

Level of Adherence to Antihypertensive Medications Among Adult Hypertensive Patients in Riyadh City

Khaled Abdullah Albishi^{*,†}

Senior Registrar of family medicine, Prince Sultan Military Medical City, Riyadh, Saudi Arabia

DOI: <https://doi.org/10.15520/ijmhs.v9i4.2532>

Accepted 25 Mar 2019; Received 1 Mar 2019; Publish Online 25 Apr 2019

Reviewed By: Dr.
Daniel V.
Department: Medical

ABSTRACT

Background: In 2015, there were 1.13 billion individuals living with hypertension around the globe. The predominance of hypertension worldwide is of about 40%. In Saudi Arabia, it reached 3.2% among those aged between 15-24 years, 51.2% among those aged 55-64 years and up to 70% among those aged 65 years and more. Hypertension causes 7.5 million deaths, about 12.8% of the total deaths every year. Adherence to medication is essential for maintaining life for hypertensive patients.

Objective: This study aimed to assess the level of adherence to hypertension medications and to determine factors affecting the compliance of hypertensive patients to their antihypertensive drugs.

Methods: we have conducted a descriptive cross-sectional study in Riyadh city population, Saudi Arabia. This study was conducted during the period from December 2018 to January 2019. The participants were selected by random sampling. Sampling included the different geographical areas of the city. The total sample included 216 subjects, all of which were approached to obtain the desired sample size. A self-administered questionnaire about hypertension and complications was filled by the participants.

Results: in this study, participants classified to three groups according to age: less than 40 years old from 40 to 65 years old and 65 years old or above. Male and female groups contributed to 72.2% and 27.8% respectively. The majority of participants had secondary education (55.6%) and about 33.3% were at least university level. The majority of participants with hypertension were on one medication prescribed for the treatment of their high blood pressure and the majority of participants (66.7%) were poorly compliant to their hypertension medication.

Conclusion: more attention is needed on preventive educational programs that focus on awareness and assessment of the hypertension medications adherence, complications of hypertension, and the danger of poor control of it.

Key words: Hypertension–adherence–control–perception

1 INTRODUCTION

The worldwide prevalence of hypertension is of about 40% [1]. It was estimated that 1.13 billion individuals living with hypertension around the globe, in 2015. [1] In Saudi Arabia, it affected 3.2% of those aged 15-24 years, 51.2% of those aged 55-64 years and up to 70% among those aged 65 years and older. It has been reported that there was an increase in pre-hypertensive cases, reaching 46.5% (3 millions) among males and 34.3% (more than 2 million) among

females [2]. Hypertension is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths worldwide. This accounts for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS [3]. Blood pressure tends to rise as individuals become older. Hypertension is considered to be a major risk factor for coronary heart disease and ischemic as well as hemorrhagic stroke. Blood pressure levels have shown significant positive and unceasing association with the risk for stroke and coronary heart disease. In some specific age groups, the risk of cardiovascular disease doubles for each increment of 20/10 mmHg of blood pressure, starting as low as 115/75 mmHg. Additionally,

* Corresponding author.

† Email: dr-ksa1(at)hotmail.com.

complications of raised blood pressure include heart failure, peripheral vascular disease, renal impairment, retinal hemorrhage and visual impairment. Management and treatment of systolic blood pressure and diastolic blood pressure until they are lower than 140/90 mmHg are associated with a reduction in the likelihood of cardiovascular complications [3]. Adherence to prescribed medication is the extent to which patients take medications as prescribed by the health care providers [4]. Nonadherence, however, is an imperative issue which might be directly linked with the management of chronic diseases like hypertension; it can impact the effectiveness of prescribed medication as well as the efficiency of the health care system and lead to economic issues [4]. Adherence to antihypertensive medications is a crucial mediator of favorable outcomes in treating HTN, and nonadherence, in turn, halts BP control. In this review, we will summarize the available evidence on health-related impacts of adherence to AHD, methods for the evaluation of adherence and potential interventions aimed to improve adherence in hypertensive individuals [5]. Nonadherence to anti-hypertensive medications has been found to be a major concern. The success of long-term maintenance therapy for hypertension depends largely on the patient's compliance with a therapeutic plan. Appropriate adherence to medication is still a challenge for hypertensive patients [6]. A study run in Jeddah, Saudi Arabia shows that 88.7% of hypertensive subjects had an optimal adherence level to anti-hypertensive therapy while 10.3% had sub-optimal adherence level [7]. On the other hand, another study run in different regions of Saudi Arabia showed that high level of compliance with anti-hypertensive medications was observed among 6.2% of patients whereas medium and low levels were observed among 67.4% and 26.4%, respectively [8].

