RESEARCH ARTICLE

Awareness and adherence to lifestyle modifications in hypertensive patients presenting to a tertiary care setting

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Abstract

Objective: To assess the level of awareness and adherence to lifestyle modifications in hypertensive patients.

Method: The descriptive study was conducted from January to June 2019 at the Pakistan Institute of Medical Sciences, Islamabad, Pakistan, and comprised adult patients of either gender with hypertension history of at least 1 year. Data was collected using a structured questionnaire to evaluate the subjects' awareness and adherence to lifestyle modifications for the control of hypertension. Data was analysed using SPSS 20.

Results: Of the 294 patients, 160(54.4%) were women. The overall mean age was 53.3±12.1 years and mean body mass index was 27.1±5.9kg/m^2, and mean duration of hypertension was 8.2±7.1 years. There were 122(41.5%) obese and 97(33%) overweight patients. Overall, 201(68.4%) patients had co-morbidities and 40(13.6%) were smokers. Of the total, 205(69.7%) knew the importance of exercise, but 104(35.4%) were doing it; 270(91.8%) were aware of restriction of sodium diet, but 244(83%) were adhering to it; 222(75.5%) knew the importance of dietary approaches to stop hypertension, but 185(62.9%) were adhering to it; and 247(84%) were aware that regular blood pressure measurement and follow-ups were important, but 150(51%) were adhering to it.

Conclusion: The level of awareness regarding lifestyle modifications was found to be high in hypertensive patients, but the status of adherence was not up to the mark.

Keywords: Awareness, Adherence, Diet, Exercise, Hypertension. (JPMA 72: 1061; 2022)

DOI: https://doi.org/10.47391/JPMA.2242

Introduction

Hypertension (HTN) is a global health issue affecting populations in both developed and developing worlds.[1] HTN is associated with lifelong chronicity and, if not controlled, it can result in stroke, neurological disorders and low quality of life (QOL).[1]

According to a recent meta-analysis, the overall HTN prevalence in Pakistan reportedly ranges from 3% to 77.5%.[2] It is a major modifiable risk factor of many serious medical illnesses, including coronary artery disease (CAD), chronic kidney disease (CKD), congestive cardiac failure(CCF), peripheral arterial disease (PAD) and cerebro-vascular diseases.[1]

In Pakistan, urban population has a higher HTN prevalence most probably due to higher consumption of added salt, saturated fats and oils, less consumption of fruits, vegetables and fibre, and a lifestyle that adds to a higher probability of developing HTN. At the beginning of the millennium, approximately one-quarter of the world's population was suffering from high blood pressure (BP) and it was projected that that by the year 2025, this figure might reach 29%.[3]

Several studies on a smaller scale assessed HTN prevalence in Pakistan,[4] but due to unawareness of patients and the ever-changing incidence of the disease, no exact figures could be quoted. Awareness and guidance among patients and relatives can reduce this number significantly and morbidity benefits can be achieved to a large extent.[1,5]

In 2013, a meta-analysis observed the effect of salt reduction on BP, lipid profile and hormonal profile, and concluded that salt reduction showed a modest effect on lowering BP and a small lipid-lowering effect. The study also suggested that low dietary salt intake would help in reducing pressures and prevent cerebro-vascular diseases.[6] A South Korean study reported that lifestyle modifications, such as physical activity and reduced intake of added salt, can control high BP.[7]

Also, consumption of vegetables, fruits and legumes is more helpful in controlling BP along with weight-loss and exercise.[6] A local study witnessed that around 60% people with HTN had awareness regarding the disease, and women were more likely to be aware than males.[8]

The current study was planned to evaluate the level of awareness and rates of adherence to lifestyle modification initiatives in patients with HTN in a tertiary care setting.

Subjects and Methods

The descriptive study was conducted from January to June 2019 at the Pakistan Institute of Medical Sciences

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(PIMS), Islamabad, Pakistan. After approval from the institutional ethics review committee, the sample size with confidence level 95%, anticipated proportion with awareness 67%[8] and relative precision 10%. The sample was raised using non-probability consecutive sampling technique from among inpatients and outpatients.

