Knowledge, Attitude, and Practice Outcomes: Evaluating the Impact of Counseling in Hospitalized Diabetic Patients in India

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ABSTRACT

Background. Patient involvement forms the cornerstone of the management of chronic diseases such as diabetes mellitus.

Objective. We evaluated the results of counseling selected hospitalized diabetic patients about their medications, disease, and lifestyle modifications in terms of knowledge, attitude, and practice outcomes.

Methods. Diabetic patients were counseled via regular bedside meetings, via the distribution of leaflets throughout their hospital stay, and during regular follow-up visits for two months after discharge from the hospital.

Results. Forty-six patients (19 in the test group and 27 controls) completed the study. In the test group, 12 patients (63.1%) were counseled in Kannada, the local language of the study site. A total of 30 to 60 minutes was spent in counseling 63.1% of the patients. Insulin was explained to 13 patients (68.4%); among the oral antidiabetic agents, metformin was discussed with 10 (52.6%) of the 19 patients. Although knowledge scores in the test group of patients improved, compared with those of the control group, as determined by the Mann–Whitney test (P < .05), we did not observe significant improvement in attitude or practice outcomes.

Conclusion. Patient counseling by a clinical pharmacist improved knowledge scores, but this improved knowledge did not lead to appropriate attitudes or practices.

Key Words: diabetes; knowledge, attitude, and practice outcomes; patient counseling

INTRODUCTION

The role of pharmacists has changed dramatically over the past 30 years. Traditionally, pharmacists have been viewed as individuals who dispense medications to the public. The concept of pharmacy practice has gradually changed from a product-oriented activity to a patient-oriented one. Pharmacists are now becoming indispensable in monitoring drug therapy in institutional settings.

It is well documented that safe and effective drug therapy occurs most frequently when patients are well informed about medications and their use. It is the responsibility of pharmacists to counsel patients before dispensing medications. Counseling is the sympathetic interaction between pharmacist and patient; it may go beyond the conveying of straightforward information about the drug and how and when to use it. The ultimate goal of this counseling is to provide information directed at encouraging the safe and appropriate use of drugs, thereby enhancing therapeutic outcomes. Several guidelines specify patient categories and the steps involved in patient counseling.

Diabetes is a syndrome caused by an absolute or relative lack of insulin. It is probably no surprise to most health care professionals in the U.S. that 20.8 million children and adults, or 7% of the American population, have diabetes. What is less well known is the fact that 25 to 30 million patients in India also have diabetes.

If left untreated, diabetes leads to various complications such as neuropathy, nephropathy, retinopathy, hyperlipidemia, foot ulcers, and infections. These complications adversely affect the quality of life for all diabetic patients. Diabetes management depends not only on drug therapy but also on physical exercise, diet, and other lifestyle changes.

Several studies have confirmed that the complications of diabetes can be reduced by proper control of blood glucose and that patients’ understanding of the disease improves when pharmacists provide them with useful, practical information. In India, the concept of patient counseling by a pharmacist is still in its infancy; pharmacists still consider the dispensing of medications to be their major role.

The concept of clinical pharmacy has recently been introduced in India. This has enabled the clinical pharmacists in Kasturba Hospital in Manipal, India, to become more patient-oriented. Within the hospital’s Department of Pharmacy Practice, a counseling center provides advice for patients who obtain their drugs from the outpatient pharmacy.

A study conducted in a community pharmacy in South India concluded that pharmacist-provided patient counseling resulted in better glycemic control and improved quality of life for the test patients, compared with the control group of diabetic patients.

The results of this study cannot be extrapolated to hospitalized patients; further data on the impact of patient counseling on knowledge, attitude, and practice (KAP) of diabetic patients are lacking in India.
OBJECTIVE
Our study was conducted with the following goals:

1. to counsel selected hospitalized diabetic patients about their disease, medications, and lifestyle modifications
2. to evaluate the impact of counseling in terms of KAP outcomes

MATERIALS AND METHODS
Duration
Our study, which ran from November 1, 2002, to April 30, 2003, was conducted in two units in the Department of Medicine at Kasturba Hospital. This is a 1,500-bed, tertiary-care teaching hospital with various specialty departments. The average bed occupancy in these units is 20 to 30 patients each.