Objective: This study aimed to assess the level of adherence to hypertensive medications and to determine factors affecting the compliance of hypertensive patients to their antihypertensive drugs.

2 METHODS & PARTICIPANTS

Study design

We have conducted a descriptive cross-sectional study in Riyadh city population, Saudi Arabia. This study was conducted during the period from December 2018 to January 2019.

The sample size was calculated using the sample size equation: $n = z^2 p(1-p)/e^2$, considering target population more than 500, and study power 95%. Systematic random sampling technique was followed. Sampling was included from the different geographical areas of the city. The total sample obtained 216 subjects. All participants were Saudi and diagnosed with hypertension.

Data collection

Study participants were required to be self-reported hypertensive. All the subjects were approached until the desired sample size was achieved. A self-administered questionnaire to be filled by participants. A letter that explains

the objectives of the study and asks for participants' consent was attached to the questionnaire. The questionnaire inquired information about duration of hypertension, knowledge of hypertension complications, number of hypertensive medications, perceived control of blood pressure, and eight questions scale that measure level of adherence to medications, previously validated [9].

Selection Criteria:

Patients included were patients willing to participate in the study, with the ability to answer and fill-in the questionnaire, and had been diagnosed with hypertension more than 6 months before the date of participation of the study. Patients excluded were not willing to participate and those who were unavailable or unable to fully attend the sessions of data collection.

Data analysis

The questionnaire responses were analyzed using the Statistical Package for the Social Science (SPSS Inc. Chicago, IL, USA) version 23. Categorical variables were described by frequencies and percentages. Descriptive analysis involved Chi-square test was used to test significance of association between categorical variables. The level of significance was set at $P < 0.05$.

Ethical considerations

All ethical issues were taken into consideration, including the confidentiality and privacy of patient data. Participants were informed that participation is completely voluntary and data collectors introduced and explained the research to participants. No names were recorded on the questionnaires and all questionnaires kept safe. Subjects were asked to give their written consents before participation in this study.

3 RESULTS

Table 1 shows general characteristics of the participants. Participants classified to three groups according to age: less than 40 years old, from 40 to 65 years old, and 65 years old or above. Male and female groups contributed to (72.2%) and (27.8%) respectively. The majority of participants had secondary school education (55.6%), and about (33.3%) were university graduates.

Table 2 showed characteristics of high blood pressure among people with hypertension. More than half of patients had the disease for less than five years (52.7%), about (30.6%) from five to ten years, and only (16.7%) had it for more than ten years. The majority of participants with hypertension were on one medications prescribed for treatment of their high blood pressure, (19.4%) on two medications, and the remaining were on wither on three or more medications (5.6%), or not using any medications (11.1%). Participants who reported that their blood pressure is controlled were more than those who reported their blood sugar is uncontrolled, (50%) and (25%) respectively. and a fourth of them did not know about the if their blood pressure is under control or not (25%).

Table 3 shows frequency of knowledge regarding the definition and awareness of complications of hypertension.

(43.3%) disagreed to the statement, „Hypertension is defined as BP 140/90 or more „, while more than half of participants agreed to that statement (56.7%). The mostly known and recognized complication of high blood pressure were „Atherosclerosis, heart attack (MI), and Peripheral Arterial Disease,„ and it account for (55.6%), while those who were aware about heart failure and stroke as complications to high blood pressure contributed to (41.7%) and (41.7%), respectively. nearly a third of participants know that renal failure (38.9%) is a complications of high blood pressure and only (25%) of them know that hypertension may lead to blindness. Participants who reported existing of other chronic illness rather than hypertension were (41.7%), and (58.3%) denied coexisting any other chronic illnesses.

Table 4 and Figure 1 show adherence of participants to their medication used to treat hypertension. The majority of participants (66.7%) were poorly compliant to their hypertension medication, while (27.8%) were moderately adherent to their hypertension medications. Only (5.6%) were highly adherent to their medications.

