e-ISSN - 2348-2184 Print ISSN - 2348-2176



AMERICAN JOURNAL OF BIOLOGICAL AND PHARMACEUTICAL RESEARCH

Journal homepage: www.mcmed.us/journal/ajbpr

A PROSPECTIVE EVALUATION ON PRESCRIBING PATTERN AND OUTCOME OF ORAL HYPOGLYCEMICS AGENTS AMONG POST-MENOPAUSAL WOMEN

S Thangamani, G S Sajini*, K Lovin¹, K Sajith¹, Kiran²

¹Department of pharmacy Practice, Grace College of Pharmacy, Palakkad, Kerala, India. ²Department of General Medicine, Karuna Medical College & Hospital, Chittur, Kerala, India.

Article Info

Received 29/06/2018 Revised 15/07/2018 Accepted 19/07/2018

Key words: -Diabetes mellitus, Postmenopausal women, Fixed dose combinations, Rational prescribing.

ABSTRACT

Prescription trends in oral hypoglycemic agents keep on changing in post-menopausal women and thus the drug prescription study may prove to be powerful exploratory tool for health care providers. To study the prescribing pattern of oral hypoglycemics among postmenopausal women. A prospective observational drug utilization study was conducted in General Medicine OPD & IPD at Karuna Medical College Vilayodi, Chittur for a period of 6 months. The study is based on the data collected from 76 patients who were postmenopausal women visiting for the treatment of diabetes. A totally 76 prescriptions were analyzed and out of 44 (57.8%) were post-menopausal women having diabetes mellitus (DM) and both DM & hypertension (HT). A total of 451 drugs were prescribed, 252 (55.8%) were anti-diabetics and the remaining includes the others. Biguanides 80 (31.75%) most commonly prescribed, followed by sulfonylureas 65 (25.7%). Total 47 (18.6%) FDC's were prescribed. After 2 weeks in Review 1 and Review 2 Metformin in monotherapy significantly reduced in FBS and RBS (FBS P≤0.05, RBS P≤0.0001) and in combination therapy Metformin with Glimepride significantly reduced FBS and RBS (FBS $P \le 0.05$, RBS $P \le 0.0001$) among post-menopausal women. Metformin is most commonly prescribed drug followed by glimepiride, voglibose and insulin preparations. In monotherapy, Metformin and sulfonylureas and in combination therapy metformin with glimepride prescribed patients were achieved their target among post-menopausal women with DM.

INTRODUCTION

Diabetes mellitus is a pandemic disease that has struck each and every corner of the world. However Type 2 diabetes is more often and significantly estimates were 90% of all diabetes cases worldwide. It occurs most frequently in adults even observed increasingly in adolescents. WHO has

Corresponding Author

G S Sajini Email:- sgsajini@gmail.com estimated that, 31.7 million individuals on average affected by diabetes in India [1, 2]. There is no specific cause for DM, but both etiologic factors and risk factors are associated with it. The risk factors are heredity, obesity, increasing age, emotional stress, autoimmune β -cell damage, endocrine diseases (e.g., Cushing disease).DM is one of the widely known risk factor for Peripheral vascular disease, CVD and Stroke. It also causes chronic complications like retinopathy, neuropathy and nephropathy [3].

23 | P a g e AMERICAN JOURNAL OF BIOLOGICAL AND PHARMACEUTICAL RESEARCH



Menopause/post-menopause is a naturally occurring process in a woman's life. It is a physiological event that can be defined as the cessation of menstrual cycles for 12 consecutive months and although many women seek medical advice before this time because of the onset of menopausal symptoms. Menopause (surgical or natural) has an unfavorable effect on glucose metabolism and thus is likely to be responsible for increased incidence of Type 2 diabetes with advancing age after 40 years [4, 5].

Diabetes is an important health issue among postmenopausal women. Postmenopausal women with Type 2 diabetes have a much greater risk of developing cardiovascular disease than non-diabetic women. Currently the use of anti-diabetic drugs are very effective, however because of lack of patient compliance, clinical inertia, insulin resistance, lack of exercise and lack of dietary control leads to unsatisfactory control of hyperglycemia [6]. Therefore, this study was carried out to find the current prescribing pattern of anti-diabetic drugs and efficacy of these drugs in maintaining adequate glycemic control in diabetic post-menopausal women.

METHODOLOGY

A Prospective Observational study was conducted in the department of General Medicine OPD & IPD at Karuna Medical College vilayodi, Chittur, for a period of 6 months. Approval of the Institutional Ethical committee was obtained prior to commencement of the study. The study based on the inclusion and exclusion criteria were as:

Inclusion criteria

Female patient's age group above 45 years. (Cessation of menstrual cycle for 1 year) and treated for DM and the exclusion criteria: Post-menopausal patients who done hysterectomy, oophorectomy

Data collection forms were prepared as a tool for collection of data like demographic profile, past medication history, family history, age of menopause. To evaluate the therapeutic outcome of prescribed oral hypoglyceamics drugs (FBS, RBS) from the baseline to reviews (after 2 weeks- Review I & after 4 weeks Review II). The level of adherence was compared with reviews based on disease specific values.

