Jurnal Kesehatan
Vol. 15, No. 2, August 2024
ISSN 2086-7751 (*Print*), ISSN 2548-5695 (*Online*)
http://ejurnal.poltekkes-tjk.ac.id/index.php/JK

The Design of an Interprofessional Health Record Form for Diabetes Mellitus Care at Primary Health Care Facility: A Recommendation

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ARTICLE INFO

Article history

Received date
20 Aug 2024

Revised date
27 Aug 2024

Accepted date
30 Aug 2024

Keywords:

Community Health Center;
Diabetes Mellitus patients;
Health service.

ABSTRACT

This research focuses on the pillars of primary care transformation by increasing primary services' capacity and capability, especially Diabetes Mellitus (DM) care. The study aims to produce a recording form containing simple, interprofessional records of DM patient care that can be used by various professions and can be applied in multiple primary health facilities. The design was developed through a development research approach with stages of form modification, expert and practitioner review, revision, trial, focus group discussion, and final revision. The trial was carried out by Community Health Center (Puskesmas) nurses in services at the Puskesmas through home visits for DM patients, Posbindu services, and outpatient care. Data from expert opinions, user opinions, and observations of the forms tested were analyzed qualitatively using the Technology Acceptance Model concept approach. The resulting form consists of two pages containing primary patient data and daily progress notes in tabular form. Research participants showed positive beliefs, attitudes, and behavior toward the forms being tested—the actual use of the form on an average of 3 patients per participant. The completeness was 90 percent filled. They expressed their intention to use the form further and recommended widespread dissemination to implement it in practice. The form is acceptable and ready to be applied for outpatient care, health monitoring, and home care for DM cases. Recommendations can be given to policymakers and health service providers to implement in services. Apart from that, the form can be further developed in electronic form by information technology developers.

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INTRODUCTION

It is well known that diabetes is a metabolic disease that may cause severe damage to the cardiovascular system and lead to disability and even death. It causes glaucoma that leads to blindness, diabetic ulcers, and even premature death in the world. Meanwhile, its prevalence has risen all over the world. Nevertheless, the world globally agreed to halt the rise in diabetes and obesity by 2025. The strategies include providing access to affordable treatment as a critical way for diabetic survivors (WHO, 2023).

Basic Health Research in Indonesia noted an increasing prevalence of diabetes from 6.9% to 8.5% (Ministry of Health RI, 2019). The recent health survey noted that Diabetes prevalence in 2023 was 11.7%, which is twice as high as it was in 2013. The survey also noted that 10.3% of Diabetics contributed to disability in Indonesia (Ministry of Health RI, 2023).

The intensive implementation of screening for risk factors for non-communicable diseases will increase the number of Diabetes Mellitus (DM) cases in the community. Thus, it should be followed by caring for people at risk and DM survivors in Primary Health Care Facilities. Kurniawati et al. (2019) found obstacles in Community Health Center facilities include service management matters, training of human resources, lack of guidebooks, and not evenly distributed standard operating procedures.

The Indonesian government is implementing a health transformation policy. It stands on six pillars to achieve development goals more effectively and efficiently. The pillar of primary service transformation encompasses a promotive and preventive approach to revitalizing and optimizing primary services, especially community health centers (Ministry of Health RI, 2020).

In Indonesia, nurses are the biggest amount among health workforce resources. (Ministry of

Health RI., 2022). Despite this, Kamil et al. (2018) found that the nursing services record (nursing documentation) needed strengthening. The research conducted by Primadilla (2022) explained that the shortcomings of the Community Health Center recording system were complicated, many variables had to be completed, and the form needed to communicate more adequately about the real problems of the patients.

Hadman (2021) recommends caring for DM patients at the primary healthcare level by providing and maintaining guidelines and managing multidisciplinary team collaboration. Thus, holistic services can be optimized. Interprofessional collaboration is more widely implemented in hospitals and has positively impacted patient safety, patient satisfaction, and service quality. Factors that influence its implementation are communication, different educational background levels, and limitations in understanding each other's roles (Ita et al., 2021).

In Indonesia, the practice of health interprofessional collaboration in the program of Controlling Non-Communicable Diseases at Community Health Centers is still limited to the scheduling of Posbindu. Posbindu is a program that provides routine screening and prompt treatment for productive ages. This collaboration is influenced by cooperation, communication, ethics, and professional roles (Rahmanida & Bachtiar, 2022). For interprofessional collaboration to be effective, a communication medium is needed. It should be able to record what is planned and done by various professions comprehensively and integrated (Sukawan et al., 2021).

