

Journal of the American Psychiatric Nurses Association

Diabetes Education for Behavioral Health Inpatients: Challenges and Opportunities

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First Published October 5, 2019 | Brief Report

<https://doi.org/10.1177/1078390319878781>



Abstract

OBJECTIVE: To adapt a diabetes survival skills education (DSSE) program for delivery on inpatient behavioral health units (BHUs) and to evaluate implementation feasibility within nursing unit workflow. **METHODS:** We employed mixed methods to codesign, implement, and evaluate a DSSE program for inpatient BHUs. The *Diabetes to Go* core program incorporates linking knowledge deficits to video education content, a companion book on diabetes survival skills, and education for nurses on delivery processes and teaching content. The *Diabetes to Go* adaptation for BHUs was codesigned in partnership with BHU staff and patients. Implementation evaluation included patient surveys and nursing staff feedback obtained during field observations. **RESULTS:** A total of 89 patients participated in nine group education sessions among whom 17 (20%) had diabetes. Nursing unit staff and patients expressed willingness to engage in program design. Barriers to implementation were encountered in both groups including lack of standardization of education content by nurse facilitators and difficulty engaging patients for the time required for completion of surveys plus group education. Preferred education media for both nurses and patients was a book. Diabetes knowledge deficits were identified among over two thirds of participants with diabetes. **CONCLUSIONS:** Group class may not be the optimal delivery model for specialized DSSE on BHUs. It remains to be determined if individual diabetes education alone or a model which combines individual and group sessions is preferable. Translation of standardized approaches for diabetes education on inpatient BHUs will require further redesign to meet the unique needs of this population.

Keywords

diabetes, education, behavioral health units, implementation, mental disorders, behavior disorders

Introduction

Serious mental illness (SMI) is defined as “a mental, behavioral, or emotional disorder resulting in serious functional impairment which substantially interferes with or limits one or more major life activities” (National Institute of Mental Health, 2017). SMI affects approximately 4.2% of all adults in the United States (Ahrensbrak et al., 2017). Persons living with SMI may also have concomitant chronic medical conditions including diabetes mellitus, which is known to be two to three times more prevalent in persons with SMI than in those without (Holt, de Groot, & Golden, 2014; Holt & Mitchell, 2015; Mitchell, Vancampfort, De Herdt, Yu, & De Hert, 2013). Persons with SMI are less likely to be aware of their diabetes diagnosis or to be screened for the condition (Holt & Mitchell, 2015). In addition, individuals with both SMI and diabetes are less likely to receive diabetes education than those with diabetes alone and waiting for SMI symptoms to completely resolve may result in delay of delivery of key diabetes education to the patient (Gonzalvo et al., 2019). Together, these factors represent a significant challenge to effective self-care management for persons with coexisting diabetes and mental illness.

Regulatory standards for inpatient education and training indicate that all patients should be discharged from acute care with instructions for self-care. This includes patients receiving psychiatric care on behavioral health units (BHUs). Hospitalization represents an important opportunity to perform an educational needs assessment and to deliver basic diabetes education to hospitalized adults. Diabetes self-management education and support is central to safe and effective care management (Powers et al., 2015) and is usually delivered in the outpatient setting individually or via group classes. Inpatient diabetes education is intended to deliver the critical survival skills required for safe self-care during the transition from the hospital to the ambulatory setting (Powers et al., 2015). To address the need for sustainable diabetes survival skills education (DSSE) for use in both inpatient and ambulatory settings, we have developed *Diabetes to Go (D2Go)*, a DSSE program that assesses individual diabetes knowledge gaps and links those gaps to

educational content (Lewis, Benda, Nassar, & Magee, 2015; Magee et al., 2013; Magee, Khan, Desale, & Nassar, 2014). D2Go has demonstrated effectiveness when provided to general medicine and surgery inpatients and in outpatient settings when delivered in a research context by a study team (Magee et al., 2013; Magee et al., 2014). The D2Go toolkit includes a companion book for the patient.

In this study, it was our dual objective to adapt the D2Go program (Magee et al., 2014) to support real-world adoption within nursing unit workflow on inpatient BHUs (D2Go-BHU) and to evaluate the feasibility and preliminary efficacy of implementing D2Go-BHU among persons with diabetes on two BHUs.

