

# Health habits and risk factors among Omanis with hypertension

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## ABSTRACT

**Objective:** To determine the health habits and risk factors among Omanis with hypertension

**Methods:** The study was conducted at the Medical Unit of the Royal Hospital, Muscat, Sultanate of Oman during the period from January 2003 to September 2003. A cohort of Omani hypertensive patients (43 male and 57 female) with a mean aged of 51.47 years was randomly selected. All participants were interviewed with a questionnaire for 15-20 minutes. Medical records of the participants were reviewed to determine the presence of associated complications as well as other unrelated chronic health problems based on the diagnosis made by the treating physicians. This was in addition to the measurement and recording of blood pressure, height and weight.

**Results:** The study revealed that the prevalence of uncontrolled hypertension was 73%. The main cause of

uncontrolled hypertension was due to unhealthy lifestyle such as more consumption of fatty food and salty food, little physical activity, obesity and age. The study also revealed that there was a significant difference between hypertension and family history, stress, drinking more coffee, physical activity and presence of associate clinical conditions including cardiac and renal.

**Conclusion:** Our study shows that lifestyle should be encouraged along with hypertensive therapy as blood pressure control cannot be achieved without reducing salt and fat, maintaining an ideal weight, and maintaining regular exercise. Therefore, it is recommended that the need for effective nursing intervention aimed at increasing levels of awareness of complying with lifestyle modifications, along with hypertensive therapy and family enforcement should be encouraged.

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Hypertension (HT) is a chronic condition, and a major public health problem.<sup>1</sup> The prevalence of HT is increasing in many parts of the world. In Europe, for example, the average HT was 44.2% compared with 27.6% in North America.<sup>2</sup> In Kuwait, the most recent data on HT showed a prevalence rate of 26.3%.<sup>3</sup> In Egypt, a recent study on normotensive and hypertensive Egyptians showed that the high normal blood pressure was 20.1%, and hypertensive was 45.3%.<sup>4</sup> In Oman, according to the National Health Survey, the prevalence rate of high systolic is 33% or diastolic blood pressure is 33%. The prevalence rate of high systolic and diastolic blood pressure is 15.2%.

Muscat was the highest for high systolic (26.3%) and diastolic blood pressure (39.4%).<sup>5</sup> It was also reported that the morbidity rate among patients with cardiovascular diseases was 220; out of this, 123 patients had HT.<sup>6</sup> Raised blood pressure is mostly asymptomatic but it produces a variety of structural changes in arteries that supply blood to the brain, heart, kidneys and elsewhere without being noticed.<sup>7</sup> The level of blood pressure has long been recognized as a determinant of the risks for several common cardiovascular diseases, including coronary heart disease, cerebro-vascular disease, heart failure (HF) and renal failure (RF).<sup>7,8</sup> For instance, the presence of smoking, high cholesterol,

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diabetes mellitus (DM) and HT combined disease increase the risk of vascular events by 20 times.<sup>9-10</sup> The inadequate control of HT has not only a significant consequences in terms of patient morbidity and mortality but also in terms of health care costs.<sup>11</sup> Modification of lifestyle is recommended in the management of HT. Normal blood pressure can be maintained and thereby it reduces morbidity from stroke, myocardial infarction (MI), congestive HF and RF.<sup>11-12</sup> Hence, nurses play an important role in educating the public about HT.<sup>1</sup> Nurses are therefore require to be knowledgeable on health habits and risk factors of HT in order to provide a good health care. The main aim of this study is to determine the health habits and risk factors of hypertension among Omani.

**Methods.** The study was conducted at the Medical Unit of the Royal Hospital during the period from January 2003 to September, 2003. The Royal Hospital is owned and administrated by the Ministry of Health, Sultanate of Oman. It serves as the apex tertiary care referral center for the country and provides facilities for 641 in-patients, and approximately 350 out-patients from the various regional hospitals in the interior and from healthcare facilities in Muscat. Patients in this type of care have a complete and accessible records of the health status from admission to the present time. A cohort of hypertensive patients (43 males and 57 females) with a mean aged of 51.47 years, whose antihypertensive regimen remained unchanged for 10 months, age  $\geq 20$  years, disease duration  $\geq 2$  years and may or may not had hypertension related complication such as cardiac, neurological, RF or DM. We excluded any non-Omani patients with other disease such as gout, liver and gall bladder, malignancy, hyperthyroidism, epilepsy or other condition. The patients were selected by simple random sampling for determination of blood pressure and its determinant factors. The patients were divided into 2 groups according to their blood pressure control, and the lifestyle were compared between the 2 groups. All participants were interviewed with a questionnaire, consisting of 3 parts, for 15-20 minutes. In part 1, the sociodemographic data were collected including age, gender, marital status, educational attainment, occupation, residence, and income. In part 2 a detailed health history about the onset of the disease and method of discovery, compliance of hypertensive therapy, duration of HT, family history of HT and stress and coping strategies used to deal with a stressful situation were also collected. Medical records of the participants were reviewed to determine the presence of associated complication as well as other unrelated chronic health problems based on the diagnosis made by the treating physicians. This was in addition to the measurement

