



Acceptability of Positive Deviance Mentorship for Diabetes Management among HIV Clients Living with Diabetes in Eastern Uganda a Cross-Sectional Study

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Authors' contributions

This work was carried out in collaboration among all authors. Authors PO-O, JK and IM conceptualized and proposal developed the research work. Author DO, under the mentorship of co-authors did data collection, analysed, report writing and wrote the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: The high risk of PLHIV on ART to become diabetes clients and to develop metabolic disorders is well investigated. Regular monitoring and health care is an essential requirement. A majority of HIV clients living with diabetes have poor diabetes knowledge and poor treatment outcomes. Positive deviance mentorship may be a better option for improving diabetes knowledge and treatment outcomes among registered HIV clients living with diabetes. Assessing the acceptability of public health interventions is key to understanding their potential for long-term success and feasibility. Limited literature exists about the acceptability of positive deviant mentorship (PDM) for improving knowledge and treatment outcomes among HIV clients living with diabetes. The findings of this study provide additional important insights for improving future positive deviance HIV and diabetes interventions and enhancing health programs and sustainability.

Aim: This study, conducted in October 2024, quantitatively evaluated the acceptability of the positive deviant mentorship for improving knowledge and treatment outcomes among diabetes clients living with HIV (mentees) exposed to PDM for three months (July to September) in Eastern Uganda.

Study Design: In October 2024, a cross-sectional survey was conducted in Mbale and Soroti Regional Referral Hospitals in Eastern Uganda.

Materials and Methods: The sample size was twenty-two registered participants exposed to PDM for three months. Purposive sampling was done to select eligible registered exposed participants. Electronic data collection was done using a structured questionnaire by trained research assistants. The twenty-two participants were asked to rate their agreement with various statements regarding the PDM's perceived satisfaction, effectiveness, and cultural suitability. All the research assistants were trained in data quality management. Ethical approval was obtained from Busitema University REC. Stata version 15 was used for analysis. Descriptive statistics (frequencies and percentages) were employed, to summarise the acceptability scores.

Results: All the 22(100%) participants participated in the study. The majority (77.3%) were above the age of 50 years, 54.6% were married, and only 13.6% had tertiary education. More than half of the participants, 54.5%, were employed, and a relatively large proportion, 59.1%, lived within a radius of 5 km from the nearest Health facility. The Muslims were only 31.8% and 45.4% of the participants' source of funds when sick was salary or business. A majority of the participants 95.5% were satisfied (very satisfied/satisfied) with positive deviant mentorship(intervention) and 95.4% would recommend the interventions to other HIV clients with low diabetes knowledge and poor glycemic control. A large proportion of the participants 91% perceived the intervention as feasible and effective in achieving its goals. Almost all the participants 95.5% felt the intervention was culturally appropriate for them.

Conclusions: The study revealed that Positive deviant mentorship is highly acceptable among the research participants in Soroti and Mbale Hospitals Eastern Uganda. The positive deviant mentorship-prescribed activities were easy to do and were culturally appropriate. This intervention is recommended for HIV clients living with diabetes who have low diabetes knowledge and poor glycemic control in similar contexts.

This study's limitations include selection bias, recall bias, a cross-sectional design, and a small sample size. These were mitigated during the data collection, mentorship and analysis process.

Keywords: HIV; diabetes, acceptability of positive deviant mentorship; HIV clients living with diabetes; Eastern Uganda.

1. INTRODUCTION

The high risk of PLHIV on ART to become diabetes clients and to develop metabolic disorders is well investigated. Regular monitoring and health care is an essential requirement however, a majority of HIV clients living with

diabetes in Sub-Saharan Africa have low diabetes knowledge and poor glycemic control (Kagaruki et al., 2018; Okia et al., 2024; Dedefo et al., 2020; Rwegera et al., 2021). A study (Okia et al., 2024) revealed that there was low diabetes knowledge among HIV clients living with diabetes and 49.8% were not knowledgeable

about recommended diabetes diets. Another study by (Dedefo et al., 2020) revealed that a majority (67%) of the participants had poor knowledge of diabetes and more than half (59.5%) had inadequate glycemic control. The known factors associated with poor glycemic control among HIV clients living with HIV include diabetes duration of more than ten years, unemployment, poor knowledge of diabetes and lack of social support (Dedefo et al., 2020; Rwegerera et al., 2021). The World Health Organization and other studies (Rajagopaul & Naidoo, 2021; Phoosuwan et al., 2022; Chireshe et al., 2024) recommend interventions to improve diabetes knowledge and treatment outcomes. Diabetes is a lifelong illness that occurs either when the body fails to generate enough insulin or cannot use the insulin it does generate efficiently, Diabetes prevalence among HIV clients is high in Sub-Saharan Africa (Peer et al., 2023). The complications of diabetes among PLWH are known and include stroke, heart failure, kidney failure, diabetic retinopathy and peripheral neuropathy.

