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Formulation of Family Based Intervention Model to Imrove Family Participation in Self-Care Management For Patients with Type Two Diabetes Mellitus in Kitui County- Kenya.

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ABSTRACT:

Type II diabetes mellitus (T2DM) is a long life disorder that is complicated and severe. Adequate metabolic control lies heavily on degree of family involvement and participation in helping the patient to carry out self-care activities. Family empowerment has the potential to enhance self-care practices resulting to improved treatment outcomes. The study aimed at developing a family-based intervention model to Enhance family participation in self-care management of type II diabetes Mellitus.a

An analytical cross sectional study design was utilized which aided in model development. Both qualitative and quantitative methods were utilized in data collection. Input was received from patients, their family members on their experience in disease management, however a team of experts from the hospital was also involved in guiding on the best strategies to use before actual model development. Data was analyzed using descriptive, inferential and thematic methods. Family participation model was then developed using eight sequential steps..

The finding showed that the tool used in model development was acceptable and viable which met the objectives of the study. This was evidenced by the overall reliability of 0.8372. Anova analysis, tested the goodness of the model at 95% confidence Levell which was found to be statistically fit. A f value of 1.533 indicated good yield and efficient model

Upon its Implementation, the developed model can help in improving family support, gainnknowledge and skills in management of disease at family level. hence reduce the risk of diabetes related complications witnessedin past. By utilizing the steps followed in formulation of this model,family members be able to take control for their own health at community

This study recommends that Kitui County Government to collaborate with local community leaders, clinicians, non-governmental organizations in adopting collaborative approach where the needs for persons with T2DM is met at the community level. Formalized and focused needs on empowering patients and their families in taking responsibility and control for their own lives style and health.

Key Words: Diabetes Mellitus**,** family -based, Model, Self-care , Type Two

Introduction

Globally, an estimated 462 million individuals are affected by type two diabetes (T2DM), corresponding to 6.28% of the world's population (Global Burden of diseases , institute for health metrics data, 2021).More than one million deaths were attributed to this condition in the year 2017 alone, ranking it as the ninth leading cause of mortality(Leach-Kemon & Gall J,2018). This is an alarming rise compared to year 1990, when the disease was ranked as the eighteenth leading cause of deaths. In terms of human suffering diabetes ranks as the seventh disease causing severe injuries.(Leach-Kemon & Gall J, (2018).

Furthermore, Projections show that by the year 2030, Seventy-thousand and seventy-nine(7079) persons will have suffered from T2DM worldwide, reflecting an increasing in number of people affected by the disease in all regions and across the globe (National Institute of Health, 2020, Khan et al.,2020). According to global burden of disease (GBD) 2017 updates, more than one million deaths occurred as a result of Type Two Diabetes Mellitus. The disease was ranked as number nine cause of death among the number of people diagnosed with it globally, an increase that shocked the world as compared to the year 1990 when the disease ranked as number eighteen cause of mortality(Global Burden of Disease, 2021). As a chronic disease(CD), the disorder has shown to cause a significant damages to not only the sick persons but also to the entire members of the

family(Shrivastava et al., 2014).Family participation as an approach usually plays a significant role in diabetes management. It has widely been recognized as among the best methods in preventing disease related complications(Kovacs Burns K, et al 2013, &Torenholt et al,2014).family participation is usually characterized by complicated matters, structural relations that are not clear, expectations and contrasting needs within the families (Mayberry LS, 2014 &Khan CM, 2013).Self-care in diabetes has been defined as an evolutionary process in development of knowledge or awareness by learning to survive with the complex nature of the diabetes in a social contex.family level is a significant area for persons to influence lifestyle interventions to participate in self-care in diabetes management.This usually results in reduced cases of diabetes related complications, acquisistion of self-care management skills,(Martire LM, 2010). as well as pocession of adequate knowledge (Mayberry LS, 2014). Self-care practice in diabetes care on ther hand include the ability of an individual, family, and society to promote and maintain health, prevent occurrence of a disease, and cope with the illness and related complications with or without any external support(Cooper HC et al, 2003, however, Self-management can be defined as the process by which which a patient uses the learned abilities and skills to manage a chronic disease or risk factors(.World Health Organization 2018) Recent studies have shown that Patients who practice self-care actvities significantly report lower rates of disease related complications as they show high level of participation in self-care as compared to the general population. Good foot care, frequent physical activity, healthy eating habits, and self-monitoring of blood sugar levels are all components of routine self-care practices American Diabetes Association (ADA, 2014). According to Tommky et al. (2018), self-care practices encompass a wide range of domains, including good dietary habits practices, physical activity, drug and alcohol use, methods of stress management, sleeping patterns, and behaviors regarding seeking medical attention.Brunosholz et al. (2016), reported that, for a patient to present with successful self-care practices, adoption of appropriate self-care management is required. When discussing T2DM, the term "self-care" can relate to a patient's capacity to take charge of his or her symptoms, treatment, physical and psychological consequences, and changes in lifestyle (ADA, 2016). According to WHO (2016), T2DM is a chronic condition that needs an individual to make a variety of daily decisions in disease management. Diabetes self-care behaviors are habits that people who have diabetes mellitus or who are at risk of developing the disease adopt with the intention of efficiently managing their condition on their own.(Tomky and colleagues, 2016). Self-management is characterized by patient's decision and behaviors that they engage in,following diagnosis of long-term disorder that affects their well-being ((Boutayeb, S, 2016).Such patients therefore pocess knowledge aimed at deliberately looking at an individuals Physical, mental, and emotional health,(Wagner et al., 2001) thus self-management characterized by a patient's decision and behaviors that they engage in their practice. Study conducted by (Nwanko, 2018) and Shrivastava et al, 2018, reported seven known types of diabetes self-care activities that an individual must routinely perform. These practices include consuming a healthy diet, engaging in physical dynamics, continous self- monitoring of blood glucose levels, adhering to prescribed medications, adoption of good problem-solving skills, sound adapting capabilities, and risk reduction modalities.(American Diabetes Association, 2016).As such must be practiced with or without a support of family members.