and recording of blood pressure, height and weight. Blood pressure was measured twice for every participant using the standard mercury sphygmomanometer and the mean was recorded as per World Health Organization guidelines and Youssef and Moubark methods.<sup>13-14</sup> In the recorded blood pressure, the effect of the last dose of medication taken on the previous day was recorded. The first morning dose are usually postponed until the measurement was completed. Blood pressure was considered to be well-controlled if the systolic was  $<140$  mm Hg and diastolic was  $<90$  mm Hg and uncontrolled if  $\geq 140/90$  mm Hg.<sup>15</sup> Hypertension was classified as mild (if systolic was 140-159 or diastolic was 90-99 mm Hg), moderate (if systolic was 160-179 or diastolic was 100-109 mm Hg), and severe (if systolic was 180-209 or diastolic was 110-119 mm Hg) and extremely severe (if systolic was  $\geq 210$  or diastolic  $\geq 120$  mm Hg).<sup>16</sup> Height was recorded in centimeters using a stadiometer. The weight was taken in kilograms. Body mass index (BMI) was calculated as weight in kilograms divided by the square of height in meters. The BMI was divided into 4 categories as described by Al-Quaiz:<sup>17</sup> underweight (BMI  $<18.5$ ), normal weight (BMI =18.5-24.9), overweight (BMI =25.0-29.9), obese (BMI =30-34.9), and extremely obese (BMI  $\geq 40$ ).<sup>17</sup> Compliance of hypertensive therapy was determined by patient's self-reporting according to Feldman et al,<sup>18</sup> who stated that patient's self-reporting of compliance is recommended in clinical practice due to its simplicity and has proven to be fairly accurate compared to other methods.<sup>18</sup> The patient was asked about their medication on a regular bases as prescribed (number of pills, frequency) and barriers for complying with the recommended schedule. Patients' records were reviewed for prescribed medication to know the number of pills and dosage and frequency. Compliers were those who were complying fully (not missing a single dose) or taking 90% or more of the prescribed pills and non-compliers were those taking  $<90\%$  of prescribed pills. This methodological approach was similar to the method used by Sackett et al,<sup>19</sup> Youssef and Moubark,<sup>14</sup> Ono and Fujita<sup>20</sup> and Degli et al.<sup>21</sup> Stress and strategies used to deal with a stressful situation was evaluated by asking about stress, main causes of stress, dealing with their stressful situation and the effect of using this in coping their emotion. Stress and coping mechanism were measured with 4 open-ended questions; the patient was instructed to select only the most important question that is related to their emotion (Cronbach alpha reliability = 0.596). In Part 3, a detailed lifestyle was collected including dietary lifestyle, smoking, and regular exercise. A dietary lifestyle was measured with 7 closed ended questions with a 4-point scale of options where

score 1 stands for not eaten at all up to score 4 which stands for usually eaten (Cronbach alpha reliability = 0.73). According to Talbot<sup>23</sup> this alpha represent a respectable alpha for a newly developed scale. Appropriate ethical protocols were followed in carrying out the study. Authorization was sought and obtained from the Director General of the Hospital. The study was explained to the participants with an assurance of anonymity before starting the interviews.

Data were summarized as numbers, percentage and mean±SD. Chi-square, t-test or analysis of variance were used to compare groups as appropriate. Person correlation was used as a measure of association between dietary lifestyle, BMI and HT. Multiple linear regression was used to examine the strength of relationship between risk factors and HT. P-value of <0.05 was considered significant.

**Results.** Table 1 illustrates that 57% of the study population were female. The largest percentage

(36%) of studied sample were in the 50-60 years age group, while the smallest percentage (3%) were in the age group of 20 to <30 years. Ninety-five percent of the patients were married, 56% were illiterate, and 76% were not working. The monthly income of 41% of the subjects was <200 Rial Omani. Almost half of the subjects (47%) had a family size of >10 members.

Table 2 shows the medical histories and family history of patients with HT. A significant difference was found between family history of: HT, HF, DM, and MI.