Positive deviance is an approach to behavioural and Social change founded on the observation that, despite facing similar challenges and possessing no more resources or knowledge than their peers, there are individuals in every community who, despite their unusual behaviour or strategies, manage to find better solutions to a problem than their peers (Baxter et al., 2016). Research has evaluated the application of the positive deviance approach and revealed that the communities accept their interventions (Kassie et al., 2024; Sarnkhaowkhom et al., 2022; Shafique et al., 2016). After analysing qualitative data from their focus groups and in-depth interviews (Shafique et al., 2016), they found that the "positive deviant approach created a strong sense of community empowerment and was well accepted in communities" in their study "Positive Deviance as a novel tool in Malaria Control and Elimination." According to feedback from the final focus group discussion, the intervention was deemed acceptable and helpful. Another study by (Kosugi et al., 2021) revealed that positive deviance intervention raised women's use of dual-method contraception and would help lower the risk of HIV infections and unwanted pregnancies. The **limitation** of Positive Deviance is the failure of Positive deviants to share their knowledge and skills as revealed in a study by (Furber & Thomson, 2006) where the positive deviant midwives did not share their unusual practices that were not included in the guidelines.

A positive deviant mentor in this study was an HIV client living with Diabetes who got above average in the pretest, was virally suppressed, and had an HbA1c below 7. He/she was registered in the HIV clinic of either Soroti or Mbale hospitals and came from the same sociodemographic context. The mentees were HIV clients living with diabetes, with a pretest mark less than average (Diabetes knowledge test of less than (11-17) and HbA1c above 7%. The mentees were also registered in Soroti and Mbale Hospitals HIV clinics. Positive deviant mentorship(intervention) was the interrelationship between a registered positive deviant mentor and a mentee which involved diabetes knowledge and experience transformation. The Positive deviant mentorship was derived from the Positive deviance theory. The World Health Organization recommends mentorships to improve the quality of health care and treatment outcomes among clients with chronic diseases.

Acceptability of an intervention can be defined as; a multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention (Sekhon et al., 2017). Assessing the acceptability of public health interventions is key to understanding their potential for long-term success and feasibility, especially in resource-constrained settings. Positive deviant mentorship can provide an additional way to improve diabetes knowledge and glycemic control among registered HIV clients living with diabetes. However, limited information exists about the acceptability of Positive deviant mentorship for improving knowledge and treatment outcomes among HIV clients living with diabetes. In addition, there is a growing need for quantitative measures to offer more statistically robust data that is generalisable than qualitative measures that have been used widely to explore acceptability. Evaluating the acceptability of positive deviant mentorship will guide the improvement and ensure better engagement and adoption among key stakeholders. This study therefore aimed to assess the acceptability of Positive Deviant Mentorship among HIV clients living with diabetes using validated scales, survey data and proven statistical analysis. The main objective was to determine the acceptability of Positive Deviant Mentorship among HIV clients living with diabetes(mentees) exposed to PDM for three months in Eastern Uganda. This study is nested in a trial that assessed the

acceptability and effectiveness of positive deviant mentorship for improving diabetes knowledge and treatment outcomes.

2. MATERIALS AND METHODS

Study design: A cross-sectional survey was employed to assess the acceptability of Positive Deviant Mentorship among a sample of twenty-two participants who were exposed to PDM for three months in Eastern Uganda.

Population: The twenty-two exposed participants were purposively drawn from Soroti and Mbale Regional Referral Hospitals HIV clinic. First, the researcher included all registered adult HIV clients with diabetes who were exposed to Positive Deviant Mentorship for three months, had an HbA1c greater than 7%, and had low (below average) diabetes knowledge. This study only included exposed participants who fulfilled the first requirement and consented. Eligible participants with mental illnesses and those who declined to give their consent were not included in the study. This exposed population was part of the Randomized controlled trial that assessed the acceptability and effectiveness of positive deviant mentorship for improving diabetes knowledge and HbA1c among HIV clients living with diabetes in Eastern Uganda.

Study site and setting: Soroti and Mbale Hospitals, are Public facilities that are funded by the government of Uganda and offer free HIV and diabetes services. Both Hospitals are located in Eastern Uganda and offer free curative and preventive health services. Expert clients and health workers provide free health education on HIV and diabetes, when the clients come for drug refills (clients come for drug refills monthly or quarterly).