Controlling DM is oriented towards stabilizing blood glucose levels (PPNI, 2017b). Interventions that can be provided in caring for DM patients include hyperglycemia management and hypoglycemia management, adherence to treatment programs, diet, physical exercise, education about the disease, nutritional monitoring, and family empowerment in creating a conducive environment and leading to family independence in caring for patients. These interventions are conducted through observation, therapeutics, education, and collaboration with other health professionals (PPNI, 2017a).

Service strategies need to be designed by considering and taking into account the various demands of comorbidities, which generally include hypertension, acid reflux disease, chronic back pain, and arthritis, with hypertension and acid reflux disease being the most common (Pati & Schellevis, 2017). Home care can be provided by the Community Health Center. A home care program for Diabetic patients with type 2 diabetes improves therapeutic adherence (Amini et al., 2020).

The home care program in the Community Health Center is a program of Public Health Nursing, namely Perkesmas (Nurianto, 2020). Home care services are mostly conducted by nurses and recorded in the nursing documentation (Primadilla, 2022). Thus, the health professionals' data are recorded in their own documentation. Concurrently, the integrated patient progress record documented by certain providers in a flow sheet enhances the quality of care (Sukawan et al., 2021).

Enhancements to the health system facilitated by health information systems must consider three critical determinants: organizational factors, behavioral factors, and technical aspects (Primadilla, 2022). This indicates that system enhancements cannot be detected just from the applications or forms it generates. However, organizational commitment and regulations must be structured accordingly.

To develop a system's behavior, researchers must account for the abilities and needs of the system users. This encompasses both electronic and paper-based information systems. The users will wish to use the system in such a manner (Davis, 1989).

This research aims to produce a form containing simple interprofessional health records of DM patients. It should be able to be used by various professionals at the Community Health Center. This research is limited to recording care management of diabetic mellitus cases. The form can be utilized by nurses, doctors, nutritionists, analysts, or other competent health workers in the Community Health Center. The resulting form is oriented as an electronic recording pilot that can be integrated into the Sehat IndonesiaKu Application. It can be developed as an electronic medical record.

METHOD

The method of this study used Research and Development to build a tailored form design for interprofessional health records. As an information system, the form is to be developed using the System Development Life Cycles (SDLC) approach. The steps include planning, analyzing, designing, and implementing (Parson et al., 2013).

The population in this study is health workers in the North Lampung District area. The sample was selected using a purposive sampling technique with a snowballing sample approach to gain research participants. There were two types of participants: experts and users. Inclusive criteria of the expert participants The participants are health officers representing the Health Service Division and Disease Control and Eradication Division of North Lampung District Health Office. They are persons in charge and responsible for fostering improvements in the quality of primary health facility services and the ones who are responsible for non-communicable disease-controlling programs. They also represented various health professions (doctors, nurses, nutrition, public health) and representatives of the professional organizations (IDI, PPNI, Persagi).

The user participant criteria include nurses, doctors, or competent health workers at the Community Health Center (Puskesmas) setting. The officer responsible for the Health Service Program and the Control of Non-communicable Disease Program made the selection based on criteria including good to moderate performance in implementing the Control Non-Communicable Disease Program according to the Health Service. There were 11 participants in total.

The steps of research conducted as follows:

1. Planning.
   Identification of the need for system development through Focus Group Discussion between participants.
2. Modify the form
   Researchers modified a nursing documentation form for primary care that has been developed in previous research. Modifications were made in such a way that doctors, nutritionists, analysts, and nurses could record together on one form.
   The form was prefilled with nursing care for DM patients with a nursing diagnosis of blood sugar instability and impaired skin integrity.
3. Expert review
   The modified form was discussed with physicians and nurses.
4. Revised Form
   The initial form design was revised based on input from experts, as in number 3.
5. Testing the design
   The revised form was launched for use by 3 Community Health Centers. They were instructed on how to use the form and then implemented it on at least 5 DM patients who required home visits (with complications or comorbid problems).
6. Evaluating the design
   The evaluation was carried out by conducting Focus Group Design (FGD) with user participants.
7. Final improvements
   The form was revised according to suggestions during the design evaluation.

Interview and discussion guidelines were used to conduct data collection through the focused group discussion and interview. Guidelines for interviews and discussions with experts include variable eligibility and whether the variables provided in the form meet DM service quality rules.

