Research Article

A comparative assessment of antidiabetic drug usage and related pharmaceutical care issues between Geriatric and non-Geriatric population in teaching hospital

Rojin G. Raj[1], Janet Benny[1], Abubaker Siddiq[2*], Shethal Saji[1], Sreelakshmi P.[1]

[1]*Department of Pharmacy Practice, SJM College of Pharmacy, Chitradurga- 577502, Karnataka, India*

[2]*Department of Pharmacology, SJM College of Pharmacy, Chitradurga – 577502, Karnataka, India*

Received: 3 March 2022 Revised: 26 April 2022 Accepted: 28 April 2022

Abstract

Background: Type 2 diabetes mellitus is a disease whose prevalance is projected to rise from the current estimated 240 million affected (6% of adults) 2017 to 380 million (7%) by 2025. Drug prescribing studies can identify irrational prescribing pattern and can suggest modification in the current prescribing practices. **Objective**: The objective of the present work was to evaluate the anti-diabetic medication usage among geriatric and non-geriatric population, to assess and compare the pharmaceutical care issues like drug –drug interaction, contraindications of therapy and drug duplication, to assess and compare the associated comorbidities and complications of type II diabetes mellitus. **Materials and Methods**: A prospective observative study was conducted in a teaching hospital. A total of 150 geriatric and non geriatric patients with type 2 DM were enrolled and studied for 6 months. **Results:** The study found out that Insulin was most prescribed drug followed by dual therapy of oral hypoglycemic agents and metformin was the most frequently prescribed drug in monotherapy. Comorbidities and diabetic complications were more in geriatric patients thus the drug related problems were also more in them**. Conclusion:** Comorbid conditions, complications and pharmaceutical care issues were seen more in geriatric patients when compared to non geriatrics.Insulin therapy was given highest in geriatrics and oral hypoglycemic agents was given highest in non geriatrics

***Keywords*:** Diabetes mellitus, complications, comorbidities, anti-diabetic medications

Introduction

The World health organization [WHO] describes Diabetes Mellitus (DM) as a metabolic ailment of multiple causes, distinguished by persistent increase in blood sugar with changes in carbohydrate, fat and protein metabolism which takes place due to disorders with synthesis of insulin, insulin activity or both (Inamdar and Kulkarni, 2017).

The prevalence of type 2 diabetes is projected to rise from the current estimated 240 million affected (6% of adults) to some 380 million (7%) by 2025 (Cho et al., 2017).Most of this growth will be in developing countries such as India and China (King et al., 1998). In developed countries the risk of type 2 diabetes increases progressively throughout life, and it is the 65 years and above age group that accounts for the majority of cases of diabetes. In contrast, in most developing countries for which data are available, the greatest number of individuals with type 2 diabetes are aged between 45 and 64 years with both the prevalence and absolute number of individuals with diabetes declining above 65 years (Dierena et al., 2010). Uncontrolled hyperglycemia in diabetic patients will increase the risk of diabetic complications like acute-hypoglycaemia and chronic-microvascular, macrovascular, which can damage the eyes, kidneys, nerves, heart and peripheral arteries (Yusefzadeh et al., 2014). Drug prescribing studies can identify irrational prescribing pattern and can suggest modification in the current prescribing practices; thereby reducing the complications (Mokta et al., 2017). Disabilities arising from ageing, diseases and associated comorbidities, multiple medications usage, age related pathophysiologic, pharmacokinetics and pharmacodynamics changes that makes them more vulnerable to drug related problems in spite of the fact that use of medications can improve the quantity and quality of life (Nole et al., 2016). Therefore, the present study is highly relevant in this scenario.