Table 3 shows the pharmacological management of HT in the studied sample. A total of 87% were compliance with the antihypertensive drugs; 75% received a single dose drug, 20% received 2 drugs and 5% received 3 drugs. A single dose was recommended for 50% of the patients while 4% was on a 3 doses per day. The most frequently (46.1%) stated barrier to noncompliance with therapy was the feeling that blood pressure was normal.

Table 1 - Frequency and percentage distribution of the studied sample according to their socio-demographic (N=100).

Characteristic	N (%)	$\chi^2$	p value
<b>Gender</b>		1.960	0.162
Male	43 (43)		
Female	57 (57)		
<b>Age (years)</b>		72.20	<0.001
20-<30	3 (3)		
30-<40	12 (12)		
40-<50	24 (24)		
50-<60	36 (36)		
≥60	25 (25)		
<b>Level of education</b>		98.20	<0.001
Illiterate	56 (56)		
Read and write	27 (27)		
Primary education	5 (5)		
Secondary education	7 (7)		
University education	5 (5)		
<b>Marital status</b>		128.96	<0.001
Not married	5 (5)		
Married	95 (95)		
<b>Family size</b>		20.60	0.112
<10	53 (53)		
>10	47 (47)		
<b>Job</b>		165.76	<0.001
Working	24 (24)		
Not working	76 (76)		
<b>Income</b>		119.520	<0.001
No answer	15 (15)		
<200	41 (41)		
200-400	30 (30)		
>400	14 (14)		
mean age = 51.47			

Table 2 - Medical histories and family history of patients with hypertension (N=100).

Characteristic	N (%)	Mean±SD	p value
<b>Blood pressure</b>			
Controlled	27 (27)		
Uncontrolled	73 (73)		
Mild	57 (57)	145.05±86.58	
Moderate	12 (12)	17.100±13.69	t=15.384
Severe	4 (4)		p=0.000
<b>Disease duration</b>			
2-5 years	55 (55)	6.53±6.46	$\chi^2=104.400$
>5 years	45 (45)		p=0.000
<b>Disease discovery</b>			
During medical consultation	74 (74)		
for other cause			$\chi^2=23.040$
During regular check-up	26 (26)		p=0.000
<b>Hypertension related complication</b>			
Absent	12 (12)		
Present	88 (88)		0.00
Renal failure	8 (8)		0.02
Diabetes mellitus	42 (42)		0.002
Heart failure	21 (21)		0.001
Myocardial infraction	17 (17)		
<b>Body mass index</b>			
Underweight (<18.5)	12 (12)		t=36.943
Normal (18.5-24.9)	48 (48)		p=0.000
Over weight (25-29.9)	23 (23)		
Obese (>30)	17 (17)		0.01
			0.001
<b>*Family history</b>			
Hypertension	63 (63)		0.001
Heart failure	22 (22)		0.01
Diabetes mellitus	43 (43)		
Myocardial infraction	10 (10)		
*patients had more than one complication			

Risk factors of HT among controlled and uncontrolled hypertension are presented in **Table 4**. The study showed that the HT was poor controlled in patients who are unemployed, eat more pickles, fatty and salty food, drink more coffee with less exercise compared to controlled hypertensive patients who complied with lifestyle modification.

The main source of stress among the studied sample was being either increased family size with less income (34%) or disease itself (38%) (**Table 5**). There was a significant difference between stress and HT ( $p < 0.05$ ). The most coping behavior of the subjects in stressful situations was praying and trusting in God (49%) while 3% practice smoking as their coping mechanism (**Table 5**).

**Table 6** shows the most common risk factors of HT. Among these were stress, drinking more coffee, and increase salt intake while least common risk factors were smoking. A correlational analysis was performed to determine if there where a relationship between dietary lifestyle, BMI and HT. The results in **Table 7** show a positive relationship between eating habits, BMI and HT. Overweight or obese people who eat more fat, salty food, and drinking more coffee tends to have uncontrolled HT.

**Discussion.** Adequate control of blood pressure is important for preventing HT complication, but it has been reported that many patients remain uncontrolled despite regular care.<sup>15</sup> Poor compliance with hypertensive therapy and current living habits thought to be a major factor in the failure to control HT.<sup>23</sup> Smeltzer and Bare<sup>24</sup> reported the blood pressure control in 27%, while Bizien et al<sup>15</sup> found it in 34.8% and the main factors of uncontrolled HT was due to obesity, consuming more fat and salt, age and history of stroke and DM.<sup>25</sup> This study found similar result that 27% of the studied sample were controlled HT and the main factors of uncontrolled HT was due to obesity, consuming more salt and fat, age, stress, inadequate activity and illiteracy.

