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Original Article

An Impact of Patient Counselling in Terms of Quality of Life, Knowledge, Attitude and Practice in Subjects with Type 2 Diabetes Mellitus and Hypertension: A Cross-Sectional Study

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ABSTRACT

Background: Diabetes mellitus and hypertension is a significant public health problem globally and is associated with a range of both short- and long-term consequences. The global diabetes prevalence in 2019 is estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045. To evaluate the impact of counselling in terms of quality of life, knowledge, attitude and practice in subjects with type 2 diabetes and hypertension. **Materials and Methods:** It is a prospective observational cross-sectional study. The patients were randomized into case and control groups. Patient demographics were also noted. The patients in case group were counselled and given information on disease management at baseline, whereas the control group was provided counselling at the end of the study. They were also interviewed based on the questionnaires (KAP and QoL). The scores were evaluated and statistically analysed. **Results:** In total of 116 participants, 47(40.52%) were female and 69 (59.48%) were male. The maximum number of participants were from 51-60 age group (37.07%). The KAP scores of the case group were improved from (Mean±SD) 2.485±0.088, 2.436±0.089 to 3.352±0.048 and 3.298±0.030 respectively, whereas no significant changes in the KAP scores of control group. The QoL of the patients were assessed using Short Form-12 (SF-12). The PCS and MCS were also assessed. The PCS of the case group were improved and no changes in the control group. There were no significant changes in MCS score of both the case and control groups. **Conclusion:** Our study confirms that improvement in knowledge by counselling about the disease and its management helped to improve the quality of life in the patients with type 2 diabetes mellitus and hypertension.

Keywords: Hypertension, Knowledge, Attitude and Practice, Medication Adherence, Patient Counselling, Quality of Life, Type 2 Diabetes Mellitus.

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INTRODUCTION

Diabetes Mellitus (DM) is a group of common metabolic disorders identified by hyperglycaemia and irregularity in carbohydrate, fat, and protein metabolism. Several distinct types of DM are caused by a complex interaction of genetics and environmental factors. It may result in chronic microvascular, macrovascular and neuropathic complexity. There are two types of diabetes mellitus, among which type 1 DM (5%-10% of cases) results from autoimmune destruction of pancreatic beta cells, leading to an absolute deficiency of insulin and type 2 DM (90% of cases) occurs due to multiple defects such as impaired insulin secretion, reduced incretin effect, insulin resistance, excess glucagon secretions, Sodium-Glucose Cotransporter-2 (SGLT-2) upregulation in the kidney. The metabolic dysregulation associated with DM causes secondary pathophysiologic changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the health care system. People who are adult or older are most probable to get this kind of diabetes. It used to be called adult-onset diabetes. But type 2 diabetes also influences kids and teens, mainly because of childhood obesity (Teh *et al.*, 2011). Hypertension is described as persistently raised arterial Blood Pressure (BP). The isolated systolic hypertension is Diastolic Blood Pressure (DBP) values less than 90 mm Hg and Systolic Blood Pressure (SBP) values of 140 mm Hg or more. Hypertension

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may result from an unknown etiology (primary or essential hypertension) or from a specific cause (secondary hypertension). Hypertension is one of the leading causes of the global burden of disease. It increases the risk of cardiovascular disease (Kojda and Harrison, 1999). Knowledge, Attitude and Practice (KAP) surveys are characteristic of a specific population to collect information on what is known, believed and done in connection to a particular topic and are the most often used study tool in health-seeking deportment research. Every knowledge, attitude and practice study is one of a kind to a specific setting and intended for a particular issue. The knowledge attitude and practises for a specific issue are the focus of KAP research. Diabetes mellitus is a group of metabolic diseases characterised by excessive glucose levels, which are caused by an excess of insulin output, activity, or both. A hormone produced by the pancreas named, insulin, regulates blood glucose levels. Insulin is a hormone that lowers blood glucose levels (Puvvada and Muthukumar, 2018). The global diabetes prevalence in 2019 is estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045. The prevalence is higher in urban (10.8%) than rural (7.2%) areas and in high-income (10.4%) than low-income countries (4.0%). One in two (50.1%) people living with diabetes do not know that they have diabetes. The global prevalence of impaired glucose tolerance is estimated to be 7.5% (374 million) in 2019 and projected to reach 8.0% (454 million) by 2030 and 8.6% (548 million) by 2045 (Guo *et al*., 2019). Estimates suggest that 31.1% of adults (1.39 billion) worldwide had hypertension in 2010. The prevalence of hypertension among adults was higher in LMICs (31.5%, 1.04 billion people) than in high-income countries (28.5%, 349 million people) (Mayfield, 1998). According to many research articles, the lack of knowledge of the patients about their disease, were improved by the counselling provided by the pharmacists. The study was conducted to assess the effect of counselling on patients with diabetes mellitus type-2 and hypertension for management their condition. The study was conducted to assess the knowledge, attitude and practice of the patients and also to assess their quality of life before and after the counselling. Nowadays, there is an increase in the cases of diabetes mellitus and hypertension. Due to the lack of knowledge about the disease and its management, the patients are not able to achieve a better health. These diseases also lead to many other complications if they are not properly treated. A better health can be achieved by knowing the disease and how to take care of their health by themselves. According to many research articles, the lack of knowledge of the patients about their disease was improved by the counselling provided by the pharmacists. Our study was conducted to assess the effect of counselling on patients with diabetes mellitus type-2 and hypertension for management of their condition, in the Department of General Medicine and community in Madhya Pradesh and Gujarat. The study was also conducted to assess the knowledge, attitude and practice of the patients and also to assess their quality of life before and after the counselling.