Tools
The Knowledge, Attitude, and Practice (KAP) Questionnaire, developed by the hospital, was prepared in three languages: Kannada, Malayalam, and English. It consisted of 25 questions: seven attitude/practice questions (numbers 8, 11, 13, 16, 17, 23, and 24) and 18 knowledge-related questions (Appendix A).

For the knowledge questions, each question was scored as one (1) for a correct answer and as zero (0) for an incorrect answer.

For the practice questions, adhering to the guidelines for disease management or instructions from the patient’s health care provider merited a score of 1; nonadherence was given a score of 0. Although we did not carry out a pilot study to test the questionnaire’s validity and reliability, we performed a reliability analysis and calculation of the Cronbach alpha value (0.72) after obtaining data from the respondents. The Cronbach alpha is used to assess the reliability of scales.

Criteria for Enrollment
Men and women with type-1 and type-2 diabetes mellitus as the chief reason for hospital admission, with or without other diseases, and who were receiving drug therapy for diabetes were eligible for inclusion in the study. Children, pregnant women, and mentally incompetent patients were excluded from the study.

Modality of Operation and Data Analysis
Patients were enrolled according to the inclusion and exclusion criteria of the study after obtaining written informed consent in their local language. We used the KAP Questionnaire to evaluate baseline scores for all enrolled patients on the day of admission (see Appendix A). Throughout their hospital stay, patients in the test group were counseled regarding their disease, medications, and lifestyle modifications (e.g., nutrition, physical activity, self-monitoring of blood glucose, possibly using dipsticks and Benedict’s test for urinalysis, taking medications). Patients received drug counseling in accordance with the recommendations of the Omnibus Budget Reconciliation Act-1990 (OBRA-1990).

To provide better counseling, we gave the test group a patient information leaflet on diabetes, prepared in the participants’ respective local languages. The pharmacist provided follow-up sessions for both the test and the control patients and then documented the details in a patient profile form developed for the study.

To improve patient compliance, we supplied the test group of patients with aids such as envelopes containing their medication and a medication calendar. We observed the patients for at least two months from the day of discharge, with an interval of one month or more between each follow-up visit. During the follow-up periods, we evaluated KAP outcomes using the same questionnaire on two occasions, with at least one month between each follow-up evaluation.

We carried out the Wilcoxon Signed-Rank test to analyze the changes in KAP following patient counseling in the test group ($P < .05$). We then compared KAP scores from the day of admission, the day of discharge, and the first and second follow-up appointments among the control and the test groups using the Mann-Whitney test ($P < .05$).

RESULTS
A total of 59 patients were enrolled in the study from November 1, 2002, to April 30, 2003. Although both type-1 and type-2 diabetic patients met the inclusion criteria, no patients with type-1 diabetes were enrolled. Patients who completed all follow-up visits until April 30, 2003, were included in the analysis.

Of the 59 patients enrolled, 46 completed the study (27 controls and 19 test patients); of the remaining subjects, two patients died during their follow-up period and 11 patients withdrew from the study for unknown reasons. Because the KAP scores did not follow a normal distribution, we used the nonparametric Mann-Whitney test and the Wilcoxon Signed-Rank test instead of the Student t-test. Selection or attrition bias might have been introduced, because we did not analyze information from the patients who dropped out of the study.

DEMOGRAPHICS
Age and Sex
The age distribution was as follows:

- five patients (10.86%), 30 to 40 years of age
- 14 patients (30.43%), between 41 and 50 years of age
- 15 patients (32.6%), 51 to 60 years of age
- eight patients (17.39%), 61 to 70 years of age
- four patients (8.69%), older than 70 years of age

The sex distribution of patients was almost equal, consisting of 22 women (48%) and 24 men (52%).

Patient History
Among the participants in the study population, 16 patients (34.78%) had a history of diabetes of less than five years’ duration. Of the remaining patients, 10 (21.73%) had a history ranging from five to 10 years; 11 patients (23.91%), from 11 to 15 years; six patients (13.04%), from 16 to 20 years; and three patients (6.52%), more than 20 years.

