Improving diabetes control in an under-resourced community: a quality improvement pilot project to introduce the Chronic Care Passport

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Abstract

The objective of this quality improvement pilot project is to implement the use of the Chronic Care Passport in a community based healthcare setting. It is an innovative tool to improve diabetes management and self-care behaviour. This tool is a patient education checklist designed to assist patients to better understand and manage their condition. The quality improvement project was conducted on a convenient sample of 10 men and 15 women from a population of 79 patients who attend a health centre for diabetes management, and whose blood glucose levels were 200mg/dl and above during the previous 12 months.

A pre/post intervention design utilizing a modified version of the Diabetes Project Participation Questionnaire (2009) was the tool used. Questions using a Likert-type scale ranked 1-4 sought to determine the knowledge, health behaviour, and health status of persons with type 2 diabetes with one being poor and four scored as excellent. For questions assessing the ability to self-care, the rank ranged from 1-5, with one being not at all confident and five completely confident. One open-ended question asked what the participants found to be the hardest part of living with diabetes.

Following a four month intervention period of patient education and glucose monitoring reading (GMR), the post test was administered. Statistical analysis was conducted using paired t-tests for normally distributed variables and chi-square test to determine differences of means, and Wilcoxon signed-ranks for binomial outcome measures. Data were analyzed using SPSS version 20. Narrative data from open-ended items were examined for patterns, trends, and differences. There was a significant difference in the increase in knowledge after the implementation of the Chronic Care Passport, \( p = .040 \). There was also a significant difference in the GMR, \( z = .042 \). There was no difference between the means for health status and self-care management. Introducing the Chronic Care Passport as the tool to assist persons with type 2 diabetes has the potential to increase the knowledge base of the patients (as it relates to diabetes self-management and reducing blood glucose level).

The aim of this quality improvement pilot project is to obtain baseline data on the effectiveness of patient education and the introduction of the Chronic Care Passport as tools to empower clients with type 2 diabetes.

Introduction

The burden of non-communicable diseases in Latin America and the Caribbean was described as a “tsunami” by the Former Director of the Pan American Health Organization (PAHO), Dr. Mirta Roses (Carleton University Health Diplomacy Monitor, 2011). Diabetes mellitus affects 346 million persons worldwide, with type 2 being the most common form (WHO, 2011). More than 80% of
diabetes related deaths occur in low and middle-income countries due to limitation in the country’s ability to offer appropriate non-communicable disease care at the primary care level because of socio-economic barriers, lack of insurance coverage, uncoordinated care, and shortage of physicians and specialist health workers (Leone et al., 2012; WHO, 2011). Globally, 85% of all people with undiagnosed diabetes are in low and middle income countries where resources are often lacking and governments may not prioritize screening for the condition (Hanson et al., 2012).

Diabetes care is becoming a priority for health systems as costs and health outcomes are being closely scrutinized (Huang et al., 2009; Siminerio et al., 2004). Despite proven affordable interventions available, diabetes continues to kill and disable millions of people globally every year (International Diabetes Federation, 2011). The World Health Organization (2012) estimated that by 2030 the number of people with diabetes in the region of the Americas would be 66,812,000; an increase over the 2000 estimate of 33,016,000. In St. Vincent and the Grenadines growth will almost double from 5000 cases of type 2 diabetes in 2000 to 9000 cases in 2030 or from 4.7% of the population to 8.5% (WHO, 2012). In 2009 there were 3,396 clinic visits, and 945 admissions to the Milton Cato Memorial Hospital in Kingstown. Seventy-one of these admissions were for amputations of lower extremities, 27 for management of the diabetic foot, and 847 for other medical management. The incidence is 0.1, prevalence 1.5, and mortality 5.5 for type 2 diabetes. In the Calliaqua health district the prevalence is 1.3 with an incidence of 0.2 (Health Information and Planning Unit, 2009).