Those included were adult patients of either gender with JTN history of at least 1 year. Those who were critically ill in the intensive care unit (ICU), and women with pregnancy induced HTN were excluded.

After taking written informed consent from the subjects, data was collected using a structured questionnaire. The primary outcome measure was awareness of and adherence to lifestyle modifications for HTN control. Obesity was measured using WHO guidelines criteria for Asian populations.[9]

Data entry was done in MS Excel. Data was analysed using SPSS 20. Categorical variables were expressed as frequencies and percentages. Numerical variables were expressed as mean and standard deviation. Awareness and adherence components were stratified according to gender and age of the patients using chi-square test. P<0.05 was considered statistically significant.

Table-1: Demographic characteristics (n=294).

	No of cases	%age
Age (years)		
20-29.9	9	3.1%
30-39.9	28	9.5%
40-49.9	62	21.1%
50-59.9	98	33.3%
60 or above	97	33.0%
Mean ± SD	53.3 ± 12.1	
Gender		
Male	132	45.6%
Female	160	54.4%
BMI categories (kg/m²)		
Low BMI < 18.5%	10	3.5%
Normal 18.5-22.9	65	22.1%
Over weight 23-27.5	108	36.6%
Obese > 27.5	127	43.1%
Mean ± SD	27.1 ±5.9	
Comorbidities		
Yes	201	68.4%
No	93	31.6%
Duration of hypertension (years)		
Mean ± SD	8.2 ± 7.1	
Marital status		
Married	267	90.8%
Unmarried	22	7.5%
Widow	5	1.7%

SD: Standard deviation, BMI: Body mass index.

Table-2: Awareness and adherence regarding lifestyle modifications (n=294).

	No of cases	%age
Do you know exercise is important for Hypertensives?		
Yes	205	69.7%
No	89	30.3%
Do you do any sort of exercise?		
Yes	104	35.4%
No	190	64.6%
If yes, do you do exercise for more than 150 minutes a week		
Yes	71	24.1%
No	223	75.9%
If no, do you face any barriers while exercise		
Yes	185	62.9%
No	109	37.1%
Where do you do exercise?		
Outdoor	31	10.5%
Indoor	9	3.1%
Do you smoke?		
Yes	.40	13.6%
No	254	86.4%
If yes, how many packs per year do you smoke?		
1 packs a year	16	5.4%
< 5 packs a year	19	6.5%
> 5 packs a year	41	13.9%
Do you know sodium Diet restriction is important for hypertensives?		
Yes	270	91.8%
No	24	8.2%
Are you following diet sodium restriction?		
Yes	244	83.0%
No	50	17.0%
Do you DASH diet is important for hypertension?		
Yes	222	75.5%
No	72	24.5%
Are you following DASH diet?		
Yes	185	62.9%
No	109	37.1%
Do you know diet rich in mineral/proteins is important for hypertensive?		
Yes	168	57.1%
No	126	27.9%
Are you taking such diet?		
Yes	136	46.3%
No	158	53.7%
Do you consume alcohol?		
Yes	10	3.4%
No	284	96.6%
If yes, were you advised to quit alcohol?		
Yes	25	8.5%
No	269	91.5%
Do you know regular measurement of BP & F/U is important for hypertensive?		
Yes	247	84.0%
No	47	16.0%

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	No of cases	%age
Do you do frequent measurements & regular check-ups?		
Yes	150	51.0%
No	144	49.0%
Were you told that anti-hypertensive to be taken regularly?		
Yes	279	94.9%
No	15	5.1%
Do you take regular medications?		
Yes	240	81.6%
No	54	18.4%
Is there any stress in your life?		
Yes	133	45.2%
No	161	54.8%
Were you advised to decrease stress by any means?		
Yes	86	29.3%
No	208	70.7%
Do you know that obesity is related to hypertension?		
Yes	201	68.4%
No	93	31.6%
Are you following any weight loss programme?		
Yes	71	24.1%
No	223	75.9%
Do your friends & family support you to be compliant or not?		
Yes	261	88.8%
No	33	11.2%

Results

Of the 294 patients, 160(54.4%) were women. The overall mean age was 53.3±12.1 years and mean body mass index was 27.1±5.9kg/m^2, and mean duration of hypertension was 8.2±7.1 years. There were 127(43.1%) obese and 108(36.6%) overweight patients. Overall, 267(90.8%) subjects were married, 201(68.4%) had co-morbidities and 40(13.6%) were smokers.