No patient had a history of diabetes of less than five years’ duration.

Language
Kannada was the language most frequently used (for 12

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patients, or 63.1%); this was followed by Malayalam for six patients (31.5%) and by English for one patient (5.2%).

**Time Required for Counseling**
Most patients (12 [63.1%]) were counseled for a period of 30 to 60 minutes during the initial visit with the pharmacist. Of the remaining patients, four (26%) were counseled for more than an hour. Patients were also counseled on the subsequent days of their hospital stay based on their requirements. In general, the most time was devoted to elderly patients, patients using insulin therapy, and patients receiving multiple drugs.

**Medications**
Figure 1 shows the drugs for which the test group had received detailed counseling. Most of the test patients (13 patients, 68.4%) were using insulin, followed by:
- metformin (e.g., Glucophage, Bristol-Myers Squibb) (10 patients, 52.6%).
- glibenclamide (five patients, 26.3%).
- other sulfonylureas (five patients, 26.3%).
- pioglitazone (Actos, Eli Lilly/Takeda) (one patient, 5.2%).
- acarbose (Precose, Bayer) (one patient, 5.2%).

No patients were taking meglitinides.

**EVALUATION OF THE QUESTIONNAIRE AND THE EFFECT OF COUNSELING ON SCORES**
The scores corresponding to the number of questions answered correctly by the control patients and the test patients are listed in Tables 1 and 2, respectively.

The median attitude/practice score of the test group on the first follow-up visit was 5; this score was significantly higher than the median score on the day of admission ($P = .013$). Similarly, the median knowledge scores during the first and second follow-up evaluations were significantly higher ($P < .001$) than on the day of admission ($P < .001$). Details are provided in Table 3.

Knowledge scores for the test group were significantly higher at the first follow-up visit ($P = .004$) and at the second follow-up visit ($P = .000$), compared with the corresponding values for the control group. However, no such differences were observed in the attitude/practice scores.

There was no significant correlation between the proportion of subjects who answered the knowledge questions correctly and those who answered the behavioral questions appropriately, as determined by Pearson’s correlation coefficient (.325).

Patients may have been counseled by the treating physician, nurses, relatives, and other patients and might have obtained diabetes-related information from other sources. This could be a confounding factor, and we did not account for it during the study.

**DISCUSSION**
Our study evaluated the impact of pharmacist-provided counseling in terms of diabetic patients’ understanding of their disease, drug therapy, and lifestyle changes. We found that counseling by pharmacists was effective in improving patients’ knowledge but not in improving their attitudes and practices. Because there was no correlation between attitude and practice, we cannot assume that improved patient knowledge would result in appropriate behavior.

Management of chronic disease is strongly linked to lifestyle modifications. For effective disease prevention and treatment, behavioral changes are required.

For patients with chronic diseases, home is usually the central site of managing the illness. This is true for diabetic patients who also need knowledge about their illness in order to manage it effectively.17 The role of the pharmacist is especially
important in helping patients control chronic diseases like diabetes. The pharmacist can monitor and track patients' blood glucose levels. During contact with the pharmacist, patients can ask questions that they might have been reluctant to ask their physicians. In general, it is the pharmacists' role to help diabetic patients to cope with their disease.\textsuperscript{18}

Every patient enrolled in our study was taking at least one drug as a part of a diabetes-management regimen, and the clinical pharmacist provided counseling according to OBRA recommendations.\textsuperscript{6} The questions patients most commonly asked about their medications had to do with the following:

- technique of insulin administration
- when to take oral hypoglycemic drugs (before or after meals)
- management of hypoglycemia

Hypoglycemia is a common problem associated with diabetes management. Pharmacists should emphasize the methods used to detect and prevent hypoglycemia. In the study population, insulin was the drug used in the majority of patients.

A major objective of counseling is to improve patient compliance. Several strategies may be taken to encourage the patient to adhere to therapy.\textsuperscript{19} Our study used patient information leaflets to promote counseling. The leaflet was written in local languages, which enhanced understanding among the patients.