MATERIALS AND METHODS

This cross-sectional study was conducted in between January 2020 to June 2021 a multispecialty tertiary care private teaching hospital. Prior to initiation of the study, an Institutional Ethics Committee (Sumandeep Vidyapeeth Institutional Ethics Committee, SVIEC/ON/Phar/BNPG20/21011) approval was obtained.

Study design

This was a questionnaire-based cross-sectional study conducted in a multispecialty private hospital. The main participants in the study were all who are suffering diabetes mellitus and hypertension more than 2 years in the multispecialty private teaching hospital during the study period and are selected based on diagnosis (January 2020 to June 2021) The questionnaire includes for this study has 25 questions (Pre and Post Counselling) related to the knowledge, attitude, and practice of subject who have participated in the study. Pregnant women and lactation mothers were excluded from this study. Also, unconscious and severely disabled patients who could not be interviewed and patients having difficulty in communication were excluded. Every patient was explained all the details about the study using the Patient Information Sheet (PIS) before taking the consent using the Informed Consent Form (ICF).

Development, Validation, and Distribution of Survey Questionnaire

A questionnaire-based cross-sectional survey has included 25 questions (Pre and Post Counselling) in the English language related to knowledge, attitude, and practice and was formulated using reference material from a similar type of study. The survey covered the domains of subject demographics, knowledge, attitude, and practice. The developed draft questionnaire was validated by face and content validation method by the three selected physicians and three selected faculty members to assess its readability and validity before pretesting among five randomly selected medical doctors for clarity, significance, and acceptability. Modifications and refinements were made as per the comments received to enable better understanding and to organize the sequence of questions. On the day of the data collection, structured and prevalidated questionnaires were distributed to the subject who gave consent for participating in the study.

Content of the survey questionnaire

The survey comprised a total of 25 closed-ended questions which takes about 30 min to complete. The survey was divided into three parts including knowledge-, attitude-, and practice-related question.

Data collection

All the subjects were well informed about the study. On the day of the data collection, structured and prevalidated questionnaires were distributed to the subject who gave consent for participating in the study. As per the doctors' feedback after validating questionnaire, necessary amendments were made to the questions before the main study. The responses of all participated were included in the analysis. The information was collected by the Principal Investigator (PI) from the patient's medical record file and if needed in a face-to-face interview with the parents of the subjects.

Statistical analysis

Descriptive statistics was used to analyze the demographics of the participants and respective answers on different categories of the questionnaires. *p* value was calculated and $p \leq 0.05$ was considered as significant.

RESULTS

This study includes 116 subjects with the aim to assess significance of counselling of the patients of diabetes mellitus-II and hypertension. There were 2 groups with randomized selection, test and control groups. The significance of counselling was evaluated on the basis of quality of life, knowledge, attitude and practice questionnaire. The outcome result reflects the effect of patient counselling in test groups in positive manner where else control group shows negligible improvement without counselling. Therefore, aim was achieved. Total 116 patients were enrolled in the study among which 58 (50%) were randomized into the case (test) group and the other 58 (50%) patients were enrolled in the control group. Among the 116 patients enrolled in the study, 69 (59.48%) were males and 47 (40.52%) were females. Of these, 10 patients (8.62%) were aged 20-40 years; 25 (21.55%) were 41-50 years; 43 (37.07%) were 51-60 years; 26 (22.42%) were 61-70 years; and 12 (10.34%) were above 70 years.