Table 5 shows significant relation between level of adherence of participants to hypertension medications and gender, age, and education groups. Male participants were more likely to adhere to their medications than females ($p=0.005$). female with low adherence were about (90%), while male with low adherence were (57%). Male and female with medium adherence contributed to (34.6%) and (10%), respectively. no one of female groups were highly compliant to their medications, and the male group who were highly adherent to their medications were only (7.7%). Level of adherence to hypertension medications among age groups was variable ($p=.000$). Participants who were above sixty five were nine participants, only three of them were highly adherent to their medications (33.3%), and the remaining were poorly adherent (66.6%). No one of the middle age groups-from 40 to 65 years- were highly adherent to their medications, and the majority of them were with low adherent to their medication (77.3%). Regarding the age group less than forty years, only (9%) were highly adherent, and half the remaining were with medium adherence (45.5%), and half were with low adherence (45.5%). Level of adherence were proportionally related to level of education ($p=.004$). The higher the education level, the more adherence to hypertension medications. One fourth of participants who were university graduates or more were with low adherence (27%), a fifth of them were with medium adherence (20%), and only (5%) were highly adherent to medications. Participants who were with secondary education and with low adherence contributed to (58.3%), and who were with medium adherence contributed to (41.7%). Participants with intermediate education or less have higher levels of adherence to their medications when compared to those with higher education levels. Half participants who have intermediate education or less were with low adherence, a forth of them were medium adherence, and the remaining forth were highly adherent to their medications.

Table 6 shows relation between adherence of participants to hypertension medications and characteristics of high

blood of participants. Significant relation between adherence and duration of hypertension of participants ($p=.001$). Participants who have hypertension for more than ten years were more likely to be poorly adherent to their hypertension medications (83.3%). Those who have the disease from five to ten years were more likely to adhere to their medications when compared the other groups, as (63.6%) of them were poorly compliant to their medications, and (18.2%) were highly adherent to their medications. Those who have the disease for less than five years, the majority were with low compliance to hypertension medications (63.2%), and the remaining were with medium adherence. The relation between adherence and the number of medications participants on were insignificant ($p=.063$). participants who were on one antihypertensive medication in relation to level of adherence to their medications were as follow: low adherence (69.6%), medium adherence (62.1%), and high adherence (4.3%). Those who were on two medications in relation to level of adherence were as follow: low adherence (57.1%), medium adherence (28.6%), and high adherence (14.3%). Those who were on three medications or more in relation to level of adherence were as follow: low adherence (50%), medium adherence (50%), and high adherence (0%). Relation between adherence to medications and control of blood pressure of participants were significant ($p=.001$). Those who reported their blood pressure was under control in relation to adherence to their medications were as follow: (83.3%) of them were with low adherence, (11.1%) of them were with medium adherence, and (5.6%) of them were highly adherent to their medications. Those who reported their blood pressure was uncontrolled in relation to adherence to their medications were as follow: (55.6%) of them were with low adherence, (44.4%) of them were with medium adherence, and none of them were at least with high adherence to his/her medications (0%). Those who were un aware of their blood pressure status wither if it is controlled or uncontrolled in relation to adherence to their medications were as follow: (44.4%) of them were with low adherence, (44.4%) of them were with medium adherence, and only (11.1%) them were with high adherence to their medications (0%). Relation between level of adherence and the presence of other chronic illnesses were insignificant ($p=0.306$). Those who reported the presence of chronic illness rather than hypertension were less than half participants, and their adherence to hypertensive medications were as follow: (73.3%) of them were with low adherence, (20%) of them were with medium adherence, and (6.7%) of them were highly adherent to their medications. Those who denied the presence of any other chronic illnesses were more than half the participants, and their adherence to hypertensive medications were as follow: (61.9%) of them were with low adherence, (33.3%) of them were with medium adherence, and (4.8%) of them were highly adherent to their medications.

Table 7 T shows the adherence of participants to hypertension medications and its relation to knowledge of hypertension and its complications. Significant relation between adherence and their knowledge of the definition of hypertension ($p=0.000$), congestive heart failure as a complication of

**Table 1. General characteristics of the participants
n=216**

| Character | | Total | |
|------------------|---|--------------|------------|
| Age | Less than 40 years (n(%)) | 066(30.6%) | 216 (100%) |
| | From 40 to 65 years (n(%)) | 132(61.1%) | |
| | More than 65 years (n(%)) | 018(8.3%) | |
| Gender | Male (n (%)) | 156 (72.2%) | 216 (100%) |
| | Female (n (%)) | 060(27.8%) | |
| Education | Not educated/ primary/ intermediate (n (%)) | 024 (11.1%) | 216 (100%) |
| | secondary (n (%)) | 072 (33.3%) | |
| | Graduate (n (%)) | 120 (55.6%) | |
| Income | Poor (n (%)) | 042 (19.5%) | 216 (100%) |
| | Average (n (%)) | 102 (47.2%) | |
| | High (n (%)) | 071 (33.3%) | |

