

# Clinic-based Depression Screening in Gynaecologic Oncology Patients Using the Patient Health Questionnaires-2 (PHQ-2): Are we Identifying the Highest Risk Patients at their Initial Visit?

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## Abstract

**Objectives:** The 2-item Patient Health Questionnaire (PHQ-2) is a short self-reported questionnaire used to screen for depression. Currently, no studies have evaluated the use of this tool among gynecology oncology patients. The objective of this study was to evaluate the sensitivity of the PHQ-2 in a gynaecologic oncology patient population compared with patient reported symptoms, medical history, and treatment for depression. Risk factors for depressive symptoms and treatment effect of antidepressants were also evaluated.

**Methods:** Consecutive 12-month new patient visits attending a gynaecologic oncology clinic completed the PHQ-2 and written intake form. Each new patient was verbally administered the PHQ-2, and then administered a written health questionnaire which gathers information about current symptoms of depression (ROS, within the past week), current diagnosis of depression, and medications with a treatment indication of depression. Additional clinical data was abstracted from patient charts and entered into a database.

**Results:** A total of 439 patients completed the PHQ-2 and written intake form. The average age was 53 years old (SD=15). The majority were White (67%), primarily spoke English (92%) and 54% did not have current diagnosis of cancer at their initial visit. Sixty-one patients screened positive on the PHQ-2, while 121 had a positive history, 92 had positive review of systems, and 79 indicated medications prescribed for depression. The sensitivity of the PHQ-2 for identifying patients meeting any criteria for depression on the written questionnaire was 18.7% with a specificity of 87.9%. The sensitivity and specificity of the PHQ-2 to identify patients reporting a current diagnosis of depression was 56.3% and 97.4% respectively, 28.8% and 89.5% respectively for the intake form, and 20.4% and 87.8% for patients on medications. Among the variables, pain correlated positively to PHQ-2 ( $r=0.13$ ,  $p<.01$ ), and those with a diagnosis of depression ( $r=0.22$ ,  $p<.01$ ). Menopause had a positive association ( $r=.13$ ,  $p<.01$ ) in women who scored positive on the PHQ-2. Hysterectomy, oophorectomy, current administration of chemotherapy, hormone replacement therapy did not significantly alter rates of depression.

**Conclusion:** Depression is prevalent in the gynaecologic oncology clinic population, with forty-six percent of all new patients reporting depressive symptoms, diagnosis of depression and/or current treatment for depression. PHQ-2 demonstrated good psychometric properties when screening for depressive symptoms in Gynaecologic oncology patients. Learning Objectives: Learners will be able to identify risk factors for patients at risk of depression utilizing PHQ-2 in a gynaecologic oncology population.

**Keywords:** Depression; Cancer; Screening; Quality of life

**Abbreviations:** PHQ-2: Personal Health Questionnaire 2 item scale; HRT: Hormone Replacement Therapy; NCCN: National Comprehensive Cancer Network.

## Introduction

Clinical practice and research have confirmed there is a coexisting link between depression and cancer with a prevalence of 20-50%, and has been found to be stronger in those with advanced disease receiving palliative care [1-3]. There is at least a 20% incidence of major depression and/or anxiety among women with gynaecologic cancers compared with a 6.7% found in the general population [2,4]. Furthermore, studies among patients with chronic disease and cancer patients confirmed that diagnosing this group of patients with depression is often difficult because symptoms (fatigue, weight loss, anhedonia, and psychomotor retardation) are often similar to those of the physical illness or its treatments and may obscure the accuracy of the source [5-7]. Most importantly, untreated depression may lead to functional impairment and diminished quality of life but may also increase physical symptoms, poor adherence to treatment and utilization of more health care resources [3,8,9]. Because of this association between cancer and depression the National Comprehensive Cancer Network (NCCN)

and the American Society of Clinical Oncology (ASCO) now requires depression screening for all cancer patients [10,11]. However, there has yet to be a strategy to help implement, detect and manage these patients with symptoms of depression [7]. The term screening may describe a number of tools in order to identify depression symptom, including using the questionnaires to identify patients who may have depression, and who may not be seeking treatment for symptoms [12-14] or whose depression is not otherwise recognized or monitored and to observe treatment effects [15]. When screening indicates that depression may

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be present this warrants further clinical assessment to determine a diagnosis of major depression disorder. Trask [16], noted that assessing cancer patients with tools such as questionnaires is relatively easy because of ease of administration and scoring may be performed by individuals who have not received extensive training, and the speed with which they can be completed by patients [5]. Additionally, written self-report instruments are further strengthened by their ability to obtain a general assessment of the severity of depression and can identify changes over time before a physician patient interaction [5]. There is currently no standardized approach to screening but there is consensus that it should be performed in order to provide early intervention. However, choosing a tool for routine screening requires a trade-off between a measure with adequate psychometric properties and one that is of reasonable length [17]. It is difficult to draw conclusions on the utility of ultra-brief tools among patients with cancer because the body of research is minimal especially within Gynaecologic oncology patients.