The interview (FGD) guidelines with user participants referred to the need for improving and developing existing forms. The interview also sought to determine acceptance, referring to the Technology Acceptance Model (Davis, 1989).

Data analysis was carried out on audio and visual recordings, which were then transcribed verbatim and then grouped into sub-themes and main themes. Data validity is maintained through triangulation of data sources and data collection techniques (observation). The reliability of qualitative data is maintained by members of the research team distilling the data and discussing it within the entire team to get the same data perspective. Politeknik Kesehatan Tanjungkarang, number 380/KEPK-TJK/VI/2023, established an ethical exemption for this research.

RESULTS

Need assessment

The health officers expect the form to be designed to be easy to fulfill, simple, informative, and easy to understand by every professional caring for DM patients at the Community Health Center. They believe that nurses and other health workers at community health centers will be encouraged to record DM patient progress with this model. They also expected that the form would be able to be implemented and transformed into an electronic health record made by the Community Health Center.

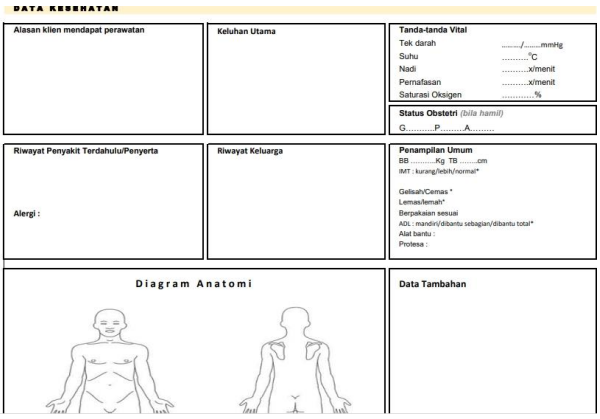
The form design

The design of the form consists of two pages. The first page includes data about the initial patient assessment. The second page includes patient progress, prefilled with various data that have to be assessed, medical diagnosis,

nursing diagnosis, and numerous actions or interventions that have to be done by nurses or other professionals.

Table 1. Structure of the formulir

Data variable	Types
Initial assessment	
Identity	
Date	Date
Registered Number	Text
Personal Identification	Text
Number	Text
Name	Text
Family Name	Option
Marital Status	Option
Religion	Option
Education	Option Option
Job	Text
Ethnic	Text
Home Address	Text
Village	Picture
District	
Photo	
Health Data	
The Reason for Seeking Health Facility	Text
Chief Complaint	Text
Vital Signs	Text
Obstetric Status	Text
Ilnness History	Text
Family History	Text
General Appearance	Text
Anatomy Diagram	Picture
Other Data	Text
Assessment Date	Date
Assessor Identity	Text
Patient Progress	
Patient Identity	Text
Subjective/objective Data	Prefilled
Progress Monitoring (By Date)	Text
Analysis	
Diagnosis	Text
Diagnosis Status (By Date)	Text
Interventions	Prefilled
Implementation ((By Date)	Text (Yes/No)
Note	Text

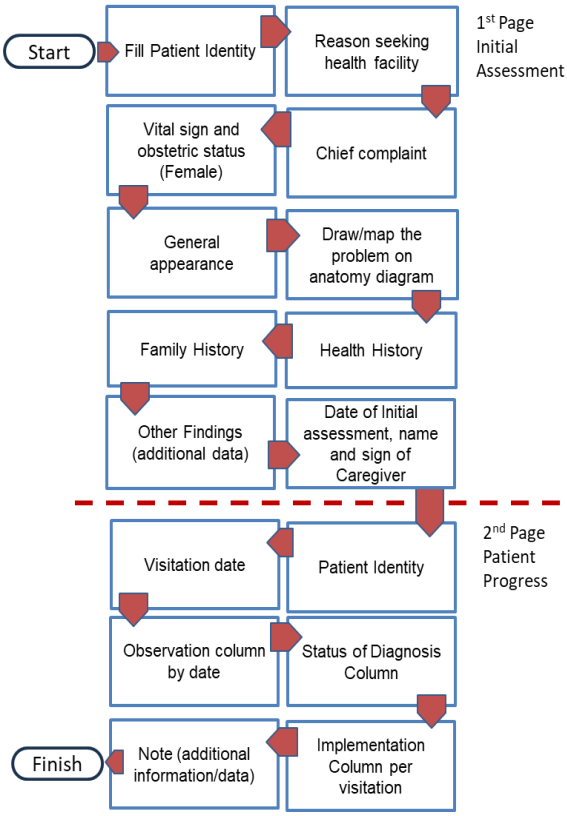


Picture 1. Fragment image of page one

On page one, professional caregiver who do the initial assessment should write down to describe the patient freely. To give a better perspective among the professionals about patient condition, such as diabetic ulcer, wound, pain, or numbness, it should be drawn on the anatomical diagram given.

