A SURVEY OF DIABETICS PATIENTS ATTENDING PUBLIC SECTOR POLYCLINICS IN BARBADOS.

DEPRESSION AND TYPE 2 DIABETES MELLITUS

Dr. Tania Whitby-Best
BSc, MB. BS, MSc, DM
Family Medicine

78th UWI/BAMP CME CONFERENCE
Introduction

- Diabetes mellitus is one of the main threats to human health in 21\textsuperscript{st} century.
- According to IDF there were 366 million people with diabetes in 2011.
- Expected to rise to 552 million by 2030.
- Ageing population, decreased physical activity and obesity are contributing factors.
# Caribbean Prevalence of Diabetes mellitus

<table>
<thead>
<tr>
<th>Country</th>
<th>Study</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barbados</td>
<td>Hennis et al (2002) Age 40-84 yrs Self report and HbA1C ≥ 10%</td>
<td>17-19.4%</td>
</tr>
<tr>
<td>Jamaica</td>
<td>Ferguson et al 2000-2001 2007-2008 Age 15-74 yrs FBS &gt;6.1 mmol/L</td>
<td>7.2% 7.9%</td>
</tr>
</tbody>
</table>
Burden of Depression

- 1 in 8 individuals may require treatment (Depression Guideline Panel 1993b)
- In primary care, depression rarely presents with classic symptoms
- Complaints of a physical nature:
  - Fatigue
  - Lack of interest activities/sexual activities
  - Sleep/bowel disturbance
  - Somatic complaints
Depression Prevalence

- **Worldwide prevalence**
  - United States 16.2%
  - United Kingdom 10%
  - Europe 14%
- **Caribbean Prevalence**
  - Barbados: institutionalized 65-98 yrs
    17.3% sig depression symptoms
    9.2% major depression
Caribbean Prevalence

- Trinidad, community sample showed a prevalence of 14% and a cross sectional descriptive survey showed a prevalence of 12.8%.
This discussion has occurred for at least 3 centuries

English physician Thomas Willis first documented an interaction between psychiatric illness and diabetes mellitus in late 17\textsuperscript{th} century

He coined the term diabetes mellitus and rediscovered that those who suffered from it urine tasted of honey

“sadness or long sorrow, diabetes is caused by melancholy”
Prevalence of Depression in Diabetes

- There are limited studies in the Caribbean.
- In Barbados no published studies
- Verbal communication Campbell et al, prevalence of depression in diabetics in a tertiary care clinic is 25%.
- Maharaj et al, prevalence to be 28% in a chronic disease clinic in Trinidad.
- $P < 0.05$ when diabetes with another chronic disease
Prevalence of Depression in Diabetes

- Systematic review of 20 studies since 1988, reported by Gavard et al in 1993
  - Prevalence 8.5%-27.3% controlled studies
  - 11%-19.9% uncontrolled studies
- Meta-analysis Anderson et al 11% prevalence of major depression
- Cross sectional survey Nigerian outpatient diabetes clinic, prevalence 19.4%
Screening for Depression

- 2002 USPSTF recommended screening adults for depression in clinical practice
  - Systems in place to assure accurate diagnosis, effective treatment, and follow-up.
- There are reliable and valid depression screening instruments
  - Generally demonstrate sensitivity 80-90%, specificity 70-85%.
Objectives

- **Primary Objective:**
  - To determine the prevalence and severity of depression among type 2 diabetics in Barbados as measured by the Beck Depression Inventory II and the Patient Health Questionnaire 9.
Objectives cont’d

- Are there any differences in the responses between the Beck Depression Inventory II and the Patient Health Questionnaire 9.
- What are the reasons for presenting to the polyclinic, any common symptoms among the depressed.
- Explore the reliability of the BDI-II and PHQ-9.
STUDY DESIGN

- Cross sectional descriptive survey of type 2 diabetic patients attending 3 polyclinics:
  - WSPC, RPPC, ECPC
- Sample size
  - 19% (95% CI ± 5) prevalence of depression among diabetics
  - Sample size 225
- www.openepi.com
## POPULATION SAMPLED

