



MOTOLIANGO DIGITAL, A COUNSELING AND SEXUAL EDUCATION APP FOR DIABETES MELLITUS PATIENTS: A PILOT STUDY

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ABSTRACT

The increasing prevalence of diabetes mellitus can cause dangerous consequences, not only limited to high blood sugar levels but also complications caused by the disease. Of the many complaints of complications caused by diabetes mellitus so far, the most frequently treated are microvascular and macrovascular complications, while complications related to sexual activity, namely sexual dysfunction, are rarely asked. In a study, many men and women suffer from sexual dysfunction who report high levels of diabetes stress. Another study stated that female DM patients report depression due to sexual dysfunction. There are not many methods for solving sexual dysfunction problems in DM patients, counseling is one of the treatments that can be provided. Another crucial aspect of changing the behavior of DM patients is education. Health education significantly impacts knowledge about sexual dysfunction in people with diabetes mellitus. Considering that sexual issues are still taboo, this study will develop a model to enable patients to seek counseling and information from an app about sexuality in DM patients. Furthermore, the digital Motoliango platform allows partners of DM patients to obtain information and participate in counseling. This study was conducted at a public health center in Gorontalo Regency, Indonesia. The Digital Motoliango platform was developed in two stages. The first involved gathering information through a literature review, patient interviews, and focus group discussions (FGDs) with experts. The second stage tested the feasibility of the model. Ten T2DM patients participating in the study agreed with the quality of the digital Motoliango platform, which was tested using the System Usability Scale (SUS) questionnaire and obtained an average score of 75, indicating that the digital Motoliango platform is suitable for use as a sexual education tool for DM patients.

Keywords: counseling; diabetes mellitus; education; model formulation; sexual function

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INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder characterized by chronic hyperglycemia caused by insufficient insulin production (Sulistiani, 2024). This disease has a major impact on the health and well-being of individuals, families, and the wider community. Epidemiological investigations have revealed a remarkable increase in the prevalence of and mortality associated with DM from 2007 to 2017. Projections indicate that by 2030, approximately 10.2% of the global population will be affected by this chronic condition.

Data from the Gorontalo Provincial Health Office in 2022 showed that the number of people with diabetes mellitus reached 18,074 individuals, distributed across several regencies and cities. Based on data from the Gorontalo Provincial Health Office, the target for diabetes mellitus screening in Gorontalo Province in 2023 was 358,747 people. The screening results exceeded the predetermined target, reaching a total of 531,767 people (148%), of whom 23,950 individuals (5%) were diagnosed with diabetes mellitus.

The increasing prevalence of DM can lead to dangerous consequences, not only limited to high blood glucose levels but also to the complications it causes. Among the many complications reported so far, the most commonly treated are microvascular and macrovascular complications,

while complications related to sexual activity, namely sexual dysfunction, are rarely discussed or assessed.

Sexual function is associated with biological, psychological, relational, and cultural factors. In men with diabetes, sexual dysfunction is relatively common: more than 50% of men with diabetes report experiencing sexual dysfunction, and its prevalence rate is three times higher compared to men without diabetes. Sexual dysfunction among adults with Type 1 Diabetes (T1D) showed that men without complications and men with diabetes complications reported decreased sexual desire at rates of 4% versus 19%, decreased arousal at 6% versus 31%, and orgasmic dysfunction at 2% versus 21%, respectively. Cross-sectional and longitudinal studies indicate that erectile dysfunction in diabetes is associated with older age, smoking, longer duration of diabetes, higher HbA1c levels, untreated hypertension, sedentary lifestyle, microvascular complications, and cardiovascular disease. In men with DM, the psychological correlates of sexual dysfunction have been less frequently studied. Recent studies demonstrate a positive association between erectile dysfunction and depressive symptoms in men with T1D and T2D. Furthermore, emotional and cognitive adjustment to diabetes appears to be associated with sexual dysfunction in men with T1D and T2D (Van Cauwenberghe et al., 2022).