When a family member is diagnosed with Diabete disorder, several other relatives are equally affected by such condition. Health care providers usually play a significant role in management of T2DM, although the outcome of glycemic control largely depends on the degree of family participation in self-care practices (Anderson, et al, 2021). Unlike other chronic disorders which somehow depend on hospital treatment and other therapies, T2DM, entirely depends on patient's aggressiveness in carrying out routine self-care activities and magnitude of support offered by family members (Anderson et al, 2001). Current reports show that patients and their families face a lot of challenges in an effort to manage T2DM, putting their lives at risk of developing diabetes related complications. (American Diabetes Association, 2018). This evidently gives an answer as to why the global prevalence for this disease has highly risen with most of the sick individuals not able to control blood sugar levels adequately. However, many researchers have come up with more interventional strategies to manage T2DM at family level due to the nature of the presentations and progression of this condition. Thus development of family based model is the seen as best strategy because it ensures that all concerned needs of patients and family members are fully addressed.(Anderson et al, 2001) The implementation of this model will address many challenges faced by patients and their families as well as shift treatment modalities from hospital to home based. It will also help patients and their families gain skills through team work and demonstrations leading to reduction in diabetes related complications,Premature sudden death that have been witnessed in the recent past,(ADA, 2014), as well as shift responsibilities of patients care from hospital settings to homes settings. The model was based on the assumptions that all patients must practice the mandatory routine self-care practices in order to live life free of diabetes related complications. It recognizes patients as disciplined in controlling blood sugar levels. The model consequently emphasizes on the significance of family support in providing care to the sick kin including psychological, financial, physical which gives patients warmth and sense of belonging. Providing care for these patients in turn reduces stress associated with the disease (Anderson, S.A1988).

The management of diabetes which is very complicated needs full support from the family members. Involving patients in self-care management can have a significant impact in reducing diabetes related complications. Empowerment for diabetes patients means the patients and family members are equipped with adequate knowledge in carrying out the significant diabetes self-care activities by their own. It can be started by optimizing functions of family to adopt and comply with the recommended diabetes self-care activities. Family based intervention model aims at shifting the health care services from hospital to patients' homes where family members take full charge in support of their ailing kind managing the disease well. The model comprises of eight steps that are cooperated together as a framework. The patient needs to apply such steps into practice in order to succeed in as diabetes management team that includes both family members and health care providers. All the procedures must be carried out patient's homestead, where patient and their family members are empowered to take responsibility for their own health and lives.

2.0: Underfining of Family Based Intervention Model (FBIM)

This study utilized the concepts of previous theories and models from the work done by various scholars including self-care model developed by Dorothea Orem (1995), the American Association of Diabetes Educators (AADE) Health belief model (HBM) as well as patients and family centered care model.The main objective both the patients manage the disorder at their homes with full support from family members however, patient and family oriented care model was the primary model utilized. This model is based on the the work of Johnson, B. H., and Abraham, M.R. (2012), which emphasis on a Nurse working with patients and their families in management of chronic diseases hence adding great value to this model. The

model places more emphasis on the nurse collaborating with the patient as well as the patient's family members in empowering them to carry out self-care activities by themselves as postulated by Wagner, 1998 and cited by Committee on quality of health care. The America institute of medicine (2016) guides community Nurse on the best approach to use in providing care to patients that is respectful of and responsive to patient's preference needs and values. This includes ensuring that patients' values direct and guide all decisions made regarding their care that is oriented on the patient and their families. It also offers direction on the fundamental ideas that are at the heart of patient's and family's health situations. According to this model, healthcare providers respect, listen to, and honor the patient and family perspectives and choices they make (Institute for Patient- and Family-Centered Care, 2013).Patient and family knowledge, values, beliefs, and cultural background is incorporated into the planning and delivery of care, which requires timely, complete, and accurate information in order to effectively participate in care and decision making. Patient and family knowledge, values, beliefs, and cultural backgrounds must also be incorporated into the planning and delivery of care. According to the Institute for Patient and Family-Centered Care (2013). Patients and their families need to be encouraged and supported in order to participate in self-care practices and decision making. However the common components(features) of the models that directed in formulation of steps to construct model included education. The health care team need to offer diabetes education to both the sick persons and their members of family.Such education should be culturally sensitive and individual patient prefelence, the new skills should be imparted such as demonstration on food preparation using locally availlable foods as well as according to nutrionist advice , clear the diabetes myths and misconception on some traditional practices, offer aggressive family support through good communications and healthy interactions while discouraging and avoiding obstructive behaviours. In each session, family techniques can be implemented, goal settings where healthy counselling and problem solving skills are encouraged. This aims at helping the sick persons accept disease with its challenges and solve the problems as they arise, including drug medication and rewards in each intervention, offer reward to the best (Walker, et al., 2015,)

