95% CI of 5.4 - 5.6 (Table-4).

An Independent sample t-test was. There was no significant difference in mean scores for gender, respondents with diabetes, kidney disease, heart problems, and numbers of hypertensive medication taken by respondents $p > 0.05$. Gender and history of kidney problems had moderate effect size $\eta^2$ 0.07 and 0.06 respectively (Table-14).

**Table-14: t-test for perceived benefits for high blood pressure management**

| Variable | | Mean score | Mean Difference | 95% Confidence interval | | Sig. 2 tailed | Effect size Ƞ2 |
|---|---|---|---|---|---|---|---|
| | | | | Upper | Lower | | |
| Gender | Male | 5.345 | -0.0706 | 0.9431 | -0.2356 | 0.400 | 0.072 |
| | Female | 5.506 | | 0.9745 | -0.2387 | 0.409 | |
| Diabetes | Yes | 5.473 | -0.0104 | 0.1668 | -0.1878 | 0.908 | -0.006 |
| | No | 5.484 | | 0.1628 | -0.1837 | 0.905 | |
| Kidney problem | Yes | 5.258 | -0.2331 | 0.9899 | -05652 | 0.162 | 0.064 |
| | No | 5.491 | | 0.1957 | -0.6620 | 0.276 | |
| Heart problem | Yes | 5.455 | -0.0256 | 0.1890 | -0.2403 | 0.815 | 0.001 |
| | No | 5.481 | | 0.1916 | -0.2428 | 0.816 | |
| Number of hypertension drugs | < 2 | 5.496 | 0.0405 | 0.2119 | -0.3107 | 0.642 | -0.038 |
| | > 2 | 5.455 | | 0.2182 | -0.3170 | 0.653 | |
| *Effect size Cohen's Ƞ$^2$ Small effect 0.01, Moderate effect 0.06, Large effect 0.14* | | | | | | | |

As shown in the Table-15, one way ANOVA test revealed no significant difference in mean score observed for categories of age, education, marital status, employment and smoking $p > 0.05$ with small effect size $\eta^2$ 0.01, 0.004, 0.005, 0.002, 0.005 respectively. On the other hand, there was statistically significant difference at $p < 0.01$ in the mean score for the number of years of having hypertension, although the effect size was small $\eta^2 < 0.01$ (Table-15).

Post hoc test comparison using Tukey HSD estimation showed that the mean score for respondents having hypertension for less than 5 years was statistically significant compared to respondents having hypertension for 10-14 years ($p < 0.01$) with small effect size $\eta^2$ 0.01 [Table 15].

**Table-15: One way test for perceived benefits for high blood pressure management**

| Variable | | Mean (SD) | 95% confidence interval | | Sig | Effect size Ƞ$^2$ |
|---|---|---|---|---|---|---|
| | | | Upper | Lower | | |
| Age (years) | <45 | 5.26 (1.01) | 5.54 | 4.99 | 0.62 | 0.01 |
| | 45-54 | 5.47 (1.001) | 5.66 | 5.28 | | |
| | 55-64 | 5.56 (0.66) | 5.66 | 5.46 | | |
| | >65 | 5.44 (0.88) | 5.61 | 5.27 | | |
| Education | Illiterate | 5.46 (0.87) | 5.64 | 5.28 | 0.44 | 0.004 |
| | Primary/Inter. | 5.42 (0.94) | 5.60 | 5.24 | | |
| | Secondary | 5.44 (0.99) | 5.60 | 5.28 | | |
| | Higher education | 5.57 (0.65) | 5.69 | 5.45 | | |
| Marital status | Single | 5.70 (0.45) | 5.92 | 5.48 | 0.17 | 0.005 |
| | Married | 5.45 (0.89) | 5.55 | 5.36 | | |
| | Divorced | 5.72 (0.40) | 5.96 | 5.49 | | |
| | Widow | 5.45 (0.97) | 5.72 | 5.18 | | |
| Employment | Working | 5.40 (1.07) | 5.60 | 5.20 | 0.35 | 0.002 |
| | Unemployed | 5.47 (0.83) | 5.59 | 5.36 | | |
| | Retired | 5.53 (0.76) | 5.65 | 5.40 | | |
| Duration of having hypertension (years) | < 5 | 5.35 (1.10) | 5.55 | 5.15 | 0.01 | 0.01 |
| | 5-9 | 5.50 (0.94) | 5.67 | 5.32 | | |
| | 10-14 | 5.61 (0.51) | 5.71 | 5.50 | | |
| | > 15 | 5.49 (0.87) | 5.63 | 5.35 | | |
| Smoking | Yes | 5.63 (0.50) | 5.78 | 5.48 | 0.37 | 0.005 |
| | Non-smoker | 5.44 (0.96) | 5.54 | 5.33 | | |
| | Ex-smoker | 5.55 (0.56) | 5.70 | 5.41 | | |
| *Effect size Cohen's Ƞ$^2$ Small effect 0.01, Moderate effect 0.06, Large effect 0.14* | | | | | | |