Methods

Design

We employed the practical robust implementation and sustainability model implementation science framework to adapt the D2Go program for inpatients on a BHU (Feldstein & Glasgow, 2008). Practical robust implementation and sustainability model draws on key principles from several theoretical frameworks including the diffusion of innovation, the chronic care model, and the model for improvement. Implementation success begins with overcoming common barriers to adopting research into practice and by engaging stakeholders in the process of program development or redesign. Implementation feasibility was established through examining program reach, effectiveness, adoption, implementation, and maintenance using both qualitative and quantitative methods. The study was reviewed and received an exempt determination by the investigators' local institutional review board. The approved consent process included an institutional review board –stamped "Patient Information Sheet," which explained details of and the voluntary nature of the program.

Setting

The study was conducted in two general psychiatry BHUs of a large, urban, tertiary care hospital in the mid-Atlantic region of the United States between January and April 2018. The two BHUs accrued 1,989 unique patient admissions in 2018, among which 264 (13.3%) had a discharge diagnosis of type 2 diabetes. Those with

diabetes were 55% male ($n = 145$), 84% African American ($n = 221$), and 45% each with Medicaid or Medicare insurance ($n = 119$ per group).

Codesign Approach to the D2Go-BHU Intervention

Adaptations for the D2Go-BHU program were designed using feedback obtained from support staff and nurses to support integration into standard nursing unit workflow. All interviews for the project were qualitative, semistructured interviews, or focus groups. These outcomes have been published previously (Smith, Baker, Bardsley, McCartney, & Magee, 2019). Briefly, staff felt that all patients, including those without diabetes, would benefit from the sessions as it may help curb food sharing among BHU residents and that computer tablet use could not be supported on BHUs due to staff and patient risk (Smith et al., 2019). Adaptations to the program included (a) delivering education through facilitated group learning sessions, (b) providing paper surveys (see descriptions below) and a hard copy D2Go survival skills education booklet, (c) and developing videos which were delivered using a secure DVD versus a tablet. Together, these three elements comprised the D2Go-BHU intervention. Staff on the BHUs were trained to deliver the D2Go content by a registered nurse who is experienced certified diabetes educator. Staff were oriented to the D2Go materials, and strategies for implementation of D2Go-BHU and facilitation of diabetes education within groups. A 60-minute facilitator-nurse training was provided on each unit. The curriculum incorporated review and discussion of the survival skills book and video content. Each unit nurse was given a pocket quick reference guide. The lead nurse also completed a formal 2-day diabetes educator preparatory course. The group process was not addressed as the nurses on the BHU are perceived to have expertise in that area. The D2Go-BHU group was scheduled for 30 minutes weekly during the 16-week pilot intervention period. Initial barriers to implementation were identified during training and addressed prior to program launch.

D2Go Patient Surveys

Participants were asked to complete a demographic survey and baseline assessments prior to participation in the group education. Completion of the surveys was voluntary and implied consent to participate. Baseline diabetes knowledge was assessed using the KNOW Diabetes 15-item survey, which has been validated with a Cronbach's alpha of 0.72 (Youssef et al., 2019). Thirteen questions cover diabetes

knowledge, with the remaining two answered if a patient takes an oral diabetes medicine or insulin. Participants were also asked to complete the highly validated 12-item Ask12® medication adherence survey which identifies barriers to medication adherence ([Matza et al., 2009](#)).

Implementation Evaluation

Study team members returned to the units to collect completed surveys and conduct informal interviews with staff to identify implementation barriers and facilitators.

These were presented to the study team and strategies to overcome implementation challenges were deliberated and documented. System's factors were addressed in partnership with the BHU staff. Analysis of reach, effectiveness, adoption, implementation, and maintenance of the program are summarized using simple descriptive statistics including counts, frequencies, and percentages. Chart review was completed for missing demographic and diagnosis data if patients had provided their name and date of birth. Information collected during informal semistructured interviews with staff were analyzed for common themes using the constant comparative method ([Coffey & Atkinson, 1996](#)) to characterize the barriers and facilitators of implementation.

Results

Between January 19 and April 20, 2018, the two BHUs conducted 9 of the 16 planned group sessions. A total of 86 patients participated in the intervention, including 17 with diabetes (20%). Demographic characteristics were available for 39 participants (45%), 7 (19%) of whom had diabetes. The participants were 51% male ($n = 20$) and 77% African American ($n = 30$), with a mean age of 51 ± 11 years for those with diabetes and 48 ± 14 years for those without diabetes ($p = 0.623$). The primary diagnosis at hospital discharge was obtained for 29 (74%) patients and included suicide attempt ($n = 10$; 35%), depression ($n = 7$; 24%), schizophrenia ($n = 5$; 17%), psychosis ($n = 7$; 17%), bipolar ($n = 3$; 10%), posttraumatic stress disorder ($n = 1$; 3%), delusion ($n = 1$; 3%), homicidal ($n = 1$; 3%), and other ($n = 2$; 7%).

