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A PHARMACIST BASED INTERVENTION TO IMPROVE THE CARE OF PATIENTS WITH HYPERTENSION AND DIABETES MELLITUS IN A PRIVATE INSTITUTION

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Knowledge, Attitude and Practice (KAP), Hypertension (HTN), Diabetes mellitus (DM) and Quality of Life (QOL)

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ABSTRACT: The study was intended to evaluate the effectiveness of patient counselling in improving the quality of life (QOL) and knowledge, attitude and practices (KAP) of hypertensive and diabetic patients in a private educational institution. The study was conducted for a period of six months with the help of validated KAP and QOL questionnaire. Impact of patient counselling was studied by comparing the KAP and QOL score obtained after each subsequent patient counselling sessions. Data analysis was done by SPSS 16.1. Among 83 patients enrolled in the study, 40 were males and 43 were females. Out of 83 patients, 32 (38.55%) were diagnosed as hypertensives and 51 (61.44%) were diabetics. It was found that most of the hypertensives and diabetics were in the age group of 51-60 years. It was further found that the scores of knowledge (2.72 ± 1.80 to 4.88 ± 0.97), attitude (3.41 ± 1.73 to 4.94 ± 0.98) and practice (3.56 ± 1.86 to 6.28 ± 1.78) of hypertensive patients increased from baseline to second follow-up which was statistically significant ($p<0.001$). Similar results were observed in diabetic patients with a gradual increase in scores of knowledge (9.1 ± 3.44 to 13.75 ± 2.62), attitude (1.18 ± 0.86 to 2.53 ± 0.96) and practice (0.92 ± 0.84 to 1.67 ± 0.887), from the baseline to second follow-up which were statistically significant ($p<0.001$). In diabetic and hypertensive patients, the scores of four domains of QOL from first follow-up to second follow-up were statistically significant with $p <0.001$. Study results highlights the need of educational interventions to improve KAP and QOL, thereby controlling disease progression, preventing complications of the diseases.

INTRODUCTION: Hypertension (HTN) and diabetes mellitus (DM) continue to be the most common cause of morbidity and mortality. The World health statistics 2012 reported that one in three adults worldwide, has raised BP - a condition that causes around half of all deaths from stroke and heart disease while one in 10 adults has diabetes [1].

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The rates for HTN was projected to 22.9 and 23.6 for Indian men and women respectively by 2025 [2]. Globally in 2013, WHO estimated that almost 382 million people suffer from DM [3]. According to International Diabetes Federation, India is one of the 6 countries of the International diabetic Federation South East Asian (IDF SEA region), 387 million people have DM in the world and 75 million people in the SEA Region; by 2035 this will rise to 123 million [4].

The incidence of type 2 DM has been increasing globally from 2.8 % in 2000 and is expected to be 4.4 % in 2030 [5]. India has the highest number of DM in the World [6]. Major causes of HTN and DM include food consumption behaviour, particularly

intake of sugar/salty food, lack of exercise, stress, smoking, alcohol drinking, intake of coffee and tea. In early period HTN is asymptomatic and the patients begin to seek medical treatment after their major organs have been damaged. Lack of patient's knowledge about the diseases, medications and life style modifications are thought to be the responsible factors for this [7]. Individuals with poor management of DM are at a greater risk of developing long term micro and macro vascular complications that led to damage of end organs such as kidney, heart, brain and eyes which affects direct and indirect health care costs and overall quality of life. Health related Quality of life and resource utilization worsening health status may lead to increased health resource utilization, which has a significant impact on the overall wellbeing of individual [8]. The study is intended to create self-awareness about the diseases and to improve their QOL and provide knowledge to control the disease progression.

MATERIALS AND METHODS: A prospective observational study was carried out in a private educational institution, Kumarapalayam, for a period of 6 months from April to September 2016. Ethical clearance was obtained from the Institutional Ethical Committee (IEC). A separate data entry form was designed to collect patient demographics, present/past medical and medication history, family history, BP, RBS, social history and physical activity. A validated KAP and QOL questionnaire was used to assess knowledge, attitude and practice and QOL among hypertensive and diabetic patients. Prior to data collection informed consent was obtained from voluntary subjects. The study design was divided into three sections - baseline, first follow up and second follow up visit, with a gap duration difference of one month between each visit. The baseline scores of KAP questionnaire were noted.

After the collection of baseline data, patient counselling was given by issuing Patient Information Leaflet (PIL) at each subsequent section. The BP, RBS value, KAP and QOL scores were obtained after each post-counselling session after first and second visit. The impact of patient counselling was assessed based on KAP and QOL scores along with values of BP and RBS. The gathered data were characterized into different groups and statistically analyzed by paired t-test using statistical software package for social sciences (SPSS) version 16.1 with level of significance ($^{*}p < 0.001$).