A study by Hawkins and colleagues assessed the effectiveness of interventions by clinical pharmacists in managing hypertensive and diabetic patients.\textsuperscript{20} The controls received conventional care by one physician; the test group of patients received care directly from a pharmacist and were closely monitored by a physician. The investigators noted an increase in patient satisfaction and patient compliance with the treatment regimen for the test group. In our study, the pharmacist monitored the patient chart for correct doses, drug interactions, and any needed dosage adjustments.

Patient involvement is of paramount importance for the successful management of diabetes. Lifestyle changes are usually necessary; these include dietary adjustments, exercise, monitoring of blood glucose levels at home, sometimes monitoring urine changes, and following an appropriate drug regimen.\textsuperscript{21}

Shilling conducted a program that utilized a pharmacist for

### Table 1  Knowledge, Attitude, and Practice (KAP) Scores of the Control Group of Patients (C1–C27)

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<th>Patient No.</th>
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<th>Attitude/Practice</th>
<th>Day of Discharge Knowledge</th>
<th>Attitude/Practice</th>
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Note: The numbers in each column represent KAP scores of the patients on different days following hospital admission.
monitoring and treating diabetic patients in a 58-bed hospital. The study enrolled 193 diabetic patients; 50% of the patients were monitored for 19 months. The increased involvement of the pharmacist resulted in better use of their abilities and more time for physicians to spend with patients who had complications.

In our study, we could not evaluate the amount of physicians’ time saved as a result of the increased pharmacist involvement; however, it is clear that a period of physicians’ time was saved as a result of the pharmacist’s clearly explaining instructions on drug use to the test group of patients.

Sczupak and Conrad assessed the effect of patient-oriented pharmaceutical services on the treatment outcomes of ambulatory patients with diabetes mellitus. The test group was monitored for drug therapy via a patient profile form, and the participants received information and training to improve compliance. These study findings indicated that the test group experienced fewer medication errors, fewer hospital admissions, and fewer changes in therapeutic regimens compared with the control group.

Self-monitoring of blood glucose is considered a key element in diabetes care, and it is widely recommended. This activity helps patients adjust their insulin dosage, diet, and exercise regimens, and it aids in detecting and preventing hypoglycemia.

A study conducted in South India on diabetic patients’ knowledge and beliefs about the disease and their practices in terms of diet, medications, and self-monitoring of blood glucose levels revealed a large gap between knowledge and action. The findings illustrate the need for increased efforts in the area of patient education. In our study, patients were taught the importance of self-monitoring.

It is essential to dedicate an appropriate amount of time to achieve improved patient counseling. The amount of time spent generally depends on factors such as a patient’s interest, the number of medications needed, the seriousness of the patient’s condition, and the pharmacist’s work schedule. Lack of time is one of the barriers to providing counseling. It is also necessary to spend more time counseling certain patient groups, such as those who need multiple drugs, those who have complicated drug regimens, and the elderly. However, our study did not consider these factors to be barriers to providing counseling.

The need for teaching diabetic patients about their illness is obvious, because the success of the diabetes treatment depends on lifestyle modifications in addition to the drug therapy. Patient
compliance is another paramount factor in treatment that warrants increased education and counseling.

STUDY LIMITATIONS

Our study did not evaluate the impact of patient counseling on compliance with treatment. More reliable methods such as determining glycosylated hemoglobin might be a better parameter to evaluate the extent of patient compliance.

Our sample size was very small. Confounding factors, such as counseling obtained from other sources, were not taken into account.

CONCLUSION

Our study identified diabetic patients, and counseling was provided to them in their local language. The results demonstrate the importance of consultations with a pharmacist in a hospital setting. The improved knowledge scores clearly indicate the benefits of pharmacist-provided counseling, although they did not translate into improved attitudes or practice outcomes.

In summary, we have seen that in developing countries such as India, pharmacists have an immense responsibility for educating hospitalized patients with chronic diseases like diabetes. Strategies should be implemented so that improved patient knowledge about diabetes treatment can lead to better attitudes and outcomes.

