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A descriptive study of adherence to lifestyle modification factors among hypertensive patients

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Background/aim: Healthy life style recommendations (e.g., physical activity, healthy diet, and decreased cholesterol levels) play an important role in controlling blood pressure (BP). This study aimed to assess lifestyle modification factors among patients diagnosed with hypertension.

Materials and methods: A descriptive-survey design was used. Data were collected using four questionnaires; one was the Beliefs about Medication questionnaire (BMQ) and the rest were developed to collect data about demographic and clinical characteristics and lifestyle modification factors.

Results: In total 312 questionnaires were completed. The results revealed that our participants did not follow the healthy lifestyle recommendations; for example, the mean blood sugar (BS) level, body mass index (BMI), and cholesterol levels were 155 mg/dL (standard deviation (SD) = 71.9), 29 kg/m2 (SD = 5.4), and 197 mg/dL (SD = 86.6), respectively. A significant correlation was shown between age and BP (P = 0.000). Increase in diastolic BP (DBP) correlated with a significant increase in cholesterol level (P = 0.002) and BMI (P = 0.006).

Conclusion: Our study showed that somewhat hypertensive patients in Jordan did not follow a healthy lifestyle. Therefore, urgent action by addressing behavioral risk factors has a positive impact on preventing and controlling hypertension.

Key words: Hypertension, adherence, cholesterol, blood sugar, body mass index, healthy lifestyle modification factors

1. Introduction

The prevalence of hypertension is increasing, mainly in developing countries, as a result of exposure to its risk factors (e.g., obesity, stress) (1). In 2008 approximately 40% of adults worldwide were diagnosed with hypertension (1); it is one of the most prevalent conditions in Jordan, with in excess of 26% of people suffering from it (2–5). Hypertension contributes to the burden of different health conditions, such as heart disease, stroke, and kidney failure (1). Additionally it leads to increased mortality and disability, mainly in low and middle income countries (3,6,7). Around 9.4 million deaths worldwide result from hypertension every year (3). To counter this situation long-term care is needed, which requires increased health expenditure (8). The health expenditure associated with noncommunicable diseases (e.g., hypertension, diabetes, and cancer), over the period 2011–2025 in low and middle income countries is estimated to be US$ 7.28 trillion. Around half of that cost results from cardiovascular diseases including myocardial infarction and angina pectoris, which are associated with hypertension (8,9). Controlling blood pressure (BP) is the major goal that could be achieved by adherence to antihypertensive drugs and lifestyle modification recommendations (7). Early detection, treatment, and good control of hypertension are associated with significant positive effects on both health and economic aspects (3).

Suitable drug therapy reduces the risk of morbidity and mortality among patients who complain of increased BP. However, BP is not properly controlled among hypertensive patients in Jordan, with around 70% of such patients failing to achieve their BP controlling goals (10,11). Behavioral risk factors play an important role in developing hypertension, for example, a salt- and fat-rich diet, alcohol use, physical inactivity, poor stress management, obesity, having diabetes mellitus, high cholesterol, and smoking (3). The prevalence of these risk factors in Jordan is high (3,12–14). Unfortunately,

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most of Jordan's hypertensive patients are not following their lifestyle modification recommendations (3,11,15), which are strongly recommended before any initiation of drug therapy. Such advice should always be followed by hypertensive patients requiring single or combined antihypertensive therapy (16).

The rate of adherence to medication among hypertensive patients is between 30% and 88% (2, 17). However, the nonadherence rate to lifestyle modification recommendations is higher (15). Evidence suggests that adherence to nonpharmacological interventions (e.g., low sodium diet and appropriate exercise) has a great impact on the reduction of BP (3,18–20). Therefore, this study was carried out to answer the following research questions:

1- What are the lifestyle modification factors that are followed and adhered to by hypertensive patients?
2- Are there correlations between blood pressure (BP) and selected modifying factors (i.e. age, cholesterol level, blood sugar (BS) level, body mass index (BMI), Beliefs about Medication questionnaire (BMQ) subscales)?