The framework for this quality improvement project was the Chronic Care Model (CCM) widely recognized as an effective strategy to deal with the diabetes epidemic and to bridge the gap between knowledge and quality care. The CCM is also a tool to improve metabolic control and major cardiovascular risk factors (Musacchio et al., 2011). Quality of life and outcomes for patients with diabetes are better when care is consistent with the elements of the CCM (Nutting et al., 2007; Parchman et al., 2007). The main goal of the CCM is to promote effective change in provider groups by supporting evidence-based clinical and quality improvement across a wide variety of healthcare settings (Strickland et al., 2010). It is also intended to encourage practitioners to follow established guidelines, improve the level of patient coordination, and improve patients’ ability to manage their illnesses (Improving Chronic Illness Care, 2006-2013).

PAHO developed the Chronic Care Passport in response to the call from Heads of Government of The Caribbean Community for a strategy to manage non-communicable diseases including diabetes (CARICOM Declaration of Port of Spain, 2011; CARICOM Nassau Declaration of Health, 2001; CARICOM Summit on CNCD’s, 2007). The Passport is a patient-held take home record that provides a meal plan, encourages interactions between patients and health care teams, and strengthens control and adherence to medication. Components of the passport include standards of care, results of examination findings and laboratory studies, meal planning, and a medication list. The Passport promotes patient empowerment and collaborative care, and it is expected to motivate continuity and continuation of care (PAHO, 2011). The Passport, along with patient educational sessions, support the elements of the CCM as a strategy to promote quality outcomes of patients (Figure 1).

**Aim of the project**

The aim of this quality improvement pilot project is to obtain baseline data on the effectiveness of patient education and the introduction of the Chronic Care Passport as
tools to empower clients with type 2 diabetes, so that they may gain greater control over their diabetes through behaviour change and enhanced self-management skills.

**Figure 1:** Chronic Care Passport  
(Source: PAHOWHO 2011)

**Methods**

Approval for this quality improvement project was received from the National Research Ethics Committee of St. Vincent and the Grenadines and Duke University Internal Review Board. The name of the health centre is used in this project; however, no protected health information is being used. This will minimize the risk of breech of participants’ privacy and confidentiality. Consent to participate in the project was obtained from the participants. For the purpose of program evaluation in the project, data are stored at Duke University School of Nursing’s secure server in a password protected folder. At the end of the project the link to the Personal Health Information will be destroyed.

**Setting**

The project was conducted at the Calliaqua Health Centre, a small Town on the South Coast of St. Vincent and the Grenadines. The Health Centre serves a population of approximately 6000. Seventy nine clients diagnosed with type 2 diabetes attend the Calliaqua Health Centre for care.

**Sample**

The District Nurse reviewed the records of 79 patients diagnosed with type 2 diabetes and she compiled a list of clients whose record consistently showed blood glucose levels 200mg/dl during the previous 12 months for inclusion in this project. Participants were also required to be mentally alert and physically able to independently engage in diabetes self-care activities. Pregnant women, children, and patients who were unable to engage in diabetes self-care activities were excluded from the project. Twenty five patients on the list (32% of the population of patients with type 2 diabetes) met the criteria and were conveniently selected; 10 males and 15 females.

**Design and Implementation**

This Quality Improvement project uses a pre/post-test intervention design. The outcome data from the pre-test formed the basis for the patient education and GMR monitoring program for a period of four months beginning August 2012. The pre-test was administered immediately following the first educational session. Following this, there were monthly educational sessions and GMR conducted by the District Nurse and the Community Health Aides. The sessions included signs of hyper and hypo glycaemia and their management, foot care, diet, medication type, administration and side effects, and exercises that the participants should be involved in. The final educational session was conducted in December of 2012, followed by the post-test.

**Data collection and data sources**

Variables measured were: Diabetes knowledge, self-management of diabetes, health behaviours, and health status (weight and GMR readings). Descriptive data included participant
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gender and age. A modified version of the Diabetes Project Participation Questionnaire (2009) was used for both pre and post test. Questions which were culturally and geographically irrelevant to this project were omitted from the questionnaire (flu shots, race; such as Pacific Islander, American Indian) since they bear no relevance to this project. The original questionnaire was evaluated in a Caribbean-Latino Community of patients with diabetes. The result of the original questionnaire showed increased self-efficacy for managing diabetes ($p<.0001$) and improvement in health outcomes ($p<.05$) (Lorig et al., 2000). A Likert-type scale of 1-4 with 1 being poor and 4 being excellent was used to measure diabetes knowledge. The ability to self-manage was measured on a scale of 1-5 (1 = not at all confident and 5 = completely confident); while, health behaviour allowed the participants to select from none of the time, a good bit of the time, some of the time, and all the time. The difference in the scales relates to the number of variables to be tested in each scale. One open ended question asked about the hardest part about living with diabetes and another sought to find out who assisted the participants most with their care.