Data collection: Data was collected by trained research assistants using an electronic structured questionnaire. The validated tool(questionnaire) was uploaded to the Kobo software and it had different items on Perceived satisfaction, perceived effectiveness, ease of use and likelihood of continued use. The Perceived satisfaction questions requested the participants to rate their satisfaction from 1 to 5, with 5 being very satisfied. The easy-to-use item had questions that evaluated the convenience and simplicity of using Positive Deviant Mentorship (PDM) activities. Participants had to rate their responses from 1 to 5 with 5 being the maximum

score. The tool also had two questions on cultural appropriateness. The first question was; do you feel the intervention was culturally appropriate for you? The second question was did you feel comfortable using the intervention in your social environment (e.g. at home or at work)? The responses were yes or no and the participant had to select one option. The responses were quantified in percentages of those who responded yes or no. The research assistants were trained in data quality management and were supervised by experienced researchers during data collection.

The Positive Deviant Mentorship (**intervention**) to which the study participants(mentees) were exposed was implemented from July to September 2024. There were four stages, in the execution of this intervention (PDM): Identifying mentors and mentees was the first step. The baseline HbA1c levels and knowledge test results of mentors and mentees were examined. Participants were deemed mentees if their HbA1c was higher than 7% and their DKT scores were below average. The mentors had above-average DKT points, a HbA1c below 7, and were virally suppressed. In the second phase, the mentors received seven days of on-site training in general communication skills, mentorship principles, and HIV-related diabetes management. The validated HIV and diabetes training manuals from WHO and MOH Uganda were used for this training. The local diabetes trainers were used, and emphasis was placed on the use of local language, diets, exercise, and correction of the common diabetes self-management errors and challenges. The training included physical demonstrations of locally recommended diets, and exercises and the use of diabetes videos, images, narratives, and case studies. During the training, mentors were expected to share any unusual or distinctive practices, and these experiences were recorded and added to the mentee manuals. The same local facilitators, resources, and infrastructure were used to train all the positive deviant mentors. The mentorship process, which lasted three months, was the third stage. A mentor from the same socioeconomic background was assigned to each mentee. The mentee and mentor met twice weekly to discuss experiences and complete the assigned tasks. The principal investigator observed and monitored the mentorship process every two weeks. All mentees received mentorship manuals with activities they were required to complete weekly. The mentors were supposed to call the principal

investigator to update him on their progress and any difficulties encountered during the mentorship process. The research team provided additional free twenty-four-hour medical consultations to all the mentees. The principal investigator and his research in addition team monitored the mentorship process every two weeks by randomly visiting mentee homes to discuss any challenges related to mentee-prescribed activities. Determining post-intervention HbA1c levels, diabetes knowledge levels, and evaluating mentees' acceptance of the intervention were all part of the fourth phase.

Data analysis: The collected data was checked for completeness and cleaned before data analysis. The data was analysed using Stata version 15. Descriptive statistics (frequencies and percentages) were employed, to summarise the acceptability scores.

3. RESULTS

All the 22(100%) participants participated in the study. The majority (77.3%) were above the age of 50 years, 54.6% were married, and only

13.6% had tertiary education. More than half of the participants, 54.5%, were employed, and a relatively large proportion, 59.1%, lived within a radius of 5 km from the nearest Health facility. The Muslims were only 31.8% and 45.4% of the participants' source of funds when sick was salary or business. Table 1 has the details.

3.1 Acceptability of Positive Deviant Mentorship

A majority of the participants 95.5% were satisfied (very satisfied/satisfied) with positive deviant mentorship(intervention) and 95.4% would recommend the interventions to other HIV clients with low diabetes knowledge and poor glycemic control. More than the average number of participants 77.3% felt the positive deviant mentorship prescribed activities were easy to perform. A large proportion of the participants 91% perceived the intervention as feasible and effective in achieving its goals. Almost all the participants 95.5% felt the intervention was culturally appropriate for them. The details are described in Table 2 and Fig. 1.

