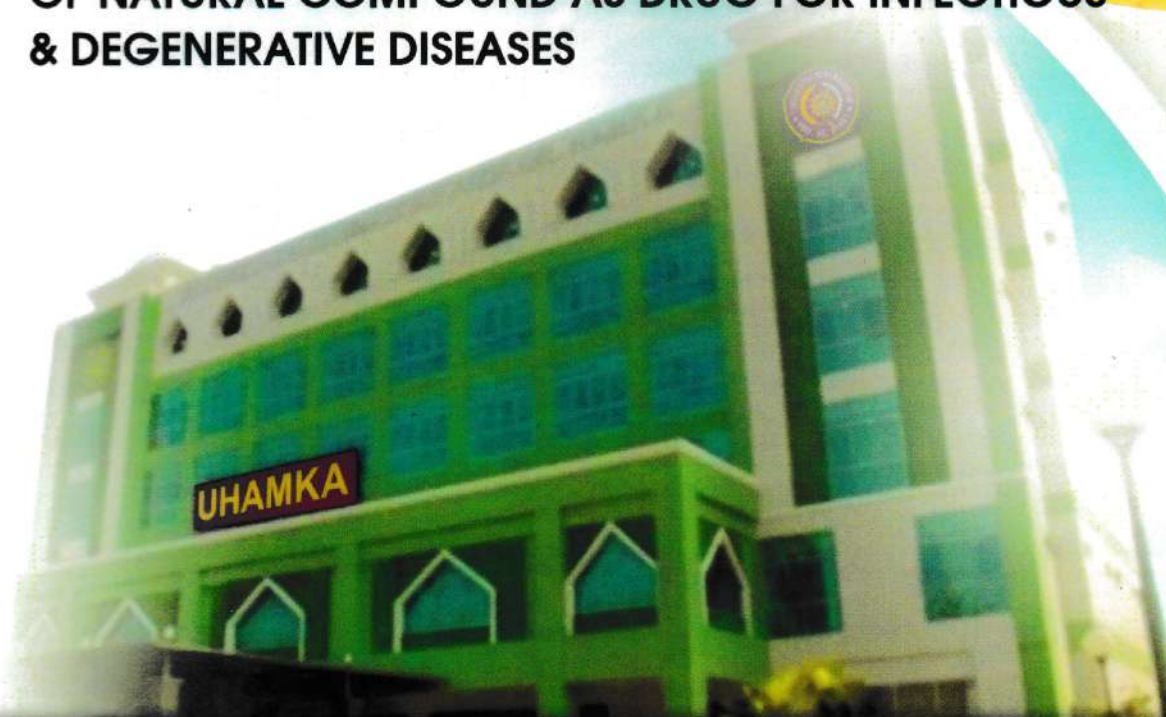


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CHALLENGES OF THE DEVELOPMENT
OF NATURAL COMPOUND AS DRUG FOR INFECTIOUS
& DEGENERATIVE DISEASES



Faculty of Pharmacy & Sciences
University Of Muhammadiyah Prof. DR. HAMKA
(UHAMKA)
Jakarta, January 10, 2015



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CHALLENGES OF THE DEVELOPMENT OF NATURAL COMPOUND AS DRUG

FOR INFECTIOUS & DEGENERATIVE DISEASES

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IDENTIFICATION DRPs IN WRONG DRUG CATEGORY AND DRUG INTERACTION TO TYPE-2 DIABETES MELLITUS INPATIENTS IN GATOT SOEBROTO ARMY CENTRAL HOSPITAL JAKARTA

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ABSTRACT

Drug Related Problems (DRPs) are unwanted incidence that happen to patients associated with drug therapy. Among the categories of DRPs are incorrect drug selection and drug interactions. which are often found in common patients who have the disease. such as type 2 diabetes mellitus. This study aimed to determine the incidence of DRPs with category of incorrect drug selection and drug interactions in patients with type 2 diabetes mellitus in Gatot Subroto Army Central Hospital Jakarta. This research was conducted with non-experimental descriptive design and data acquisition retrospectively for medical record data.