This results in better health outcomes, an improved patient and family satisfaction in treatment offered, higher motivation among staff members as well as more judicious resource allocation. The study aimed at developing a family based Intervention model to enhance family participation in self-care management for patients with type two diabetes mellitus. Through embracing good communication, team work and ultmost cooperation from the sick individual, their kin as well as members of health care workers facilitated in successful development of ths model. The formulation of the model involved use of eight friendly interactive interventioal steps.This was done by ensuring that goals set were fully met and enhanced.

3.0 Study Methods and Materials.

Mixed study designs were utilized. Firstly, an analytical cross-sectional descriptive study design as well as delphi design were both utilised which fitted well in this research. Mixed methods approaches that leaned slightly more on qualitative approaches than quantitative was applied. Data collection was done in two phases. A pannel of experts from the hospital were fully involved in providing with wise advice and offering scientific directions, where their ideas and opinions were fully relied on utilised in model development.Precisely,focused group discussions were highly utilized and formulation of the steps for developing the model in each step was achieved. Both patients and their families were fully involved, their ideas and inputs were considered and in incorporated in all the steps of model if found relevant. The study was carried out in outpatient diabetes clinic and patients' homesteads in Kitui County of Kenya. The study population included all patients with an evidence of having type II diabetes mellitus and their family members. Systematic sampling framework was used in identifying the names of all diabetes patients in diabetic register book. This included only those who were attending the diabetes clinic.The inclusion criteria comprised of all patients aged 18 years to 70 years and their family members. A structured interview schedule was utilized in the study was issued to panelist experts. Sample size of 68 respondents was used. Interviews was carried out in six villages. This included only those clients who were not escorted to the clinic by their family kins..Focus group discussion of about 6- 8 members from each villages were interacted with to understand the family involvementand and general participation in self-care management in Type two diabetes .

Formulation of family based intervention model.

Family based interventions are the services and procedures offered by health care providers at people's homes (Kielland HA, Borras, 2013). This model puts its focus on shifting health tasks from health facility to family level which is the lowest (Hostler et al, 2018),This Fosters a supportive atmosphere, improving health outcomes, and addressing the unique obstacles faced by families that are critical.Development of this model comprised of Nine (9) steps whose concepts are clear, simple and client/ family friendly where inclusivity was highly considered.

Steps followed in model Formulation

Step 1 : Develop Educational Materials and familiarize session :
Informative brochures, pamphlets, were created and patients explained on the importance and benefits of the model on enhancing family involvement in T2DM self-care management. Educational materials including MOH, dietary guidelines which was translated and substituted with locally available food stuff. Others included exercise and general physical activity, medication adherence, and blood glucose monitoring. Materials are easily understandable, culturally sensitive, and available in multiple languages if necessary.- After ethical permission
Step 2 Interaction and recruitment of participant
Actual interaction and recruitment to participant based on the selection criteria of the study
Step 3 : **Conduct Family Education Sessions**
A plan was collectively made where regular educational sessions specifically designed for T2DM patients and their family members were Organized depending on patients' preferences, family requests and observation from the Nurse. Health care providers, officers from different departments were invited for the forum and were requested to give their input on

various areas in T2DM management. The discussion was an open to everyone had care for T2DM
Step 4 :Facilitate Effective Communication Honesty was the order of the day that time especially to patients and their family members. Active listening and empathy Adopted aimed at ensuring that family members felt heard and understood. Provide guidance on effective communication techniques, such as using "I" statements, asking open-ended questions, and expressing support and encouragement.
Step 5:Establish Support Groups The existing diabetes support groups was encouraged however, challenges patient and family members faced were addressed and patients concerns. Arrangements were put in place. An agreement on regular meetings where families could share experiences, exchange information, and provide emotional support to each other.
Step 6 ;Encourage Collaborative Decision Making family members were called and fully involved in all steps on decision-making process regarding T2DM management. Patients and their families were Encouraged to actively participate in healthcare appointments, allowing them to ask questions, seek clarifications, and discuss treatment options with the healthcare providers. Much emphasize was stressed on the importance on taking control and responsibility for their own lives
Step 7; Utilize Technology New technological advancements to support family involvement in T2DM self-care management was introduced .this included Providing access to mobile applications or web-based platforms that offer educational resources, medication reminders, meal planning tools, and blood glucose tracking. Family members were educated on use of and form whats-up groups that helped in communication not only to family members but also to clinicians Other options included Utilization of telemedicine for virtual consultations, enabling family members to attend appointments and actively engage in discussions with healthcare professionals.
Step 8 **Assess and Address Barriers:** Identify potential barriers that hinder family participation, such as lack of awareness, cultural beliefs, or logistical challenges. Develop strategies to overcome these barriers, such as providing transportation assistance, translating materials into relevant languages, or offering flexible scheduling options for educational sessions.
Step 9 **Evaluate and Modify** Continuously assess the effectiveness of the implemented strategies. Gather feedback from T2DMI patients and their families through surveys, focus groups, or interviews. Use the collected data to identify areas for improvement and modify the model accordingly.