**Table 2. General characteristics of hypertension of the participants
n= 216**

| Character | | Total | |
|----------------------------------|--------------------------|--------------|------------|
| Duration of Hypertension | Less than 5 years(n(%)) | 114(52.7%) | 216 (100%) |
| | From 5-10 years(n(%)) | 066(30.6%) | |
| | More than 10 years(n(%)) | 036(16.7%) | |
| Number of medications | No medications (n (%)) | 024 (11.1%) | 216 (100%) |
| | 1 medication (n (%)) | 138 (63.9%) | |
| | 2 medications | 042(19.4%) | |
| | 3 or more | 012(5.6%) | |
| Control of blood pressure | Yes (n (%)) | 108 (50%) | 216 (100%) |
| | No (n (%)) | 054 (25%) | |
| | I do not know(n (%)) | 054 (25%) | |

Table 3. knowledge of definition and complication of hypertension

| Question | Frequency | Percent | Total |
|---|------------------|----------------|---------------|
| HTN is defined as BP 140/90 or more | | | |
| Yes | 122 | 56.5% | 216 (100%) |
| No | 94 | 43.5% | |
| Frequency of disease recognized as a complications of hypertension | | | |
| Atherosclerosis, MI, and PAD | 120 | 55.6% | 216 (100%) |
| Congestive heart failure | 90 | 41.7% | |
| Stroke | 90 | 41.7% | |
| Renal failure | 84 | 38.9% | |
| Blindness | 54 | 25% | |
| Coexisting other chronic illnesses other than hypertension | | | |
| Yes | 90 | 41.7% | 216 (100%) |
| No | 126 | 58.3% | |

Table 4. adherence of participants to their medication

| | Frequency | % |
|-------------------------|------------------|--------------|
| Low adherence | 144 | 66.6 |
| Medium adherence | 60 | 27.8 |
| High adherence | 12 | 5.6 |
| Total | 216 | 100.0 |

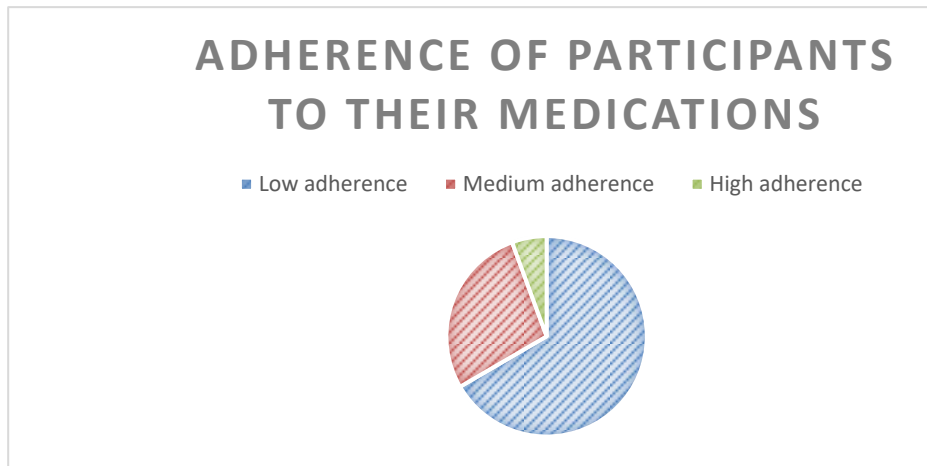


Figure 1. Adherence of participants to their medication

Table 5. Adherence of participants to hypertension medications among gender, age, and education groups

| Adherence | Gender | | p-value |
|------------------|---------------|----------------|---------|
| | Male n=156 | Female n=60 | |
| Low adherence | 57.7% | 90.0% | .005 |
| Medium adherence | 34.6% | 10.0% | |
| High adherence | 7.7% | 0.0% | |

| Adherence | Age | | | p-value |
|------------------|--------------------------|----------------------|------------------------|---------|
| | 40 years or less n=66 | 40-65 years n=132 | Above 65 years n=18 | |
| Low adherence | 45.5% | 77.3% | 66.7% | .001 |
| Medium adherence | 45.5% | 22.7% | 0.0% | |
| High adherence | 9% | 0.0% | 33.3% | |

| Adherence | Education | | | p-value |
|------------------|------------------------------|-------------------|-----------------------------|---------|
| | Intermediate or less n=24 | Secondary n=72 | University or more n=120 | |
| Low adherence | 50.0% | 58.3% | 75.0% | .004 |
| Medium adherence | 25.0% | 41.7% | 20.0% | |
| High adherence | 25.0% | 0.0% | 5.0% | |