Inclusion Criteria:

1. Both gender

2. Patients of age above 20 years and below 70 years.

3. People with diagnosed and undiagnosed HTN and DM

4. Patient who gave consent form

Exclusion Criteria:

1. Pregnant and lactating women

2. Patient below 20 years and above 70 years

RESULTS AND DISCUSSION: The study was used to assess the impact of patient counselling in improving the KAP and QOL of hypertensive and diabetic patients in a private educational institution. A total of 240 people were screened. Out of which, only 83 patients met the eligibility criteria. Among 83 study subjects, 32 were diagnosed as hypertensives and 51 as diabetics.

TABLE 1: SOCIO-DEMOGRAPHICS OF PATIENTS

Demographic		HTN		DM	
		Number of patients (N=32)	Percentage (%)	Number of patients (N=51)	Percentage (%)
Gender	Male	21	65.63	19	37.25
	Female	11	37.37	32	62.74
Age distribution (yrs.)	20-30	7	21.87	3	5.88
	31-40	5	15.62	8	15.69
	41-50	4	12.5	14	27.45
	51-60	10	31.2	24	47.06
	61-70	6	18.75	2	3.92
Education	Illiterate	0	0	2	3.92
	Primary	3	9.37	3	5.88
	Secondary	11	34.37	7	13.73

	Graduates	4	12.5	10	19.61
	Post graduates	14	43.75	29	56.86
Alcoholic history	Alcoholic	9	42.86	6	31.58
	Non alcoholic	10	47.61	2	10.53
	Past alcoholic	2	9.52	11	57.89
Smoking history	Current smoker	4	19.04	6	31.58
	Past smoker	1	4.76	2	10.53
	Non smoker	16	76.19	11	57.89
Physical activity	<3 days/week	3	9.37	4	7.84
	>3days/week	7	21.87	11	21.57
	Lack of exercise	22	68.75	36	70.59
Body Mass Index (BMI) classification (kg/m^2)	Under weight (<18.5 kg/m^2)	1	3.12	5	9.80
	Normal weight (18.6-24.9-kg/m^2)	16	50	21	41.17
	Over weight (25-29.9 kg/m^2)	14	43.75	16	31.37
	Obese (30 kg/m^2)	1	3.12	9	17.64

TABLE 2: COMPARISON OF KAP SCORES IN BASELINE AND 1ST FOLLOW UP AMONG HYPERTENSIVE PATIENTS

HTN	Baseline (Mean ± SD)	1st follow up (Mean ± SD)	T-value	P-value	Level of significance
Knowledge	2.72 ± 1.80	3.44 ± 1.43	-5.26	<0.001	Significant
Attitude	3.41 ± 1.73	3.5 ± 1.68	-1.79	0.083	Non-significant
Practice	3.56 ± 1.86	3.72 ± 1.92	-1.71	0.096	Non-significant

(SD: Standard Deviation, p value >0.05, Non-significant; p value <0.05, Significant; p value <0.001, Highly significant)

TABLE 3: COMPARISON OF KAP SCORES IN 1ST FOLLOW-UP AND 2ND FOLLOW-UP AMONG HYPERTENSIVE PATIENTS

HTN	1st follow-up (Mean ± SD)	2nd follow-up (Mean ± SD)	T-value	P-value	Level of significance
Knowledge	3.44 ± 1.43	4.88 ±0.97	-9.68	<0.001	Significant
Attitude	3.5 ± 1.68	4.94 ± 0.98	-8.28	<0.001	Significant
Practice	3.72 ± 1.9	6.28 ± 1.78	-7.43	<0.001	Significant

(p-value >0.05, Non-significant; p value <0.05, Significant; p value <0.001, Highly significant)