Intervention and Validation of the Model

The intervention started at data collection stage, an overview introduction of the study was done at the diabetes outpatient clinic in kitui County Refferal outpatient diabetes clinic. A powerpoint presentation tool was screened at the waiting bay. A narrative video was developed and audio-taped using a tape recorder. This applied to all patients and their family members who visited or had an appointment with a physician at that time. The data was then collected in two phases where in phase I comprised of data was collected from patients and their relatives using questionnaires at the diabetes clinic. For those patients who were not accompanied by a family member data was collected in Phase II. This was done in form of home-visiting.The researcher team visited relatives of those patients not accampanied by their relatives, who were requested to respond after signing consent forms. at their homes or residence of choice during this time. Similarly, Interviews were recorded using a digital voice recorder and transcribed verbatim. Each session took a duration of an average of Thirty (30) minutes in length. A trained officer on record monitoring was recruited as the discussion continued who also made comments about non-verbal communication among the study respondents (Deakin et al., 2020).. Transcripts were compared with tapes for accuracy. Pamphlets and other diabetes-related materials were distributed to the five participants in the focused group. Concepts from three models and theories including the health belief model, self-care model and patients and family centered model were applied in the FGD interview (Deakin et al., 2016). At first, consent was obtained and granted by the respondents then the first part which had social demographics was filled in by the respondents. confidentiality was highly maintained (DeL Giacco et al., 2020). similarly, An interview schedule tool was offered to the team of expert penalists for validation of the model purposes.The experts were specialists on diabetes management working in the clinic.

RESULTS AND FINDINGS

4.1 Patients influence in self -care management

Table 1: Model Summary the patients' participation in diabetes self-care management

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.780[a]	.8200	.570	.00000

Source Field Data (2023)

The study indicated a moderate to strong positive correlation with an R value is 0.780, the R Square value is 0.8200, which means that approximately 82% of the variance in family participation in self-care can be explained by the patients' related factors included in the model and the adjusted R Square is 0.570, suggesting that approximately 57% of the variance in family participation in self-care can be explained by the patients' related factors. From above table the study can indicate that the included factors have a substantial influence on family participation in self-care among Type II Diabetes Mellitus patients. The degree to which patients participate in self-care management reduced the frequency to which patients were able to suffer from disease related complications. It helped in model development where the researched planned for educational sessions with sick individuals.

4.2 Inferential analysis on the establishment of the best interventional strategies to enhance family participation in self-care

Inferential analysis was performed on the establishment of the best intervention strategies to enhance family participation in self-care among T2DM and the results were presented in 3 tables which comprised of model summary, ANOVA summary and multiple linear regression.

Table 2: Model Summary on the establishment of the best intervention strategies

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.454[a]	.526	.012	.2865631

Source Field Data (2023)

According to table 2 above it indicated the value of R being 0.454 this indicated the relationship between the on the establishment of the best intervention strategies to improve family participation in self-care among T2DM was 45.4% while the value of r squared of 0.526 was achieved which was greater than 0.5 this indicated goodness in model fitting of the study.

Table 3: Patients Rating on establishment of the best intervention strategies to improve family participation

Test Item		**F**	**%**
How involved are you in the self-care activities of the patient with DMT2?	Very involved	13	22.8%
	Somewhat involved	13	22.8%
	Not very involved	18	31.6%
	Not involved at all	13	22.8%
Have you received any education or information about DMT2 and its management?	Yes	27	47.4%
	No	30	52.6%
How often do you communicate with healthcare providers about your DMT2?	Frequently	17	29.8%
	Occasionally	13	22.8%
	Rarely	14	24.6%
	Never	13	22.8%
Do you feel comfortable discussing concerns or asking questions about the DMT2 with healthcare providers?	Yes, very comfortable	15	26.3%
	Somewhat comfortable	13	22.8%
	Not very comfortable	12	21.1%
	Not comfortable at all	17	29.8%
Have you received any training or guidance on how to assist yourself in self-care activities?	Yes	24	42.1%
	No	33	57.9%
How effective was the training or guidance in self-care needs?	Very effective	10	17.5%