Picture 2. Fragment image of page 2

On the second page, the professional caregiver in charge records data by filling in the right column that links to the left column. This page can be used for several health professionals meeting or visiting with patients, as well as for outpatient and home care. As guided by the left table, they could add a checklist or short examination findings every visit. The colorful column is designed for easy data writing and reading.



Picture 3. Form usage flow

The first page includes the patients' initial or basic data. Professional Caregivers can jump right to the second page after the first meeting or visit with a patient.

User technology acceptance

The design was reviewed and tested by participants as below.

Table 1. Characteristics of research participants

Characteristics	n	%
Sex		
Male	2	18.2
Female	9	81.8
Education		
Nursing diploma	1	9.1
Registered Nurse	6	54.5
Doctor	1	9.1
Public health	3	27.3
Workplace		
Community Health Center	5	45.5
Government Health Office	6	54.5

Six participants reviewed the form, and five participants tested it by implementing it along with the homecare program and Diabetic Group Program, SIMANIS, by nurses who work in the Community Health Center. In addition to caring for Diabetic patients, nurses collaborated with doctors and sanitarians.

In providing care for DM patients at the Community Health Center, nurses take the biggest role in terms of direct contact with patients and families. So, doctors and other health workers do not record much in the format provided, but the doctor also saw the notes made by the nurse.

1. Perceived of use

The reviewer's suggestions include the form model and the rule of data variable. They agreed to the final design and expected the form to be implemented in Community Health Center. They believed this design would facilitate the professionals' care of patients.

All user participants believe this form was very useful in helping their work. There is no negative sentiment regarding the usefulness of this format as their expression.

$I_{1:}$ "*I think it is useful in helping our work as nurses. Usually, we come to the community, take notes elsewhere, and then go to the Community Health Center to copy them. In this case, we no longer need to copy, so it is more concise*."

$I_{2:}$ "*This helps me, especially in our SIMANIS program*."

The involvement of other professions in filling out forms still needs to be higher because nurses almost entirely carry out home visits. Doctors and nutritionists only see the format.

I_3 "*My doctor already knows, and he agrees with this format. However, we have already printed many outpatient forms. So the doctor said another time, for the next*."

Thus, the effectiveness of the form in outpatient settings cannot be seen because it has not been tested. And we need to pay attention to integration with existing medical records.

2. Perceived of ease

Participants enthusiastically stated that the format developed was so easy to use and understand that they could adjust immediately, even if they were new to using it. Participants also felt very helpful in terms of the immediate availability of information. This way, nurses or other staff can easily understand the patient's progress.

I_2: "*This makes things easier for me*".

I_1: "*Because it is very concise*."

3. Attitude toward using

The participants' attitudes towards the form were excellent, as can be seen from the enthusiasm of the informants in explaining their experiences.

I_1: "*If I could, I would just use this at Puskesmas. If necessary, it can be used as an SPJ attachment*."

I_2 "*I think this is good, Miss... and I use it for SIMANIS*."

I_4 "*Yes, Miss... I like using it because it is simple, less expensive, and cheaper*."

It can be said that all informants have a positive attitude toward using the form and even show behavior that influences other people to use it.

4. Behavioral intent to use

The participants' attitude was validated by their statements that they intended to implement it at the community health center. This utilization plan varies between informants. Two of them apply it to the program they manage, SIMANIS. As stated in the statement, it is a particular health service for DM sufferers.

I_1 *"... and I will continue this, Miss.... In my program*".

Other participants will apply it in community health nursing through home visits.

5. Actual use

The form was tested in the care of 15 diabetic patients. As many as 90% of participants filled out the form completely. They completed an average of 3 patient meetings/visits. One informant added the importance of further

training for other community health center health workers.

Some suggestions for improving the form design include adding primary data. Treatment history must also be added, especially if the patient has wounds. This is intended to see recurrence. Apart from that, the compliance variable needs to be specified, whether regarding medication adherence, treatment behavior, or adherence to diet. In the intervention column, slots must be provided for non-pharmacological treatments and complaints of difficulty sleeping. These recommendations were already made at the final improvement of the design.