Table 6. Adherence of participants to hypertension medications among duration of hypertension, number of medications, control of hypertension, and presence of other illnesses

| | Duration of Hypertension | | | Total n=216 |
|------------------|----------------------------|-------------------------------|-------------------------------|----------------|
| | Less than 5 years n=114 | From 5 to 10 Years n=66 | More than 10 years n=36 | |
| Low adherence | 63.2% | 63.6% | 83.3% | .001 |
| Medium adherence | 36.8% | 18.2% | 16.7% | |
| High adherence | 0.0% | 18.2% | 0.0% | |

| | Number of medications | | | | Total N=216 |
|------------------|-----------------------|-----------------------|-----------------------|----------------------------------|----------------|
| | No Medication n= | 1 Medication n=138 | 2 Medications n=42 | 3 Medications or more n=12 | |
| Low adherence | 75.0% | 69.6% | 57.1% | 50.0% | .063 |
| Medium adherence | 25.0% | 26.1% | 28.6% | 50.0% | |
| High adherence | 0.0% | 4.3% | 14.3% | 0.0% | |

| | Blood pressure control | | | Total n=216 |
|------------------|------------------------|------------------------|---------------------|----------------|
| | Controlled n=108 | Not controlled n=54 | Do not know n=54 | |
| Low adherence | 83.3% | 55.6% | 44.4% | .001 |
| Medium adherence | 11.1% | 44.4% | 44.4% | |
| High adherence | 5.6% | 0.0% | 11.1% | |

| | Presence of other illnesses | | Total n=216 |
|------------------|-----------------------------|-------------|----------------|
| | Yes n=90 | No n=126 | |
| Low adherence | 73.3% | 61.9% | .306 |
| Medium adherence | 20.0% | 33.3% | |
| High adherence | 6.7% | 4.8% | |

Table 7. Adherence of participants to hypertension medications and its relation to knowledge of hypertension and its complications

| | Definition of Hypertension | | | Total n=216 |
|------------------|----------------------------|---------------|-----------------------|----------------|
| | True n=144 | False n=36 | I do not know n=36 | |
| Low adherence | 70.8% | 83.3% | 33.3% | .000 |
| Medium adherence | 20.8% | 16.7% | 66.7% | |
| High adherence | 8.3% | 0.0% | 0.0% | |

| | Atherosclerosis, MI, and PAD as complications to HTN | | Total N=216 |
|------------------|--|------------|----------------|
| | Yes n=120 | No n=96 | |
| Low adherence | 70.0% | 62.5% | .510 |
| Medium adherence | 25.0% | 31.3% | |
| High adherence | 5.0% | 6.3% | |

| | CHF as a complication of HTN | | Total n=216 |
|------------------|------------------------------|-------------|----------------|
| | Yes n=108 | No n=126 | |
| Low adherence | 53.3% | 76.2% | .000 |
| Medium adherence | 33.3% | 23.8% | |
| High adherence | 13.3% | 0.0% | |

| | Stroke as a complication of HTN | | Total n=216 |
|------------------|---------------------------------|-------------|----------------|
| | Yes n=90 | No n=126 | |
| Low adherence | 73.3% | 61.9% | .094 |
| Medium adherence | 20.0% | 33.3% | |
| High adherence | 6.7% | 4.8% | |

| | Renal failure as complications to HTN | | Total N=216 |
|--|---------------------------------------|----|----------------|
| | Yes | No | |

| | n=84 | n=132 | |
|------------------|-------------|--------------|------|
| Low adherence | 64.3% | 68.2% | .004 |
| Medium adherence | 35.7% | 22.7% | |
| High adherence | 0.0% | 9.1% | |

| Blindness as complications to HTN | | | Total N=216 |
|--|---------------------|---------------------|------------------------|
| | Yes n=54 | No n=162 | |
| Low adherence | 55.6% | 70.4% | .047 |
| Medium adherence | 33.3% | 25.9% | |
| High adherence | 11.1% | 3.7% | |

hypertension (p=0.000), renal failure as a complication of hypertension (p=0.004), and blindness as a complication of hypertension (p=0.047).

