The impact of pharmacist intervention on diabetes outcomes in diabetic patients
Eugenie Brown Myrie
Andrea M. Wilkins Daly
University of Technology, Jamaica
School of Pharmacy
College of Health Sciences
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Outline of Presentation

- Introduction/Background Information
- Aim and Objectives
- Methods
- Results and Discussions
- Conclusions
- Recommendations
- References
- Exposure of work/publication
Introduction
Introduction

- Diabetes mellitus (DM) is one of the most common metabolic disorders in the world
- It is a chronic progressive non-communicable disease (NCD), characterized by hyperglycemia
  - Two main classifications are:
    - Type 1
    - Type 2
DM is a chronic illness that requires

- continuing medical care
- ongoing patient self-management education
- support to prevent acute complications and to reduce the risk of long-term complications.

- Diabetes care is complex and requires multi-factorial risk reduction strategies along with glycemic control
Introduction cont’d

• Type 2 diabetes is a worldwide epidemic which is associated with reduced life expectancy, mainly due to cardiovascular disease.

• The incidences of both microvascular and macrovascular complications in diabetes are associated with increasing levels of hyperglycaemia.
Effects of Diabetes

• The effects of diabetes can be devastating.
• Sixty-five percent of patients with diabetes die from heart disease or stroke.
• Thirty percent of those > 40 years of age have impaired sensation in their feet.
• 60% of all nontraumatic amputations are attributed to diabetes.
• Diabetes is also the leading cause of kidney failure, accounting for 44% of all new cases in 2002.

Impact of Pharmacist Intervention 2010
Global Prevalence

- 422 million adults live with diabetes mainly in developing countries.
- The number of persons living with diabetes quadrupled since 1980 from 108 to 422 million.
- This global rise in DM is attributed to sedentary life style, with overweight and obesity as two of the factors driving this increase.
- Increase in the prevalence has been faster in low to middle income countries.
Prevalence of DM in Caribbean

• “Diabetes continues to be a major public health problem with high disease burden, frequent complications and inadequate quality of care.”¹

• Statistical profile for Jamaica - diabetes is ranked as the third leading cause of death (10.8%), with stroke in the first place (16.5%) and Ischemic Heart disease second (11%).²

• Factors associated with diabetes prevalence which is more common in women than in males in the Caribbean is increase in age and body mass index.

Complication of DM

- DM is a major health problem in the world and is often characterized by long term complications such as:
  - microvascular – includes retinopathy, nephropathy and neuropathy
  - macrovascular – cardiovascular disease and independent risk factors such as HTN, hyperlipidemia and obesity
  - foot ulcers
- These have led to a significant increase in both morbidity and mortality.¹

¹ Impact of Pharmacist Intervention - 2016
Management of Diabetes

Treatment Goals
Pharmacotherapy
Management of Diabetes

Treatment goals

• Attainment of HbA1C and BG readings
  • blood pressure
  • lipid levels
• Avoidance of adverse effects and complications
• Optimization of adherence to treatment

As close as possible to normal

Impact of Pharmacist Intervention
Management of Diabetes

• **Pharmacotherapy** - Good management - this includes:
  • the use of generic medicines
  • the use of interventions in order to promote healthy lifestyles
  • patient education to assist self-care
  • for the regular screening in order to detect diabetes early as well as to treat complications.
Rationale for the study
Pharmacist Intervention Studies

- There is a need for effective management of diabetes patients in order to improve patient outcomes and prevent complications.
- Pharmacist involvement in diabetes management has shown improvement in patient outcomes in a variety of care settings throughout the world.\textsuperscript{1,2,3}
- Most of the existing evidence regarding the impact of the pharmacist’s intervention has been in USA and other parts of the world, with few in the Caribbean especially in Jamaica.


Studies Saudia Arabia, Nepal, USA
Diabetes Self Management Education

• Ongoing processes of facilitating the knowledge, skill and ability necessary for diabetes self-care.
• It incorporates the needs, goals and life experiences of the person with diabetes.
• Education helps people with diabetes initiate effective self-management and cope with diabetes.
• Ongoing diabetes education helps people with diabetes maintain effective self-management throughout a lifetime of diabetes

American Diabetes Association, 2014

Impact of Pharmacist Intervention—2016
Benefits of Diabetes Education Programme (DEP)