Statistical Analysis

The data was entered in to the Microsoft Office Excel 2010 worksheet, mean; percentage and standard deviation (SD) were used. The data were analyzed using Graph pad prism Version 7 (One Way ANOVA) followed by Dunnett's Multiple Comparison test.

RESULTS

During the study period, a total of 76 prescriptions were assessed. 44 (57.8%) were found to have diabetes

patients. The mean average age of the patients was 61.97 ± 10.76 . Family history of diabetes mellitus was present in 27 (61.3%) patients. Co-morbid conditions associated with diabetes included Hypertension in 23 (52.2%), Coronary artery disease in (20.4%), Cerebro vascular disease in 7 (15.9%), and others include 5 (11.3%), [Table 1].

A total of 252 anti-diabetic drugs were prescribed during the study period. Biguanides were 80 (31.7%), Sulfonylureas were 65 (25.7%), Alpha Glucosidase Inhibitors were 25 (9.9%), Thiazolidinediones 8 (3.1%), followed by insulin preparations 27 (10.7%). Total of 47 FDCs were prescribed, [Table-2].

Metformin (Biguanides)was the most common prescribed individual oral hypoglycemic drugs followed by glimepiride (Sulfonylureas). And the level of significance of baseline blood sugar is compared with Review 1 (FBS P>0.05, RBS P \leq 0.001) and Review 2 (FBS P \leq 0.01, RBS P \leq 0.0001), [Table-3]

In the combination therapy, Metformin + Glimepiride was the most commonly prescribed FDCs in the hypoglycemic drugs and has a high level significance. The baseline blood sugar is compared with the Review 1(FBS \leq 0.05, RBS P>0.05) and Review 2 (FBS \leq 0.01, RBS P \leq 0.0001). It is followed by Voglibose + Glimepiride. Here also the base line blood sugar is compared with the Review 1 (FBS P>0.05, RBS P>0.05) and Review 2 (FBS P>0.05, RBS P \leq 0.001, [Table-4]

DISCUSSION

Choice of an anti-hyperglycemic drug should be guided by anticipated benefits in an individual patient, taking into consideration the genetic, physiological and environmental factors that caused the disease, concurrent medical condition like hypertension, CVD, renal impairment, adverse effects of drugs and cost..

During the study period, a total of 155 post-menopausal women with HT or DM or both were assessed. Out of 77(49.7%) were having HT, and 39 (25.16%) having DM and 39(25.16%) having HT and DM. The mean average age of the patients was 64.032 ± 10.492 and it is comparable with the previous study [5, 7].

In the present study the most commonly prescribed anti-diabetics agent were Biguanides (50%). The reasons for metformin was most preferred choice in the current study is probably because of the fact that it has many advantages like it does not cause hypoglycaemia and weight gain due to its peculiar mechanism of action beside having many non-glycaemic advantages like its utility to prevent insulin resistance, metabolic syndrome, fatty liver helping as an adjuvant in keeping check over dyslipidemia and hypertension [8-12].

Sulfonylureas (25%) were the secondary drug of choice followed by Biguanides. The choice was possibly because of its efficacy to achieve glycaemic control as



monotherapy or in combination, similar to the previous study [13]. And this is followed by insulin preparations (141%), Alpha glucosidase Inhibitors (16.66%) and Thiazolidinediones (4.83%). Metformin may be contraindicated as per ADA guidelines in elderly patients with age more than 65 years with renal insufficiency or significant heart failure [5, 10]. However in our study it was the most frequently prescribed drug both alone and in combination. The possible reason for it may be that mean age of the patients was 54 ± 7.8 years and there were only five patients with CKD.

Metformin (Biguanides)was the most common prescribed individual oral hypoglycemic drugs followed by glimepiride (Sulfonylureas) which is similar to the previous studies [7, 11, 13]. And the level of significance of baseline blood sugar is compared with Review 1 (FBS P>0.05, RBS $P\leq0.001$) and Review 2 (FBS $P\leq0.01$, RBS $P\leq0.0001$). While compared to the other classes of hypoglycemic drugs there is no significance changes in the blood sugar level is seen. Thus the study shows that the Biguanides and Sulfonylureas having a high level of significance in the reduction of blood sugar level in our study population [9, 10]. Thus, the result reflects that biguanides and sulfonylureas are still the choice of most physicians in the treatment of type 2 diabetes even for post-menopausal women.