Of the total, 205(69.7%) knew the importance of exercise, but 104(35.4%) were doing it; 270 (91.8%) were aware of restriction of sodium diet, but 244(83%) were adhering to it; 222 (75.5%) knew the importance of dietary approaches to stop hypertension (DASH) diet, but 185(62.9%) were adhering to it; and 247(84%) were aware that regular blood pressure measurement and follow-ups were important, but 150(51%) were adhering to it.

Likewise, 279 (94.9%) patients were told to regularly take anti-hypertensive medications, but 240 (81.6%) were taking them regularly; and 201(68.4%) knew that obesity was related to HTN, but 71(24.1%) were following any weight-loss programme. In majority of the cases 261 (88.8%), friends and family were supportive (Table-2).

Male patients were better aware of the importance of exercise and participation in sports and were associated with smoking

Table-3: Overall and stratified awareness and adherence of lifestyle modifications according to gender (n=294).

	Total (n=294)	Gender		p-value
		Male (n=134)	Female (n=160)	
Do you know exercise is important for Hypertensives?				
Yes	205 (69.7%)	103 (76.9%)	102 (63.8%)	0.01
No	89 (30.3%)	31 (23.1%)	58 (36.2%)	
Do you do any exercise?				
Yes	104 (35.4%)	58 (43.3%)	46 (28.8%)	0.009
No	190 (64.6%)	76 (56.7%)	114 (71.2%)	
If yes, do you do exercise for more than 150 minutes/week?				
Yes	71 (24.1%)	38 (28.4%)	33 (20.6%)	0.12
No	223 (75.9%)	96 (71.6%)	127 (79.4%)	
If not, do you face any barrier for exercise?				
Yes	185 (62.9%)	79 (51%)	106 (66.2%)	0.19
No	109 (37.1%)	55 (41%)	54 (33.8%)	
Do you participate in any sort of sports?				
Yes	40 (13.6%)	30 (22.4%)	10 (6.3%)	<0.001
No	254 (86.3%)	104 (73.6%)	150 (93.8%)	
If yes, outdoor or indoor? (n=40)				
Outdoor	31 (77.5%)	24 (80%)	7 (70.0%)	0.15
Indoor	9 (22.5%)	6 (20%)	3 (30.0%)	
Do you smoke?				
Yes	77 (26.1%)	71 (53%)	6 (3.8%)	<0.001
No	217 (73.9%)	63 (47%)	154 (96.3%)	
If yes, <1 pack year, <5 pack year or > 5 pack year? (n=76)				
Less the 1 pack year	16 (21.0%)	15 (21.1%)	1 (20.0%)	0.15