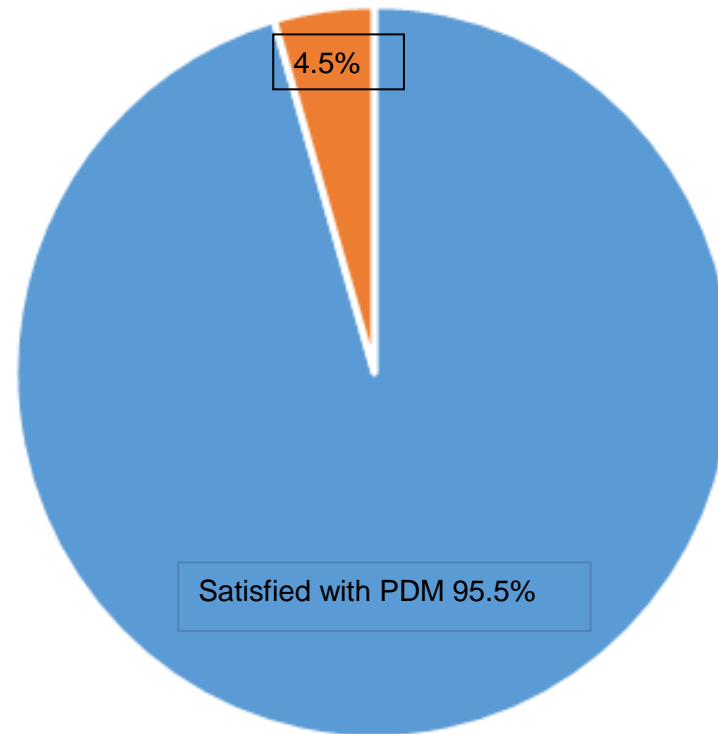
Table 1. Socio-demographic characteristics of the participants

	Characteristics	Categories	Frequency	Percentage
1	Sex	Male	10	45.5
		Female	12	54.5
2	Age	20-34	1	4.5
		35-49	4	18.2
		50+	17	77.3
3	Marital Status	Married	12	54.6
		Widow	4	18.2
		Divorced/separated	5	22.7
		Others	1	4.5
4	Education level	No formal education	3	13.6
		Primary	9	41
		Secondary	7	31.8
		Tertiary	3	13.6
5	Religion	Catholic	6	27.3
		Muslim	7	31.8
		Protestant	6	27.3
		Pentecostal	3	13.6
6	Employment status	Unemployed	10	45.5
		Employed	12	54.5
7	Distance to the nearest Health Facility	within 5 KM	13	59.1
		> 5 KM	9	40.9
8	Source of income when sick	Salary/Bussiness	10	45.4
		Support from children/relatives	6	27.3
		Use free government services	4	18.2
		Others	2	9.1

Table 2. Summary table for the level of acceptability of positive deviant mentorship

Dimension	Description	Category	Frequency	Percentage	
1	General Satisfaction	Overall how satisfied are you with Positive deviant mentorship	Very satisfied	13	59.1
			Satisfied	8	36.4
			Very dissatisfied	1	4.5
		How easy was it to participate in positive deviant mentorship activities	Very easy	11	50
			easy	6	27.3
			Neutral	4	18.2
			Very difficult	1	4.5
		Would you recommend positive deviant mentorship(intervention) to other clients	Very likely	14	63.6
			Likely	7	31.8
			Not at all	1	4.6
		To what extent do you feel the intervention met your knowledge and glycemc control needs	Completely agree	11	50
			Agree	8	36.4
	Disagree		2	9.1	
	Not at all		1	4.5	
2	Perceived effectiveness	Do you believe positive deviant mentorship (intervention)was effective in achieving its goals	Very effective	12	54.6
			Effective	8	36.4
			Neutral	1	4.5
			Not effective at all	1	4.5
		How likely do you think the intervention will have a positive impact on your glycemc control	Very likely	12	54.6
			likely	6	27.3
		Neutral	3	13.6	
		Not Likely	1	4.5	
3	Engagement and Participation	How engaged did you feel while participating in the positive deviant mentorship activities	Very engaged	11	50
			Engaged	10	45.5
			Neutral	1	4.5
		Did you face any challenges or barriers in completing the positive deviant mentorship activities	Yes	2	9.1
			No	20	90.9
	How frequently did you participate or engage in the intervention	Daily	19	86.4	
		Weekly	3	13.6	
4	Feasibility and Practicality	How feasible do you think it is to continue with intervention in your daily routine	Very feasible	11	50
			Feasible	9	41
			Neutral	1	4.5

Dimension	Description	Category	Frequency	Percentage
		Not feasible	1	4.5
	Did you find the resources or materials (tools and instructions) provided adequate	Yes	20	90.9
		No	2	9.1
	How much time did you need to commit to the intervention	1-2 hours daily	11	50
		3-5 hours daily	9	41
		More than 5 hours daily	2	9
5 Cultural Acceptability	Do you feel positive deviant mentorship(intervention) was culturally appropriate	Yes	21	95.5
		No	1	4.5
	Did you feel comfortable engaging in the intervention activities in your social environment	Yes	21	95.5
		No	1	4.5



■ Percentage of clients satisfied with intervention ■ Percentage of those not satisfied