	Somewhat effective	18	31.6%
	Not very effective	14	24.6%
	Not effective at all	15	26.3%
Are you part of any support groups or counseling sessions specifically designed for families of individuals with DMT2?	Yes	29	50.9%
	No	28	49.1%
How beneficial do you find these support groups or counseling sessions in addressing the challenges associated with your DMT2 disease?	Very effective	20	35.1%
	Somewhat effective	14	24.6%
	Not very effective	9	15.8%
	Not effective at all	14	24.6%
How well do you feel the care plans are tailored to your family's specific needs and circumstances?	Very well tailored	14	24.6%
	Somewhat tailored	14	24.6%
	Not very tailored	10	17.5%
	Not tailored at all	19	33.3%
Have you been provided with any behavioral change strategies to encourage your involvement inyour self-care?	Yes	31	54.4%
	No	26	45.6%
How effective do you find these strategies in motivating your participation in your self-care?	Very well tailored	16	28.1%
	Somewhat tailored	15	26.3%
	Not very tailored	16	28.1%
	Not tailored at all	10	17.5%

Source Field Data (2023)

The frequency distribution reveals that the highest number of participants, 18 individuals, responded that they were "Not very involved" in the self-care activities of the patient. This group accounted for approximately 31.6% of the total sample. Both the categories "Very involved" and "Somewhat involved" received equal responses from 13 participants each, representing approximately 22.8% of the participants each. Similarly, the category "Not involved at all" also had 13 responses, accounted for approximately 22.8% of the sample. These results indicated that there was a significant variation in the level of involvement among the participants regarding the self-care activities of the patient with DMT2. While a considerable proportion of participants reported being "Not very involved" or "Not involved at all," there was also a notable group of participants who expressed being "Very involved" or "Somewhat involved." Out of the total participants, 27 individuals, accounted for approximately 47.4% of the sample, responded affirmatively, indicating that they had received education or information about T2DM and its management. On the other hand, 30 participants, representing approximately 52.6% of the sample, answered negatively, indicating that they had not received any education or information on the subject.

Among the participants, the highest frequency of responses was observed in the category "Frequently," with 17 individuals, representing approximately 29.8% of the total sample. Following closely behind, the category "Occasionally" received 13 responses, accounting for around 22.8% of the participants. Similarly, the categories "Rarely" and "Never" both received 14 and 13 responses, respectively, making up approximately 24.6% of the participants each. "Do you feel comfortable discussing concerns or asking questions about the patient's DMT2 with healthcare providers?" was assessed among a sample group among the participants, the highest frequency of responses was observed in the category "Not comfortable at all," with 17 individuals, representing approximately 29.8% of the total sample. Following closely behind, the category "Yes, very comfortable" received 15 responses, accounting for around 26.3% of the participants. In the category "Somewhat comfortable," there were 13 responses, making up approximately 22.8% of the sample. Additionally, the category "Not very comfortable" garnered 12 responses, representing approximately 21.1% of the participants.

Among the respondents, 24 individuals, accounting for approximately 42.1% of the total sample, reported receiving training or guidance on how to assist the patient with self-care activities. This indicates that a significant proportion of the participants have been provided with the necessary knowledge and skills to support the patient in managing their condition effectively. The highest frequency of responses was observed in the category "Somewhat effective," with 18 participants, accounting for approximately 31.6% on "How effective was the training or guidance in preparing you to support the patient's self-care needs" of the total sample. Following closely behind, the category "Not effective at all" received 15 responses, representing approximately 26.3% of the participants. The category "Not very effective" garnered 14 responses, making up around 24.6% of the sample. On the other hand, "Very effective" received 10 responses, accounting for approximately 17.5% of the participants. Out of the total participants, 29 individuals, representing approximately 50.9% of the sample, reported being part of support groups or counseling sessions designed for families of individuals with DMT2. On the other hand, 28 participants, accounting for approximately 49.1% of the sample, indicated that they were not part of such support groups or counseling sessions.

The determine "How beneficial do you find these support groups or counseling sessions in addressing the challenges associated with the patient's DMT2?" was evaluated among a sample group. Among the participants, the highest frequency of responses was observed in the category "Very

effective," with 20 individuals, accounting for approximately 35.1% of the total sample. Following closely behind, the category "Somewhat effective" received 14 responses, representing approximately 24.6% of the participants. In contrast, the category "Not very effective" received 9 responses, making up around 15.8% of the sample. Similarly, the category "Not effective at all" also received 14 responses, accounting for approximately 24.6% of the participants.

The determine "How well do you feel the care plans are tailored to your family's specific needs and circumstances?" was evaluated among a sample group. Among the participants, an equal number of 14 responses were recorded for both "Very well-tailored" and "Somewhat tailored" categories, accounting for approximately 24.6% each. This indicates that a significant proportion of the participants felt that the care plans were tailored to some extent to meet their family's specific needs and circumstances. However, 10 participants, representing approximately 17.5% of the sample, responded that the care plans were "Not very tailored." This suggests that there is room for improvement in addressing the unique requirements of these families within the care plans.