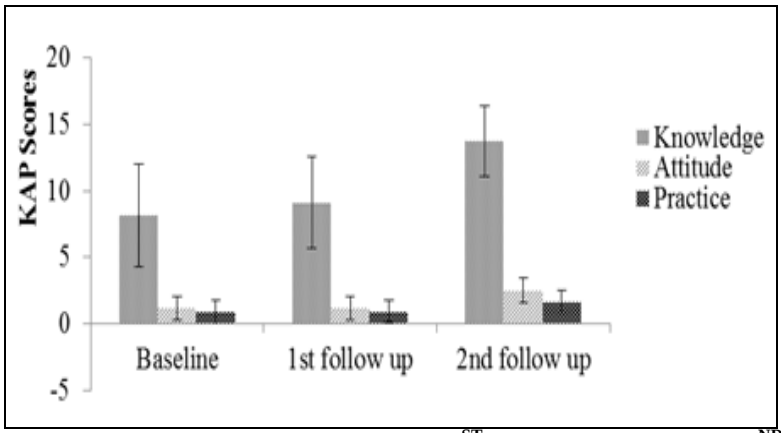

FIG. 1: COMPARISON OF KAP SCORES IN BASELINE, 1ST FOLLOW-UP AND 2ND FOLLOW-UP AMONG DIABETES PATIENTS

TABLE 4: COMPARISON OF QOL SCORES IN 1ST FOLLOW-UP AND 2ND FOLLOW-UP AMONG HYPERTENSIVE PATIENTS

HTN	1st follow-up (Mean ± SD)	2nd follow-up (Mean ± SD)	T-value	P-value	Level of significance
Domain 1	43.66±7.36	56.09±8.27	-9.15	<0.001	Significant
Domain 2	37.28±12.79	47.84±10.14	-7.36	<0.001	Significant
Domain 3	19.12±11.95	42.53±17.41	-7.53	<0.001	Significant
Domain 4	31.84±9.42	46.59±9.19	-13.46	<0.001	Significant

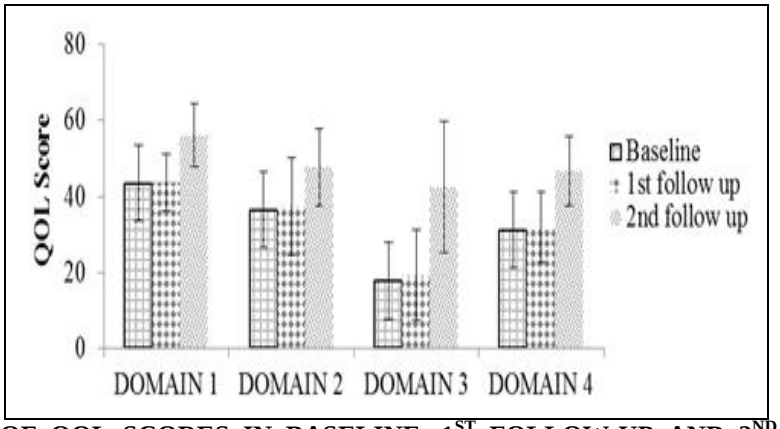

FIG. 2: COMPARISON OF QOL SCORES IN BASELINE, 1ST FOLLOW-UP AND 2ND FOLLOW-UP AMONG HYPERTENSIVE PATIENTS

DISCUSSION: Table 1 represents the socio-demographics of patients. It was observed that the proportion of HTN was higher among males 21 (65.63%) than females 11 (37.37%), and it may be due to social habits like smoking, alcohol consumption, stress and tobacco chewing [9]. Our study further shows that postmenopausal women were more prone to HTN due to loss of estrogen production as it has vasodilatory effect [10].

In case of DM, females 32 (62.74%) were found to be more affected than male 19 (37.25%). This result was supported by Wallace *et al*., the association between sex hormone binding globulin and insulin resistance is stronger in women than in men, and stronger in postmenopausal than in premenopausal women. However, it is not clear whether sex hormone binding globulin leads to insulin resistance or whether the reversal is the case [11].

Most of the hypertensives and diabetics were belong to the age group of 51 - 60 years. The prevalence of HTN increases with age, it might be due to physiological changes of blood vessel flexibility [12 - 16]. Moreover, the study reveals that people who are prone to develop complications of DM at an early age (20 - 40 years) compared with Caucasians (>50 years) indicate that DM must be carefully screened and monitored regardless of patient age within India [17]. Since our study was conducted in a private educational institution, we found that the proportion of HTN and DM were higher among educated people. The respondents reported that lack of time for doing exercise; other sedentary life styles and family history may be the responsible factors for disease. International studies on DM in developing and developed countries were found an inverse associations among diabetes, educational level and socioeconomic status; perhaps the better educated were more health conscious [18].

Majority of the hypertensive patients were non-alcoholics (47.61%) followed by alcoholics (42.86%) and past-alcoholics (9.52%). Fardella *et al*., explained that stimulation of renin angiotensin aldosterone system (RAAS) by alcohol, changes the sodium - calcium level in the body and inhibition of nitric oxide production may leads to BP [19]. Other study reported that people who were taking >2 drinks per week were at high risk of HTN. In our study, majority of diabetic patients had no alcoholic history 10 (52.63%) followed by current alcoholics 8 (42.11%) and past-alcoholics (5.26%). Alcohol exerts a toxic diabetogenic effects on pancreas and it indirectly increases the adiposity [20 - 22].

Among hypertensive and diabetic patients, non-smokers were more prevalent than current smokers followed by past smokers. As most of the patients had family history of HTN/ DM, intake of foods rich in saturated carbohydrates and fats may be the reasons for development of disease apart from smoking. Similar findings show that smoking was not an identifiable risk factor for HTN and DM [23]. Smoking reduces insulin-mediated glucose uptake by 10% to 40% in smokers than non smokers [24].