Address for Corresponding Author:
Dr. Abubaker Siddiq
Associate Professor
SJM College of Pharmacy, SJM Campus, Chitradurga, Karnataka, India
Email: pharmasiddiq@gmail.com

DOI: https://doi.org/10.31024/ajpp.2022.8.2.3

Materials and Methods

The study was carried out at a teaching hospital at Chitradurga district, Karnataka. The institutional Ethical Committee approval was obtained prior to the study. This prospective observational study was conducted for a period of six months from September 2018 to February 2019. The aim of the study is to evaluate the anti-diabetic medication usage among geriatric and non-geriatric population,assess and compare the pharmaceutical care issues like drug –drug interaction, contraindications of therapy and drug duplication,comorbidities and complications of type II Diabetes mellitus.All requird data were collected from medical reports, laboratory reports and interaction with the patient after obtaining informed consent. The collected data were analysed using the Microsoft Exel 2007.

Study design

A Prospective observational study

Inclusion Criteria

Patients of both genders.

Patients diagnosed with type II diabetes mellitus.

Patients of age between 40-64 years for non geriatrics and 65-80 years for geriatrics.

Patients having co- morbidities were also included.

Exclusion Criteria

Patients with type I diabetes mellitus.

Sources of data

Medical reports of patients

Laboratory reports.

Interaction with the patients.

Statistical analysis

The data were analyzed using descriptive methods (mean) for measuring central tendency, chi-square test as a test of goodness of fit, Pearson correlation for finding the extend of correlation, fisher extract test for calculation of p-value and result were generated through SPSS software (version 2015).

Results

There were 150 patients enrolled in the study of which 75 were geriatrics and 75 were non geriatrics. Out of the 75 geriatric subjects 22 (29.33%), 31(41.33%), 6(8%), 2(2.67%) were having one, two, three, more than three comorbidities respectively and 14(18.67%) were not having any comorbidity. Out of 75 non geriatric subjects 36(48%), 14(18.66%), 4(5.33%) were having one, two, three comorbidity respectively and 21(28%) were not having any comorbidity (Table 1).

Out of 75 geriatric patients, acute, macro, micro and macro+micro vascular complications were 3(4%), 36(48%), 6(8%) and 11(14.67%) respectively. Out of 75 non geriatric patients, acute, micro, macro and macro+micro vascular complications were 5(6.67%), 27(36%), 5(6.67%) and 8(10.66%) respectively (Figure 1).

Table 1. Comorbidity status (n=150)

Comorbidities	Geriatric subjects		Non geriatric subjects	
	Frequency	Percentage (%)	Frequency	Percentage (%)
One comorbidity (n=58)	22	29.33	36	48
Two comorbidities (n=45)	31	41.33	14	18.66
Three comorbidities (n=10)	06	8	04	5.33
More than three comorbidities (n=02)	02	2.67	00	00
None (n=35)	14	18.67	21	28
TOTAL	**75**	**100**	**75**	**100**

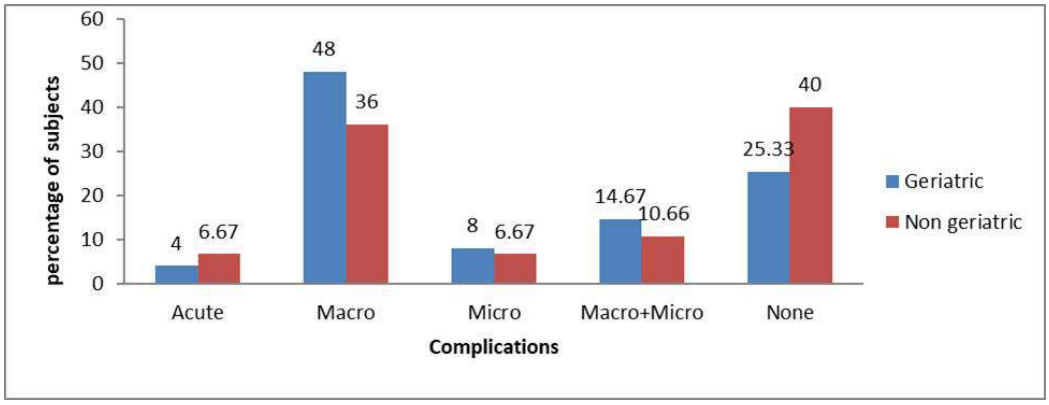

Figure 1. Complications status

Table 2. Oral hypoglycaemics and insulin distribution (n=210)