Among the 116 patients enrolled, 15.52% of the patients were graduated; 6.03% were primary school pass; 25.86% were middle school pass; 22.41% studied up to high school; 11.21% studied up to higher secondary and 18.97% of the patients were illiterate.

The Case group had a good knowledge score (3.325±0.84) at the end of the study; the control group had no much changes in their knowledge score (2.243±0.182) at the final interview (Table 1). The case group had a positive attitude and practice outcomes at the end of the study; but the control group had a negative outcome at the end of the study (Table 2). The patient counselling helped to improve the quality of life with respect to physical component summary of patients in the case (intervention) group. The patient counselling helped to improve the quality of life with respect to mental component summary of patients in the case (intervention) group.

The patient counselling helped to improve the FBS values in the case group. The patient counselling helped to improve the PP2BS values in the case group. The patient counselling helped to improve the systolic BP values in the case group The patient counselling helped to improve the diastolic BP values in the case group (Table 3).

Knowledge *p*-value: 0.0001 for case and 0.001 for control. It is concluded that a clinical pharmacist can play a major role in improving patient's knowledge and adherence by patient education. Odds ratio: 0.6912. The individuals receiving counselling are 0.69 times likely to be benefitted than those who did not receive (Table 4).

Attitude and Practice *p*-value: 0.00001 for case and 0.0192 for control. Statistically significant parameter. It is accepted that developing maintenance of diet and exercise improved the patient's practice activities. Odds ratio: 0.6919. The individuals receiving counselling are 0.69 times likely to be benefitted than those who did not receive with the attitude and practice parameter (Table 5).

Physical component summary *p*-value: 0.8688 for case and 0.7702 for control. Statistically Insignificant. Irrespective of their activities to keep up with a healthy lifestyle. The physical component in the study did not help the patients. Odds ratio: 0.9293. Counselling showed positive outcomes with physical aspects compared to the control groups and is 0.9 times affective than the control group with no counselling. Mental component summary *p*-Value: 0.3897 for case and 0.0959 for control. Insignificant. Odds ratio: 0.6588. The individuals receiving counselling are 0.69 times likely to be benefitted than those who did not receive (Table 6).

Systolic *p*-Value: 0.0837 for case and 0.2730 for control. Insignificant. Odds ratio: 1.0055. The population of case group have showed positive outcomes when subjected to counselling on systolic BP. Diastolic *p*-Value: 0.0371 for case and 0.8892 for control. *p*-value is significant only for case population. Odds ratio: 1.0399. The case group subjects compared to control group have showed positive outcomes when subjected to counselling on diastolic BP (Table 7).

FBS p-Value: 0.0001 for case and 0.0001 for control. The blood glucose levels were decreased in the case group, and the quality-of-life score was also improved. Odds ratio:1.1397. The case group responded positive on exposure to counselling (Table 8).

PP2BS *p*-Value: 0.00001 for case and 0.0003 for control. The blood glucose level and levels of total cholesterol, triglycerides and LDL were decreased in the subjects in the test groups but not in the control group subjects. Thus, it suggests that the patient counselling has an impact on controlling the blood glucose levels and the cholesterol levels in the body of a patient. Odds

ratio:1.1001. The case group responded positive on exposure to counselling.

In this study, A total of 116 participants were included and containing case group and control group with 58 (50%) participants each in randomized manner, Among the participants 69 (59.48%) were male and 47 (40.52%) were female respectively. Most of the patients were from 51-60 age group followed by 61-70 and 41-50 age group for most of the participants, The education qualifications among 116 participants were as follows 15.52% of the participants were graduated; 6.03% were primary school pass; 25.86% were middle school pass; 22.41% studied up to high school; 11.21% studied up to higher secondary and 18.97% of the participants were illiterate. Knowledge score of participants in case group has a significant improvement compared to control group and similar positive outcome was noted in attitude and practice score of case group, but control group shows negative outcome for attitude and practice score, The Physical Component Summary (PCS) and Mental Component Summary (MCS) has been improved after patient counselling in case group. The *p* vale concluded that a clinical pharmacist can play a major role in improving patient's knowledge, attitude and practice of patient regarding its treatment and disease prevention, whereas *p* value of physical component, mental component and systolic in the study were insufficient, but *p* value of diastolic, FBS and PP2BS were impacted by patient counselling and shows improved quality of life in case group participants.