Among the participants, 31 individuals responded affirmatively, indicating that they have been provided with behavioral change strategies to encourage their involvement in the patient's self-care. This group constitutes approximately 54.4% of the total participants. On the other hand, Twenty-six (26) participants responded negatively, stating that they have not been provided with any behavioral change strategies. This group represents approximately 45.6% of the participants. The test variable "How effective do you find these strategies in motivating your participation in the patient's self-care?" was assessed among the participants. The study indicated the highest frequency of responses was observed in the category "Very well-tailored," with 16 participants, accounting for approximately 28.1% of the total sample. Close behind, the category "Somewhat tailored" received 15 responses, representing approximately 26.3% of the participants. Similarly, the category "Not very tailored" garnered 16 responses, making up around 28.1% of the sample. Lastly, the category "Not tailored at all" received 10 responses, accounting for approximately 17.5% of the participants.

RESULTS OF MODEL TESTING

The developed Family-Based Intervention Model was evaluated for its feasibility, acceptability, and effectiveness in enhancing family participation in the self-care management of DMTII patients in Kitui County. Data were gathered from two key groups:

- Experts (n = 5)
- Patients and Family Members (n = 15)

The responses revealed that the model was practical, culturally sensitive, and had the potential for scaling into national policy frameworks.

Results from Experts

Table 4: Expert Responses on Model Feasibility and Challenges

Question	Response Rate (n=5)	Key Insights
Can this model be implemented to help patients?	5 (100%) Yes	Implementation will reduce disease complications and improve family bonding.
Are there expected challenges during implementation?	5 (100%) Yes	Conflicts, disruption of routines, and cost concerns were anticipated.
Should it be adopted in Ministry of Health policies?	5 (100%) Yes	Experts viewed it as a scalable home-based care framework.

Expert Narrative Responses

Experts emphasized that:

- The model would create teamwork between patients, families, and healthcare providers.
- Challenges like family disputes and increased caregiving costs could be addressed through family meetings, counseling, and outreach programs.

The Model is Acceptable and Practical

The model was reviewed and tested by both health experts and DMTII patients/family members, and all stakeholders agreed that it can be implemented in real-world settings. Its step-by-step structure, which includes family education, communication enhancement, and collaborative decision-making, aligns with existing healthcare delivery systems and cultural practices in Kitui County.

Evidence

- 100% of experts (5/5) agreed the model was feasible and implementable.
- 100% of patient/family participants (15/15) saw value in family involvement.
- Experts suggested that it complements current clinical protocols and can be integrated into ongoing home-based care strategies.

Why it matters

Acceptability is critical for uptake. If both professionals and families find a model realistic, culturally appropriate, and aligned with their values, the likelihood of long-term success and adoption increases.

Importance to Community Health Initiatives: The development and implementation of this family-based intervention model play a crucial role in community health initiatives by promoting preventive healthcare measures and reducing the burden on healthcare facilities. Educating families on effective self-care management enhances adherence to treatment plans and fosters healthier lifestyles. This model can be integrated into community-based healthcare programs, improving health outcomes through structured family participation. Additionally, it fosters a culture of community-driven health responsibility, ensuring sustainable diabetes management at the grassroots level.

Artificial Intelligence in Healthcare: Artificial Intelligence (AI) can complement this study by offering innovative solutions for personalized diabetes management. AI-powered applications can provide real-time monitoring, predictive analytics, and tailored educational resources for both patients and family members. Machine learning algorithms can assess patterns in patient data, enabling early detection of complications and timely interventions. Additionally, AI-driven telemedicine can enhance access to expert consultations, reducing hospital visits while ensuring effective disease management. By integrating AI into the developed model, healthcare providers can optimize treatment plans, enhance patient engagement, and improve overall

health outcomes in managing T2DM in Kitui County.

. Results from Patients and Family Members

Table 5: Importance of Family Participation (n = 15)

Response	Frequency	Percentage
Yes	15	100%
No	0	0%

All respondents affirmed the importance of family participation in managing their condition.

Table 3: Ways Family Participation Was Helpful

Support Method	Frequency
Appointment reminders	14
Support of all kinds	10
Improved communication	6
Participation in education at home	0
Help with food, clinic attendance, counseling	12

Most patients received reminders and practical support from family, such as accompaniment to clinics and meal preparation. Participation in home-based education was lacking, signaling a gap for improvement.

Narrative Responses from Focus Groups

Patients and family members shared insights such as:

- "Family participation gave me a sense of belonging and love."
- "Frequent interactions helped reduce my stigma and made me feel cared for."
- "My family reminds me about medication and accompanies me to the hospital."

Such testimonies indicated that the model successfully enhanced the emotional and psychological support system, which is critical in chronic disease management.

Table 6: Suggestions to Increase Family Participation

Suggestion	Frequency
Patient to choose caregiver	12
Involve healthcare team at home	(Unspecified)
Use of mobile communication	(Unspecified)
Resolve family disputes	(Unspecified)

C. Support for Continued Implementation

Table : 7Willingness to Support Family Participation

Response	Frequency
Yes	15
No	0

All patients and family members were in favor of continuing family involvement in care.