DISCUSSION

Effective diabetes management requires a comprehensive, patient-centered approach that leverages the expertise of diverse healthcare professionals (Kennedy et al., 2019). Meanwhile, successful interprofessional healthcare practice requires a conducive health practice environment (Tataw & Stokes, 2023), which should include health recording preparedness.

The form design

This research has developed a recording form of short fields and checklists that provide a complete picture of the patient's condition from the beginning to the end of treatment. Informative format design is essential for health professionals and patients. The availability of accurate, informative, easily accessible records will support appropriate clinical decision-making to benefit continuity of care (Honavar, 2020).

Interprofessional electronic health records (HER) have been implemented in primary care in various countries. However, the technical implementation could be smoother in hospitals (Robertson et al., 2022). In Indonesia, implementation still needs to be improved by the availability of internet signals, even though electronic health records prioritize stable internet availability (Putri, 2023). Paper-based recording is still the primary tool for storing data and information on patient services and conditions (Krismanigrum et al., 2022). Nurses who provide health services through home visits say that paper-based records must be supported to record service results (Primadilla et al., 2023).

This form's construction is intended to inspire the design of an electronic health information system. Paper-based forms will give computer programmers or application developers an idea of the desired final output of an information system. Having clear data variables will streamline the development of an electronic information system and minimize system errors.

A fundamental principle in interprofessional health documentation or recording is that healthcare professionals should document their activities within their scope of practice (Adamson et al., 2020). In this study, participants from various professions indicated the need for variable data to be provided in the form, including signs and symptoms as well as conditions relevant to DM. Thus, guidance is provided to health professionals to carry out careful assessment and evaluation of diabetes mellitus patients.

Essential variables that need to be studied in treating diabetes patients in primary care do not only focus on individual complaints but also on how health behavior is related to patient care. Asri et al. (2020) suggest the importance of assessing the patient's beliefs about their health, whether controlled or uncontrolled, behaviors, and self-awareness to optimize the self-care of diabetes mellitus patients.

In the form designed in this study, data variables regarding wound care as required by participants are provided. They argue that the more important target for family care is Diabetes Mellitus sufferers who have diabetic wounds. This is important due to common and highly morbid complications of diabetes, especially DFU (McDermott et al., 2023). The wound care indicators used in this form refer to the Indonesian Nursing Outcome Standards (PPNI, 2017b). We added empty rows, making it possible to add indicators or nursing outcomes according to the nurse's knowledge.

User’s technology acceptance

This research shows user enthusiasm, both among health workers who directly provide care and among health service managers at the government level. It is very important to study carefully what and how the user needs the system.

According to Davis (1989), an information system's acceptance level determines how it is utilized. The perception of its usefulness forms this: what is built will make their work easier and help them complete it. This perception shapes the user's attitude, builds the intention to use the system, and is ultimately shown in actual use. No matter how well the system is built, the effort will be in vain if the user does not believe that the system will help his work.

The information system intervention built in this research emphasizes the system needs that

health professionals want to utilize. Nurses and doctors were involved in designing data items according to their needs. According to them, the most important things are the ease of reading the data studied throughout the treatment and the ease of recording without having to input redundant data.

The responses expressed by the informants to the design resulting from this research can be seen clearly. For them, the resulting design records the patient's condition, treatment results are easy to access, and the data is easy to read. This belief formed their intention to use it again in the real practice of home visits for DM patients.

The approach used to analyze the acceptability of the design built in this research uses the Technology Acceptance Model, a process consisting of three stages: external factors, cognitive responses, and cognitive responses (Marikyan & Papagiannidis, 2023). This conceptual model has been widely used to study internal motivation and focuses on outcomes, namely the actual use of information technology (Alsyouf et al., 2023).

CONCLUSION

Health professionals who manage diabetes cases or care for patients with the disease, particularly nurses, believe this form is acceptable and ready to be utilized in the workplace as an addendum to the medical record. This form works effectively for non-communicable disease programs and home visits, particularly for managing patients with diabetes mellitus. To have a broader impact, it should be disseminated at the Community Health Center's weekly meetings. Additionally, professional associations such as nursing organization (PPNI) medical organization (IDI) are essential sources of support. Researchers recommend that the Community Health Center use this design and develop an electronic medical record.

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