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	Total (n=294)	Gender		p-value
		Male (n=134)	Female (n=160)	
Less the 5-pack year	19 (25.0%)	16 (22.5%)	3 (60.0%)	
More the 5-pack year	41 (54.0%)	40 (56.4%)	1 (20.0%)	
Do you know sodium Diet restriction is important in hypertensives?				
Yes	270 (91.5%)	129 (96.3%)	141 (88.1%)	0.01
No	24 (8.5%)	5 (3.7%)	19 (11.9%)	
Are you following diet sodium restriction?				
Yes	244 (82.9%)	116 (86.0%)	128 (80.0%)	0.13
No	50 (17.1%)	18 (14.0%)	32 (20.0%)	
Do you DASH diet is important for hypertension?				
Yes	222 (75.5%)	102 (76.1%)	120 (75.0%)	0.82
No	72 (24.5%)	32 (23.9%)	40 (25.0%)	
Are you following DASH diet?				
Yes	185 (62.9%)	82 (61.2%)	103 (64.4%)	0.57
No	109 (37.1%)	52 (38.8%)	57 (35.6%)	
Do you know mineral/proteins diet is important for hypertensive?				
Yes	168 (57.1%)	82 (61.2%)	86 (53.8%)	0.19
No	126 (42.9%)	52 (38.8%)	74 (46.2%)	
Are you taking such diet?				
Yes	136 (46.2%)	61 (45.5%)	75 (46.9%)	0.82
No	158 (53.8%)	73 (55.5%)	85 (53.1%)	
Do you consume alcohol?				
Yes	10 (3.4%)	10 (7.5%)	0 (0.0%)	<0.001
No	284 (96.6%)	124(92.5%)	160 (100.0%)	
If yes, were you advised to quit alcohol?				
Yes	25 (8.5%)	19 (14.2%)	0 (0.0%)	0.02
No	269 (91.5%)	115 (85.8%)	160 (100.0%)	
Do you know regular measurement of BP & F/U is important for hypertensive?				
Yes	247 (44.1%)	115 (85.8%)	32 (85.2%)	0.43
No	47 (15.9%)	19 (14.2%)	28 (14.8%)	
Do you do frequent measurements & regular check-ups?				
Yes	150 (51.0%)	67 (50%)	83 (51.9%)	0.74
No	144 (49.0%)	67 (50%)	73 (28.1%)	
Were you told that anti-hypertensive to be taken regularly?				
Yes	279 (94.9%)	125 (93.3%)	154 (96.3%)	0.25
No	15 (5.1%)	9 (6.7%)	6 (3.7%)	
Do you take regular medications?				
Yes	240 (81.7%)	112 (83.6%)	128 (80.0%)	0.43
No	54 (18.3%)	22 (16.4%)	32 (20.0%)	
Is there any stress in your life?				
Yes	133 (45.2%)	52 (38.8%)	81 (50.6%)	0.04
No	161 (54.8%)	82 (61.2%)	79 (49.4%)	
Were you advised to decrease stress by any means?				
Yes	86 (29.2%)	32 (23.9%)	54 (33.8%)	0.06
No	208 (70.8%)	102 (76.1%)	106 (66.2%)	
Do you know that obesity is related to hypertension?				
Yes	201 (68.3%)	101 (75.4%)	100 (62.8%)	0.01
No	93 (31.7%)	33 (24.6%)	8 (34.2%)	
Are you following any weight loss programme?				
Yes	71 (24.1%)	44 (32.8%)	27 (16.9%)	0.001
No	223 (75.9%)	90 (67.2%)	133 (83.1%)	
Do your friends & family support you to be compliant or not?				
Yes	261 (88.8%)	125 (93.3%)	136 (85.0%)	0.02
No	33 (11.2%)	9 (6.7%)	24 (15.0%)	

Table-4: Stratification of awareness and adherence of lifestyle modifications according to age (n=294).

