Identification Of Oral Antidiabetic Drug Interactions In Polypharmacy Prescription Of Patients Diabetes Mellitus At Jember Hospital

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Article Info	ABSTRACT
Keywords: drug interactions, antidiabetic, screening, recipe, polypharmacy	Background: Diabetes mellitus (DM) is a metabolic disorder characterized by an increase in blood glucose due to decreased insulin secretion by pancreatic beta cells, disruption or insulin resistance. The rate of DM with comorbidities or complications is increasing, usually receiving more than three types of medication (polypharmacy). The potential for drug interactions in diabetes patients is still very common. There were 186 potential drug interactions, with 16.2% potentially causing hyperglycemia and the remainder causing hypoglycemia. This can be caused by the large number of drugs that are often used (polypharmacy or multiple drug therapy). Objective: to identify potential oral antidiabetic drug interactions in screening polypharmacy prescriptions for type 2 diabetes mellitus patients in hospitals. Method: This research was conducted at one of the Jember Regency Hospitals. This type of research is descriptive research with retrospective data collection. The research sample was 80 using the Slovin formula with random sampling technique. Data analysis is displayed in the form of frequencies and percentages which are then processed using Microsoft Excel and SPSS. Results: In this study it was found that male patients were (38.8%) and female were (61.3%). The age group is dominated by patients 51 – 60 years old (42.5%). Polypharmacy consisted of at most 5 drugs (45.0%), drug interactions occurred in 65 prescriptions (81.3%) with the severity of drug interactions being moderate, 38 potential events (47.5%), major, 6 potential events (7.5%). %), minor 21 potential events (26.3%), and no interaction as many as 15 potential events (18.8%). Conclusion: This study found that the potential interactions for oral antidiabetic drugs in polypharmacy screening were mostly moderate interactions (47.5%) with 38 potential events.
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INTRODUCTION

Diabetes Mellitus (DM) is a metabolic disease characterized by high blood sugar levels due to impaired insulin secretion, insulin action or both (Rusdi, 2020). Diabetes is defined as a metabolic disorder associated with increased blood sugar levels (hyperglycemia) due to damage to insulin secretion or insulin action. (Yosmar et al., 2018)

The rate of DM with comorbidities or complications is increasing. Type 2 DM patients are screened for polypharmacy prescriptions, usually receiving more than three types of

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medication (Risal et al., 2021). DM disease is caused by the lifestyle of people who are not aware of early detection of DM disease, lack of physical activity, and wrong eating patterns. Lifestyle can be a factor in the occurrence of DM, such as diet and physical activity. The habit of consuming unhealthy foods and lack of physical activity can lead to a high risk of developing type 2 DM. Due to its chronic and progressive nature, the increasing number of sufferers, and the various negative impacts it causes, diabetes mellitus needs to be closely monitored. (Parman & Nyompa, 2018).

Polypharmacy was defined as a patient's daily use of three or more medications. Patients with polypharmacy are at high risk of experiencing potential drug interactions with significant clinical impact. Polypharmacy often occurs in patients who suffer from DM accompanied by comorbidities or complications, both of which have very specific treatments so they will definitely require more medication to treat them. Polypharmacy usually results in drug interactions (Sengaji et al., 2023).

Drug interactions are one of eight categories of drug-related problems that can affect patient clinical outcomes. With the increasing complexity of drugs used in current treatment and the tendency for polypharmacy to occur, the possibility of drug interactions is increasing (Noviyanto et al., 2023). Drug interactions are categorized into 3, namely Major (large), Minor (small), Moderate (medium) depending on the severity of the results and quality of documentation (Fitri et al., 2022).

The potential for drug interactions in diabetes patients is still very common. This can be caused by the large number of drugs that are often used (polypharmacy or multiple drug therapy). This drug interaction problem is a very important problem to identify in order to achieve the desired therapeutic results, especially in patients with special conditions such as type 2 DM patients who receive drug therapy in varying amounts and types. (Retnowati et al., 2023).