The aim of this study was to assess lifestyle recommendations among Jordanian patients having high BP.

2. Materials and methods

2.1. Design

A descriptive design was used because it is suitable when we intend to collect data over a short period at defined times.

2.2. Participants and setting

A convenience sampling technique was used to include participants from outpatient clinics in four government hospitals that cover most of the geographical area of Jordan. Participants were included in this study if they met the following criteria: hypertensive patient aged 18 years or above, was taking regular medication to control their BP, had no clear cognitive abnormality, was able to read and write Arabic, and had follow-up appointments at an outpatient clinic. Patients who had end-stage renal failure, movement disability, bone and joint diseases, multiple sclerosis, and/or myasthenia gravis were all excluded to reduce the effect of confounding factors.

2.3. Ethical considerations

Ethical approval was obtained from Jordan's Ministry of Health and the four hospitals from which the participants were recruited. Each participant signed an informed consent before taking part. The participants' rights (e.g., freely participating, could withdraw at any time) were explained and confidentiality was confirmed. The data were stored on computer by the primary author. The data can be accessed by the primary author using a password.

2.4. Recruitment procedure

To reduce the risk of assessment bias, research assistants (RAs) (three nurses who have bachelor degrees in nursing) were trained before data collection about the procedure and how to handle the questionnaires. Additionally, during data collection they contacted the main researcher when they faced any challenges. Each patient's health record was reviewed by the RAs. All participants who met the inclusion criteria were handed the information sheet. Those who showed interest in the study were interviewed by the RAs to answer the patient's questions about the study; then they signed the informed consent and completed the questionnaires (filling out the questionnaires required an average of 15 min).

2.5. Data collection methods

The data were collected using a self-reported specifically developed questionnaire and a general BMQ 12 (21). It contains four parts with 17 items in total to assess beliefs toward medication. Each item is rated from "0" (indicating strongly disagree) to "5" (indicating strongly agree). The four parts of BMQ 12 measure the following positive and negative beliefs:

1- General harm (GH): four questions that measure beliefs toward the harmfulness of medication.
2- General overuse (GO): four questions that measure beliefs toward the way of prescribing/overprescribing of drugs by physician.
3- General sensitivity (GS): five questions that measure beliefs toward medication's adverse events and sensitivity.
4- General benefit (GB): four questions that measure positive beliefs toward drugs (i.e. benefits).

We used a valid and reliable Arabic version of the Beliefs about Medication questionnaire (BMQ 12) (with Cronbach alpha coefficient 0.71) (5). BMQ 12 was used to assess the patients' beliefs and correlate them with their levels of adherence to their lifestyle modification recommendations. Meanwhile, the specifically developed questionnaire included:

1- Demographic characteristics (e.g., age, sex, insurance status, occupation, marital status, education, and income).
2- Clinical characteristics: BP, cholesterol level, BS, co-morbidity, disease duration, height, weight, and BMI.
3- Adherence to lifestyle factors and drugs: obesity, BP (frequency of checking, having a BP machine), BS monitoring, smoking, exercise (frequency, type, barriers), diet, compliance to medication regimen, having stress and methods used to deal with it.

2.6. Sample size

A power equation was used to determine that the sample size for this research needed to be 211 patients, based on

confidence interval of 1.96, 16.5% prevalence of adherence to modification factors among hypertensive patients, and a margin of error of 5%. Taking into consideration the drop-out rate, the optimal sample size was calculated to be 300 patients.

2.7. Data analysis

To describe the characteristics of the participants' descriptive statistics were used: frequency and percentage were used for qualitative variables; mean and standard deviation were used for quantitative variables. The correlations between BP and selected modifying factors were examined by bivariate correlations.

3. Results

3.1. Demographical characteristics

A total of 350 questionnaires were distributed during the study period; the returned questionnaires totaled 312, which had been completed by patients over 5 months (August–December 2013). The participants had a mean age of 57.6 years (SD = 11.8) for all age groups and mean income 295.4 Jordanian Dinars (=$413) (SD = 201.8). Fifty-six percent of the participants were male, 92% had Jordanian nationality, 83% were educated, 88% were married, 96% lived with their family, 52% were not working, and 79.5% had medical insurance (see Table 1).