	Age			p-value
	Up to 40 years (n=37)	41 to 60 years (n=160)	61 or above (97)	
Do you know exercise is important for Hypertensives?				
Yes	26 (70.3%)	123 (76.9%)	56 (57.7%)	0.005
No	11 (29.7%)	37 (23.1%)	41 (42.3%)	
Do you do any exercise?				
Yes	20 (54.1%)	62 (38.8%)	22 (22.7%)	0.001
No	17 (45.9%)	98 (61.3%)	75 (77.3%)	
If yes, do you exercise more than 150 minutes/week?				
Yes	14 (37.8%)	42 (26.3%)	15 (15.5%)	0.01
No	23 (62.2%)	118 (73.7%)	82 (84.5%)	
If no, do you face any barriers or hurdles				
Yes	19 (51.4%)	101 (63.1%)	65 (67.0%)	0.24
No	18 (49.6%)	59 (36.9%)	32 (23.0%)	
Do you participate in any sort of sport?				
Yes	14 (37.8%)	20 (12.5%)	6 (6.2%)	<0.001
No	23 (62.2%)	140 (87.5%)	91 (93.8%)	
Where do you do exercise?				
Outdoor	12 (85.7%)	15 (75%)	4 (66.7%)	0.60
Indoor	2 (14.3%)	5 (25%)	2 (33.3%)	
Do you smoke?				
Yes	9 (24.3%)	42 (26.3%)	26 (26.8%)	0.95
No	28 (75.7%)	118 (73.8%)	71 (73.2%)	
If yes, how many packs per year do you smoke?				
1 packs a year	3 (33.3%)	9 (21.4%)	4 (16.0%)	0.71
< 5 packs a year	3 (33.3%)	10 (23.8%)	6 (24.0%)	
> 5 packs a year	3 (33.3%)	23 (54.8%)	15 (60.0%)	
Do you know sodium Diet restriction is important for hypertensives?				
Yes	33 (89.3%)	148 (92.5%)	89 (91.8%)	0.25
No	4 (10.8%)	12 (7.5%)	8 (8.2%)	
Are you following diet sodium restriction?				
Yes	33 (89.2%)	128 (80.0%)	83 (85.6%)	0.80
No	4 (10.8%)	32 (20.0%)	14 (14.4%)	
Do you DASH diet is important for hypertension?				
Yes	25 (67.6%)	126 (78.8%)	71 (73.2%)	0.29
No	12 (32.4%)	34 (21.3%)	26 (26.8%)	
Are you following DASH diet?				
Yes	21 (56.8%)	101 (63.1%)	63 (64.9%)	0.67
No	16 (43.2%)	59 (36.9%)	34 (35.1%)	
Do you know diet rich in mineral/proteins is important for hypertensive?				
Yes	23 (62.2%)	93 (58.1%)	52 (53.6%)	0.62
No	14 (37.8%)	67 (41.9%)	45 (46.4%)	
Are you taking such diet?				
Yes	19 (51.4%)	71 (44.4%)	47 (47.4%)	0.71
No	18 (48.6%)	89 (55.6%)	51 (52.6%)	
Do you consume alcohol?				
Yes	0 (0.0%)	5 (3.1%)	5 (0.2%)	0.32
No	37 (100.0%)	155 (96.9%)	92 (94.8%)	
If yes, were you advised to quit alcohol?				
Yes	2 (5.4%)	15 (9.4%)	8 (8.2%)	0.73
No	35 (94.6%)	145 (90.6%)	89 (91.8%)	
Do you know regular measurement of BP & F/U is important for hypertensive?				
Yes	33 (89.2%)	127 (79.4%)	87 (89.7%)	0.06
No	4 (10.8%)	33 (20.6%)	10 (10.3%)	

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	Age			p-value
	Up to 40 years (n=37)	41 to 60 years (n=160)	61 or above (97)	
Do you do frequent measurements & regular checkups?				
Yes	24 (64.9%)	79 (49.4%)	47 (48.5%)	0.19
No	13 (35.1%)	81 (50.6%)	50 (51.5%)	
Were you told to take anti-hypertensive regularly?				
Yes	36 (97.3%)	149 (93.1%)	94 (96.9%)	0.71
No	1 (2.7%)	11 (6.9%)	3 (3.1%)	
Do you take regular medications?				
Yes	34 (91.9%)	122 (76.3%)	84 (86.6%)	0.02
No	3 (8.1%)	38 (23.8%)	13 (13.4%)	
Is there any stress in your life?				
Yes	13 (35.1%)	74 (46.3%)	46 (47.4%)	0.41
No	24 (64.9%)	86 (53.8%)	51 (52.6%)	
Were you advised to decrease stress by any means?				
Yes	10 (27.0%)	44 (27.5%)	32 (33.0%)	0.61
No	27 (73.0%)	116 (72.5%)	65 (67.0%)	
Do you know that obesity is related to hypertension?				
Yes	25 (67.6%)	124 (77.5%)	52 (53.6%)	<0.001
No	12 (32.4%)	36 (22.5%)	45 (46.4%)	
Are you following any weight loss program?				
Yes	9 (24.3%)	43 (26.9%)	19 (19.6%)	0.41
No	28 (75.7%)	117 (73.1%)	78 (80.4%)	
Do your friends & family support you to be compliant?				
Yes	33 (89.2%)	144 (90.0%)	84 (86.4%)	0.70
No	4 (10.8%)	16 (10.0%)	13 (13.4%)	