In research at Otanaha Hospital, Gorontalo City, polypharmacy that had the potential to experience drug interactions were minor (48%), moderate (32%), major (4%)(Rasdianah & Gani, 2021). There were 186 potential drug interactions, with 16.2% potentially causing hyperglycemia and the remainder causing hypoglycemia. The main role of pharmacy in drug interactions is monitoring drug use and providing solutions to clinical problems that occur (Handayani & Saibi, 2019).

Based on this problem, it is necessary to conduct a study that discusses and identifies the potential for oral antidiabetic drug interactions in polypharmacy prescription screening that occurs in type 2 DM patients. So this research was conducted to determine the potential for drug interactions in type 2 DM patients in one of the homes. Sick in Jember in 2022.

METHODE

This research was conducted at Hospital, Jember, East Java. This type of research is descriptive research with retrospective data collection, namely research obtained based on information or searching for type 2 DM patient prescription data from the patient's medical record data source. The population in this study was 600 medical record data from outpatients suffering from type 2 DM for the period January – December 2022 at Hospital,

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Jember. The sample in this study was medical record data from patients diagnosed with type 2 DM who met the inclusion and exclusion criteria. Sampling was calculated using the slovin formula using random sampling techniques and obtained results from 80 medical record samples.

The instrument in this research used in data collection was a data recapitulation sheet. The procedure for collecting data on 600 patient medical records according to the population and medical records that meet the inclusion criteria is 400 samples of medical records. The medical records were observed/observed for the patient's identity (age, gender and number of drugs) and then examined what drugs were used on the patient. Next, the drugs used in DM patients are applied to Medscape and seen whether there are drug interactions. If there is a drug interaction, whether the interaction is in the moderate, minor or major category. Data was processed using Microsoft Excel and SPSS. Data analysis was carried out through univariate analysis. Univariate analysis was carried out for each variable based on the research results. The purpose of this analysis is to determine the frequency and percentage of each variable. Using Microsoft Excel as a data analysis tool facilitates fast and efficient visualization and interpretation of data. SPSS was used to determine SD (standard deviation) and mean.

RESULT AND DISCUSSION

Research entitled potential interaction of oral antidiabetic drugs in screening polypharmacy prescriptions for diabetes mellitus patients at Hospital aims to identify potential interactions of oral antidiabetic drugs in screening polypharmacy prescriptions for diabetes mellitus patients at Hospital. This research was conducted in March-April 2024 at Hospital Jember. The sample used was medical records of type 2 DM patients at Hospital for the period January – December 2022. This research received ethical approval with No.156/KEPK/UDS/II/2024. The following are patient characteristics based on gender and age:

Table 1. Patient Characteristics Based on Gender and Age

Characteristics	Amount	Percentage (%)
1. Gender		
Man	31	38,8 %
Woman	49	61,3 %
Average	3,30	
standard deviation	0,973	
2. Age		
33-40 years old	5	6,25 %
41-50 years old	7	8,75 %
51-60 years old	34	42,5 %
61-70 years old	27	33,75 %
71-76 years old	7	8,75 %
Average	1,61	
standard deviation	0,490	
Total	80	100 %

Source: Medical record data

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Based on data from table 1, it was found that the characteristics of female patients dominated (61.3%) of the total patients. Research at Gunung Maria Tomohon Hospital found similar results in terms of female gender dominance of (58.70%)(Poluan et al., 2020). The predominance of female patients was found in previous research conducted by Poluan et al (2020) (Interaksi et al., 2023). The researcher's assumption is that women are at higher risk of developing type 2 DM. This is because women are more at risk of developing diabetes because physically women are more likely to experience a greater increase in body mass index. Monthly cycle syndrome (premenstrual syndrome), due to post-menopause which causes the distribution of body fat to easily accumulate due to the hormonal process so that women are at risk of suffering from type 2 diabetes mellitus (Rasdianah et al., 2023).