In men with DM, several problems may occur within the domain of sexual dysfunction. Men with DM may also experience ejaculatory disorders, orgasmic disorders, and decreased libido (Venggasamy et al., 2021). Sexual problems are not only experienced by male patients, but decreased sexual function also occurs in female patients. A study by Hendry (2023) found that women of reproductive age with DM had a 5.6 times higher risk of experiencing sexual dysfunction compared to women of reproductive age without DM.

The prevalence of erectile dysfunction among patients with diabetes shows significant variation, ranging from 35% to 90%. Furthermore, in the United States, the total direct cost of evaluating and treating sexual dysfunction is estimated to reach \$400 million, with approximately one-quarter of this amount associated with DM and obesity. Respondents who had suffered from DM for five years or more were found to have a higher risk of erectile dysfunction compared to respondents who had experienced DM for less than five years (Thoriq et al., n.d.).

A study by Van Cauwenberghe et al. (2022) showed that a greater number of men and women with sexual dysfunction reported high levels of diabetes-related stress. Another study reported that female patients with DM experienced depression due to sexual dysfunction (Yosra et al., 2025). Marital harmony is not only dependent on external factors such as environment and economic conditions; sexual intimacy is also one of the factors influencing the relationship. The findings of this study emphasize that sexual intimacy is a crucial element in a healthy romantic relationship (Matondang et al., 2024). These findings highlight the importance of assessing sexual dysfunction during annual medical examinations.

DM affects sexual health and marital satisfaction among couples, and considering that sexual health support is one form of care that can be provided, sexuality should therefore be discussed openly and regularly with patients with DM (Mohan et al., 2024). There are still limited methods available to address sexual dysfunction problems in patients with DM, and counseling is one of the interventions that can be provided. Research has shown that counseling has positive effects in improving sexual function among female patients with diabetes (Abdelkhaliek et al., 2024). Counseling has also been proven to significantly improve sexual function in patients with chronic kidney disease in Bekasi City, requiring only four to six days to achieve improvement in sexual function (Suraningsih et al., 2024). Another important intervention in changing the behavior of patients with DM is the provision of education. Health education has an influence on patients' knowledge regarding sexual dysfunction in individuals with diabetes mellitus. Patients'

understanding of DM complications serves as a means to help them manage diabetes throughout their lives (Jurnal et al., 2023). Considering that sexual issues are still regarded as taboo topics, this study aims to develop a model formulation that enables patients to participate in counseling and seek information through an application regarding sexuality in patients with DM. In addition, through Motoliango Digital, partners of patients with DM can also obtain information and participate in counseling sessions.

METHOD

The formulation procedure for the Motoliango Digital model consists of two stages:

First Stage:

Initial Model Development (Qualitative Study)

Objective: To identify and formulate the initial content and features of the application based on patients' needs and input from experts.

Steps:

Literature Study

Reviewing various scientific sources related to sexual education for patients with DM and identifying important information needed by patients to overcome or prevent sexual dysfunction.

Interviews with Patients and Their Partners (Husbands)

Conducted to identify the impact of sexual dysfunction on their lives and how they cope with it. The technique used was semi-structured interviews. The interview results were analyzed using descriptive narrative analysis, and the findings were presented in the form of stories or qualitative findings.

Focus Group Discussion (FGD)

FGDs were conducted to formulate the content, features, and interface design of the Motoliango Digital application. FGD participants included doctors, nurses, Prolanis officers, and IT experts. The results of the FGDs were used to design the initial draft of the application model.

Second Stage

Model Trial and Validation

Objective to test, evaluate, and validate the application model so that it is ready for wider implementation.

Initial Model Trial

The Motoliango Digital model was tested on a limited number of patients with DM. Access was provided through the initial prototype version of the application.

Validation by Experts

Technical validation by IT experts: Ensuring that the application can be accessed and functions properly without technical issues.

Content validation by health professionals: Doctors, nurses, and counselors assessed the relevance and accuracy of the sexual education content.

Model Revision

Based on the trial results and validation feedback, improvements were made to the application and its content.

Model Development

Further development of the application model was conducted based on the revised version.