and alcohol (p<0.05). Male subjects were more aware regarding sodium diet, but there was no difference in terms of adherence to sodium-restricted diet (p=0.13). Male subjects were significantly more aware regarding the association of obesity with HTN, followed a weight-loss programme, and were more likely to get support from family and friends for compliance (p<0.05). There was no significant difference between the genders regarding importance of DASH diet and its adherence, care-seeking, and intake of medications (p>0.05). Females were more stressed (p=0.04) (Table-3).

Patients aged <60 years were significantly more aware regarding the importance of exercise and were more likely to exercise (p<0.05). Patients aged up to 40 years were significantly participating in sports (p<0.001). Older patients were more frequently smoking than those aged <40 years (p=0.71). Those aged up to 40 years were more likely to get regular check-ups and were more likely to adhere to regular medications (Table-4).

Discussion

It is well established that dietary intake and other lifestyle factors have important implications in HTN.[10]

In the present study, more than two-third patients were aware regarding the role of exercise for hypertensives, but only around one-third were adhering to any sort of exercise. Alefan Q. et al. also concluded high HTN knowledge, but low compliance with lifestyle modification.[11] One local study concluded that knowledgeable patients were more likely to practise lifestyle modification strategies.[12] In a study, two-third respondents were doing physical exercises.[13] Similar adherence to healthy lifestyle was witnessed in Ethiopia.[14]

In the current study, the level of awareness was quite high, as >80% patients were following sodium-restricted diet, while close to two-third were following the DASH diet. Tibebu et al. reported that huge majority of their respondents were not adhering to lifestyle and dietary modifications, and very few were following salt-restricted diet.[15] In one study, almost all patients adhered to salt restriction.[12] The proportion of up to one-third cases not following DASH diet or any salt restriction in the present study is alarming and needs the attention of healthcare providers.

Around half of the study population was having BP measured frequently and having check-ups, but more than 80% were taking medications regularly. In comparison, 92% of patients in a study agreed that anti-hypertensive medication helped them in controlling BP.[11]

The majority in the current study were overweight and obese; two-thirds aware of the relationship between obesity and HTN, but only one-fourth were following any

weight-loss programme. The Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure recommended that lifestyle modifications and weight-loss strategies can result in better BP control.[11] Another study also witnessed high rate of overweight and obesity.[11] Many other studies have confirmed the relationship between obesity and HTN.[16,17]

In the current study, men were significantly better aware regarding lifestyle modifications and were adhering to it. Several studies have reported contrasting findings, as in many instances women being more adherent to lifestyle modification strategies.[18]

In terms of age, there was no difference observed in the level of awareness and adherence regarding lifestyle modifications. Tibebu et al. reported that patients aged <60 years were more likely to adhere to lifestyle modifications.[15] A study in Saudi Arabia also witnessed patients aged <65 years being more adherent to healthy diet than their older counterparts.[19] Compared to older-age patients, those aged <60 years were significantly more likely to adhere to healthy lifestyle in a study.[14] Many factors affect compliance towards lifestyle changes, including support from family and friends, impact of health education and patient-physician relationship.[20] In the present study, majority of respondents received support from family and friends. Lifestyle counselling by physicians about diet, weight-loss and physical activity can play an important role in promoting a healthy lifestyle.[21]

In view of the comparative analysis above, it is suggested that motivation strategies, counselling sessions, support from family and friends, and use of media platforms regarding the role of lifestyle modifications could be very useful in improving the rates of adherence.

Conclusion

Hypertensive patients were found to be aware about lifestyle modifications, but adherence level was low, especially among female patients.

Acknowledgement: We are grateful to all the study subjects as well as to the administrative and clinical teams of PIMS, Islamabad, and to Mr Saleem Abbasi for statistical assistance.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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