Multiple linear regression model of patients' characteristics on perceived benefits to the management of high blood pressure was not significant ($p > 0.49$), The model explains 2.4% of variance in perceived benefit. Although, level of education is the main factor contributing to patients' beliefs about the benefits of management of hypertension (Beta 0.107, $p > 0.083$). Respondents with heart problems made the least contribution (Beta 0.001, $p > 0.979$) [Table 16]. Hierarchical multiple regression was used to assess the ability of all independent variables to predict benefits to hypertension management after controlling for education. Education was entered at step 1, which explained 0.2% of variance in benefits. After entering all the independent variables at step 2, the total variance explained by the model was 2.0%, $p > 0.46$. Education explained an addition of 1.8% variance after controlling for education. In the final model, none of the independent variables reached significance. Education contributed the most (Beta 0.107, $p > 0.083$) and heart problem contributed the least (Beta 0.001, $p > 0.979$) [Table 16].

**Table-16: Linear Regression of patients characteristics on perceived benefits to the management of high blood pressure**

| Model | Beta | Sig. |
|---|---|---|
| (Constant) | | 0.000 |
| Gender | 0.067 | 0.195 |
| Age | 0.072 | 0.245 |
| Level of Education | 0.107 | 0.083 |
| Marital Status | -0.019 | 0.707 |
| Occupation | 0.039 | 0.461 |
| Smoking | -0.020 | 0.679 |
| Duration of having hypertension | 0.079 | 0.132 |
| Number of anti-hypertensive medications | -0.038 | 0.456 |
| Diabetes mellitus | -0.006 | 0.909 |
| Kidney problems | 0.064 | 0.186 |
| Heart problems | 0.001 | 0.979 |

## DISCUSSION

The presented results correlated with previous studies in highlighting the importance of patients' health beliefs for predicting the behaviours among hypertensive patients [5, 9, 11, 15, 22-24]. However, to the best of our knowledge this is the first study in Bahrain that has linked the patients' health beliefs with hypertension through their effects on behaviour.

When discussing about health beliefs we are dealing with different perspectives affecting the process of treating and controlling the disease. And as these beliefs have different domains (perceived susceptibility, perceived seriousness, perceived barriers and perceived benefits). We studied the four main domains affecting hypertension beliefs.

**Perceived Susceptibility to the Effect of Hypertension**

According to the previously mentioned scoring method of Health Beliefs Model and as shown by the mean (SD) which was 4.88 (1.1) (95% CI = 4.8 – 5.0), more than 70% of the participants in this study strongly perceived susceptibility to the effect of hypertension especially when they have concomitant comorbidities; which, in fact, correlates with what patients always mention in the clinic during their doctor visits. This is particularly true for patients with longer duration of having hypertension and those with serious medical diseases; and this is proven in this study when the relationship between different patients' characteristics as the independent variables and the patients' beliefs (Table-6). Our findings are contrary to the British population who, despite their belief that hypertension is a long-term condition, believe in serious consequences and emotional responses are low [15].

This study showed, although non-significant, patients taking more than two medications believe they are more susceptible to the effect of hypertension. This could be explained by the longer duration of having uncontrolled hypertension which may have added to their knowledge about hypertension or experienced these effects already.

