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RESEARCH ARTICLE

The risk of combined use of herbal and conventional medicines in diabetic patients

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Abstract

Background: The prevalence of diabetes mellitus (DM) continues to increase due to changes in human lifestyle. Adherence to taking medication becomes one of the keys to successful blood glucose control. Unfortunately, not all people with DM are obedient to take medicine because of various reasons, such as fear of the side effects. To avoid some concerns about medicine, some prefer to add herbal medicine. **Objective:** This study determined whether the addition of herbal medicine to conventional drugs increases the incidence of hypoglycemia. **Methods:** This study was carried out from October 2019-March 2020 on 350 Madurese patients with DM in 33 primary healthcare centres of Madura. Data were collected using a valid and reliable questionnaire. The independent variable in this study was the use of herbal medicine, while the dependent variable was the incidence of hypoglycemia. **Results:** About 41.4% of respondents used herbal medicine in addition to conventional drugs. Among those who consumed herbal medicine, 59.3% experienced hypoglycemia, while 24.4% did not take herbal medicine. The results showed a significant relationship between the use of herbal medicine and the incidence of hypoglycemia with a p -value of 0.0001. **Conclusion:** The use of herbal medicine increased the incidence of hypoglycemia.

Introduction

Diabetes mellitus (DM) is a non-infectious chronic disease that has become one of the major global health problems (Asiimwe, Mauti & Kiconco, 2020). Around 463 million people had diabetes in 2019 (Saeedi *et al.*, 2019). Without strategic actions, this number will increase to 578 million people in 2030 and largely to 51% or around 700 million people in 2045 (Saeedi *et al.*, 2019). National strategies for early diagnosis and effective management, as well as cost-effective diabetes prevention programs, are required to reduce this number (Basit *et al.*, 2018).

Therefore, some necessary ways are to improve clinical guidelines, educate the public regarding the downsides of unhealthy lifestyles, control overweight and obesity in people, and design policies to reduce environmental pollution (Lin *et al.*, 2020).

The current treatment strategies for DM patients are more focused on controlling blood glucose levels

(Wang *et al.*, 2020). Adherence to taking medication is one of the successful keys to controlling the blood glucose levels of DM people. Unfortunately, not all people with DM take their drugs as prescribed in the long term. Some patients might be nursing the fear of side effects, forget to take medicine, and most importantly feel tired from taking medicine for their whole life (Athiyah & Rahem, 2017).

To reduce these concerns, such patients add herbal medicine which is considered safe for consumption in the long term (Ekar & Kreft, 2019). Sometimes, DM patients tend to use only herbal medicine based on relatives' suggestions (Cengiz & Budak, 2019). Such a habit might cause unwanted side effects.

Blood glucose control and quality of life between patients who took complementary and alternative medicine (CAM) and patients who did not, showed no significant difference (Miller *et al.*, 2009); the use of CAM was more common in patients with poor metabolic control (Cengiz & Budak, 2019), and CAM

could be toxic to them (Amjad *et al.*, 2019). Some herbal medicine even causes hypoglycemia (Goksu *et al.*, 2010) which can increase the risk of complications, such as heart disease and diabetic peripheral neuropathy in people with DM (Jiang *et al.*, 2014).

Indonesia has wide tropical forests with various species of plants that can be used as raw materials for traditional medicine (Yunus & Dida, 2017). With this natural resource, Indonesians such as those on Madura Island prefer to consume herbs to maintain health and prevent diseases (Wahyu & Rahem, 2020). It is important for health professionals to further assess the use of herbal remedies in addition to conventional drugs and provide appropriate counselling to the public (Cengiz & Budak, 2019). Hence, this study is aimed to determine whether how the use of herbal medicine in addition to conventional drugs contributes to the incidence of hypoglycemia in people with diabetes mellitus in Madura Island, East Java.

Methods

This observational study used a cross-sectional design. It was conducted in 33 primary healthcare centres in four districts of Madura Island, East Java. Data collection was carried out in person from November 2019 to January 2020. The respondents were the Madurese with Type 2 diabetes mellitus., Some of the inclusion criteria were those who underwent routine treatment in the primary healthcare centres within the past three months (September, October, and November) in 2019; willing to participate by filling out informed consent forms; DM patients receiving oral antidiabetic drugs from the primary healthcare centres; having abilities to read, write, and speak in the Indonesian language; neither pregnant nor breastfeeding; and living in the working area of primary healthcare centres.

The sample size in this study was 350 respondents calculated based on a formula by Lemeshow *et al.* (1990) as follows (Ogston *et al.*, 1991):

$$n = \frac{Z_{1-\frac{\alpha}{2}}^2 P \cdot (1 - P) \cdot N}{d^2(N - 1) + Z_{1-\frac{\alpha}{2}}^2 P(1 - P)}$$

N = number of populations; P = proportion of population; d = degree of tolerable error.