Fig. 1. Pie chart with overall satisfaction levels among HIV clients living with diabetes exposed to positive deviance mentorship in Eastern Uganda

4. DISCUSSION

The majority of HIV clients living with diabetes in developing countries, find it challenging to achieve a high level of diabetes knowledge and good glycemic controls. The researchers and study participants thought positive deviant mentorship would be an acceptable intervention to mitigate these challenges in Eastern Uganda. This is because of the shared experiences of being diagnosed with two chronic diseases (HIV and diabetes), that require lifelong costly management. This study revealed a high acceptability level of positive deviant mentorship since most participants perceived the positive deviant mentorship (intervention) as effective, feasible and culturally appropriate in helping them achieve the desired diabetes knowledge and glycemic outcomes. Because positive deviance approaches are used by those who are at risk and do not conflict with local culture, they are known to be widely accepted, reasonably priced, and sustainable (Triatmaja et al., 2023; Marsh et al., 2002). These study findings align with (Study et al., 2024) who revealed that Implementation fidelity, penetration, organisational readiness, and sustainability scores were positively and significantly correlated with the acceptability of the approach. A study by (Kassie et al., 2024) noted that healthcare systems have enhanced quality, reduced errors, and improved patient outcomes by identifying lessons from those who exhibit exceptional practices and implementing successful strategies in their practice. An earlier study "Positive Deviance –An Expedient Tool for Action to Ameliorate Malnutrition in Resource-Poor Settings" noted that positive deviance produced results comparable to community therapeutic care studies and that positive deviance is indigenously acceptable and affordable (Sosanya et al., 2017). Our study findings are similar to other research results that reported mentorship as Acceptable and effective for improving chronic disease health outcomes (Lavender et al., 2022; Williams et al., 2018; Akinde et al., 2019). A study by (Lavender et al., 2022) reported that peer mentors perceived their support to mentees as being acceptable and beneficial in improving mentee health outcomes. Another study by (Williams et al., 2018) also noted that mentors and mentees gave high grades for perceived treatment credibility and service delivery after the mentorship process. A peer mentor mother intervention in HIV care further supports our findings because they also found that their participants felt peer mentoring

was acceptable (Akinde et al., 2019). After all, it reinforces skill-related ART adherence and sustained engagement in care after delivery. The findings of this study, offer insights into the strengths and weaknesses of the Positive Deviant Mentorship from the participant's perspective. A higher acceptability score obtained in this study indicates that Positive Deviant Mentorship is likely to be adopted widely in similar contexts, leading to improved health outcomes (diabetes knowledge and HbA1c levels) among HIV participants. The findings above were discussed in the context of existing literature on positive deviance health interventions' acceptability and how the findings can inform future HIV and diabetes program design and policy.

This study demonstrates the catalytic role of PDM, considering the cross-sectional participants and 95.4% recommending the interventions to other clients. The PDM approach received an acceptance level of 95.5% possibly indicating behaviour change happening among participants exposed to the intervention. The study confirms the advantage of PDM as a promising approach which can accelerate behavioural change and improve diabetes knowledge and treatment outcomes.

5. CONCLUSION

The study revealed that Positive deviant mentorship is highly acceptable among the research participants in Soroti and Mbale Hospitals Eastern Uganda. The positive deviant mentorship-prescribed activities were easy to do and were culturally appropriate. This intervention is recommended for HIV clients living with diabetes who have low diabetes knowledge and poor glycemic control in similar contexts.

5.1 Contributions of the Study

This study provides baseline information for future positive deviant acceptability studies and interventions among HIV clients living with diabetes (HIV-Diabetes) in Eastern Uganda. Prior research in our setting primarily examined the acceptability of other interventions that focus on clients with only one of the two medical conditions either diabetes or HIV. The study revealed that positive deviant mentorship is highly acceptable and recommended for improving diabetes knowledge and glycemic control among HIV clients living with diabetes.

5.2 Limitations of the Study

Because the research relied on self-reported responses, the self-reported questionnaire used in the study is susceptible to recall bias. During the mentorship and data collection process, the research team obtained reports from the participants' mentors and the laboratories, which they compared with their responses. The exposed intervention participants were purposively selected and the sample was relatively small, selection bias is a potential limitation. Causal inference cannot be established because a cross-sectional study was employed and data was analysed at a single point in time.

ETHICAL APPROVAL AND CONSENT

The approval number was BUFHS-2024-160. Written informed consent was obtained from all the study participants. The consent form was translated into the local languages to accommodate those who could not read English. Confidentiality was observed, and the principal investigator kept the data gathered under lock and key. All the research assistants were trained to ensure privacy and confidentiality.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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