REFERENCES


The Knowledge, Attitude, and Practice Questionnaire

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Appendix A: Knowledge, Attitude, and Practice (KAP) Questionnaire

1. Diabetes is a condition in which the body contains:
   o a higher level of sugar in the blood than normal.
   o a lower level of sugar in the blood than normal.
   o either a higher or a lower level of sugar in the blood than normal.
   o I don't know

2. The major cause of diabetes is:
   o an increased availability of insulin in the body.
   o a decreased availability of insulin in the body.
   o I don't know

3. The symptom(s) of diabetes is/are:
   o increased frequency of urination.
   o increased thirst and hunger.
   o increased tiredness.
   o slow healing of wounds.
   o all the above
   o I don't know

4. Diabetes, if not treated:
   o can lead to eye problems.
   o can lead to kidney problems.
   o can lead to foot ulcers.
   o can lead to heart problems.
   o all the above
   o I don't know

5. The most accurate method of monitoring diabetes is:
   o checking blood glucose levels.
   o checking urine sugar.
   o I don't know

6. In a diabetic patient, high blood pressure can increase or worsen:
   o the risk of heart attack.
   o the risk of stroke.
   o the risk of eye problems.
   o the risk of kidney problems.
   o all the above
   o I don't know

7. A diabetic patient should measure his or her blood pressure:
   o once a year.
   o once every six months.
   o once every two months.
   o once every month.
   o need not check at all
   o I don't know

8. When was your blood pressure checked last?
   o one week ago
   o one month ago
   o two months ago
   o six months ago
   o one year ago

9. The lifestyle modification(s) required for diabetic patients is/are:
   o weight reduction.
   o stopping smoking.
   o stopping alcohol intake.
   o all the above
   o I don't know

10. A diabetic patient should have his or her eyes checked:
    o once a year.
    o once every six months.
    o need not check at all

11. When did you have your last eye examination?
    o one month ago
    o six months ago
    o one year ago
    o two years ago
    o not done at all

12. Regular urine tests will help in knowing:
    o the status of liver function.
    o the status of kidney function.
    o the control of diabetes.
    o I don't know

13. When was your last urine exam?
    o one month ago
    o six months ago
    o one year ago
    o not done at all

14. The important factors that help in controlling blood sugar are:
    o a controlled and planned diet
    o regular exercise
    o medication
    o all the above
    o none

15. A regular exercise regimen will help in:
    o increasing blood circulation.
    o enhancing insulin action.
    o I don't know

16. Do you exercise regularly?
    o Yes o No
    If yes, how often?
    o Every day o Once weekly o Once monthly

17. Are you following a controlled and planned diet?
    o Yes o No
    If yes, how often?
    o Always o Sometimes o Rarely

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18. The well-balanced diet includes:
   - green leafy vegetables.
   - fiber-rich food.
   - low sugar, oil, and fat.
   - I don’t know

19. For proper foot care, a diabetic patient:
   - should inspect and wash the feet daily.
   - should select the best possible footwear.
   - should walk barefoot inside and outside the house.
   - should not walk barefoot inside and outside the house.

20. Treatment of diabetes comprises:
   - antibiotic therapy.
   - blood transfusions.
   - substituting insulin.
   - taking more bitter vegetables.
   - I don’t know

21. Diabetes cannot be treated with:
   - insulin.
   - glibenclamide.
   - metformin.
   - antibiotics.
   - I don’t know

22. Upon control of diabetes, the medicines:
   - can be stopped immediately.
   - can be stopped after one month.
   - should be continued for life.
   - I don’t know

23. Do you miss taking the doses of your diabetic medication?
   - Yes
   - No

   If yes, how often?
   - occasionally
   - once a week
   - once a month

24. Are you aware of blood sugar levels falling below normal when you are taking drugs?
   - Yes
   - No

   If yes, did you at any time experience any of the following symptoms?
   - weakness
   - confusion
   - visual disturbances
   - I don’t know

25. How do you manage hypoglycemic symptoms?
   - by taking sugar
   - by taking medicines
   - by taking insulin
   - I don’t know