4 DISCUSSION

Blood pressure control in hypertension patients considered as a long-standing challenge. Adherence to medication is always a matter of concern, especially in chronic diseases. Several recent studies have highlighted the importance of patient medication adherence and have outlined factors that affect patient compliance with prescribed therapy. In the current study, we asked the participants about their blood pressure whether it is controlled or not, 25% of them reported uncontrolled blood pressure and 25% did not know the status of their blood pressure. Another study done over one hundred and six hypertensive African-American patients and reported higher results of uncontrolled hypertension [10]. The current study revealed significant relation between blood control and adherence to medication (p=.001), almost the majority of whom perceived their blood pressure is controlled were poorly adherent to medications. Similar results reported in a study done over one hundred and two hypertensive patients at the University of Michigan Medical Centers [11]. Regarding the adherence to hypertension medications, this study showed that the majority of participants were with low adherence to medications (66.7%) and only (5.6%) were with high adherence to their medications.

Another study done and reported a higher rate of adherence to their hypertensive medications (67.7%) [11]. In the same context, another different study done among 315 patients and it reported higher results, as 49.8% of the patients were adherent [12]. Male were more likely to adhere to their medications when compared to female with a significance (p=.005). A cross-sectional study was conducted in a rural area of the Ardabil city in 2013 showed different results, it showed adherence was slightly high among female respondents than male [13]. In the same context, another study was conducted to assess adherence to medications in patients undergoing hypertensive treatment in the Primary Health Clinics of the Ministry of Health in Malaysia, and it showed female patients were found to be more likely to adhere to their medication regime, compared to their male counterparts ($p < 0.05$) [14].

5 IN CONCLUSION

The findings suggest that patients' greater perception of control over trying to reduce blood pressure may result in decreased reliance on medications and subsequent non-adherence to drug therapy. Gender, age, educational level, control of blood pressure, duration of being affected by hypertension, and knowledge of the disease and its complications are all factors affecting adherence to therapy. To analyze the association between various socio-demographic factors and adherence to hypertensive treatment, more attention is needed on prevention educational programs that focus on awareness and assessment of the hypertension medications adherence, complications of hypertension, and the danger of poor control of it.

REFERENCES

- [1] WHO World Health Statistics. 2015;available at. Available from: http://www.who.int/gho/publications/world_health_statistics/2015/en/.
- [2] of health, Saudi Arabia(2017): World hypertension day. Available from. Ministry;Available from: <https://www.moh.gov.sa/en/HealthAwareness/healthDay/2017/Pages/HealthDay-2017-05-17.aspx>.
- [3] S GMH, H EK, A GA. Raised Blood Pressure Available from. WHO Global Health Observatory. 2015;18(1):27. Available from: http://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence_text/en/4-Mekonnen.
- [4] O GE, P KC. Adherence to antihypertensive medications: is prescribing the right pill enough? *Nephrology Dialysis Transplantation*. 2014;30(10):1649–1656.
- [5] Adherence to antihypertensive medications in Iranian patients. vol. 7; 2016.
- [6] GM F. Al-Sereahi HS, Al-Muhandis MA, Mahyuddin R, Al-Sinani T. (2017). Adherence to hypertensive drug among patients;. in. Jeddah SA;. p. 13–14.
- [7] Alotayfi MJ, Alsohaimi SA, Al-Qadi BK, Kamil SM, Aththi AJ, Alhazmi GA et al. *The Egyptian Journal of Hospital Medicine*. 2018 10;p. 73–5.
- [8] E KWMMMD, J WH. Predictive validity of a medication adherence measure in an outpatient setting. *The Journal of Clinical Hypertension*. 2008;10(5):348–354.
- [9] G HMO. Robbins L, Mancuso CA, Allegrante JP. *Ethnicity & Disease*. 2004;14(1):3–12.
- [10] P PR, D TS. Factors affecting medication adherence in hypertensive patients. *Annals of Pharmacotherapy*. 2002;36(1):40–45.
- [11] Wright, Postma MJ. 12- Thi-Phuong-Lan Nguyen, Catharina C M Schuiling-Veninga, Thi Bach Yen Nguyen, Thu-Hang Vu. E Pamela. 2017;12(2):0171203. Available from: <http://journals.plos.org/plosone/article>.
- [12] Determinants of patient's adherence to hypertension medications: application of health belief model among rural patients. *Annals of medical and health sciences. research*. 2014;4(6):922–927.
- [13] A ANSR, T P. Medication adherence among hypertensive patients of primary health clinics in Malaysia. *Patient preference and adherence*; 2012.

AUTHOR BIOGRAPHY

Khaled Abdullah Albishi Senior Registrar of family medicine, Prince Sultan Military Medical City, Riyadh, Saudi Arabia