The exact mechanism behind diabetes and smoking is not clear but other study show that smoking increases the risk oxidative stress associated inflammation which directly damage β-cell

function and impairs endothelial function [25 - 28]. Lack of exercise among hypertensive and diabetic patients may be due to poor knowledge about its benefit. Keith *et al*., found that regular exercise reduces the risk of HTN [29]. In general, intense physical activities were reported by younger age groups and more often by men than women. Similar finding was reported by Kufe *et al*., [30].

According to body mass index (BMI) classification, majority of hypertensives had normal body weight (50%) followed by over weight (43.75%). HTN was equally distributed among obese and under-weight patients (3.12%). Most of the diabetic patients had normal body weight (50%) followed by over-weight (43.75%) and obese (3.12%). India has a higher prevalence of DM compared to western countries suggesting that DM may occur at a much lower BMI in Indians compared with Europeans. Therefore, relatively lean Indian adults with a lower BMI may be at equal risk as those who are obese [18]. Among the hypertensive and diabetic patients, mean reduction in BP (SBP 144.66 to 120.94, DBP 92.59 to 82.59), and RBS level (182.73 to 162.94) was observed from baseline to final follow-up.

Table 2 compares the knowledge of hypertensive patients at baseline and first follow-up where the scores range from 8.14 ± 3.878 to 9.1 ± 3.442, which was significant. But there was no significant improvement in both attitude and practice at baseline and first follow up in patients with HTN.

Table 3 shows that knowledge of hypertensive patients increased from first follow-up to second follow-up, which was statistically significant. Scores for attitude in first and second follow-up range from 3.5 ± 1.68 to 4.94 ± 0.98, which was clinically significant ($p<0.001$). In case of practice, the scores from first follow-up to second follow-up ranged from 3.72 ± 1.92 to 6.28 ± 1.78, which was statistically significant ($p<0.001$).

Scores for knowledge increased from baseline (8.14 ± 3.87) to first follow-up (9.1 ± 3.44) for diabetic patient, which was statistically significant (**Fig. 1**). When comparing the scores of attitude and practice in baseline and first follow-up, which was statistically insignificant. After second follow-up, it was clearly evident that patient counselling was effective among patients with gradual increase in scores of knowledge (9.1 ± 3.44 to 13 ± 6.2), attitude (1.18 ± 0.86 to 2.53 ± 0.96) and practice (0.92±0.84 to 1.67 ± 0.887), which was statistically significant ($p<0.001$). At baseline, only a few patients were aware of the cause, signs/symptoms, complications, prevention and management of diabetes and hypertension. At the end of second follow-up, the KAP scores were increased due to continuous patient counselling. Similar findings were also reported by from Juna *et al*., [31], Fatema *et al*., [32] and Renuga *et al*., [33], in their studies between control and interventional groups.

From **Table 4**, scores of domain 1 increases from first follow-up to second follow-up reveals that physical health of hypertensive patients increases from 43.66 ± 7.36 to 56.09 ± 8.27 which was statistically significant with $p <0.001$. Domain 2 denotes quality of psychological health was increased after the patient counselling from 37.28 ± 12.79 to 47.84 ± 10.14 *i.e*. significant. Scores for domain 3 ranges from 19.12 ± 11.95 to 42.53 ± 17.41 indicates that social relationship of hypertensive patients increased after patient counselling. Scores of domain 4 ranges from 31.84 ± 9.42 to 46.59 ± 1.19 in environmental health, which was clinically significant ($p<0.001$). According to WHO, QOL is an important health outcome in its own right, representing the ultimate goal of all health interventions.

Fig. 2 compares the first and second follow-up, all domain scores of QOL among diabetic patients were statistically significant with scores ranges from domain 1 (39.49 ± 7.68 to 46.45 ± 8.10), domain 2 (24.1 ± 10.10 to 31.14 ± 8.27), domain 3 (10.04 ± 8.46 to 24.84 ± 16.43) and domain 4 (26.1 ± 11.69 to 39.02 ± 8.13).

CONCLUSION: HTN and DM become a huge challenge in many developing countries, including India. Undergoing epidemiological transition, it is essential to gather both epidemiological and KAP data on these diseases in the design of sound prevention and control programs. It is particularly important to maximize the efficiency of such programs to minimize delay in achieving effective disease control. Since prevalence of prehyper-tension and pre-diabetes were higher among the study populations.

There is a need for screening of individuals at the early age group. Patients should be assessed during every subsequent visit for controlling disease progression and preventing the complications by adopting non-pharmacological therapy along with medication adherence. Therefore, healthcare professionals have an indispensable role in providing adequate knowledge about the diseases, increasing the QOL and the life expectancy of patients to achieve a better clinical outcome.

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