Metformin + Glimepiride was the most commonly prescribed FDCs in the hypoglycemic drugs and has a high level significance, which implies the study population having a good outcome in controlling the blood sugar level. The baseline blood sugar is compared with the Review 1(FBS \leq 0.05, RBS P>0.05) and Review 2 (FBS \leq 0.01, RBS P \leq 0.0001). In most of the previous studies, this combination is prescribed after the failure with the metformin or glimepiride as monotherapy to achieve the glycemic control as initial therapy. It is followed by Voglibose + Glimepiride. Here also the base line blood sugar is compared with the Review 1 (FBS P>0.05, RBS P>0.05) and Review 2 (FBS P>0.05, RBS P \leq 0.001).

Table 1. Demographic Profile of Study Population

Parameters	n (%)
Female with DM	44 (57.8%)
Mean age (years)	61.9 ± 10.76
History of DM	27 (61.3%)
Co-existing Conditions	
Hypertension	23 (52.2%)
Coronary Artery disease	9 (20.4%)
Cerebro-Vascular disease	7 (15.9%)
Others	5 (11.3%)

Table 2. Prescribing Pattern of Oral Anti-Diabetics Drugs among Study Population.

Drug Classes	n (%)
Biguanides	80 (31.7%)
Sulfonylureas	65 (25.7%)
Alpha Glucosidase Inhibitors	25 (9.9%)
Thiazolidinediones	8 (3.1%)
Insulin Preparation	27 (10.7%)
Fixed Dose Combinations	47 (18.6%)

Table 3. Frequency of Distribution of Oral Hypoglycemic Drugs (Monotherapy) among Study Population

Monotherapy (n=36)	Baseline	Review 1	Review 2
Biguanides (n=18)	174.1 ± 79.02	131.44 ± 13.88***	112 ± 24.9****
RBS (mg/dl)			
FBS (mg/dl)	119.9 ± 26.19	98.5 ± 31.12^{ns}	$78.72 \pm 7.55 **$
Sulfonylureas (n=9)	160.3 ± 36.31	145.5 ± 21.45 ns	128.8 ± 10.7 ns
RBS(mg/dl)			
FBS(mg/dl)	137.55 ± 53.9	106.11 ± 19.41 ns	96.22 ± 20.6 *
Alpha Glucosidase Inhiibitors (n=6)	162.2 ± 19.3	160 ± 28.2 ns	162 ± 21.36 ns
RBS(mg/dl)			
FBS(mg/dl)	99.8 ± 12.2	91.8 ± 8.1 ^{ns}	93.3 ± 6.42 ns
Thiazolidinediones	176.6 ± 25.1	174 ± 14.2 ns	170 ± 26.4 ns

25 | P a g e AMERICAN JOURNAL OF BIOLOGICAL AND PHARMACEUTICAL RESEARCH



(n=3)			
RBS(mg/dl)			
FBS(mg/dl)	91.6 ± 10.4	84.6 ± 8.08 ns	78.3 ± 2.88 ns
<i>ns-</i> Non significant P>0.05, *- P≤0.05, **-	<i>P</i> ≤0.01, ***- <i>P</i> ≤0.001,	****- P0.0001 Versus Ba	se line Blood Sugar in
Monotherapy			

Table 4. Frequency of Distribution of Oral Hypoglycemic Drugs (Combination Therapy) among Study Population.

Combination Therapy (N=42)	Baseline	Review 1	Review 2	
Voglibose + Metformin (n=7)				
RBS(mg/dl)	199.3 ± 55	181.7 ± 25.9 ns	178.5 ± 30.7 ns	
FBS(mg/dl)	101.3 ± 8.9	94.1 ± 9.6 ^{ns}	91.2 ± 9.3 ns	
Voglibose + Glimepiride (n=11				
RBS(mg/dl)	250.8 ± 153.8	176.8 ± 57.04 ns	$108.36 \pm 19.2^{***}$	
FBS(mg/dl)	174.2 ± 105.3	129.2 ± 36.1 ns	93.2 ± 13.9 ns	
Metformin + Glimepiride (n=17			121.2 ± 17.3****	
RBS(mg/dl)	217.2 ± 55.0	178 ± 63.9 ns		
FBS(mg/dl)	145.7 ± 42.6	96.6 ± 14.2*	84.8 ± 4.7**	
Metformin + Gliclazide (n=5)	224 ± 57.9	210 ± 23.4 ns	$200 \pm 12.24^{\text{ ns}}$	
RBS(mg/dl)				
FBS(mg/dl)	104 ± 13.4	99.8 ± 7.08 ^{ns}	96 ± 23.02 ns	
V + G + M (n=2)	179.5 ± 20.50	160 ± 28.8 ns	155 ± 21.2 ns	
RBS(mg/dl)				
FBS(mg/dl)	105 ± 7.07	$102 \pm 4.2^{\text{ ns}}$	$99 \pm 1.4^{\text{ ns}}$	
ns- Non significant P>0.05, *- P≤0.05, **- P≤0.01, ***- P≤0.001, ****- P≤0.0001 Versus Base Line Blood Sugar in				
Combination therapy				