Table 1. Demographical characteristics of the participants (n = 312) (Jordan, 2013).

	Mean	SD	Frequency	Percent
Age (in years)	57.6	11.8		
≤34			5	1.6
35–44			30	9.6
45–54			100	32.1
55–64			85	27.2
≥65			92	29.5
Income (Jordanian Dinar)	395.4	201.8		
0–200 JD			27	8.7
201–400			216	69.2
401–600			46	14.7
>600			23	7.4
			Frequency	Percent
Sex	Male		176	56.4
	Female		136	43.6
Nationality	Jordanian		286	92.0
	Other		26	8.0
Education	Educated		259	83.0
	Not educated		53	17.0
Marital status	Married		276	88.4
	Single		8	2.6
	Widowed		21	8.0
	Divorced		7	1.0
Living status	Alone		12	3.8
	Family (husband /wife/children/ mother/father)		299	95.9
	Others		1	.3
Insured	Yes		248	79.5
	No		64	20.5
Working	Yes		64	20.5
	No		163	52.3
	Retired		85	27.2

n: total number of participants

3.2. Clinical characteristics

Tables 2 and 3 show the clinical characteristics of the participants; more than half of the participants (52%) had two types of disease or more (co-morbid who had hypertension and another disease) while less than half of the patients only had hypertension as a disease without co-morbidity (48%). The mean duration of being ill (whether for patients who only had hypertension and those who were co-morbid) for all participants was around 1 year (0.9) (standard deviation (SD) = 0.8). The mean cholesterol level was around 197 mg/dL; 33% of participants had a level around 150–200 mg/dL and around 19% of them had a cholesterol level above 200 mg/dL. The mean of BMI was 29 kg/m^2 (SD = 5.4) with 68.6% of patients being overweight (37% of the overweight were classified as pre-obese).

The means of SBP and DBP were 145.7 mmHg (SD = 17) and 95.7 (SD = 10.9) mmHg, respectively. The mean BS level was 155 mg/dL (SD = 71.9). The data revealed that participants believed their medication was intrinsically harmful (mean (M) = 14; SD = 2.9); was overused by doctors (M = 15; SD = 3.3); patients were very sensitive to its adverse effects (M = 17; SD = 4.6), but they also believed that there were positive characteristics regarding their medication (M = 15.3; SD = 2.6) (see Tables 2 and 3).

3.3. Patients' health-related behaviors

Regarding health-related behaviors, more than half (59.6%) of the participants showed adherence to a low sodium diet, 54.5% never smoked, and 53.5% had a BP monitoring machine at home, but 52.2% did not measure their BP (52.2%) and 64.4% did not measure their BS levels.

Table 2. Clinical characteristics (categorical variables) of the participants (n = 312) (Jordan, 2013).

		Frequency	Percent
Co-morbidity	No	149	47.8
	Two types or more	163	52.2
Cholesterol	Less than 150 mg/dL	51	16.3
	150–200 mg/dL	102	33
	Above 200 mg/dL	60	19.2

Table 3. Clinical characteristics (continuous variables) of the participants (n = 312) (Jordan, 2013).

	Minimum	Maximum	Mean	Std. deviation
Disease duration in years	0	2	0.9	0.8
Height (centimeters)	140.0	197.0	169.4	8.7
Weight (kilograms)	45.0	170.0	83.2	14.8
BMI (kilograms/m^2)	18.6	51	29	5.4
Cholesterol (mg/dL)	63.0	600.0	197.3	86.6
SBP (mmHg)	106.0	195.0	145.7	17.2
DBP (mmHg)	60.0	150.0	94.7	10.9
BS (mg/dL)	69	440	155	71.9
Frequency of exercise per week	0.0	2.0	0.4	0.6
Frequency of medication per day	0.0	4.0	1.6	0.7
GH	7	20	14	2.9
GO	8	45	15	3.3
GB	8	20	15.3	2.6
GS	7	54	17	4.6