The ultra-short 2-item Patient Health Questionnaire (PHQ-2) is a tool that accurately screens for depression in adolescents, adults and geriatrics [17]. It further shows to be as effective as the longer screening instruments (Zung Depression Scale or Beck Depression Inventory). The PHQ-2 [17] is widely used in primary care and to our knowledge; there are no published empiric evaluations of the diagnostic accuracy of the PHQ-2 in cancer patients. Therefore, the objective of the current study was to determine the diagnostic accuracy of the PHQ-2 as a screening instrument for identifying cases of major depression compared to patient reported symptoms, medical history, and treatment for depression in a single institution of Gynaecologic oncology clinic. Risk factors for depressive symptoms and treatment effect of antidepressants were also evaluated.

## Methods

### Eligibility and recruitment

To be eligible to participate in the study, participants had to be: 1) at least 18 years old, 2) able to read Standard English or Spanish, 3) able to provide informed consent, 4) a new patient to a single institution of Gynaecologic oncology clinic, 5) patients currently taking medication for depression or anxiety and those with pre-existing diagnosis of depression. However, participants with symptoms consistent with a psychotic disorder or those considered to be a risk for suicide based on staff clinical judgment were excluded from participating due to potential ethical considerations.

### Study setting and design

A single site community Gynaecologic oncology program, received approval by the Institutional Review Board (IRB). Because the data had

been collected as part of routine clinical care, individual patient consent had not been obtained.

### Depression screening measurements

Personal Health Questionnaire (PHQ): The PHQ-2 is a 2-item scale which consists of the two main criteria for a major depressive episode, evaluating depressed mood and anhedonia for a minimum of a 2 week duration. PHQ-2 score ranges from 0-6, with a score of  $\geq 3$  suggest clinically significant depression.

### Measurements

All new patients who presented for their appointment was approached to participate in the study from April 20015 to April 2016, and the objective of the study was explained. Informed consent was obtained and presumed when patients proceeded with the questionnaire. Participating patients were verbally administered two questions (the PHQ-2) by the Medical Assistant. After verbal responses were collected they were then given a written intake form, which gathered information about socio-demographic characteristics, current symptoms of depression (within the past week) current diagnosis of depression, and medications with a treatment indication of depression. Intake form, self-reported depression symptoms Socio-economic status was acquired by the patient's zip code and was cross referenced with US Census data (Figure 1). This enabled us to abstract median income and educational level. Demographic data included: age, race, and primary language. We also obtained pain scales, menopausal status (defined as surgical or chemical menopause before age 50), prior diagnosis of cancer, whether they had undergone hysterectomy or oophorectomy, or if they were receiving Hormone Replacement Therapy (HRT), and/ or Chemotherapy.

### Statistical analysis

Descriptive statistics, such as frequencies, mean, and median were used to display patient characteristics, screening and interview data. Statistical analysis was performed using logistic regressions and correlations and independent samples proportion tests.

### Results

Overall, 439 consecutive patients underwent screening over a 12 month period from April 20015 to April 2016.

### Participants

The average age was 53 years (SD=15). The majority of the participants were White (67%), English speakers (92%) and a little over half (54%) did not have current diagnosis of cancer at their initial visit (Table 1).