Table 2. Patient characteristics based on number of drugs

Number of Drugs	Frequency	Percentage (%)
3	2	2,5 %
4	3	3,8 %
5	36	45,0 %
6	17	21,3 %
7	13	16,3 %
8	8	10,0 %
9	1	1,3 %
Total	80	100 %

Sumber : Data rekam medis

Based on data from table 2, it shows that the group with 3 drugs 2 prescriptions (2.5%), the group with 4 drugs 3 prescriptions (3.8%), the group with 5 drugs 36 prescriptions (45.0%), the group with 6 drugs 17 prescriptions (21.3%), group with 7 drugs 13 prescriptions (16.3%), group with 8 drugs 8 prescriptions (10.0%) and group with 9 drugs 1 prescription (1.3%). As you get older, the use of a combination of several drugs at once is very necessary. This combination is necessary because in old age, a person will suffer from diabetes mellitus with other comorbidities so this combination cannot be avoided.

Table 3. Patient characteristics based on potential drug interactions

Drug Interactions	Frequency	Percentage (%)
Yes	65	81,3 %
No	15	18,8 %
Total	80	100 %

Source: secondary data

Based on data from table 3, it shows that in this study there were 65 prescriptions that experienced drug interactions (81.3%) and 15 prescriptions that did not experience drug interactions (18.8%). This drug interaction occurs due to comorbidities that cause patients to need various kinds of drugs or polypharmacy in their therapy. According to previous research, results (90.3%) experienced drug interactions (Rahmawaty & Hidayah, 2020). According to researchers, one of the problems that arises in patient prescribing behavior and can influence

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patient clinical outcomes is that more drugs are used. This is what will cause patients to experience polypharmacy, one of which can potentially cause drug interactions. Drug interactions are one of eight categories of drug-related problems that can affect patient clinical outcomes. With the increasing complexity of drugs used in current treatment and the tendency for polypharmacy to occur, the possibility of drug interactions is increasing. So this drug interaction is very important both clinically if it results in increased toxicity or reduces the effectiveness of therapy.

Table 4. Characteristics of drug interactions based on clinical significance level classification

Drug Interaction Criteria	Frequency	Percentage (%)
Moderate	38	47,5 %
Major	6	7,5 %
Minor	21	26,3 %
Total	65	100 %

Based on data from table 4, it shows that in this study the types of drug interactions based on the level of clinical significance that occurred in type 2 DM prescriptions at Hospital were moderate with 38 prescriptions (47.5%), major with 6 prescriptions (7.5%), minor there were 21 prescriptions (26.3%). According to previous research at one of the pharmacies in the city of Bandung, they found similar results, namely moderate was the highest result at 134 (69.07%)(Herdaningsih et al., 2016). The researcher's assumption is that the effects resulting from moderate interactions can cause changes in the patient's clinical condition so that this requires appropriate changes in therapy (Mayasari et al., 2023). The highest potential for drug interactions was obtained by moderate (moderate) 47.5% with 38 prescriptions, and the least was obtained by major (large) 7.5% with 6 prescriptions. The most common drug interaction based on moderate severity is metformin and amlodipine. The effects that occur on changes in clinical conditions in patients require changes in therapy. Metformin is the only biguanide group currently recommended for the treatment of type 2 DM. This drug is recommended as first-line treatment because of its good efficacy and low incidence of side effects. Therefore, great care must be taken in selecting other drugs that do not interact with metformin to ensure that metformin achieves the expected therapeutic effect. (Saibi et al., 2018). Meanwhile, amlodipine is a hypertension drug (lowers high blood pressure) which is classified as a calcium channel blocker (Rofifah, Dianah, 2020). If metformin is used simultaneously with amlodipine, it can reduce the effectiveness of metformin through antagonistic pharmacodynamic mechanisms, resulting in very low blood glucose levels or hypoglycemia.

CONCLUSION

This study concluded that the potential interactions found for oral antidiabetic drugs in polypharmacy screening were mostly moderate interactions (47.5%) with 38 potential events.

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