SBP: systolic blood pressure
DBP: diastolic blood pressure
BS: blood sugar
BMI: body mass index
BMQ: beliefs about medication questionnaire
GH: general harm
GO: general overuse
GB: general benefit
GS: general sensitivity

Doing exercise was reported by 41.7% of the participants, with 86.9% of them doing some walking exercise. Meanwhile, 58.3% did not do any exercise because they reported some barriers, with around half of those (45%) reporting "feelings of tiredness" as a barrier.

Adherence to medication was measured by asking "how often do you take your medicine"; more than third of them (38.8%) answered "often". Meanwhile, the majority of the participants (72.5%) did not have stress at the time of data collection; those who had experienced stress responded by repression and keeping silent (41.9%) or nervousness (53.5%), as represented by screaming, shouting, or destroying an object) (see Table 4).

3.4. The correlation between BP and selected modifying factors

A significant correlation was shown between age and BP; increasing SBP and DBP correlated with increase in age (P = 0.000) (see Figure 1). Increase in DBP correlated with a significant increase in cholesterol level (P = 0.002) and BMI (P = 0.006) (see Figure 2). Meanwhile, an increase in SBP significantly correlated with an increase in BS (P = 0.007). The SBP correlated significantly with the BMQ subscales: patients who believe that a drug is overprescribed (GO) by their doctor and that a drug is intrinsically harmful (GH), and who are highly sensitive to its adverse effects (GS) experience an increase in SBP. However, SBP decreased among patients who believe in the benefit of the drugs (GB) prescribed to them (see Table 5).

4. Discussion

This study assessed adherence to lifestyle recommendations among Jordanian patients having high BP; the current study highlights the demographics and clinical and behavioral characteristics of such hypertensive patients. Some demographics (age, education, marital status, living with family) and clinical characteristics (systolic and diastolic BP, co-morbidity, and exercise) of participants are similar to those in other studies conducted in Jordan (10,22,23). This means our sample is somewhat representative of Jordanian patients having high BP. However, in the current study, around 19% of the participants had high cholesterol levels and 68.6% were overweight, percentages that were higher than the findings reported by Al-Nsour et al. (13) (7.5% and 30.5%, respectively). These differences might be the result of their participants being diagnosed with chronic diseases, with their research focusing on more than hypertension, unlike the current study. Additionally, around 38% of their participants did not check their cholesterol levels, whereas all participants in this current study did so.

Social determinants of health contribute to hypertension and influence its control when it happens (4); age was an important independent predictor of hypertension (23). These findings were congruent with the current study results in terms of increasing age correlating significantly with increasing SBP and DBP, high cholesterol levels being associated with increased DBP, and high BS being associated with increased SBP. These findings agreed with the research by Al-Bdour et al., who found a significant correlation between BS and increased BP (24).

A number of research studies have stated that sodium intake control helps to reduce BP by 1.4/0.9 mmHg and accordingly reduce actual and potential complications (25,26). Our study's finding showed that adhering to a prescribed low sodium diet was more successful than other lifestyle modification options. This result may be explained by the fact that sodium reduction needs less time and effort than other processes. Although around 60% of the current study's participants adhered to a prescribed sodium reduction program, the means of SBP and DBP were high (145.7 and 94.7 mmHg, respectively). This might be rationalized by our participants who did not adhere to other lifestyle modifications such as measuring and monitoring their BP, BS, and cholesterol levels, and who failed to take regular exercise).