Data were collected by the full time nursing staff of the Health Centre involved in the daily management of patients attending the Health Centre. Training in data collection was provided by the project officer and a registered nurse with extensive experience in research.

**Data Analysis**

Statistical analysis was done using SPSS version 20. Demographic and descriptive statistics were collected for gender, age, highest level of education, and participation in the education program ($n=25$). Statistics were run to determine if the distribution was normal for diabetes knowledge pre/post tests. The descriptive statistics were calculated to determine if the distribution was normal for those variables. Only one variable had a skewness higher than 1.0. When items were summed to create a knowledge variable, those items were not skewed (.15 for PRE and -.10 POST). Therefore the assumption of normality was met for the knowledge variable. A paired t-test was calculated to compare pre and post-test knowledge, health behaviours, and self-management scores. Pre and post test scores for health status, blood pressure (BP), weight, and GMR were compared. Because the GMR was not normally distributed (someone had a GMR of 27mm/l) it was compared using the Wilcoxon test. BP and weight were compared using t-tests. There was a trend for a decrease in diastolic BP ($p=.10$). Weight and systolic BP did not change. GMR showed a significant decrease ($p=.04$) using Wilcoxon paired sample non-parametric test to compare rankings. A Pearson chi-square test was calculated for trends in the differences between the means of the variables for diabetes knowledge and gender.

**Results**

Of the 25 participants, 10 (40%) were males and 15 (60%) females. Of this total, 17 (68%) had primary education; 6 (24%), secondary education; and 2 (8%) had university education.

The mean knowledge score obtained from patients before the Chronic Care Passport was introduced was 33.74 ($SD=7.9$) compared to the mean score of 33.52 ($SD = 9.3$) after the intervention. When the t-test for paired samples was run it revealed that there is a statistical significant difference between these two means ($t = 2.216, df = 18, p = .040$).

The results of a Chi-Square test of independence indicated that there is no association between diabetes knowledge of male and female ($\chi^2 =0.548, df=1, p \geq .05$). There is also no association between the highest levels of
education achieved and a reduction in the GMR reading ($\chi^2 = 47.2, df = 44, p \geq .05$).

There was no significant difference in the patient’s ability to self manage after the Chronic Care Passport was introduced. The mean score of self-management before implementation was 27.18 ($SD = 9.39$) compared to 28.81 ($SD = 7.6$). The mean difference was $-1.64$ ($SD = 11.77$, 95% CI = 3.58-6.86), indicating that there is no statistically significant improvement in the patient’s ability to self-manage.

There was a statistically significant difference between the mean of the GMR scores obtained prior the intervention, 9.11 ($SD = 4.36$), and the mean of the scores obtained after the intervention, 7.44 ($SD = 2.93$). When the Wilcoxon Signed Ranks test was run, it revealed that there is a significant difference between the two means, $z = 0.042$. There was a downward trend with the diastolic blood pressure; however, this was not statistically significant; $p = .102$.

Responses to the open ended question were grouped according to themes. Of the 25 participants, 22 (88%) indicated that the hardest part about living with diabetes was the diet and medication. Other responses included stress of having the condition, living with diabetes, knowing that there is no cure for diabetes, and injury.

**Discussion**

The respondents demonstrated increased knowledge of diabetes self-management after the introduction of the Chronic Care Passport. However, this knowledge did not translate into the ability to self-care. This is not surprising; as the majority of respondents indicated that sticking to diet and medication was the hardest part of living with diabetes. Participants knew about the management of diabetes, and were able to identify complications of the disease. The respondents did not follow the meal plan or the schedule for blood glucose monitoring. This result is supported by the findings of Wint et al., (2006) who found that although patients were aware of the complications of diabetes, few were motivated to make lifestyle changes.