The patient's criteria as subject in this study were inpatient in Gatot Subroto Army Central Hospital in Jakarta. diagnosed with type-2 diabetes mellitus. have no pregnancy during the study. receive diabetes mellitus medications. and have complete medical record data. The data were analyzed descriptively. The results showed there were 42 patients diagnosed with diabetes mellitus type 2 in which 50% of men and 50% of women. with aged 40-60 years 64.29% and ≥ 61 years 35.71%. Single hypoglycemic drugs most widely used class of short-acting insulin as much as 83.3%. hypoglycemic drug combination is the most widely used short-acting insulin + long-acting insulin as much as 54.76%. From 42 patients. 12 patients (28.57%) experienced DRPs with category of incorrect drug selection including the used of unsafe drugs 19.05%. incorrect drugs 7.14%. and drug combinations that are not necessary 2.38 %. On DRPs with category of drug interactions. patients can receive more than one drug interactions. From 42 patients observed 112 drug interactions. there were 47 (41.96%) cases were interaction between sulfonylurea with other drugs. cause increasing effect of sulfonylurea drugs that pose an increased risk of hypoglycemic. 29 (69.05%) cases were interaction between sulfonylurea with other drugs caused decreased effect sulfonylurea and 36 (32.14%) cases were interaction between metformin with other drugs caused increasing the risk of hypoglycemic effect.

Keywords: Drug Related Problems (DRPs). incorrect drug selection. drug interactions and type-2 diabetes mellitus.

INTRODUCTION

Type 2 diabetes mellitus is a disease that is concern of public. because this is a chronic disease which is found in many people. patients who suffer type 2 diabetes

mellitus could have complications. this disease is a degenerative disease and it is not curable but can be controlled in order to avoid complications (ADA. 2003).

Incorrect drug selection is DRPs events that need to be considered. because the drug is one of the most important elements in health care efforts. Treatment and prevention of various diseases can not be separated from drug therapy. Various of drug selection are currently available. it needs careful consideration in choosing a drug for a disease. if there are wrong drug selection. it will result in therapeutic failure (Cipole. 98).

Research has been done in the General Hospital of Dr. Soetomo on Drug Related Problems study in patients with type 2 diabetes mellitus in Dr Soetomo Hospital. The results of the analysis in patients with type 2 diabetes mellitus which is also accompanied by other diseases. but the patient did not receive all the drugs needed to treat diseases suffered by 25%. The percentage of patients with diabetes mellitus type 2 is receive diabetes mellitus medications are also receive other drugs that are not necessary. because there is no indication for receive the drug by 5.56%. Percentage wrong drug selection in patients with type 2 diabetes mellitus caused by the condition of the patient. with the presence of complications suffered by 12.04%. This research was conducted to determine the incidence of DRPs with category of incorrect drug selection and drug interactions in patients with type 2 diabetes mellitus in Gatot Subroto Army Central Hospital Jakarta.

RESEARCH METHODS

Design Research

This research was conducted with non-experimental descriptive design and data acquisition retrospectively for medical record data. Data were retrieved from the medical records of patients diagnosed with diabetes mellitus type 2 in Gatot Subroto Army Central Hospital Jakarta.

Materials and Devices Research

The tool used was data sheet collection. While the materials used were the medical records of patients with type 2 diabetes mellitus.

Sample Research (Inclusion Criteria)

- a. Male and female patients ≥ 40 years were diagnosed with type 2 diabetes mellitus.
- b. Patients hospitalized at Gatot Subroto Army Hospital from June-August 15, 2010.
- c. Medical records include the diagnosis of disease, anamnesa, fasting plasma glucose ≥ 126 mg / dl, plasma glucose ≥ 200 mg / dl.
- d. Patients have no pregnancy during the study
- e. Patients who received diabetes mellitus medications

Data Source and Data

- a. Data Source : data source from medical record of patients diagnosed with diabetes mellitus type 2, then observed the use of the medicine from June 15 to August 15, 2010.
- b. Data : The data that will be taken include the patient's name, age, gender, diagnosis of disease, anamnesa, fasting plasma glucose, plasma glucose, drugs regimen, adverse effects and minimum laboratory data containing creatinine data. The results of discussions with doctors and nurses.

1. Data Analysis

Results were analyzed with descriptive method to determine :

- a. Patients characteristics include gender and age.
- b. Characteristics of hypoglycemic drugs.
- c. DRPs identification with category of incorrect drug selection and drug interactions.