**Current Symptoms Checklist: (check once for any symptoms present, twice for major symptoms)**

<input type="checkbox"/> Depressed mood	<input type="checkbox"/> Racing thoughts	<input type="checkbox"/> Excessive worry
<input type="checkbox"/> Unable to enjoy activities	<input type="checkbox"/> Impulsivity	<input type="checkbox"/> Anxiety attacks
<input type="checkbox"/> Sleep pattern disturbance	<input type="checkbox"/> Increase risky behavior	<input type="checkbox"/> Avoidance
<input type="checkbox"/> Loss of interest	<input type="checkbox"/> Increased libido	<input type="checkbox"/> Hallucinations
<input type="checkbox"/> Concentration/forgetfulness	<input type="checkbox"/> Decrease need for sleep	<input type="checkbox"/> Suspiciousness
<input type="checkbox"/> Change in appetite	<input type="checkbox"/> Excessive energy	<input type="checkbox"/> _____
<input type="checkbox"/> Excessive guilt	<input type="checkbox"/> Increased irritability	<input type="checkbox"/> _____
<input type="checkbox"/> Fatigue	<input type="checkbox"/> Crying spells	
<input type="checkbox"/> Decreased libido		

**Figure 1:** Intake form, self-reported depression symptoms.

Ethnicity	F	%
Caucasian	292	67
Hispanic	70	15.9
African American	42	9.6
Native American	13	3
Other	22	5
Spoke English	404	92
No cancer diagnosis	237	54

Note: Out of initial 583 patient records, 439 had an indication of PHQ-2 screening with diagnostic results.

Table 1: Demographic for females (N=439).

The sensitivity of the PHQ-2 for identifying patients meeting any criteria for depression on the written questionnaire was 18.7% with a specificity of 87.9%. The sensitivity and specificity of PHQ-2 in identifying patients reporting a current diagnosis of depression was 56.3% and 97.4% respectively, 28.8% and 89.5% respectively for the intake form, and 20.4% and 87.8% for patients on medications.

Table 2 shows the frequency and percent distribution among our patients with depressive symptoms. Fifty-eight patients (13.2%) screened positive on the PHQ-2, while the written intake form showed 87 (19.8%) of patients had a diagnosis of depression, 66 (15%) had positive review of systems, and 54 (12.3%) indicated medications prescribed for depression.

Table 3 summarized the correlations, odds ratios, percent correct among the indicators of depression and PHQ-2. Among the variables, PHQ-2 correlated positively with a diagnosis of depression ( $r=0.63$ ,  $p<0.01$ ), and with current depression symptoms reported in ROS ( $r=0.19$ ,  $p<0.01$ ). The simple 2-item screening test was 97.4% specificity and 56.3% sensitivity in identifying patients who reported a current diagnosis of depression, 89.5% and 28.8% respectively for current symptoms of depression. Prescriptions for depression and verbal indicators of depression were not related with PHQ-2.

According to Table 4, pain correlated positively with PHQ-2 ( $r=.13$ ,  $p<.01$ ), current symptoms of depression ( $r=.13$ ,  $p<.01$ ), diagnosis of depression ( $r=.22$ ,  $p<.01$ ) and anti-depressant medications ( $r=.10$ ,  $p<.05$ ). Depression prescription was positively related with age ( $r=.11$ ,  $p<.05$ ) and menopause ( $r=.17$ ,  $p<.01$ ). There were some socioeconomic and neighbourhood relationships associated with being prescribed

Indicators of Depression	f	%
PHQ-2	58	13.2
Diagnosis of Depression	87	19.8
Current symptoms of depression	66	15
Prescribed Medicine for Depression	54	12.3

Note: These are not mutually exclusive categories; denominator =439 patients with PHQ-2 Screening.

Table 2: Frequency and percent distributions depression (N=439).

Indicators of Depression	r	Odds Ratio	Specificity	Sensitivity	Correct
Diagnosis of Depression	0.6	49.1*	97.40%	56.30%	89.30%
Current symptoms of depression	0.2	3.5*	89.50%	28.80%	80.40%
Prescribed Medicine for Depression	0.1	1.8 <sup>NS</sup>	87.80%	20.4	79.50%

Note: \*Significant at .01 levels (two-tailed) for both correlation and odds ratios; NS-not-significant.

Table 3: Performance of patient health questionnaire (PHQ-2).

Variables	N	PHQ-2	Current symptoms of depression	Written intake form	Prescribed Anti-Depressants
Age (years)	439	-0.02	0.04	0	0.11'
% Below Poverty <sup>a</sup>	379	0.07	0.03	0.04	-.12'
Median Income <sup>a</sup>	379	-0.09	-0.08	-0.06	0.07
% HS Education <sup>a</sup>	381	-0.05	0.01	-0.01	0.12'
Pain Level (intake form)	438	0.13''	0.13''	0.22''	0.10'
Menopause	439	-0.02	0.01	0.04	0.17''
HRT	439	-0.06	-.09'	-0.08	-0.05
Chemotherapy	439	0.03	0.04	0.01	-0.04

Note: ''Significant at .01 level (two-tailed); \*Significant at .05 level (two-tailed); <sup>a</sup>Zipcode cross reference with US Census data.