Table 8: Reasons for Supporting Family Participation

Reason	Frequency
Prevents complications	11
Sign of family care/love	4
Strengthens family bond	Majority (implied)

Changes Noted Since Model Education

Type of Change	Frequency
Good change observed	12
Slight change or no change	3

This confirms the positive influence of family education on diabetes management, with 80% of respondents acknowledging visible improvements

V.

CONCLUSION

The conclusions made in this study included -

Family members concern and participation in helping their sick relatives manage disease by their own has the potential to improve self-care practices, enhance treatment outcomes, and promote overall well-being for individuals living with Type two diabetes Mellitus.

By use of the steps used in development of this model, it can be concluded that T2DM can well be managed at patients' homes with full support from family members. This in turn can reduce diabetes related complications that are fatal as well as reduction in the number of appointment times. By use of concepts of developed model, a physician can review patients virtually, which makes life easy for the sick persons, by forming the support groups, all patients get quran to share their experiences hence reduce disease stress. Though application good communication skills, each person will be able to

respect each other , emphasize the patients and encourage them to accept that they are sick.

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REFERENCES

[1].Aikens, J. E., Perkins, D. W., Lipton, B., Piette, J. D. (2009). Longitudinal analysis of depressive symptoms and glycemic control in type 2 diabetes. Diabetes Care, 32(7), 1177-1181 Aguiree, F., Brown A., Cho NH, et al, (2017). International Diabetes federation (IDF) diabetes Atlas Basel.

[2].American Association of diabetes educators (2011) technical review : Diabetes self-management education and training outcomes measures.

[3].American Diabetes association(2014) Standard of medical care in diabetes:

Diabetes Care.37(suppl 1): S14-80.doi: 102337/dc14-sS0 14.

[4]Anderson RM, Funnel M, (2017), facilitating self-care through empowerment.

Psychology In diabetes care,

[5].Anderson, S. A. (1988). Parental stress and coping during the leaving home transition. *Family Relations*, **37**(2), 160–165. https://doi.org/10.2307/58431

[6}Anderson J,(2019) Adherence to treatment and soocial support in patients with Non-

insulin dependent diabetes mellitus: diabetes complications.

[7].Anderson BJ, Miller JP, Auslander WF, Santigo JV, (2021)Family characteristics of diabetes of diabetes adolescents : relationship to metabolic control. Diabetes care ; 4-586-593

[8}.Anderson BJ, Miller JP,Auslander, WF,Santigo JVN (2018): Family chacteristics of diabetes adolescents : relationship to metabolic control. Diabetes care 4 586-597

[9] Anderson RM, Funnel M, (2018), Compliance and adherence are dysfunctional concepts in diabetes care; the diabetes education.

[10].Armour., S. Norris., L.Jack, X. Zhang., L. Fisher(.2018). Effectiveness of familyparticipation In diabetes management.

[11].Bearman KJ, La Greca AM (2016) Assessing friend Support of adolescents and diabetes care. the diabetes social support questionnaire-friends version.

[12].Boutayeb, A, Boutayeb S. (2016) the burden of Non- Communicable Diseases in

developing Countries Ranjbarzadeh

[13].Bruttomesso D, Gagnaye R, Leclercg D, Crazzolara D, Busata E, Casiglia E, (2016)

the use of degree of certainty to evaluate Knowledge.

[14].Chesla AL., (2018). Family Predictors of disease Management over one year in Latino and

[15].European American patients with T2DM.

Christensen, D.L., Friis H., Mwaniki DL. (2019) Prevalence of glucose intolerance and

[16] Associated risk factors in rural and urban population of different ethnic groups Kenya.

Cooper H, Booth K, Gill G (2003), Patients perspective on diabetes health care education. Health Educ, Res 2003, 18(2) : 191-206.doi: 10.1093/her/18.2.191.D

[17].Dalal, J.J. Beunza, J. Volmink, C, Adebamowo, F. Bajunirwe, M, Njelekeka

[18].Deakin., T. McShanc., Cade J.E, Williams., R.(2016) Group based self- management

education in Adults with type 2 diabetes mellitus.

[19] Orem., D.E, (1995) Nursing concepts of practice. (5th edition). St Luis: Mosby.

Evangelista.,L.S., & Shinning., M.A, (2018) What do we know about adherence and self-

care?

[20]Person and Family-Centered Care. Available at: http://www.ihi.org/topics/pfcc/pages/default.aspx.

Accessed July 13, 2016.

[21].Fisher, L., Chesla, C., Skaff., M. (2018). The Family and disease management in patients

with type 2 diabetes mellitus.

.[22]Gazmararian., J. Ziemer., D. Barnes., C. (2017) Perception of barriers of self-care

management Among diabetes patients. Diabetes educator 35: 778-778.

[23].Giacco D, Tee H, Priebe S, Santos C, Xanthopoulou P (2020) Healping people with

Psychosis to expand social networks: the stakeholders view

Global Burden of Disease Collaborative study results (2021). Institute for health metrics and evaluation.

[24].Grossman., H.Y,Brink., S.Hauser .,S. (1987) Self-efficacy in adolescent girls and boys with Insulin-dependent diabetes mellitus.