RESULTS AND DISCUSSION

1. Patients Characteristics include Sex and Age.

Patients with type 2 diabetes mellitus by gender were found 42 patients in which 21 (50%) men and 21 (50%) women. The majority of patients with type 2 diabetes mellitus were patients with aged under 60 years. There were 27 Patients

(64.29%) with aged 40-60 years and 15 patients (35.71%) with aged ≥ 61 years. Data can be seen in Table 1.

Table 1. Characteristics of Patients by Sex and Age

Characteristics of Patients		Number of Patients	Percent
Gender	Men	21	50
	Women	21	50
	Total	42	100
Age (years)	40 – 60 (adult)	27	64.29
	≥ 61 (elderly)	15	35.71
	Total	42	100

2. Type of Hypoglycemic Drugs

a. Single hypoglycemic drugs

Hypoglycemic drugs were used in patients with type 2 diabetes mellitus include sulfonylurea 12 cases (28.56%), biguanide 8 cases (19.05%), short-acting insulin 35 cases (83.33%), 23 cases with long-acting insulin (54.76%). The data presented in Table 2.

Table 2. The use of single Hypoglycemic Drug in Patients Diabetes Mellitus Type 2

Group	Name of Drug	Number of Patients	Percent
Sulfonylurea	Glibenclamide	5	11.90
	Gliquidone	4	9.52
	Glimepiride	2	4.76
	Glicazid	1	2.38
Biguanide	Metformin	8	19.05
	InsulinHM Recombinant	26	61.90

Short Acting Insulin	DNAoriginal		
	Humalog insulin lispro	8	19.05
	Insulin Glulisin	1	2.38
Long Acting Insulin	Glargine insulin	23	54.76
	Total	77	

b. Hypoglycemic drugs with combination

Hypoglycemic drug combination were used in patients with type 2 diabetes mellitus include a combination of two drugs known as sulfonylureas 1 case (2.38%). sulfonylureas with biguanide 4 cases (9.52%). Combination sulfonylurea with biguanide + short-acting insulin + long-acting insulin 1 case (2.38%). biguanide with short-acting insulin 1 case (2.38%). short-acting insulin with a long-acting insulin 23 cases (54.76%). The data presented in Table 3.

Table 3. Combination Hypoglycemic Drug In Patients Diabetes Mellitus Type 2

GroupDrugs	Type of Drug	Number	Percent
Sulfonylurea + Sulfonylurea	Glimepiride + Glibenclamide	1	2.38
	Metformin + Glibenclamide	2	4.76
Sulfonylurea + Biguanide	Metformin + Glicazid	1	2.38
	Metformin + Glimepiride	1	2.38
Sulfonylurea + Biguanide + Short Acting Insulin + Long Acting Insulin	Glikazid + Metformin + Insulin HM + Glargine Insulin	1	2.38
Biguanide + Short Acting Insulin	Metformin + Insulin HM	1	2.38
Short Acting Insulin + Long	Insulin HM + Glargine Insulin	22	52.38

Acting Insulin	Insulin Glulisin + Glargine Insulin	1	2.38
	Total	30	71.42

3. DRPs Identifications

a. Incorrect Drug Selection

The results showed the presence DRPs with category of incorrect drug selection 12 (28.57%) patients with type 2 diabetes mellitus. DRPs with highest incidence was incorrect drug selection including 8 patients (19.04%) the use of unsafe drugs. 3 patients (7.14%) the use of incorrect drugs. 1 patient (2.38%) the use of drug combination that are not necessary. The use of drugs in patients with type 2 diabetes mellitus lead to incorrect drug selection can be seen in Table 4.