The Z value for 0.05 is 1.96; the proportion of the population is 0.5; and the degree of tolerable error is 0.05; the number of populations obtained was N = 1853 DM patients.

Taking the criteria into account, there were 318 respondents plus 10% who met the inclusion criteria,

and in total the number of respondents was 350 respondents selected through non-random sampling. The research variables consisted of adherence to health control, medication adherence, reasons for not adhering to medication, herbal medicine consumption, and hypoglycemia. The instrument used in this study was a questionnaire compiled by the researchers themselves. The questionnaire used had been tested for content and empirical validity and reliability to ensure the suitability of the instrument with the indicators of the variables.

Results

Out of 350 respondents shown in Table I, 272 (77.7%) respondents attended health check-ups in the primary healthcare centres monthly, of which 98 (36%) respondents were not compliant with taking drugs.

Table I explains the major reason for the non-adherence to taking medication. Most of the respondents forgot to take medication (37.8%).

Table I: Research variables

| | Frequency | Percentage (%) |
|---|------------|----------------|
| Adherence to health control | | |
| Not routine | 78 | 22.3 |
| Routine | 272 | 77.7 |
| Total | 350 | 100 |
| Adherence to taking medication for 272 respondents | | |
| Not adhering | 98 | 36 |
| Adhering | 174 | 64 |
| Total | 272 | 100 |
| Reasons for not adhering to taking medication (98 respondents) | | |
| Bored | 32 | 32.7 |
| Forget | 37 | 37.8 |
| Feeling healthy | 16 | 16.3 |
| Cannot stand the side effects | 7 | 7.1 |
| Difficult to take medicine | 6 | 6.1 |
| Total | 98 | 100 |
| The habit of using herbs other than oral anti-diabetic drugs | | |
| No | 205 | 58.6 |
| Yes | 145 | 41.4 |
| Total | 350 | 100 |
| The incidence of hypoglycemia | | |
| No complaint | 214 | 61.1 |
| Hypoglycemia | 136 | 38.9 |
| Total | 350 | 100 |

The cross-tabulation results stated in Table II showed that respondents (59.3%) who consumed herbal medicine experienced hypoglycemia, while 24.4% of those who did not take herbal medicine experienced glycemia. Based on the Chi-square testing analysis, ($p = 0.0001$), this study showed a significant difference in the incidence of hypoglycemia between respondents who consumed herbs and those who did not.

Table II: Incidence of hypoglycemia

| Herbs consumption | Hypoglycemic effects | | | | | |
|-------------------|----------------------|-------------|--------------------|-------------|------------|------------|
| | No hypoglycemia | | Hypoglycemia | | Total | |
| | n | % | n | % | n | % |
| Not consuming | 155 | 75.6 | 50 | 24.4 | 205 | 100 |
| Consuming | 59 | 40.7 | 86 | 59.3 | 145 | 100 |
| Total | 214 | 61.1 | 136 | 38.9 | 350 | 100 |
| Chi-square | $p = 0.0001$ | | Odd ratio = 14.519 | | | |

Discussion

This study found that, as indicated in Table I, even though the respondents did routine check-ups, they poorly adhere to medication. Similarly, Rahem et al. also found in their study that many patients did not comply with medication for various reasons (Rahem, Athiyah & Setiawan, 2021).

Table I also highlighted that the major reason for non-compliance was forgetfulness. This result is to the research conducted by Rahem et al. (2019) stating that DM patients who participated in the chronic disease management program claimed they mostly forgot to take medication (Rahem et al., 2019). Due to several reasons beyond non-adherence to medication, it is necessary for pharmacists to always motivate and educate patients on the importance of taking medication.

This current study found interesting facts that apart from taking oral antidiabetic drugs, the respondents also took herbal medicine (41.4%) which reflects the culture of the Madurese community, who take herbal medicine for daily health maintenance (Utami et al, 2020).

The incidence of hypoglycemia was identified in 136 (38.9%) cases as shown in Table I. Based on the Chi-square results (Table II), there was a significant difference in the incidence of hypoglycemia between respondents who consumed herbs and those who did not. This is per the findings from a study conducted by Goksu et al., which stated that the use of herbal

medicine together with conventional antidiabetic drugs could lead to hypoglycemia (Goksu et al., 2010). With the odd ratio value of 4.519, it means that respondents who took herbal medicine in addition to conventional drugs were 4.519 times more likely to experience hypoglycemia than those who did not.

However, if herbal medicine is used correctly as an adjuvant/companion therapy alongside a conventional drug, it is very useful to control blood glucose levels (Venkatakrisnan, Chiu & Wang, 2019). Using herbal medicine and conventional drugs and adopting healthy living may significantly contribute to glycemic control (Venkatakrisnan et al., 2019).

Conclusion

The use of herbs as an additional medication to conventional antidiabetic drugs increased the incidence of hypoglycemia in DM patients. It is recommended that the public need to learn more about the procedures of using herbal medicine under supervision by competent health professionals.

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