<table>
<thead>
<tr>
<th>Polyclinic</th>
<th>Population served</th>
<th>Percent</th>
<th># collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSPC</td>
<td>55,000</td>
<td>46%</td>
<td>110</td>
</tr>
<tr>
<td>RPPC</td>
<td>45,000</td>
<td>38%</td>
<td>84</td>
</tr>
<tr>
<td>ECPC</td>
<td>20,000</td>
<td>16%</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>120,000</td>
<td>100%</td>
<td>230</td>
</tr>
</tbody>
</table>
INCLUSION CRITERIA

- Age 21-75 years
- Diagnosed ≥ 1 year with type 2 diabetes
- Patient of the polyclinic
- Able to provide informed consent
EXCLUSION CRITERIA

- Type 1 Diabetes Mellitus
- Diagnosed < 1 year
- Gestational diabetes
- Age < 21 years or > 75 years
- Not able to give informed consent
DATA COLLECTION INSTRUMENTS

DEMOGRAPHIC DATA

- Age
- Gender
- Ethnicity
- Education
- Employment status
- # yrs diabetic
- Assoc chronic diseases
- Diabetes treatment
- Complications of diabetes
- Reasons for visit to clinic
## Data collection instruments
### comparison of BDI-II & PHQ-9

<table>
<thead>
<tr>
<th></th>
<th>BDI-II</th>
<th>PHQ-9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>21 items</strong></td>
<td>Self reporting</td>
<td>Self reporting</td>
</tr>
<tr>
<td>Ages 13 and older</td>
<td>5-10 mins</td>
<td>Adolescents and adults</td>
</tr>
<tr>
<td></td>
<td>Guttman ranked statements</td>
<td>4 point Likert scale</td>
</tr>
<tr>
<td>Score 0-63</td>
<td>Cut off 14 senst 87.7% spec 83.9%</td>
<td>Cut off 10 senst 88% spec 88%</td>
</tr>
<tr>
<td>Good internal consistency</td>
<td>Sensitive to change</td>
<td>Good internal consistency</td>
</tr>
<tr>
<td>Sensitive to change</td>
<td></td>
<td>Sensitive to change</td>
</tr>
</tbody>
</table>
### Data collection instruments

**Comparison of BDI-II & PHQ-9**

<table>
<thead>
<tr>
<th></th>
<th>BDI-II</th>
<th>PHQ-9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assess</strong></td>
<td>Assess intensity of depression</td>
<td>Depression monitoring</td>
</tr>
<tr>
<td><strong>Intensity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>of</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>depression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>Cost attached</td>
<td>Free of cost</td>
</tr>
<tr>
<td><strong>attached</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Added</strong></td>
<td>Added psychosocial impairment</td>
<td></td>
</tr>
<tr>
<td><strong>psychosocial impairment</strong></td>
<td></td>
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</tr>
</tbody>
</table>
Ethical Issues

- Approval by UWI IRB, MOH
- Informed consent obtained from each participant
- Confidentiality discussed with participants
- If any significant features of depression noted in participants- referred with their permission
**Pilot study**

12 patients
- 15 approached
- 3 declined

**ECPC**
- sample polyclinic
- Informed pretest
- Not part of final

**Concerns**
- problems with demographic questionnaire
- improper wording

**Changes made**
- questions added
- questions reworded

**Time taken to complete questionnaires assessed**
Data Collection

- Field workers trained by P.I.
  - Inclusion and exclusion criteria maintained
  - Appropriate dress and approach
- MOH, senior sister of polyclinic informed prior to data collection
- Convenience sample
- Confidentiality maintained
### Data analysis

**spss version 22**

<table>
<thead>
<tr>
<th>Statistical Analysis</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive statistics</td>
<td>Categorical variables</td>
</tr>
<tr>
<td></td>
<td>Continuous variables</td>
</tr>
<tr>
<td>Pearson’s chi square</td>
<td>Categorical variables</td>
</tr>
<tr>
<td>Independent samples t test</td>
<td>Means bet categorical and continuous variables</td>
</tr>
<tr>
<td>Pearson product cor coefficient (r)</td>
<td>Correlation continuous variables</td>
</tr>
<tr>
<td>Spearman rank coef (rho)</td>
<td>Correlation continuous variables</td>
</tr>
<tr>
<td>Kappa measure of agreement</td>
<td>Categorical data</td>
</tr>
<tr>
<td>Bland-Altman chart</td>
<td>Agreement bet 2 metric continuous variables</td>
</tr>
<tr>
<td>Cronbach’s alpha (α)</td>
<td>Internal consistency of scales</td>
</tr>
</tbody>
</table>
RESULTS

