ORIGINAL ARTICLE ASIAN JOURNAL OF MEDICAL SCIENCES

Impact of polypharmacy in older patients with type 2 diabetes in rural population in South India

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Submission: 06-08-2022 Revision: 02-09-2022 Publication: 01-10-2022

ABSTRACT

Background: The World Health Organization describes polypharmacy as a safe and efficient treatment that complies with evidence-based medicine and uses at least five different medications. **Aims and Objectives:** The aim of our study was to investigate the impact of polypharmacy in older patients with type 2 diabetes mellitus (T2DM) in rural population in South India. **Materials and Methods:** The study comprised a total of 100 patients, who were referred to the Government General Hospital, Nizamabad, between January 2020 and March 2022. The records of 50 randomly chosen non-diabetic patients who visited our hospital for other ailments were compared to those of the 50 T2DM patients. **Results:** In this study, a total of 100 patients were enrolled, out of which 62 were male (62%) and 38 were female (38%). The duration of diabetes was noted to be 0–5 years in 28 patients, 6–10 years in 52 patients and >10 years in 20 patients. In our study, we observed that more than five drugs were prescribed to 45 patients in the case group and only ten patients in the control group. **Conclusion:** Our study shows that older adults with diabetes have a high prevalence of polypharmacy and that this condition may have a significant impact on a number of health-related outcomes. Each patient should receive a customized course of treatment with the right number of medications for their particular ailment. The danger of side effects increases with the number of medications.

Key words: Type 2 diabetes mellitus; Polypharmacy; Elderly patients

Access this article online

Website: http://nepjol.info/index.php/AJMS

DOI: 10.3126/ajms.v13i10.47279

E-ISSN: 2091-0576

P-ISSN: 2467-9100

INTRODUCTION

The prevalence of polypharmacy, associated consequences, and alternative therapies is all significant clinical practice topics; nevertheless, investigations on this area have only increased in the last 10–15 years.[1] Most frequently, it is accepted that polypharmacy is equivalent to "the use of five or more medicines per day."[2] Polypharmacy frequently results in the creation of a vicious cycle: The use of more medications results in unpleasant reactions that are misinterpreted as the occurrence of additional diseases or comorbidities and result in the prescription of more medications.[3] The distinction between "acceptable" and "inappropriate" polypharmacy must also be made by doctors. The need to prescribe additional medications to a single patient and the risk-benefit ratio serve as the basis for the distinction between the two.[4]

Two or three hypoglycemic medications are frequently used to treat patients with type 2 diabetes mellitus (T2DM). This therapeutic approach is predicated on the idea that combining medications with several modes of action enhances glycemic control. Unquestionably, a triple therapy is linked to a higher risk of hypoglycemia. Because T2DM patients frequently have major co-occurring disorders requiring adequate treatment, close monitoring is essential for the safe usage of the triple therapy. Numerous medications used in these comorbid patient populations may have a major impact on glucose homeostasis.

Up to 19.3% of adults aged 65 or older may have diabetes mellitus, one of the most common chronic diseases in

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older people (135.6 million worldwide).[5] According to earlier studies, more than 80% of people with diabetes also have other chronic diseases, which increase their risk of polypharmacy and its negative effects.[6-8]

Aims and objectives

The aim of our study was to investigate the impact of polypharmacy in older patients with type 2 diabetes in rural population in South India.

MATERIALS AND METHODS

To assess the effects of polypharmacy in senior T2DM patients, we conducted a prospective observational study. The study comprised a total of 100 patients, who were referred to the Government General Hospital, Nizamabad, between January 2020 and March 2022. The patients were divided into two groups: T2DM patients (case group) who participated in a study and patients with other ailments (control group) who visited our hospital. The records of 50 randomly chosen non-diabetic patients were compared to those of the 50 T2DM patients.

Inclusion criteria

The following criteria were included in the study:

- Everyone with type 2 diabetes who is older than 40 years old.
- All diabetics, regardless of glucose control.
- All diabetics, regardless of their use of OHA or insulin.

Exclusions criteria

The following criteria were excluded from the study:

- Type 1 diabetes mellitus
- Patients with pancreatitis, fibrocalculous pancreatitis, and diabetes brought on by steroids.

We gathered information on the patients' age, sex, comorbidities, and medications, and we used this information to build a Microsoft Office Excel database. Incomplete medical records for patients were not accepted. Following that, we determined the total number of comorbidities for each patient, examined the types of medications prescribed, determined the drug class for each prescription, and determined the total number of medications as well as the polypharmacy for each patient. These findings led us to describe polypharmacy as "the daily use of five or more medications" by a single patient.[2]

Statistical methods

Frequencies and percentages were used to present categorical variables. Continuous variables were presented as mean and standard deviation (SD). The independent samples t-test was used to compare continuous variables. In various tables, P-values representing the level of significance were shown. Microsoft Excel was used for analysis, with a 5% level of significance (Microsoft Office 2013).

RESULTS

In our study, a total of 100 patients were enrolled, out of which 62 were male (62%) and 38 were female (38%) (Table 1).

In our study, we enrolled elderly patients above the age group of 40 with 22 patients in 41–50 age group, 48 within 51–60 years of age and 30 patients in >60 years (Table 2).