Type of therapy	Drug type	Geriatric subjects		Non geriatric subjects	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Mono therapy (n=146)	OHA	20	19.05	18	17.14
	Insulin	56	53.33	52	49.52
Dual therapy (n=61)	OHA	15	14.28	27	25.71
	Insulin	12	11.43	7	6.67
Triple therapy (n=3)	OHA	2	1.9	1	0.95
	Insulin	00	00	00	00
TOTAL		**105**	**100**	**105**	**100**

Table 3. Pharmaceutical care Issues

Pharmaceutical care issues	Geriatric subjects		Non geriatric subjects	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Drug interaction	89	59.3	59	39.33
Drug duplication	03	2	02	1.33
Contraindication	05	3.33	01	0.66
None	53	35.33	88	58.66
TOTAL	**150**	**100**	**150**	**100**

In geriatrics mono, dual and triple therapy were 72.38%, 25.71% and 1.9% respectively.In this the OHA and Insulin percentages were as follows: monotherapy[OHA 20(19.05%), Insulin 56 (53.33%)], dualtherapy [OHA 15(14.28%), Insulin 12 (11.43%)] and tripletherapy OHA 2(1.9%).In non geriatrics mono, dual and triple therapies were 66.66%, 32.38% and 0.95% respectively. In this the OHA and insulin percentages are as follows: monotherapy [OHA 18(17.14%), Insulin 52(49.52%)], dual therapy [OHA 27(25.71%), insulin 7(6.67%)] and triple therapy OHA 1(0.95%). The results are shown in table 2.

A total of 159 drug related problems were found in it 97 were observed in geriatrics and 62 were observed in non geriatrics (Table 3).

Discussion

Type 2 Diabetes Mellitus accounts for majority of DM cases. The prevalence of patients with comorbidities is increasing in most developed countries (Brilleman et al., 2013).World population aging leads to a greater prevalence of chronic health conditions and increases medication use and healthcare system costs (Lyra et al., 2007). In our study we found that Insulin was most prescribed drug followed by dual therapy of OHA.This matches with the results of study conducted by (Agarwal et al., 2014) in it there was a higher percentage of use of insulin in type 2 diabetics. Only 41% of patients on anti-diabetic therapy had optimal glycemic control. OHAs still dominate the prescribing pattern, but there was a shifting trend toward the use of insulin preparations in the management of type 2 diabetes mellitus. In achieving optimal glycemic control, the efficacy of the anti-diabetic drugs was only 41%; therefore intensification of current drug treatment as well as planning multiple drug interventions with lifestyle modification is necessary (Akshay et al., 2014). This also matches with the results of study conducted by (Simon et al., 2015) which concluded that compared to 2007 data, a slight but significant increasing trend toward combination therapies and insulin was observed. The use of metformin increased over time especially in monotherapy (66% among monotherapy in 2013 versus 50% in 2007) (Simon et al., 2015). In our study we found that geriatric patients were more prone to drug related problems .This matches with the result of study conducted by (Inamdar et al., 2017) which concluded that a total of 147 pharmaceutical care issue related to anti diabetics were reported [69.38% in geriatrics and 30.61% in non-geriatrics], which were related to; drug not appropriate for therapy [geriatrics 35.29% non-geriatrics 22.22], Contraindications related [geriatrics 26.47% non geriatrics 17.77%], adverse drug reactions [geriatrics 6.86% non-geriatrics 6.66%] and drug

interaction [geriatrics 23.53% non-geriatrics 20%].[1]In our study we found that comorbidities and diabetic complications were more in geriatric patients thus the drug related problems were also more in them. This matches with the result of study conducted by (Peron et al., 2015) which concluded that polypharmacy, or the use of multiple medications, is a common concern in older adults with diabetes. Age, comorbidities, microvascular and macrovascular complications of diabetes may further complicate diabetes management in older adults (Peron et al., 2015).