Weight loss is correlated with decreased BP (20,27). A positive relationship was detected between BP and BMI (23,28,29). More than half of our participants were overweight and obese and their DBP was correlated with increased BMI readings. This confirms previous study findings about adherence to lifestyle modification (11). These results may be explained by more than half of our sample not doing any exercise, since they had barriers preventing them from doing so, such as 'feeling tired'. Several studies have shed light on this outcome and have explained these results (30,31). They claimed that the simple recommendations of 'exercise' or 'weight control' were very broad or ambiguous, therefore making them difficult to be followed by patients (31). On the other hand, around half of our participants (41%) were doing exercise but without any effect on their BP; it might be that the duration of exercise was not sufficient to play a part in reducing their BP. The data indicate that intervention to enhance weight reduction and practicing appropriate exercise (type and duration) should be part of any comprehensive lifestyle modification intervention. Moreover, it ensures the focus is on body weight, physical activity, and salt intake as modifying factors informing hypertension. This might reduce the high risk factors relevant to noncommunicable diseases in Jordan (e.g., smoking, obesity, and lack of physical activity) (3,13,14). Meanwhile, this study indicates the importance of proper management and rational selection of antihypertensive drug therapy, in order to improve the overall health of the Jordanian population.

Table 4. Patients' health-related behaviors (n = 312) (Jordan, 2013).

		Frequency	Percent
Do you have a BP monitor?	Yes	167	53.3
	No	145	46.7
Do you measure your BP?	Yes	149	47.8
	No	163	52.2
The frequency of measuring BP	Every day	73	23.5
	Every week	36	11.5
	Every month	6	1.9
	Other*	34	10.9
	I do not measure it	163	52.2
Do you measure your BS?	Yes	111	35.6
	No	201	64.4
The frequency of measuring BS	Every day	44	14.1
	Every week	33	10.6
	Every month	6	1.9
	Other*	28	9
	I do not measure it	201	64.4
Smoking	Currently smoker	70	22.4
	I was but I stopped	72	23.1
	Never smoke	170	54.5
Doing exercise	Yes	130	41.7
	No	182	58.3
Type of exercise (for the person who answers "yes" n = 130)	Walking	113	86.9
	Jogging	9	6.9
	Others**	8	6.2
The extent of difficulties that you have during exercise	No barriers	41	31.5
	Minimum	30	23.1
	Low	30	23.1
	Moderate	29	22.3
	High	0	0
Barriers to exercise (for the person who answers "no" n =182)	Feeling tired	82	45.1
	No time	21	11.5
	Pain	60	32.9
	Shortness of breath	5	2.7
	Other***	14	7.8
Sodium reduction diet	Yes	186	59.6
	No	126	40.4
Adhere to medication	Always	96	30.8
	Often	121	38.8
	Sometimes	70	22.4
	Once	20	6.4
	Never	5	1.6
Having stress	Yes	86	27.5
	No	226	72.5
Coping methods (for the person who answers "yes" to having stress; n = 86)	Repression and being silent	36	41.9
	Nervous and angry (screaming, shouting, destroying objects)	46	53.5
	Other****	4	4.6

BP: blood pressure
BS: blood sugar
Other*: more than month
Other**: i.e. boxing, football
Other ***: i.e. drowsiness, long distance to find appropriate place/no appropriate area
Other****: crying, walking around, reading, and eating