In our study, duration of diabetes was noted to be 0–5 years in 28 patients, 6–10 years in 52 patients and >10 years in 20 patients (Table 3).

In our study, we observed that four drugs were prescribed to five patients in case group and 40 patients in control group. Five drugs were prescribed to ten patients in case group and eight patients in control group. Six drugs were prescribed to 17 patients in case group and only two patients in control group. Seven drugs were prescribed to nine patients in case group and no patients in control group. >8 drugs were prescribed to nine patients in case group and no patients in control group (Table 4).

In our study, we found five patients and two patients missed 1 dose/week in case group and control group, respectively. Two doses in a week were missed by nine patients in case

Table 1: Gender-wise distribution

Gender	Number of patients		Percentage
	Case (n=50)	Control (n=50)	
Male	32	30	62
Female	18	20	38
Total	50	50	100

Table 2: Age-wise distribution

Age group	Case (n=50)		Control (n=50)		Total
	M	F	M	F	
41–50	8	4	7	3	22
51–60	16	9	13	10	48
>60	8	5	10	7	30
Total	32	18	30	20	100

Table 3: Duration of diabetes

Duration DM	Number of patients (n=50)	%
0–5 years	14	28
6–10 years	26	52
>10 years	10	20
Total	50	100

group and one patient in control group. Three doses were missed by three patients in case group and one patient in control group in a week. Two patients in case group missed 4 doses/week (Table 5).

DISCUSSION

Regarding the concept of polypharmacy, four studies[9-13] looked at the typical intake of five or more medications per day, two studies[14,15] looked at more than five, one study[16] looked at less than four, and one looked at more than nine drugs per day.[17]

In this prospective observational study, we evaluated the effects of T2DM on the number of medications administered to diabetic patients older than 40 years old as well as the effects of polypharmacy on diabetic patients. In 50 T2DM patients (case group) and 50 non-diabetic participants (control group) who were hospitalized for illnesses other than diabetes, we compared patient characteristics and polypharmacy. Our findings imply that compared to non-diabetic people, diabetic patients have more comorbidities and are given prescriptions for more medications. According to our data, individuals with T2DM received more medications than patients who were sent to the hospital for other diseases, regardless of the drug class.

The pattern of medications that were most frequently administered were as follows in the first group. Four drugs (OHA+statins+PPI+beta blockers), five drugs (OHA+statins+PPI+beta blockers+diuretics), six drugs (OHA+statins+PPI+beta blockers+diuretics+anticoagulants), seven drugs (OHA+statins+PPI+beta blockers+diuretics+anticoagulants+calcium channel blockers), and eight drugs (2OHA+statins+PPI+beta blockers+diuretics+anticoagulants+calcium channel blockers). In second group, medications without diabetic drugs were prescribed.

Table 4: Number of drugs prescribed

Number of drugs	Case (n=50)	Control (n=50)
4	5	40
5	10	8
6	17	2
7	9	-
>8	9	-
Total	50	50

Table 5: Number of drugs missed in a week

Number of drugs missed in a week	Case (n=50)	Control (n=50)
1	5	2
2	9	1
3	3	1
4	2	-
Total	19	4
Percentage	38	8

Breuker et al.,[17] prospective observational trial, included 904 hospitalized patients, 671 of whom had T2DM. At the time of admission, it was discovered that T2DM patients received twice as many medicine prescriptions as people without diabetes. The treatment was evaluated, treatment errors were found, and the number of medications needed for long-term therapy in an ambulatory setting were decreased during hospitalization. At discharge, it was discovered once more that the list of medications provided to individuals with T2DM was twice as many as that of the other patients. The T2DM group also displayed a higher percentage of severe treatment mistakes.

The analyses' findings led the authors to identify polypharmacy in diabetic patients – but not diabetes itself – as a separate risk factor for treatment mistakes. Interestingly, before any harm to the patients was caused, up to 25.8% of potential drug interactions caused by improper medicine combinations were successfully rectified. The authors emphasize the need for careful drug selection by doctors. Particularly crucial for senior individuals, such as diabetics, is this.

Our findings confirm that polypharmacy is a significant issue for senior T2DM patients. This is, as far as we are aware, the first South Indian study to look into the effects of polypharmacy on older patients with type 2 diabetes in rural areas.

Limitations of the study

There are no limitations to this study.

CONCLUSION

Our study shows that older patients with diabetes have a high prevalence of polypharmacy and that this condition may have a significant impact on a number of health-related outcomes. Each patient should receive a customized course of treatment with the right number of medications for their particular ailment. The danger of side effects increases with the number of medications. On the other hand, it is crucial to keep in mind that patients can suffer harm from receiving insufficient care. This study was carried out with the intention of enhancing clinical management of such patients in the future.

ACKNOWLEDGMENT

We would like to acknowledge all the individuals who have extended their help and assistance throughout all aspects of our study.

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SKA- Concept and design of study, Review of literature, Acquisition of data, Original draft preparation, Revision of final manuscript; **MS-** Interpretation of results, Preparation of manuscript, Review and editing; **GR-** Concept of study, Review of literature, Statistical analysis, Interpretation of results, Revision of final manuscript

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Source of Support: Nil, **Conflict of Interest:** None declared.