Table 4. Types of Drugs and DRPs with Category of Incorrect Drug Selection in patients with Type-2 Diabetes Mellitus

Causes of DRPs	Type of Drug	Drug Effects	Number of patients	Percent (%)
The use of unsafe drugs	Dexamethasone	Effect on increasing diabetes mellitus and hypertension	1	2.38
	Cilostazol	Having side effects on diabetes mellitus and hypertension	2	4.76
	Siprofloxacine	Having side effects on diabetes mellitus and hypertension	5	11.90
The use of incorrect drugs	Spirolacton	Incorrect drug selection in diabetes mellitus patients with hypertensive (Chobanion. et al. 2004)	2	4.76
	Clonidin	Incorrect drug selection in diabetes	1	2.38

		mellitus patients with hypertensive (Triplit. et al. 2005)		
Incorrect combination	Glimepiride + Glibenclamide	Incorrect combination because both sulfonylurea class	1	2.38

b. Drug Interactions

The results observed from 42 patients showed 112 cases were presence DRPs with category of drug interactions. where patients may receive more than one drug interactions. Drug interaction between sulfonylurea with other drugs as many as 47 cases (111.9%) increasing sulfonylurea effect cause increased risk of hypoglycaemic and 29 cases (69.05%) were decreased the sulfonylurea effects cause sulfonylurea effect become inadequate. Drug interaction metformin with other drug as many as 36 cases (32.14%) were increased metformin effect cause risk of hypoglycaemic.

Table 5. Types of Drug and DRPs Categories of Drug Interactions In patients with diabetes mellitus type 2

Type of drug		Effects	Number of case	Percen t (%)
Drug A	Drug B			
Sulfonylurea	Clopidogrel	Increased sulfonylurea effects: increased hypoglycemic effect due to various mechanisms such as a decrease in hepatic metabolic. renal excretion barriers. expulsion of protein binding. decreased plasma glucose. changes in carbohydrate metabolism	5	11.90
	Cilostazol		1	2.38
	Acetosal		14	33.33
	Naenoxaparin		2	4.76
	Gemfibrozil		3	7.14
	Ranitidine		15	35.71
Sulfonylurea	Bisoprolol	Reduction in the effects of sulfonylureas: hypoglycemic effect decreased. due to a variety of mechanisms that increased hepatic metabolism. decreased insulin	4	9.52
	Carvediol		1	2.38
	Amlodipin		13	30.95
	Nifedipin		4	9.52

	Dexametasone	release. increased urinary excretion	1	2.38
	Phenitoin		1	2.38
	Isoniazide		1	2.38
	Rifampicin		1	2.38
	CaCO ₃		1	2.38
	Na-bikarbonate		2	4.76
Sulfonylurea	Ciprofloxasin	Increased effect of sulfonylureas: hypoglycemic effect occurs potentiation	5	11.90
Sulfonylurea	Glicosyde digitalis (digoxin)	Increased effect of sulfonylureas: increased serum levels of digitalis glycosides	2	4.76
Metformin	Nifedipine	Nifedipine increases the absorption of metformin: metformin C _{max} and AUC increased by respectively 20 and 9% of the metformin is excreted in the urine increased	4	9.52
Metformin	Furosemide	Furosemide increases plasma levels of metformin. the C _{max} and AUC increased by 22% to 15%. Renal excretion is not a significant change. C _{max} and AUC of furosemide lower 31 and 12%. t _{1/2} terminals down 32% without a significant change in furosemide renal clearance.	15	35.71
	Digoxin	Drug cationic (digoxin. ranitidine) which eliminated any potential kidney interact with metformin and compete on secretion system / tubular transport. metformin levels may increase.	2	4.76
Metformin	Ranitidine		15	35.71

CONCLUSION

1. The results showed that from 42 patients diagnosed with type 2 diabetes mellitus were found 50% men and 50% women. There were 27 Patients (64.29%) with aged 40-60 years and 15 patients (35.71%) with aged ≥ 61 years.
2. Single hypoglycemic drugs most widely used class of short-acting insulin is as much as 83.3%. while the hypoglycemic drug combination is the most widely used short-acting insulin + long-acting insulin as much as 54.76%.
3. DRPs Identification :
 - a. From the 42 patients. 12 patients (28.57%) experienced DRP with category of incorrect drug selection include 19.05% the use of unsafe drugs. 7.14% the use of incorrect drugs. and 2.38 % drug combinations that are not necessary.
 - b. From 42 patients observed 112 cases drug interactions. There were 47 (41.96%) cases interaction between sulfonylurea with other drugs cause increased sulfonylurea effect so that increased risk of hypoglycaemia. and 29 (25.89%) cases were decreased sulfonylurea effect. While interaction Metformin with other drugs 36 (32.14%) cases were increased metformin effect and risk of hypoglycaemia.

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