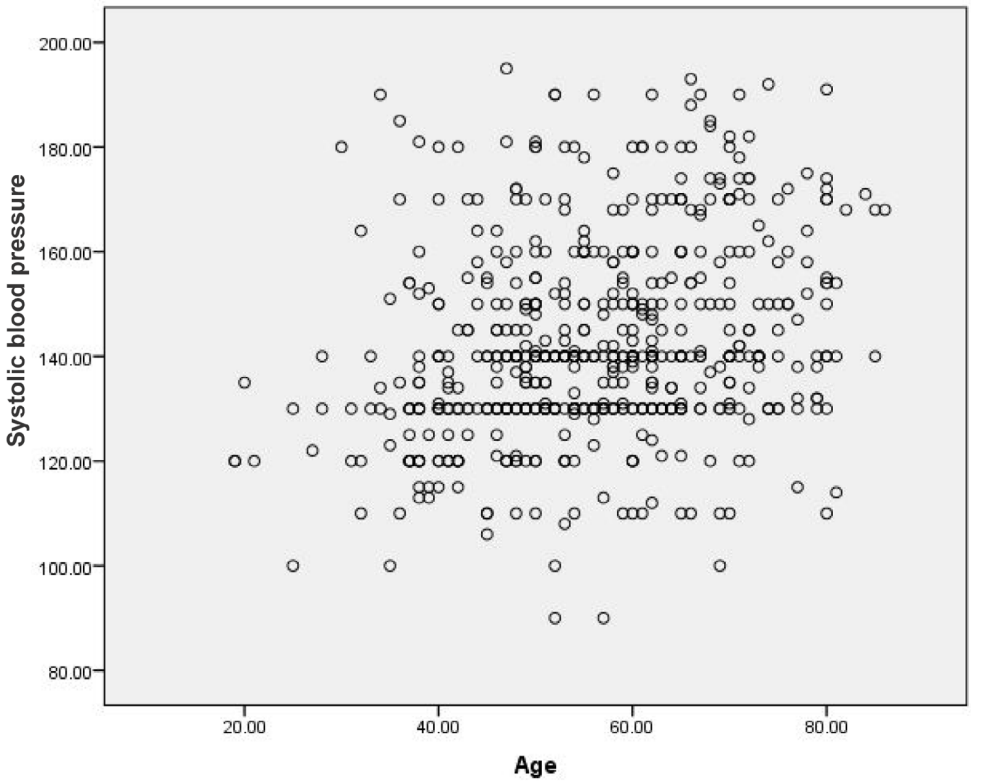

Figure 1. Correlation between systolic BP and age.

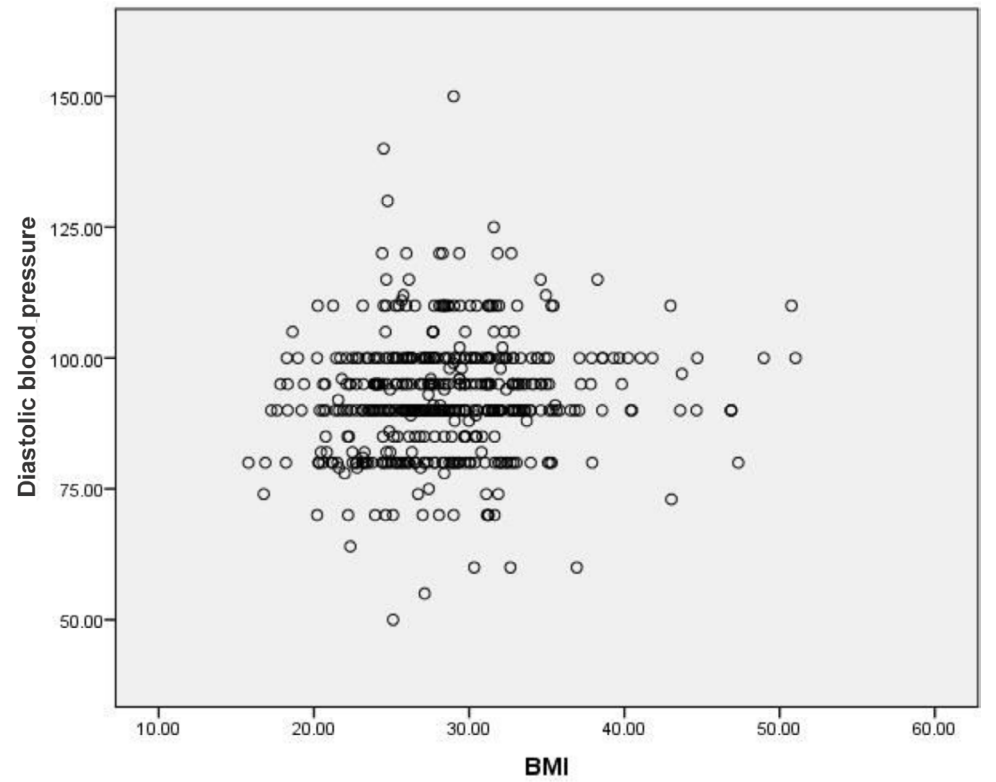

Figure 2. Correlation between diastolic BP and BMI.