It seems that the hypertensive therapy compliance rate of 87% in the present study falls in the upper ranges of compliance. This was based on the compliance with 90% of the prescribed drugs and on patient's self-reporting. The high compliance rate may be due to a free medical treatment and easy access to health care facilities available in Oman. Based on this result, perhaps compliance of therapy was not the most important factors responsible of poor blood pressure control. This is in disagreement with Salako and Ajose's<sup>15</sup> study that shows poor adherence to therapeutic plans and non-compliance were perhaps the most important factors responsible for poor blood pressure control. Obesity is significantly associated with an increase in blood pressure.<sup>26,27</sup> This study revealed that there was a positive correlation between BMI and HT and this

result is supported by a study carried out by Venegas et al<sup>27</sup> that shows the same results (**Table 2 & 7**). A family history of HT is an important predictive of early HT within a family as it appears to share certain environmental risk factors and common pathophysiological pathways.<sup>28</sup> In industrialized countries, the family history of HT has been estimated to be up to 4 times higher than average,<sup>29</sup> this study results found that the majority (63%) of the participants reported a family history of HT. This is supported by a recent study conducted in Oman that shows that a family history of HT was prevalent and predicts the differential BP among offspring of first-cousin hypertensive parents<sup>30</sup> (**Table 2**).

Although regular physical activity helps prevent obesity, HT and DM,<sup>23,31</sup> only 20% of the participants reported maintained regular exercise in this study (**Table 4**). Coffee intakes have been implicated as a contributor to coronary heart disease incidence in retrospective studies.<sup>23</sup> Superko et al<sup>32</sup> found that ambulatory BP was reduced in a group that discontinued caffeinated coffee, supporting this study which indicates that the majority of the participants were consuming more coffee and there was a strong relation between HT and coffee ( $p=0.02$ ) (**Table 4 & 6**). Emotional stress is directly associated with the incidence of heart disease.<sup>23</sup> In this study, the main source of stress among the studied sample was increased family size with reduced income and disease itself. This may be explained by the fact that the majority was married and almost half had a family size of more than ten members with less income. All these factors predisposed a person to tension and stress, which led to increased HT and there was a strong relation between stress and HT (**Table 1 & 6**). The burden of elevated blood pressure as risk factors for HF, stroke, and RF has been clarified in some epidemiological studies.<sup>33-34</sup> In our study, the majority of patients had DM, as supported by Saeed and Al-Dabbagh's study in Iraq that the majority of type 2 DM patients suffered from HT<sup>35</sup> (**Table 2**). Smoking doubled the risk of cardiovascular events in all groups of systolic blood pressure.<sup>36</sup> In this study, smoking was less common risk factor among Omani hypertensive patients, this confirms with Abraham et al<sup>4</sup> study that found a similar result among Egyptian hypertensive patient<sup>4</sup> (**Table 6**).

In conclusion, our study showed that lifestyle should be encouraged along with hypertensive therapy as blood pressure control cannot be achieved without reducing salt and fat, maintaining an ideal weight, and maintaining a regular exercise. Therefore, effective nursing intervention through increasing levels of awareness that complies with lifestyle modification along with hypertensive therapy and family enforcement should be encouraged. The patients and family must know

Table 3 - Pharmacological management of studied sample (N=100).

Pharmacological management	N (%)
<b>Compliance with a prescribed therapy</b>	
Compliant	87 (87)
Non compliant	13 (13)
<b>Number of drugs</b>	
1	75 (75)
2	20 (20)
3	5 (5)
<b>Dose frequency per day</b>	
1	50 (50)
2	46 (46)
3	4 (4)
<b>Perceived barriers to pharmacological compliance (n=13)</b>	
No barriers	2 (15.4)
Feeling blood pressure is normal	6 (46.1)
Forgetfulness	5 (38.5)

Table 5 - Causes of stress as risk factors of hypertension and coping behaviors among studied sample.

Characteristic	N (%)
<b>Source of stress</b>	
Family problems	21 (21)
Hard work	7 (7)
Increase family size with less income	34 (34)
Disease	38 (38)
<b>Coping behaviors when dealing with their stressors</b>	
Pray and trust in God	49 (49)
Let tension out on others	10 (10)
Take sedatives with doctor's order	8 (8)
Withdraw from situation	17 (17)
Want to be alone	13 (13)
Relive tension by smoking	3 (3)
<i>p</i> <0.05 (stress statistically significant as a risk factor of hypertension)	

Table 4 - Liner analysis of the predictors of risk factors among controlled and uncontrolled participant with hypertension.