Re-trial

The application was tested again after revision to ensure that all aspects met the required standards.

Final Result: The final version of the Motoliango Digital application was declared valid, feasible for use, and ready to be implemented as a sexual counseling medium for patients with DM.

RESULT

The feasibility test of Motoliango Digital was conducted through a user testing approach by simulating an ongoing intervention using the application. The introduction and socialization of the application were directly delivered by the researcher. After patients with Type 2 Diabetes Mellitus (T2DM) understood how to use the application, they were given the opportunity to use it independently. Subsequently, participants completed a questionnaire in the form of an application evaluation sheet. A total of 40 T2DM patients participated in the feasibility test of Motoliango Digital. The evaluation results using the System Usability Scale (SUS) showed an average score of 75. Based on the SUS interpretation, this score falls into the “good” usability category and is above the standard average SUS score of 68. These findings indicate that Motoliango Digital has a good level of usability and is acceptable to users.

During the testing process, participants were able to use the application independently after receiving instructions on how to operate it. Users were able to access menus, understand the information presented, and follow the application workflow without significant difficulties. This indicates that Motoliango Digital is easy to learn and use for T2DM patients as a medium for sexual health education. Overall, the feasibility test results show that Motoliango Digital is suitable for use as a sexual education medium for T2DM patients due to its good usability level and acceptability among target users.

DISCUSSION

The design of the Motoliango Digital application was carried out in two stages. The first stage involved model development through a literature review, interviews with patients and their partners, and Focus Group Discussions (FGD) with Prolanis officers. These activities were conducted to identify user needs and to formulate the initial content, features, and structure of the application.

After the initial development stage, the process continued with model testing and validation. The initial model was tested on a limited number of patients with DM using an early version of the application (prototype). This stage also included validation by IT experts and health professionals involved in diabetes care. Following this testing phase, several revisions were made to improve the model based on feedback obtained.

The final stage involved re-testing the application after revisions to ensure that all aspects met the required standards. The final result showed that the Motoliango Digital application was valid, feasible, and ready to be implemented as a sexual counseling medium for patients with DM. The findings of this study indicate that Motoliango Digital can be used as a counseling and sexual education application for individuals with diabetes mellitus. Sexual aspects in patient health represent a need for emotional bonding and physical intimacy with others, including sexual partners and close relationships. Furthermore, sexual health is an essential component of care that must be provided by healthcare professionals to ensure comprehensive patient management. In reality, sexual health is often an unmet patient need. Counseling interventions have been shown to have a positive effect in improving sexual function among female patients with DM.

Marital harmony does not depend solely on external factors such as environment and economic conditions; sexual intimacy is also a key factor influencing relationships. These findings emphasize that sexual intimacy is a crucial element in a healthy romantic relationship (Matondang et al., 2024), highlighting the importance of assessing sexual dysfunction during routine health examinations.

DM affects sexual health and marital satisfaction among couples. Given that sexual health care is an important aspect of management, sexuality should be discussed openly and regularly with patients with DM (Mohan et al., 2024). However, limited approaches exist for addressing sexual dysfunction in patients with DM, and counseling is one of the available interventions. Studies have shown that counseling has a positive effect in improving sexual function among female patients with diabetes (Abdelkhaliek et al., 2024). Counseling has also been proven to significantly improve sexual function in patients with chronic kidney disease in Bekasi City within four to six days of intervention (Suraningsih et al., 2024). Another important strategy in changing patient behavior in DM management is health education. Health education significantly influences knowledge about sexual dysfunction in individuals with diabetes mellitus, and patients' understanding of DM complications serves as a key factor in supporting lifelong disease management (Jurnal et al., 2023).

CONCLUSION

This study indicates that Motoliango Digital has the potential to serve as a counseling and sexual education application for individuals with diabetes mellitus. Motoliango Digital has been shown to be relevant and satisfactory for users, with content that aligns with their needs. Consultation with experts in information technology, design, and language provided valuable input for improving the application. However, several aspects, such as accessibility and user instructions, still require further enhancement.

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