Conclusion

From this prospective observational study it is concluded that comorbid conditions and complications were seen more in geriatric patients when compared to non geriatrics.It was also found that insulin therapy was given highest in geriatrics and OHA was given highest in non geriatrics. In overall therapy of geriatric patients monotherapy of insulin was highest pescribed followed by monotherapy of OHA whereas in non geriatric patients monotherapy of insulin was highest followed by dual therapy of OHA. Drug related problems like drug interaction drug duplication and contraindications were seen more in geriatrics compared to non-geriatrics.

Acknowledgement

The authors are thankful to the management of SJM vidyapeetha, Chitradurga through the principals of SJM College of Pharmacy and Basaveshwara medical college and hospital for providing necessary facilities, support and encouragement throughout the study.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Financial support

The authors declared no financial support.

References

Akshay A, Agarwal, Pradeep R, Jadhav I, Yeshwant A, Deshmukh. 2014. Prescribing Pattern and Efficacy of Anti-diabetic Drugs in Maintaining Optimal Glycemic Levels in Diabetic Patients. Journal of Basic and Clinical Pharmacy, 5(3):79-83.

Brilleman SL, Purdy S, Salisbury C, Windmeijer F, Gravelle H, Hollinghurst S. 2013. Implications of Comorbidity for Primary Care Costs in the UK: A Retrospective Observational Study. British Journal of General Practice, 2:274-82.

Cho NH, Kirigia J, Claude J et.al., 2017. International diabetic federation. Diabetic Atlas.8th ed. UAE. 1:1-145.

Dierena SV, Beulensa JW, Yvonne T, Schouwa VD, Grobbeea DE, Nealb B. 2010. The Global Burden of Diabetes and its Complications: an Emerging Pandemic. European Journal of Cardiovascular Prevention and Rehabilitation 17(1):S3-S8.

Inamdar SZ, Kulkarni RV. 2017. Anti-Diabetics Drug Usage and Related Pharmaceutical Care Issues among Geriatrics and Non-Geriatrics: A Comparative Assessment. Indian Journal of Pharmacy Practice, 10(3):160-65.

King H, Aubert RE, Herman WH. 1998. Global Burden of Diabetes, 1995–2025: Prevalence, Numerical Estimates, and Projections. Diabetes Care 21:1414–31.

Lyra DP, Rocha CE, Abriata JP, Gimenes FR, Gonzalez MM, Pela IR. 2007. Influence of Pharmaceutical Care intervention and Communication Skills on the Improvement of Pharmacotherapeutic Outcomes with Elderly Brazilian Outpatients. Patient Education and Counselling, 68:186-92.

Mokta J, Mokta K, Ranjan A, Joshi I, Garg M. 2017. Diabetes Drug Prescription Pattern and Awareness Among Health Care Providers in Sub-Himalayan Region of India: A Population Based Study.Journal of The Association of Physicians of India, 65(1):50-54.

Nole M, Veronese N, Perin PC, Pilotto A, Teingo A, Crepaldi G et al., 2016. Polypharmacy in elderly patients with type 2 diabetes receiving oral antidiabetic treatment. Acta Dibetologica 53(2):323-30

Peron EP, Ogbonna KC, Donohoe KL. 2015. Diabetic Medications and Polypharmacy. Clinics in Geriatric Medicine, 31(1):1-14.

Simon D, Dallongeville J, Charbonnel B, Bureau I, Detournay B, Leproust S,et al.,2015. Patterns of Pharmacological Treatment in Type 2 Diabetes in France in 2013. Value in Health 18(3):335-46.

Yusefzadeh G, Sepehri G, Goodarzi H, Shokoohi. 2014. A .Prescription Pattern Study in Type 2 Diabetes Mellitus in Diabetic Out Patients in Private Clinics in Kerman, Iran. British Journal of Medicine & Medical Research, 4(32):5144-53.