Risk factors	Uncontrolled hypertension			Controlled hypertension N=27	Odds ratio (95% CI)	p value
	Mild N=57	Moderate N=12	Severe N=4			
	n (%)	n (%)	n (%)	n (%)		
<b>Occupation</b>					2.20 (1.77-2.64)	0.000
Working	16 (28)	3 (25)	1 (25)	19 (70)		
Not Working	41 (72)	9 (75)	3 (75)	8 (30)		
<b>Eating more pickles</b>					2.15 (1.62-2.68)	0.000
Not eaten	28 (49.1)	6 (50)	0	18 (66.7)		
Sometimes	18 (31.6)	5 (41.7)	3 (75)	4 (14.9)		
Always	4 (7)	1 (8.3)	0	2 (7.3)		
Usually	7 (12.3)	0	1 (25)	3 (11.1)		
<b>Eating salty food</b>					2.28 (1.69-2.88)	0.000
Not eaten	23 (40.4)	4 (33.3)	0	15 (55.6)		
Sometimes	20 (35)	5 (41.7)	3 (75)	7 (26)		
Always	10 (17.6)	2 (16.7)	1 (25)	4 (14.8)		
Usually	4 (7)	1 (8.3)	0	1 (3.6)		
<b>Eating fatty food</b>					2.35 (1.64-3.05)	0.000
Not eaten	7 (12.2)	2 (16.7)	1 (25)	7 (26)		
Sometimes	25 (43.9)	8 (66.6)	2 (50)	10 (37)		
Always	15 (26.3)	2 (16.7)	1 (25)	5 (18.5)		
Usually	10 (17.6)	0	0	5 (18.5)		
<b>Smoking</b>					2.95 (1.62-4.27)	0.000
Yes	7 (12.2)	2 (16.7)	0	7 (26)		
No	50 (87.8)	10 (83.4)	4 (100)	20 (74)		
<b>Drinking coffee</b>					1.37 (.56-2.17)	0.001
Yes	49 (86)	9 (75)	3 (75)	19 (70.4)		
No	8 (14)	3 (25)	1 (25)	8 (29.6)		
<b>Numbers of Coffee cups</b>					1.94 (1.60-2.28)	0.000
No drinking coffee	8 (14.1)	3 (25)	0	10 (37.1)		
<5 cups per day	29 (50.9)	3 (25)	1 (25)	13 (48.2)		
>5 cups per day	20 (35)	6 (50)	3 (75)	4 (14.9)		
<b>Exercise</b>					1.57 (0.668-2.48)	0.000
Not practicing exercise	42 (73.7)	6 (50)	4 (100)	10 (37.1)		
Practice a regular exercise	5 (8.8)	2 (16.7)	0	13 (48.1)		
Practice irregular exercise	10 (17.5)	4 (33.3)	0	4 (14.8)		
<b>Compliance of therapy</b>					2.02 (1.11-2.94)	0.000
Comply	51 (89.5)	9 (25)	2 (50)	25 (92.6)		
Not comply	6 (10.5)	3	2 (50)	2 (7.4)		

Table 6 - Strength of relationship between some risk factors and hypertension using multiple regressions.

Variables	b	Beta	t	p value
Stress	49.09	1.15	2.52	0.01
Drinking coffee	-44.85	-1.04	-2.29	0.02
Increase salt intake	-34.25	-0.99	-1.97	0.05
Family history of TH	2.73	0.078	0.715	0.477
Physical activity	1.25	0.03	-133	0.895
Types of occupation	-11.85	-0.297	-0.604	0.548
Smoking	-3.69	-0.08	-0.38	0.707

b - regression coefficient, T - values for regression coefficient, R<sup>2</sup> =0.136, F=1.264, p=0.259

Table 7 - Correlation between dietary life style, body mass index and hypertension.

Variables	HT	Increase salt intake	Fatty food	Spicy food	Drinking coffee	BMI
Hypertension	1.00	-0.084	0.037	-0.004	0.053	0.059
Increase salt intake	0.084	1.00	0.532	0.678†	0.606†	-0.211*
Fatty food	0.037	0.532†	1.00	0.784†	0.878†	-0.171
Spicy food	-0.004	0.678†	0.784†	1.00	0.893†	-0.245*
Drinking coffee	0.053	0.606†	0.878†	0.893†	1.00	-0.244*
BMI	0.59	-0.211*	-0.171	-0.245*	-0.244*	1.00

\* correlation is significant at the 0.05 level (2-tailed), †correlation is significant at 0.01 level (2-tailed). BMI - body mass index, HT - hypertension

that nursing advice should not be put aside as soon as they feel their blood pressure is controlled. It was recommended that further large-scale, case-control with a large sample from the community should be carried out to be able to generalize it to all hypertensive patients in Oman.

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