A reduction in GMR could mean that although the participants found diet and medication to be the most difficult part of living with diabetes, they could have modified their diet sufficiently to reflect a reduction in the results while at the same time taking their medication. Participants could have conformed to the diet plan for a day before taking the test, or the time of day when the test was done could have influenced the result. The participants’ diastolic blood pressure showed a downward trend; however, this was not a significant observation. Since the project was conducted over a four month period and it is not likely that significant changes would be observed in all the variables. However, a downward trend can be considered a positive sign. Prior to the intervention the majority of participants showed poor diabetes control. With the introduction of the passport and the educational sessions there was improvement in blood glucose monitoring. This could have been due to the Hawthorne effect where diabetes self-management behaviour may have been altered because the participants knew that they were being evaluated; hence the impact on the result.

No association was observed between the educational levels of participants and the GMR outcome. This contradicts the findings of Wint et al., (2006), who, in a study to explore the Jamaican adult’s knowledge of diabetes mellitus, motivational factors, and identify possible barriers to positive lifestyle changes and glycaemic control, found an association between educational levels and the ability of patients to understand their disease. During the educational sessions conducted in this project, the topics were presented in a manner that clients across the educational spectrum could understand.
The majority cited diet and medication as the two main challenges to diabetes self-management. The comments are reflective of the results in which there was no change in self-management scores. It is important to note that these are aspects included in the CCP. Continued work should be done to address these challenges. Additional inquiry into the barriers to diet and medication as aspects of self-management should be conducted. This may be responsible for them not following the meal plan as observed in the results.

A noteworthy finding is that the participants reported that they did not simply rely on one health care provider to assist with their care. They indicated that the nurse, doctor, diet and medication was the hardest and the Community Health Aides assisted them with the management of diabetes. This related to the Chronic Care Model which advocates for a holistic approach to the management of patients with type 2 diabetes. The model promotes matching roles and responsibilities to ensure that care is given and the promotion of a culture that promotes safe and high quality care.

This project has provided valuable baseline data indicating that with further evaluation the Chronic Care Passport can be considered as the tool for diabetes self-care management. The outcome variable was a reduction in glycaemic levels and this was achieved within a four month period. It is also concluded that improved knowledge may have had an impact on the reduction of blood glucose levels. There was no evidence of an impact in the other variables; however, this may be due to the limitation of time in which to observe significant changes. This project was conducted over a four month period; a longer time frame is needed in order to measure changes in behaviour and self assessment. While acquiring knowledge requires no action apart from listening and internalising, a longer period of observation may detect improvements in other variables such as health behaviour. This quality improvement project has provided valuable information for systemwide implementation of the CCP as the tool to be used for the management of diabetes.

Implication for nursing and healthcare

An integrated Primary Healthcare approach is encouraged, this includes social participation and affiliation with agencies and organizations. This project encourages inter-professional collaboration in the management and control of diabetes. With further evaluation the Passport can provide a guide to nurses and other healthcare professionals about the protocol to follow when managing diabetes and other chronic non-communicable diseases. It can also be the standard used to measure quality output in the management of patients with chronic non-communicable diseases. The patients are aware of the type of services their healthcare providers are obliged to deliver and will demand that care.

Limitations

This pilot project was conducted over a four-month period. The time frame did not allow for detecting change in all variables. The sample size is small (32% of the population of patients with type 2 diabetes who attend the Calliaqua Health Centre for care). This is therefore not representative of the total population of patients with type 2 diabetes. It would have been ideal to include HbA1c as part of the evaluation; however, due to limitations of material and financial resources, this may not be sustainable over the long term. Data were collected by the staff of the Health Centre with whom the clients are familiar. This could have possibly influenced the response of clients.

Conclusion

This project has indicated that with further evaluation the Chronic Care Passport and patient educational sessions can be considered for use as a tool to increase knowledge about
diabetes self-care management. Improved knowledge may have had an impact on the reduction of blood glucose levels. There was no evidence that the passport and educational sessions affected other variables. A longer period of observation may detect improvements in other variables such as health behaviour. This quality improvement pilot project has provided valuable baseline information for system wide evaluation of the CCP as the tool to be used for the management of diabetes.

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