Table 5. The Pearson product moment correlation between BP and selected modifying factors.

	SBP	P-value	DBP	P-value
Age	0.3**	0.000	0.2**	0.000
Cholesterol level	0.24	0.000	0.2**	0.002
BS	0.11**	0.007	0.045	0.27
BMI	0.033	0.457	0.120**	0.006
BMQ subscales				
General harm	0.159**	0.005	0.082	0.152
General benefit	0.175**	0.002	0.044	0.435
General overuse	0.185**	0.001	0.034	0.556
General sensitivity	0.161**	0.004	0.056	0.322

**Correlation is significant at the 0.01 level (2-tailed). SBP: systolic blood pressure
DBP: diastolic blood pressure BS: blood sugar
BMI: body mass index BMQ: Beliefs about Medication questionnaire

We tried to minimize the potential bias in this study by using power calculation and different settings to collect data. However, the findings of this study are relatively limited by the use of a descriptive design (weak external validity), convenience sampling technique, and using a specially developed self-reported questionnaire (which is liable to elicit reporting bias). All these reasons limited the generalizability of the current study.

We conclude from the current study that Jordanian hypertensive patients did not adhere to lifestyle modification to any great or meaningful extent. Addressing behavioral risk factors (physical inactivity, high BS, increased cholesterol levels, obesity, exposure to stress, and poor stress management) has a positive impact on preventing and controlling hypertension. Such prevention and control strategy consequently reduces the burden of chronic diseases in terms of morbidity, mortality, and cost. Therefore, urgent action should be taken by health policymakers in Jordan to initiate screening programs for identifying these factors and designing appropriate interventions to enhance patients' adherence to healthy lifestyle modification factors. Health care providers, particularly nurses, should provide education about these factors for patient and their family in practice settings. We recommend that the health policymakers have to cooperate with the media in order to provide education programs that aim to reach their target goal, since each house in Jordan has media technology and so the educational goals reach the whole population. Future research is needed to focus on the ways that facilitate patient adherence to healthy lifestyle recommendations and to assess the actual barriers that prevent patient from following these recommendations.

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References

1. WHO. Global status report on noncommunicable diseases 2010. Geneva: World Health Organization, 2011.
2. Alhalaiqa F, Deane K, Nawafleh A, Clark A, Gray R. Adherence therapy for medication non-compliant patients with hypertension: a randomised controlled trial. J Hum Hypertens 2012; 26: 117-126.
3. WHO. A global brief on hypertension. Silent killer, global public health crisis. Geneva: World Health Organization, 2013.
4. Ministry of Health. Directorate of Information Studies and Research, Ministry of Health, The Hashemite Kingdom of Jordan. Mortality in Jordan 2005. Amman (JO), 2008.
5. Alhalaiqa F, Masa'Deh R, Batiha AM, Deane K. Validity of Arabic version of Beliefs about Medication Questionnaire. CNR 2015; 24: 539-555.
6. WHO. The Global Burden of Disease: 2004 Update. Geneva: World Health Organization, 2008.