[25].Health Quality Ontorio. (2016) Behavioral interventions from type 2 diabetes an evidence based analysis.

[26].International diabetes federation (2017) IDF diabetes Atlas- 8th edition; retrieved from

www.diabets atlas.org. World Health Organization WHO, (2016) Global report on diabetes . retrieved from http/apps.intris/bitram/bits.

[27].Ivastava/.R.B.,Shrivastava,S.,Ramsey J. (2017). Role of self-care in in management

Diabetes mellitus

[28].Johnsone., S.B (2017) methodological Issues in diabetes Research. Measuring adherence. Diabetes Care.

[29].Johnson, B.H.&Abraham, M.R.(2012) Patnering with patients, Residents and Families: A Resource for leaders of Hospital, Ambulatory Care Settings and long term

care Communities.MD;Institute for Patient and Family Centered Care

[30].Khan MAB, Hashim MJ, King JK, Govender RD, Mustafa H, AI Kaabi JJ(2020)
Epidemiological Global Health. March, 10(1): 107-111.doi
10,2991/jegh.k.191028.001PMD:32175717.
[31]Kleinbeck,C & Williams,C. (2019) disabilities, diabetes and devices: Home Health Care. nurse.
[32]. Kielland. Aanesen HA,Borras (2013) the future service models for home and
Community health; *International conference on digital ecosystems and technologies.*
[33].Kovacs Burns K,Nicolucci A, Holt RI, et al., (2013).Diabetes attitudes, wishes and needs
second study : cross -national benchmarking indicators for family member living with
people with diabetes. *Diabetes Medicine 30; 778-788.*
[34].Leach-Kemon K, Gall J (2018). Why estimate? Seattle, Washington: Institute for Health
Metrics and Evaluation, Available from: http://www.healthdata.org/acting-data/why-
estimate (accessed June 18, 2019).
[35].Maskari F,El-sadig M,Nagelkerke N. (2017) Assessment of direct medical cost of diabetes Mellitus and its complications.
[36].Mayberry LS, Osborn CY (2014), Family involvement is helpful and Harmful to patients'
self-care and glycemic control. *Patient Educ Couns* 2014; 97: 418–425.
Martire LM, Schulz R, Helgeson VS, Small BJ, Saghafi EM.(2010) Review and Meta
analysis of Couple-Oriented Interventions for Chronic Illness. Annals of behavioral medicine a publication of the Society of Behavioral Medicine.
[37].Medication taking and diabetes: a systematic review of the literature. Odegard PS, Capoccia K. Diabetes Educ. 2007;33:1014–1029. doi: 10.1177/0145721707308407.
[38] Nadkarni, A, (2017) Implementation plans and self-monitoring of blood glucose in diabetes dissertation, Michigan University.
[39]Nickelett EJ, Heisler ME, Spencer MS, Rosland AM (2013). Direct social support and long-term health among middle -aged and older adults with type 2 diabetes.
[40] Oti., S.O, Vijver S.J, Aggyemang C, Kyubutung C. (2018) Magnitude of diabetes and its
association with obesity in slums of Nairobi.
Institute for Patient- and Family-Centered Care.(IPFCS) [Accessed Dec 31, 2014];What is meant by the word "family"? http://www.ipfcc.org/faq.html
[41]. Shrvastava, S. R. B. L., Shrivastava, P. S., & Ramasamy, J. (2013). Role of self-care in
management of diabetes mellitus. *Journal of Diabetes and Metabolic Disorders*, *12*(1).
https://doi.org/10.1186/2251-6581-12-14.
[42]. Shrivastava et al. Journal of Diabetes & Metabolic Disorders 2013, 12:14
Souse V.D. &Zauszniewski J.A, (2016) toward a theory of diabetes self-care management.
Journal of theory construction and testing 9, 61-67.
[43]Tomky., D,Cypress .,M. (2018) American Association of Diabetes Education (AADE) *Position Statement: AADE 7 Self- Care behaviors: the diabetes Educators.*
[44]Torenholt R, Schwennessen N, Willaing I, (2014) Lost in translation: the role of family in
interventions among adults with diabetes: A systematic Review.
[45].UK prospective diabetes study (UKPDS)(2018) Intensive blood glucose control with insulin Compared to conventional treatment and risk of complications in patients with type II diabetes. mellitus.
[46].Vivienne., W.U,Courtey., M. Edwards., H. McDowell.,J.Shorttridge-Baggett (2008)
Developing and validation of the diabetes management-efficacy sale.
[47].Wagner., E.H, Austin ., BT, Davis C.(2001) Improving chronic care*: translating evidence into action:* Health aff(milwood), 2001,vol 20 (pg 64).
[48].Walker RJ, Gebregziabher M, Martin-Harris B, Egede LE,(2015). Quantifying direct effects of social determinants of Health on glycemic control in adults with type 2 diabetes. Diabetes Technology.
[49].Whitemore, R. (2019) strategies to facilitate lifestyle change associated with diabetes mellitus. Journal of nursing scholarship 32: 225-232.
[50]'World Health Organization (2016) global Report on diabetes.