DISCUSSION

In this study, a total 116 participants were included in our study, out of 116 participants, 58 (50%) were in case study and another 58 (50%) were in control study respectively, participant of case study were getting patient counselling which show significant improvement in their treatment and knowledge about their disease (diabetes mellitus type 2 with hypertension). In total of 116 participants in this study, 47 (40.52%) were female and 69 (59.48%) were female. The maximum number of participants were from 51-60 age group (37.07%), which is follow by age groups 60-70 and 41-50 with percentage of 22.42% and 21.55% respectively, this indicates the factors like gender and age helpful

Table 1: Effect of Patient Counselling on Knowledge Outcomes.

	Pre Counselling	Post Counselling	
Group	Mean	Mean	Difference
Case	2.485	3.325	0.84
Control	2.425	2.243	0.182

Table 2: Effect of Patient Counselling on Attitude and Practice Outcomes.

	Pre Counselling	Post Counselling	
Group	Mean	Mean	Difference
Case	2.436	3.298	0.862
Control	2.371	2.221	0.15

Table 3: Effect of Patient Counselling on Physical Component Summary.

	Pre Counselling	Post Counselling	
Group	Mean	Mean	Difference
Case	2.068	2.134	0.066
Control	2.074	1.989	0.085

Table 4: Effect of Patient Counselling on Mental Component Summary.

	Pre Counselling	Post Counselling	
Group	Mean	Mean	Difference
Case	2.253	2.649	0.39
Control	2.3764	1.841	0.53

Table 5: Effect of Patient Counselling on FBS.

	Pre Counselling	Post Counselling	
Group	Mean	Mean	Difference
Case	145.03	100.32	44.71
Control	155.29	122.43	32.86

Table: 6 Effect of Patient Counselling on PP2BS.

	Pre Counselling	Post Counselling	
Group	**Mean**	**Mean**	**Difference**
Case	192	140.44	51.56
Control	177.12	142.53	34.59

Table 7: Effect of Patient Counselling on Systolic BP.

	Pre Counselling	Post Counselling	
Group	**Mean**	**Mean**	**Difference**
Case	143.7	140.05	3.65
Control	143.89	141.01	2.88

Table 8: Effect of Patient Counselling on Diastolic BP.

	Pre Counselling	Post Counselling	
Group	**Mean**	**Mean**	**Difference**
Case	93	89.68	3.32
Control	87.87	88.12	0.25

for further study. A study was conducted by Puvvada *et al.* (2018) to assess the effects on patients with hypertension and diabetes mellitus-II with patient counselling about their knowledge, attitude, practice and quality of life. They concluded that there was a positive impact on treatment adherence and Quality of Life (QOL) when the knowledge of the disease and its management improved. It was observed that counselling had no effect on mental component summary of the patient's quality of life. This study includes a Knowledge Attitude and Practice questionnaire (KAP), a Quality of Life questionnaire (QOL) with a section of pre follow up and post follow up survey and a feedback form to conclude the process form participant's reference (Kojda and Harrison, 1999; Puvvada and Muthukumar, 2018). A Knowledge Attitude and Practice questionnaire (KAP) contains a total of 25 questions, in comparison between participants of case and control group, case group has improved their knowledge about causes and symptoms with lifestyle modifications required for management of hypertension and diabetes, improved their practice of checking their blood pressure and blood sugar levels. A study was conducted by Thomas *et al.* (2017) to assess knowledge, attitude and practice of hypertensive patients with patient counselling in tertiary care hospital. They concluded that the study proves that the counselling provided by the pharmacist plays an important role in improving knowledge attitude and practice of patient towards disease management (Thomas *et al.*, 2017). Difference in knowledge of participant between pre follow and post follow survey are (Mean ± SD) 2.485±0.088 to 3.352±0.048 of case and 2.425±0.089 to 2.243±0.094 of control respectively, difference in attitude and practice of participant between pre follow up and post follow up survey are (Mean ± SD) 2.436±0.089 to 3.298±0.030 of case and 2.371±0.104 to 2.221±0.103 of control respectively. A study was conducted by R Malathi *et al.* (2011) to assess the impact on knowledge, attitude and practice, of diabetes counselling programme on patients in Erode district of south India. The conclusion of this study showed that pharmacist counselling helped in the improvement in managing diabetes (Malathy *et al.*, 2011).