Patients with longer duration of hypertension believed that they were more susceptible to effects of hypertension. This could be explained that as the patients' condition advances in severity or developed complications without receiving the proper treatment, or when they sustain the same illness for a longer period of time, they will eventually be more susceptible to undesirable effects of hypertension.

A significant difference was observed in the smoking groups; where, smokers have stronger belief they are more susceptible. This is elucidated by believing that smoking can cause hypertension, which has been shown in a previous study[9]. On the other hand, some smokers may use smoking as an excuse to relieve their stress, which increases the likelihood of having the effects of hypertension.

Role of stress could be applied similarly to the widows and divorced patient groups [Table 7], who perceived they are also more susceptible to hypertension effects due to the social and psychological stress they went through when they lost their partners. In accordance with previous literature [5, 9], many patients perceived headache caused by stress to be the most common symptom as well as the major cause of direct elevation of blood pressure. In this study, a participant declared "Whenever I feel severe headache, I will directly take my blood pressure pills to relieve it"; and another one mentioned "Every time I feel stressed or anxious, I know my blood pressure will shoot up". This is also similar to a study done on Nigerian population which showed that hypertension is caused by stress, thinking too much and lack of social infrastructure [22]. Likewise, it was discovered in a study about Iranian beliefs on medication adherence[11] that patients considered mental illnesses and psychological factors as the cause of hypertension and they try to control them in order to treat their hypertension. A British study about the role of illness perception on patient compliance[15] showed the same results in addition to the belief that hypertension is related to risk factors such as obesity and smoking.

**Perceived Seriousness of the Effect of High Blood Pressure**

The mean (SD) perceived seriousness score was 4.55 (1.0) with a 95% CI = 4.5 - 4.6 (more than 70%) (Table-4) explaining that majority of the patients moderately agreed with the seriousness of elevated blood pressure effect on their health, which reflects their strong beliefs about the seriousness of high blood pressure and its complications; this corresponds to the Iranian and British population who believe that hypertension is a high risk disease which can be controlled but not cured [11, 15].

Patients with heart or kidney diseases perceived hypertension to be a more serious threat to their health than those without. This intuitively reflects the high amplitude of the impact of these diseases on patients' health leading to more awareness regarding seriousness of hypertension.

A recent longitudinal study [23] concluded that time elapsed since diagnosis could be a very important variable in the formation of beliefs about symptoms. This is in disagreement with our results which found longer duration of hypertension to have no effect on symptoms beliefs.

This can lead us to an important conclusion related to the management of hypertension in primary health care services, providing correction of false symptoms related to high blood pressure as majority of patients participated in this study reported beliefs in the form of false symptoms.

**Perceived Barriers to High Blood Pressure Management**

The mean (SD) perceived barrier score was 2.48 (1.1) (95% CI = 2.4 - 2.6) which represents their weak beliefs regarding the beneficence of alternative medicine or considering medication side effects as barriers to the management (less than 50%); indicating that most of the participants in this study were aware about the non-beneficence of alternative medicine as a treatment of hypertension; although their awareness decreases with increasing age. Contradictory to the Iranian population who trust the use of traditional medicines as a treatment of hypertension; despite their beliefs in synthetic medications as well [11]. Furthermore, one of the qualitative studies about patients' perspectives on hypertension and drug adherence [5], found that traditional and alternative medicine were believed to be safer than drugs.

Moreover, among Bahraini population, participants were not worried from medication side effects nor addiction and did not consider them a reason to intentionally non-adherence to treatment; unlike other studies which showed perceiving hypertension medications are incompatible with patients' bodies or experiencing medication side effects are major influencers of non-adherence or self-adjustment of the medications [5, 11, 24].

Among those who admitted they may intentionally stop taking medication, the majority were males who reported they mostly feared from sexual dysfunction as a troublesome adverse effect of treatment which will lead them to stop medication, unlike a study conducted among Nigerian population which showed that males will stick to their medications because they believe stopping the medication intentionally will lead to loss of libido or erectile dysfunction as a complication of the disease [22].

Despite that there is no significant difference between the subgroups in the level of education, illiterates and, surprisingly, higher educators have stronger beliefs in alternative medicine as a treatment for hypertension (Table-12). Illiterates were expected to have these beliefs; but not for higher educators. This could be due to their wide exposure to the conflicts in social media, television or other sources regarding herbal medicines which may lead them to try different remedies.