7. WHO. 2008-2013 Action plan for the global strategy for the prevention and control of noncommunicable diseases: World Health Organization, 2009.
8. World Economic Forum, Harvard School of Public Health. The Global Economic Burden of Non-communicable Diseases: World Economic Forum and the Harvard School of Public Health, 2011.
9. World Health Organization and World Economic Forum. From Burden to "Best Buys": Reducing the Economic Impact of Non-Communicable Diseases in Low- and Middle-Income Countries. Geneva: World Health Organization and World Economic Forum, 2011.
10. Jaddou H, Bateiha A, Al-Khateeb M, Ajlouni K. Epidemiology and management of hypertension among Bedouins in Northern Jordan. Saudi Med J 2003; 24: 472-476.
11. Al-Drabah E, Irshaid Y, Yasein N, Zmeili S. Prescription pattern of antihypertensive drugs in Family Practice Clinics at Jordan University Hospital. Med-Science 2013; 2: 469-488.
12. Naddaf A. Lifestyle of hypertensive patients and their drug compliance. Bull Pharm Sci 2004; 27: 307-314.
13. Al-Nsour M, Zindah M, Belbeisi A, Hadaddin R, Brown DW, Walke H. Prevalence of selected chronic, noncommunicable disease risk factors in Jordan: results of the 2007 Jordan Behavioral Risk Factor Surveillance Survey. CDC - Preventing Chronic Disease 2012; 9: 11-0077.
14. Bulatova N, Yousef AM, AbuRuz SD, Abu Farha R. Hypertension management and factors associated with blood pressure control in Jordanian patients attending cardiology clinic. TJPR 2013; 12: 827-33.
15. WHO. Adherence to long-term therapies evidence for action. World Health Organization, 2003.
16. Chobanian A, Bakris G, Black H, Cushman W, Green L, Izzo J, Jones D, Materson B, Oparil S, Wright JJ et al. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 2003; 42: 1206-1252.
17. Al-Qasem A, Smith F, Clifford S. Adherence to medication among chronic patients in Middle Eastern countries: review of studies. East Mediterr Health J 2011; 17: 356-363.
18. Bacon S, Sherwood A, Hinderliter A, Blumenthal J. Effects of exercise, diet and weight loss on high blood pressure. Sports Med 2004; 34: 307-316.
19. Alderman MH. Non-pharmacological treatment of hypertension. Lancet 1994; 344: 307-311.
20. He J, Whelton PK, Appel LJ, Charleston J, Klag MJ. Long-term effects of weight loss and dietary sodium reduction on incidence of hypertension. Hypertension 2000; 35: 544-549.
21. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. Psychol Health 1999; 4: 1-24.
22. Al-Motassem F Y, Bulatova Nl, AbuRuz S. Management of coronary artery disease in Jordan: cross-sectional comparative study. JJPS 2008; 1: 28-40.
23. Batiha A-M, AlAzzam M, ALBashtawy M, Tawalbeh L, Tubaishat A, Alhalaiqa F. The relationship between hypertension and anthropometric indices in a Jordanian population. Adv Stud Biol 2015; 7: 233-243.
24. Al-Bdour MD, Al-Till MI, Abu Samra KM. Risk Factors for Diabetic Retinopathy among Jordanian Diabetics. Middle East Afr J Ophthalmol 2008 ;15:77-80.
25. Pimenta E, Gaddam KK, Oparil S, Aban I, Husain S, Dell'Italia LJ, Calhoun DA. Effects of dietary sodium reduction on blood pressure in subjects with resistant hypertension: results from a randomized trial. Hypertension 2009; 54: 475-481.
26. Cook N, Cutler J, Obarzanek E, Buring J, Rexrode K, Kumanyika S, Appel L, Whelton P. Long term effects of dietary sodium reduction on cardiovascular disease outcomes: observational follow-up of the trials of hypertension prevention (TOHP). Brit Med J 2007; 334: 885-888.
27. Wexler R, Aukerman G. Nonpharmacologic strategies for managing hypertension. Am Fam Physician 2006; 73: 1953-1956.
28. Gao X, Wang G, Wang A, Xu T, Tong W, Zhang Y. Comparison of lipid accumulation product with body mass index as an indicator of hypertension risk among Mongolians in China. ORCB 2013; 7: e308-e14.
29. Dua S, Bhuker M, Sharma P, Dhall M, Kapoor S. Body mass index relates to blood pressure among adults. North Am J Med Sci 2014; 6: 89-95.
30. Paczkowska A, Koligat D, Nowakowska E, Hoffmann K, Bryl W. Analysis of direct costs of hypertension treatment among adolescents in Poland. Acta Pol Pharm 2014; 71: 197-203.
31. Xu K, Ragain R. Effects of weight status on the recommendations of and adherence to lifestyle modifications among hypertensive adults. J Hum Hypertens 2005; 19: 365-371.