- The evidence of the benefits of diabetes self-management education is encouraging and positive.
- Diabetes education is associated with improved diabetes knowledge and improved self-care behavior (*Norris*, 2005).
- DE improved clinical outcomes such as lower HgbA1c, lower self-reported weight, improved quality of life, healthy coping and lower costs (*American Diabetes Association*, 2014).
- A recent meta-analysis suggested that educational and behavioral interventions in T2DM produced a moderate decline in HgbA1c which was statistically significant. (*Gary*, 2003).
Aim of the Study

• To determine the impact of pharmacist intervention on therapeutic outcomes among diabetes patients who are enrolled in a Diabetes Educators programme.
Purpose of Study

- Investigate the impact of a Diabetes Educators' Programme among persons living with diabetes and requiring better control of the condition.
- Gather intervention outcomes/parameters most beneficial to the participants. The findings would also serve to promote the effectiveness of Diabetes Education in improving therapeutic outcomes.
  - the results will serve to motivate pharmacists to carve out new and innovative practice niches for patients, primarily who suffer from chronic lifestyle diseases.
Specific Objectives

The objectives of this study are to:

1. To investigate whether pharmacist intervention through education and greater monitoring influences attitude and behaviour of diabetes patients towards their condition.

2. Determine how the patient’s knowledge and understanding of diabetes improves disease outcome.

3. Document the improvement in the use of monitoring devices as evidenced by frequency of testing and recording of results.

4. Evaluate the patient's' adherence to therapy over the period that they were monitored by the Diabetes Educators (DEs).

5. Determine if study subjects experienced improvement in therapeutic outcomes as measured by reduced glycosylated haemoglobin (A1c), blood pressure and overall quality of life.
Method
Divisions of the Study

• Study had two (2) arms:
  • Retrospective Record Review
    • Investigated differences in baseline A1c and BG values
  • Questionnaire to Participants
    • 34 point instrument
    • Investigated impact of education on knowledge, understanding and attitudes
    • Investigated improvement in A1c and BG
Method

• **Study Design:** A mixed method, retrospective cross-sectional design that examined the impact of the Diabetes Education on the therapeutic outcomes among diabetes patients who were initially requiring tighter control.

• **Site location:** University of Technology, Jamaica’s Medical Centre.

• **Data Source:** Impact was measured by the change in primary and secondary variables over a 1-3 year period and patient’s knowledge and attitude towards diabetes.

• The patients were interviewed at their first visit and baseline data recorded.
Study Parameters

- **Study parameters and variables were:**
  - Demographic data: age, gender, weight, category of staff/student
  - Primary Variables:
    - Glycosylated Haemoglobin (A1C)
    - Blood glucose readings
  - Secondary Variables
    - Blood Pressure
    - Lipids Panel
Data Collection Method

• Impact of intervention questionnaire
  • Participants completed a 34 point instrument
  • Participants signed Consent Forms

• Retrospective medical and diabetes educator’s record review
Inclusion Criteria

• All participants were referred by the primary care physician if they met the following criteria:
  • Above 18 years
  • Are patients of the UTech Medical Center
  • Have uncontrolled diabetes despite treatment
  • Are non-adherence to treatment regimen and/or lifestyle recommendations
Exclusion Criteria

• Patients served by the Medical centre but who were not diagnosed with diabetes
• Patients who had diabetes but were not selected for participation in the diabetes educator’s programme
**Intervention Strategies**

- Visits with the Clinical Pharmacist lasted for 30-60 minutes
- Each appointment focused on disease management, lifestyle adjustments and goal-setting
- Intervention included the following:
  - diabetes education
  - medication counseling
  - A1C and review of home glucose readings
  - assessments of blood pressure and weight
  - diet and exercise adherence
  - lipids
  - foot care
**Intervention Strategies cont’d**

- Referrals were made to foot care specialists, or nutritionists where need for such services were identified.

- Follow-up labs were ordered, and recommendations for medication changes were made by the pharmacist to the primary care physician.
Data Analysis

- The Statistical Package for the Social Science (SPSS) software program version 18.0 was used for data entry and analysis
- Descriptive statistics was used to determine frequency and means for study variables
- Statistical significance was determined at a 95% confidence interval and probability of < 0.05
Results & Discussion from Questionnaire
Participants for the questionnaires were primarily male patients – purposive sample. They were more receptive to the request. Most participants were in the 41-60 age group.