- Sample size 230
- 97% response rate
- 76.5% females, 23.5% males
- Mean age 61 years
DEMOGRAPHICS

- **Length of time diabetic**
  - 57.8% > 10 years
  - 3.5% for 4 years

- **Other chronic illnesses**
  - 75% HTN
  - 50% arthritis and high cholesterol
  - 10% heart disease
  - 6% H/O stroke
DEMOGRAPHICS

- **Education**
  - 1° education 36.5%, 2° education 43.5%

- **Employment**
  - Retired 44.8%, paid 33.5%
  - Occasional 4.8%, unemployed 17%

- **Complications**
  - Foot 25.7%, eye 22.6%, heart 9.1%
  - Kidney 2.6%, other 6.5%
**DEMOGRAPHICS**

- **Treatment**
  - Tablets only 70%, insulin only 15.2%
  - Insulin and tablets 11.3%
  - Diet and exercise 2.6%
  - No treatment < 1 %
# Prevalence of Depression

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cut Off Score</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>14</td>
<td>7.4% CI 4-11</td>
</tr>
<tr>
<td>PHQ-9</td>
<td>10</td>
<td>3.5% CI 1-6</td>
</tr>
<tr>
<td>PHQ-9</td>
<td>8</td>
<td>7% CI 3.6-10</td>
</tr>
</tbody>
</table>
Reasons diabetic patients present to polyclinics

- 49% follow up or routine
- 12% prescription renewal
- 9% health education
- 6% specialist visits
- 24% other
Reasons depressed diabetics (BDI-II) present to polyclinics

- 41% follow up
- 12% dressings/blood tests
- 6% other
Reasons depressed diabetics (PHQ-9) present to polyclinics

- 38% follow up
- 25% dressings
- 12.5% other
The mean BDI-II total score is 5.99, the median score is 4.5 and the mode is 3.
Frequency of PHQ-9 scores

The mean score for PHQ-9 is 2.12, median is 1 and mode is 0
Relationship between BDI-II & PHQ-9

\[ y = -0.29 + 0.4x \]

\[ R^2 \text{ Linear} = 0.682 \]
Relationship between BDI-II and PHQ-9

- Pearson product-moment correlation coefficient
  - $R = 0.826$
  - $N = 230$
  - $P < 0.0005$
## Agreement between BDI-II and PHQ-9

<table>
<thead>
<tr>
<th>Statistical Analysis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kappa coefficient</td>
<td></td>
</tr>
</tbody>
</table>
| BDI-II (14) vs PHQ-9 (10) | 0.538  
                           | P < 0.0005  
                           | Moderate agreement |
| Kappa coefficient    |                          |
| BDI-II (14) vs PHQ-9 (8) | 0.706  
                           | P< 0.0005  
                           | Good agreement   |
Agreement between BDI-II and PHQ-9

Bland-Altman analysis
Agreement between BDI-II and PHQ-9 scores

Bland-Altman Analysis

- The analysis indicates that 95% limits of agreement between the two scales ranged from -3.59 to 11.39
- The two methods do not consistently provide similar measures because there is a level of disagreement.
Reliability of BDI-II and PHQ-9

- Cronbach’s alpha for BDI-II
  - .84
  - High level of internal consistency
  - $\alpha$ if item deleted, range (.83-.87)

- Cronbach’s alpha PHQ-9
  - .78
  - $\alpha$ if item deleted, range (.72-.78)
Discussion

Comparison: Prevalence of Depression in Diabetes Mellitus

Depression in Diabetics

Barbados | USA | Worldwide

Depression

0.00% | 1.00% | 2.00% | 3.00% | 4.00% | 5.00% | 6.00% | 7.00% | 8.00% | 9.00% | 10.00%
Discussion