This all indicates that Bahraini population is moving toward increasing awareness about the barriers of hypertension management. On the other hand, there are still a significant percentage of people, especially older age, need more explanation and awareness about the importance of avoiding alternative medicine whenever there is no clear scientific evidence about their positive contribution to hypertension control. In addition, more time should be spent with the patients to discuss all the aspects which could have an impact on blood pressure control including the use of alternative and herbal medicine.

**Perceived Benefits to the Management of High Blood Pressure**

The mean (SD) perceived benefits score was 5.48 (0.9) (95% CI = 5.4 - 5.6) indicating that majority of patients strongly believed in the benefit of hypertension management prescribed by their doctor (more than 70%). This reflects that these patients are usually more aware of the benefits of management of hypertension to control their complications. Study participants reported taking their hypertension medications regularly according to the prescription as one said "If I take it every day, it is effective"; similarly, British population was found to highly believe in the necessity of medication and this was strongly related to compliance [15].

Our population were against discontinuing treatment without contacting their health care provider even if it caused them side effects or they felt better. Furthermore, they were aware of the importance of healthy lifestyle including regular follow ups, exercising, diet, adherence to medication and

maintaining optimal weight; which is similar to the beliefs of Nigerian population [22]. However, not all of them were compliant with the lifestyle recommended for hypertensive patients which may be considered a limitation to control high blood pressure.

## CONCLUSION

The study findings suggest that participants were fairly knowledgeable about hypertension, which play a role on controlling the disease with the most predictor variables having a significant influence on patients' beliefs were duration of having hypertension and existence of other chronic medical problems; i.e. heart and kidney problems. Furthermore, in the review of role of perceptions toward hypertension, we concluded that patients' perceptions are an important factor in hypertension care and should be deeply explored. It is judicious to be aware that patients' beliefs and behaviour may vary between different generations, with all the diversions in demographic data and socioeconomic factors. The differences basically lay in the intercommunication between these factors and patients' beliefs which are distinct from one person to another.

### Implication for Clinical Practice

These results have potentially important implications for improving disease management among adult Bahraini hypertensives. It is important to tackle all patients' beliefs during their visit to their doctor in order to clarify any misunderstanding at any point, to correct the myths about hypertension to achieve better control and to emphasize on maintaining healthy lifestyle, i.e. proper diet, exercises and weight management; with helping patients to discover and overcome the obstacles to maintaining healthy lifestyle.

## RECOMMENDATION

There is well established impact of health beliefs on management of hypertension among Bahraini adult patients. Further research is recommended using a qualitative approach to highlight the patients' perception about hypertension management. The use of interview will provide understanding to the health beliefs of participants. We also recommend to conduct another research to study the effect of these health beliefs on treatment adherence.

### Strengths

Our study is strong in many ways:

- The large sample size.
- Our results can be generalized to Bahraini population as our selection process was well designed the patients were recruited from both general and non-communicable diseases clinics from the five health regions in Bahrain in order to avoid selection bias.
- The questionnaire was self-reported to avoid interviewer bias and all conductors agreed on a unified phrases to clarify the questionnaire in case of any doubtful question and
- This study provided more detailed information to explain the results.

### Limitations

The limitations to be mentioned are:

- The participants were selected conveniently, but we aimed for a large sample size in order to overcome random selection bias.
- The investigation tool was self-reported.

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### Conflict of interests

Non to declare.

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### Author's Contributions

All authors contributed in all research steps: Noora Almanea, Zainab Almisbah, Dhabya Alsada, Sara Ismaeel, Murtadha Mohamed.

The research was supervised by Dr Mohammed Ali Jaffar Ahmed Mandeel.

### Ethics

This research has been reviewed and approved by the Primary Care Research Committee in Bahrain. Informed consent was taken from each participant verbally.

### Research word count

The research paper contains 4996 words excluding title page, abstract, references, figures, tables and acknowledgments.

### Data Statement Section

The research paper was submitted to the Primary Care Research Committee in Bahrain. The research was submitted to Dryad. The temporary link is provided below:
https://datadryad.org/review?doi=doi:10.5061/dryad.ns60sc3

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