Of the 39 participants who provided demographic characteristics, 90% responded to at least one of the two assessment surveys. Complete responses were available for 32 (91%) patients for the KNOW survey and 18 (51%) patients for the ASK12. Both surveys were completed by 6 of the 17 participants with diabetes (86%). Those with

diabetes had lower ASK12 scores compared with those without diabetes, 23 ± 7 versus 33 ± 6 , $p = .10$, representing a trend toward fewer barriers to medication adherence. Scores on the Ask12 range from 12 to 50, with a higher score representing greater barriers to medication adherence (Matza et al., 2009). Persons with diabetes answered most items related to what to eat correctly, but less than 33% correctly answered items related to target blood glucose (BG) after a meal, need for checking BG, symptoms of high BG, and where to store oral medicines. Patients chose not to complete the post-D2Go-BHU knowledge and medication adherence surveys.

This study identified implementation barriers to DSSE delivery on the BHUs. Staff-related barriers included limited retention of the training provided, lack of standardization of the DSSE content delivery, and having only one facilitator per unit for the diabetes group classes, without back up. Structural challenges included issues of availability of DVD players, which even when resolved, were still not used as intended. Many patients were unwilling or unable to complete the surveys. Those who did complete them often reported subsequently being tired and not able to maintain attention for a group discussion, leading the facilitators to drop the surveys. Other patients simply left the sessions. Patients preferred the printed D2Go book, so the staff used the book as a discussion guide and patients followed the content in their copies of this education tool. This practice is still being utilized in the BHU group classes. This resulted in the video content also being dropped.

Discussion

To our knowledge, this is one of the first mixed-methods examinations of the feasibility of implementing DSSE for inpatients on BHUs. Our experience demonstrates the challenges of adapting and implementing a standardized, structured, and scalable program for achieving improvements in diabetes knowledge, skills, and attitudes among patients with concomitant SMI and diabetes. There are clearly limitations to our findings which can be attributed to implementation barriers encountered at multiple levels during this study. Despite staff and patient stakeholder engagement in and apparent enthusiasm for the adaptation redesign process, significant pragmatic implementation barriers were nonetheless encountered which hindered our ability to successfully implement and evaluate the intervention using a group class model.

Preimplementation focus groups identified potential opportunities to adapt the D2Go program to support implementation, including delivery within group education sessions and availability of print and video-based education content (Smith et al., 2019). At the BHU staff level, there was receptivity to attempting to engage in delivering DSSE; however, challenges to implementing the program in a group education format were encountered. Although several nurses received training on the D2Go-BHU program and DSSE content, only one trained facilitator on each unit conducted the group class, with no backup facilitator identified, which was challenging for continuity. In addition, despite the training provided, staff knowledge of what and how to teach DSSE content was limited, which is consistent with the literature (Alotaibi, Gholizadeh, Al-Ganmi, & Perry, 2017) and resulted in the nurses feeling most comfortable using the *Diabetes to Go* book as a guide to providing the education content. Finally, the concentration of persons with diabetes attending the group classes was only 20% which, while generally reflective of the prevalence of this diagnosis in the hospital BHUs, clearly limited our ability to engage persons with diabetes in the intervention.

In terms of survey results, among all D2Go-BHU group participants, 45% completed baseline surveys. There was a trend for participants with diabetes to demonstrate fewer barriers to both medication taking behaviors and to medication adherence when compared with those without diabetes. This finding is consistent with evidence from the literature that persons with SMI have equal to better therapeutic persistence than their counterparts without SMI (Gonzalvo et al., 2019). While the KNOW Diabetes survey responses suggest that the few participants with diabetes appeared to understand what they should eat, most did not understand fundamental concepts on BG monitoring and the symptoms of high BG, suggesting that there is certainly a need for DSSE for these patients. We were unable to obtain post-D2Go-BHU knowledge and medication adherence surveys, so we could not assess the impact of the DSSE on patient outcomes.