CONCLUSION

Menopause has an unfavorable effect on metabolism and hormones, thus is likely to be responsible for increased incidence of Type 2 diabetes with advancing age after 40 years. Oral hypoglycemic agents still dominate the prescribing pattern, but there was a shifting trend toward the use of insulin preparations in the management of Type 2 DM. Metformin was the most common prescribed individual oral hypoglycemic drugs followed by glimepiride. In combination therapy metformin with glimepride patients were achieved their target among DM patients.

ACKNOWLWEDGEMENT Nil

CONFLICT OF INTEREST

No conflict of interest

REFERENCES

- 1. Sudhaa Shar M, Vishal R, Tandon *et al.* (2006). Prescribing Pattern of Oral Anti-hyperglycaemic Drugs, Rationality and Adherence to American Diabetes Association (ADA) Treatment Guidelines among Type 2 Diabetes Mellitus (T2DM) Postmenopausal Women. *JCDR*, 7063.
- 2. Satinder B. (1998). Use of hormone replacement therapy in women with diabetes. Journal of Diabetes Nursing, 2, 2.
- 3. Carbaja and Alejandra AE. (2005). Contraception and Hormonal Therapy in Women with Diabetes Mellitus. J Diabetes Metab, 1000554.
- 4. Akshay AA, et al. (2003). Deshmukh. Prescribing pattern and efficacy of anti-diabetic drugs in maintaining optimal glycemic levels in diabetic patients. *Jbclinpharm*, 139731.
- 5. Nicola DG, NatarinC, Anne D, Gary SF. (2015). Adherence to NICE guidelines on diabetes prevention in the UK: Effect on patient knowledgeand perceived risk. *Primary Care Diabetes*, 9(6), 407-11.
- 6. S Nuthakki, S Pendyala, C Vallabhu et al. (2016). An Assessment of Anti-hyperglycemic Drug Utilization Patterns and Adherence to AACE/ACE 2015 Guidelines in South Indian Tertiary Care Teaching Hospital. *Ijopp*, 9, 3.
- 7. PavanGara MD, et al. (2016). A prospective study on prescribing pattern and drug interactions in type 2 diabetes patients with comorbid cardio complications in a teaching hospital. *Wjpps*, 5-6690.
- 8. Hassan Y, Mathialagan A, Awaisu A, Aziz NA, Yahaya R, Salhani A. (2009). Trend in the use of oral hypoglycaemic agents in an outpatient pharmacy department of a tertiary hospital in Malaysia. *Asian J Pharm Clin Res*, 2, 40-46.

26 | P a g e AMERICAN JOURNAL OF BIOLOGICAL AND PHARMACEUTICAL RESEARCH



- Cefalu WT. (2015). American Diabetes Association. Standards of Medical Care in Diabetes 2015. *Diabetes Care*, 38(1), S1-S90.
- 10. Vries TPGM, Henning RH, Hogerzeil HV, Fresle DA. (1995). Guide to good prescribing: a practical manual. Geneva; World health Organization. *Action Programme on Essential Drugs*, 14-31.
- 11. Qasim MA, Ahmed SS, Ali MJ, Maha HI, Ekhlas KH, Saja MS. (2012). Adherence to the Standard Guidelines for Prescription of Antidiabetic Agents in Patients with Type 2 DM. *Journal of Applied Pharmaceutical Science*, 2(7), 138-43.
- 12. Mirza Atif Beg, Shaktibala Dutta et al. (2014). A study on drug prescribing pattern in hypertensive patients in a tertiary care teaching hospital at Dehradun, Uttarakhand. *Ijmspd*, 10.5455.
- 13. Adibe MO, Aguwa CN, Ukwe CV, Okonta JM, Udeogaranya PO. (2009). Outpatient utilization of anti-diabetic drugs in the South Eastern Nigeria. *Int J Drug Dev Res*, 1, 27-36.
- 14. Hasamnis A and Patil S. (2009). Prescription pattern study in type 2 diabetes mellitus in an Indian referral hospital. *Internet* J Pharmacol, 7, 1.
- 15. Sultana G, Kapur P, Aqil M, Alam MS, Pillai KK. (2010). Drug utilization of oral hypoglycaemic agents in a university teaching hospital in India. *J Clin Pharm Ther*, 35, 267-77.