Table 1: Cross tabulation: Gender and Age Distribution

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>20 - 40</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>41 - 60</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>61 - 80</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>
Table 2: Cross tabulation: Gender, Age and Type of Diabetes

<table>
<thead>
<tr>
<th>Type of diabetes</th>
<th>Gender</th>
<th>Age Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20 - 40</td>
<td>41 - 60</td>
</tr>
<tr>
<td>Type 1</td>
<td>Female</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Type 2</td>
<td>Male</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

Impact of Pharmacist Intervention 2016
Fig 1. Category of Staff
Fig 2. Sources of Information on diabetes before enrolling into the Diabetes Educator Programme

Impact of Pharmacist Intervention-2016
Physicians and staff of the HC who are part of the multidisciplinary team involved in the management and care of the diabetes pat. Mention studies
> 80% of participants indicated that their knowledge about DEP was obtained from health professionals, primarily physician and nurses.
Insert slide showing movement from before to after (rating) - VWB
Fig. 6. Enrolment duration in DEP
Fig. 7. Knowledge of the Hemoglobin A1C (HbA1c) before enrolment in DEP
Table 5: Factors that influences attitude towards testing - HbA1c

<table>
<thead>
<tr>
<th>Factors that influences current attitude towards HbA1c testing</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEP only</td>
<td>2</td>
<td>16.7</td>
</tr>
<tr>
<td>DEP + others</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Impact of Pharmacist Intervention - 2010
3 persons tested once per year; 4 every quarter and 5 every six months. Majority within ADA guidelines.
Results showed that participants increased the frequency of the exercise after enrolment in the DEP
## Table 6: Cross tabulation: Owning a blood glucose testing machine use and testing frequency

<table>
<thead>
<tr>
<th>Do you test your blood sugar on a regular basis?</th>
<th>Did you know how to use it?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Owned a blood glucose machine before joining the programme</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Owned a blood glucose machine before joining the programme</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
</tbody>
</table>

Impact of Pharmacist Intervention - 2016
Table 7: Testing frequency

<table>
<thead>
<tr>
<th>Testing Frequency</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once Daily</td>
<td>17</td>
</tr>
<tr>
<td>2x / day</td>
<td>8</td>
</tr>
<tr>
<td>3x / day</td>
<td>42</td>
</tr>
<tr>
<td>Every other day</td>
<td>8</td>
</tr>
<tr>
<td>Once weekly as often as feasible</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
</tr>
</tbody>
</table>
Fig. 11 How participants describe their present attitude towards diabetes

Impact of Pharmacist Intervention-2016
Fig. 10 Rate the impact of the Diabetes Educators Programme on your knowledge
Results & Discussion from Record Review
Fig. 1 Comparison between Baseline and Intervention in A1c
Fig 2. Comparison between Baseline and Interventions in Blood Glucose
Fig 3 - Bar Chart showing average baseline and intervention A1c
Fig. 4 Bar Chart showing average baseline and intervention Blood Glucose

Average Baseline: 9.3
Average Interventions: 7.0
Continuum of service includes: medication counselling, education in diabetes self-care skill, Targeted pharmacy-based services such as blood glucose meter training, foot care etc
Fixed appointments and follow calls to ensure that appointments are kept. – all readings will be at a fixed time point.
References


References


Presentation of Research Findings

• Presentation at the CAP/PSJ Conference July 27-31, 2016
• To do a publication in the American Journal of Health-System Pharmacy
• To present a poster at the American College of Clinical Pharmacist's annual meeting in October 2017.
• To present a poster at the American Society of Health-System Pharmacy June 2017
Acknowledgement

- **Dr. Janette Stewart** her assistance in the initial start up of the programme
- **Mrs. Heather White** Administrator at UTech Medical Center
- **Physicians**- Dr. Sophie Abrikian and the other physicians at UTech Medical Center for their referral to the programme.
- **Nurses** – Mrs. Kimbely Farquharson-Waugh and Receptionist- Miss Andrea McPherson and the staff from the UTech Medical Center
- **Patients in the DEP**
- **Miss Nickania Pyrce and Miss Tieca Harris** for their expertise and dedicated time spent in guiding us.
- **Dr. Aneisha Collins-Fairclough** for her guidance in offering expertise in the questionnaires.
- **Mr. David Finlay** for assistance statistical analysis.
- **Mr. Afis Ismail and Nickolai Watson** for the SPSS analysis
  Mr. Romario Vassell and Mr. Oshaun Sinclair for their support and assistance.
- **Family and friends for prayers and constant support**
World Diabetes Day

- **November 14** each year - **World Diabetes Day**
  - aims to increase an awareness of the effects of diabetes and the complications caused by the disease.
Thank You