Subhish Palaian *et al.* (2006) conducted a study to assess the impact of counselling in hospitalized diabetic patients in terms of KAP outcomes. They concluded that patient counselling by the pharmacist helped to improve the knowledge scores but appropriate attitudes or practices were still not established (Palaian *et al.*, 2006). The quality of life in Diabetic patients with hypertension was assessed using Short Form-12 (SF-12) where the Physical Component Summary (PCS) and Mental Component Summary (MCS) were assessed separately, contains a total of 6 questions each, in comparison between participants of case and control group, case group has improved their both Physical Component Summary (PCS) and Mental Component Summary (MCS). There was a significant difference in the Mean ± SD PCS scores pre follow up and post follow up for case group whereas, for control group it was not significant. No significant difference was observed between the MCS scores as Mean ± SD of pre follow up and post follow up in case and control groups. A study was conducted by Naveen *et al.* (2014) to assess the impact of patient counselling by clinical pharmacist on health-related quality of life in Hypertensive patients. They concluded that the study concludes that hypertension affects the quality of life of patients and the education plays a major role in improving healthcare outcomes (Naveen *et al.*, 2014). A study was conducted by R Adepu *et al.* (2007) to assess the impact on quality of life in type 2 diabetes mellitus patients, of patient counselling in selected South Indian community pharmacies. The conclusion of this study was found out that there is a major impact of pharmacist provided patient counselling which helped to improve the knowledge

about disease and diet and life style changes influenced glycemic control and overall quality of life in diabetic patients positively. Pharmacist provided patient counselling might be considered as an important element in implementing the disease management program (Adepu *et al*., 2007). Difference in Physical Component Summary (PCS) of participant between pre follow and post follow survey are (Mean ± SD) 1.903±0.199 to 1.989±0.317 of case and 1.909±0.555 to 1.934±0.317 of control respectively, difference in Physical Component Summary (PCS) of participant between pre follow and post follow survey are (Mean ± SD) 1.903±0.199 to 1.989±0.317 of case and 1.909±0.555 to 1.934±0.317of control respectively, difference Mental Component Summary (MCS) of participant between pre follow and post follow survey are (Mean ± SD) 1.827±0.223 to 2.244±0.161 of case and 2.186±0.567 to 2.520±0.828 of control respectively. A study was conducted by Sourav Ghosh *et al.* (2010) to assess the impact on quality of life in type 2 diabetes mellitus patients, of patient counselling. They concluded that the study proves that patient counselling helps in improving the quality of life of the patient with diabetes mellitus (Ghosh *et al*., 2010). A study was conducted by Sriram *et al.* (2011) to assess the impact of treatment care on quality of life in patients with type 2 diabetes mellitus. The outcome was that the pharmaceutical care program was effective in improving the clinical outcome and the patient's quality of life with type 2 diabetes mellitus (Sriram *et al*., 2011).

CONCLUSION

Now a days more importance is given to the Health-Related Quality of Life (QoL). It is viewed as a therapeutic outcome. This study focuses on the patient counselling done by the pharmacist. It mainly focuses on treatment outcomes, Knowledge, Attitude and Practice (KAP) and QoL of patients with pre-existing hypertension and diabetes. At the beginning of counselling, when asked, the patients had poor knowledge, poor attitude and poor extent to fight against the disease this ultimately leads to poor QoL. In contrast to control group, a greater improvement in treatment outcomes, KAP and QoL were observed in case group at the end of the study. Our study confirms that patients gained the knowledge about disease and its management had favourable impact on treatment outcomes and QoL.

ABBREVIATIONS

BP: Blood Pressure; **DBP:** Diastolic Blood Pressure; **DM:** Diabetes Mellitus; **FBS:** Fasting Blood Sugar; **ICF:** Informed Consent Form; **IEC:** Institutional Ethics Committee; **KAP:** Knowledge, Attitude and Practice; **LDL:** Low-Density Lipoprotein; **LMICs:** Low- and Middle-Income Countries; **MCS:** Mental Component Summary; **PCS:** Physical Component Summary; **PI:** Principal Investigator; **PIS:** Patient Information Sheet; **PP2BS:** Postprandial 2-Hour Blood Sugar; **QoL:** Quality of Life; **QOL:** Quality Of Life; **SBP:** Systolic Blood Pressure; **SD:** Standard Deviation; **SF-12:** Short Form-12 Health Survey; **SGLT-2**: Sodium-Glucose Cotransporter-2; **SVIEC:** Sumandeep Vidyapeeth Institutional Ethics Committee; **Type 1 DM:** Type 1 Diabetes Mellitus; **Type 2 DM:** Type 2 Diabetes Mellitus.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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