DSSE has a well-documented impact on outcomes. There is existing evidence of successful interventions of diabetes education in the inpatient setting, most of which has been generated on general medicine and surgery units (Bensal et al., 2018; Munoz et al., 2012). These approaches may broadly be categorized as diabetes specialty care models, diabetes nonspecialty care models—including delivery by nursing unit staff, and technology-supported diabetes education (Nassar, 2019). There is existing and emerging evidence of the impact of these models on outcomes

including A1c, length of stay, 30-day readmissions, and costs ([Hardee et al., 2015](#); [Murphy, Schroeder, Ridner, & Whitner, 2019](#); [Wexler et al., 2012](#)).

There are few studies which have examined provision of diabetes education to persons with SMI in the inpatient setting. One such study conducted on four inpatient psychiatry units in the United Kingdom did demonstrate impact on several behavioral outcomes. A collaborative approach to education and activity covering heart health, diabetes and weight, smoking and lung disease, cancer screening, and substance misuse was implemented as two 45-minute weekly group classes. The result was a 26% improvement in self-reported understanding of the conditions covered, a 35% average reduction in anxiety, an increase by 20% in motivation to change, 26% in motivation to do exercise, and 16% in confidence to change (Richmond, 2017). Although hard clinical outcomes were not reported, this study supports the premise that health education could be impactfully delivered in group classes among inpatient with SMI. The findings of our study raise important questions about the feasibility of integrating a group class model focused exclusively on DSSE within usual nursing unit workflow on BHUs. While the group learning model is familiar to both BHU staff and patients, and the Richmond et al. study, showed proof of concept for delivery of generalized health education on BHUs, our results suggest that this may not be the optimal approach to delivering specialized DSSE within this setting. If group classes are to be further evaluated for this purpose, we hypothesize that it may increase the likelihood of success to limit attendance solely to persons with diabetes. An alternative approach would be to provide general health education, for example, healthy eating and physical activity, in the group setting for all unit patients combined with 1:1 focused survival skills diabetes education for persons with diabetes on the unit. This latter approach would be aligned with the findings of the 2016 outpatient self-management education and support systematic review that a combination of group and individual sessions resulted in the greatest improvement in glycemic control ([Chrvala, Sherr, & Lipman, 2016](#)). Given the challenges encountered, it is also likely that persons with SMI and diabetes will require additional DSSE in the immediate postdischarge period to successfully transition to outpatient settings.

Conclusions

This pilot study sought to adapt, implement, and assess the preliminary efficacy of a DSSE program on inpatient BHUs within unit workflow to enable improvement in

diabetes self-care knowledge and skills among patients with concomitant SMI and diabetes. Despite nursing staff and patient willingness to engage in the program, barriers to implementation in each stakeholder group were identified. Our study suggests that the group class setting may not be the optimal approach to delivering DSSE within BHUs. Based on our findings, further research would be required to determine if it is possible that small classes limited only to those with SMI and diabetes could be successful. A combination of group support in existing BHU classes to address healthy lifestyle management relevant to all persons with SMI, including those with diabetes, combined with 1:1 administration of surveys and individualized DSSE to those with diabetes may offer an alternative solution. Finally, dedicated 1:1 DSSE may be necessary for inpatients with diabetes and SMI on BHUs. The latter approaches would align with the findings of the American Association of Diabetes Educators' systematic review of the effect of diabetes self-management education on glycemic control among adults with type 2 diabetes mellitus which recommends individualized diabetes education ([Chrvala et al., 2016](#)). Whether DSSE can be effectively delivered by BHU staff or diabetes educators during inpatient stays remains to be determined. Our findings reveal several important considerations for delivery of DSSE on BHUs and suggest that translation of standardized approaches on inpatient BHUs will require further redesign to meet the unique needs of this population. There is a significant need for DSSE for those with both SMI and diabetes, and further study will be required to address whether and how this need can be addressed effectively.

Acknowledgements

The authors would like to thank Clayton Bourges, MS, and Mary Hill for their contributions, the administration at the MedStar Washington Hospital Center and the nurses on the Behavioral Health Units where the data were collected.

Author Roles

MFM, KS, and JKB conceived the study. KS and KB determined the methodology. KB, KS, and JKB collected the data. KS and KB analyzed the data. JKB, MFM, KS, and KB took the lead in writing and organizing the manuscript. KB and KS wrote the methods section, and MFM, JKB, KS, and KB wrote the introduction, results, and discussion sections. All authors reviewed the final manuscript before submitting for publication.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The study was funded by the National Institutes of Health, National Institute for Diabetes, Digestive, and Kidney Diseases (Grant Number R34-DK-109503).

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