Prevalence of Depression in Diabetes Mellitus

- Walkes et al reported 46.6% Barbadians age > 16 yrs enjoy high levels of happiness
- Adams and Carter in 2011
  - Focus group reported low confidence in healthcare providers and may thus under report symptoms
- Study in USA reported some barriers to disclosure of depression:
  - Prescribed antidepressants
  - Lack of confidence in negotiating care
Discussion

Reasons for Encounter

- Cross sectional survey USA 77% of diabetics presented to primary care for follow up
  - Of this 72% mentioned a symptom or complaint
- 70-90% of patients with depression or anxiety also complain of somatic symptoms
- Most will admit if asked
Discussion

Reasons for encounter in this study

Reasons for encounter

- Follow up: 50%
- Prescription: 20%
- Health education: 10%

Note: The chart represents the percentage of reasons for encounter during the study.
Reasons for Encounter

- Hoyos et al reported 21.9% patients presented in primary care in Barbados for follow up
- Study in Croatia
  - Most common reason diabetics present
  - Prescription renewal
# Discussion

## Correlation between BDI-II and PHQ-9

<table>
<thead>
<tr>
<th>Study/Author</th>
<th>Country</th>
<th>Pearson’s coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present study Principal Investigator Type 2 diabetics</td>
<td>Barbados</td>
<td>.83</td>
</tr>
<tr>
<td>Rogers et al Cross sectional survey Mental health practices</td>
<td>USA</td>
<td>.87</td>
</tr>
<tr>
<td>Diez-Quevedo et al General hospital inpatients</td>
<td>Spain</td>
<td>.76</td>
</tr>
<tr>
<td>Dum et al Out patient substance abusers</td>
<td>USA</td>
<td>.84</td>
</tr>
<tr>
<td>Kung et al Mood disorder clinic</td>
<td>USA</td>
<td>.77</td>
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</table>
Discussion
Agreement between the scales

- Bland-Altman plot: plot differences between both scores and mean of both scores
- Plot shows that the two methods do not consistently provide similar measures because there is a level of disagreement.
- By decreasing cut off score for PHQ-9 prevalence becomes equivalent to that of BDI-II
## Discussion

### Reliability of BDI-II

<table>
<thead>
<tr>
<th>Study/Author</th>
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<td>Present study</td>
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<td>.84</td>
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<td>Principal investigator</td>
<td></td>
<td></td>
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<tr>
<td>Tyoe 2 diabetics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campbell <em>et al</em></td>
<td>Barbados</td>
<td>.86</td>
</tr>
<tr>
<td>University students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lipps <em>et al</em></td>
<td>Jamaica, Bahamas, St Kitts and Nevis, St Vincent</td>
<td>.88</td>
</tr>
</tbody>
</table>
## Discussion
### Reliability of PHQ-9

<table>
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</table>
Limitations of Study

- Convenience sample
- Response bias
  - Questions such as “suicidal ideation” and “interest in sex”
  - Did not instruct participants to vary sequence of 3 questionnaires
- Selection bias – participants may be different
- Privacy sometimes a problem in polyclinics
Conclusions

1. The prevalence of depression among type 2 diabetics in Barbados as measured by BDI-II is 7.4%.

2. The prevalence of depression among type 2 diabetics in Barbados as measured by PHQ-9 is 3.5% at a cut off score of 10 but increased to 7% at a cut off score of 8.

3. Correlation between the BDI-II and PHQ-9 was good however, agreement was moderate and showed some discrepancy.
Conclusions

4. BDI-II and PHQ-9 showed good internal consistency (reliability) in our study population.

5. PHQ-9 is still a good option for depression screening as it shows good reliability and is cost effective.
Recommendations

1. Screening for depression is advised when support services are in place. Routine assessment of DM by interview or questionnaire.
2. Cost of BDI-II may be a hindrance, consider PHQ-9 as an alternative.
3. Diabetes care should include stress management strategies and coping skills training.
4. CME for doctors and nurses
Future Research

- Prevalence of depression in primary care in Barbados
- Psychometric properties of PHQ-9 in Barbadian population
- Prevalence of depression in type 2 diabetics in private care
QUESTIONS