Table 4: Correlation of demographic and medical indicators with depression (PHQ-2).

Cancer Type	N	PHQ-2	Written intake form
		P	P
No cancer	236	0.13	0.19
Endometrial <sup>NS</sup>	61	0.11	0.18
Cervical <sup>NS</sup>	37	0.19	0.19
Ovary, fallopian tube or peritoneal <sup>NS</sup>	37	0.11	0.22
Breast <sup>NS</sup>	32	0.09	0.25

Note: <sup>NS</sup>- Means weren't significantly different than mean for No Cancer at .05 levels (two tailed).

Table 5: Proportion (P) of depression reported by types of cancer.

antidepressant. Anti-depressants negatively related to neighbour poverty ( $r=-.12$ ,  $p<.05$ ) and positively related with level of education ( $r=.12$ ,  $p<.05$ ). Proportions for PHQ-2 & Diagnosis of Depression are reported across different types of cancer in Table 5. According to independent samples proportions tests, having depression for all cancer types was not significantly different than patients without cancer.

## Discussion

We report the assessment of the PHQ-2 in a community based gynaecologic oncology clinic. The 2-question screen was sensitive for a diagnosis of major depression when compared with written intake questionnaire, with sensitivities of 0.56 and 0.23 for positive test of a threshold of 3 or more.

Screening for depression especially in primary care, has been offered as a solution but currently is piecemeal element in many practices [18]. The US preventive services Task Force recommended screening for depression general adult populations in clinical practices that have treatment protocols, care management, and availability of specially trained depression care providers. [7,16] This was created to improve supportive and palliative care after many cancer patients reported that their psychosocial needs are not being addressed adequately. The National Comprehensive Cancer Network (NCCN) now recommends that patients be screened at regular intervals during treatment and survivorship because symptoms may negatively impact quality of life. However, oncologists or primary care providers generally do not feel comfortable in diagnosing major depressive disorders, and nor should they be according to the NCCN. However, the guidelines and recommendations for screening are set to provide initial care and referrals for concerns of psychiatric diagnosis. The NCCN survivorship panel has recommended questions that providers may ask to determine if patients are feeling anxious or depressed but have not endorsed a screening tool. There continues to be a need for properly designed and well controlled studies to determine if depression screening would

benefit gynaecologic oncology patients and if so, to provide examples on how to apply this to clinical practice. Strengths of the study are that all patients received depression screening. The research assistants were blinded to the PHQ-2, and they administered the patient intake form with without looking at the results of the screening test. [19].

All new patients were invited into the study consecutively, ensuring that there was an adequate spectrum of disease. The acceptance rate to participate in the study was high. A limitation to the study is that it was conducted at a community gynaecologic oncology clinic and this may not be completely generalizable to other gynaecologic oncology care settings in which the PHQ-2 may be utilized. Furthermore, these patients were not aware at the time of the PHQ-2 and that the results were being studied. It is possible that consenting patients for a study of tools to screen for depression would influence their likelihood to answer them positively. Another limitation is that we utilized a score of 3 for a positive test however; we may have captured more patients with a score of 2 or higher. We believe that lower threshold score has clinical advantages over a threshold score of 3 or higher in that more patients with depression will be detected and has been utilized in primary care practices. Also, the intake form with symptom checklist is not a validated measure of clinical depression. Despite these limitations, the PHQ-2 may be a promising screening tool, especially those who want to conduct a quick initial depression screening in busy gynaecologic practices. Since there is a high co-existing link between depression and cancer with prevalence of 20-50% and in our sample 56.3% reported a diagnosis of depression. Studies have demonstrated that, although primary providers can provide effective therapy (i.e. without referral) for up to 7% of the patients who have depression, most cases of depression may be unrecognized or inappropriately treated. Future directions for this research include prospectively studying the PHQ-2 in written or Web-based form rather than oral format to ascertain if that would increase the sensitivity and decrease the morbidity and mortality in patients with a Gynaecology Cancer.

#### Declarations

Ethical Approval and Consent to participate: "Not Applicable".

#### Consent for publication

"Not Applicable".

#### Availability of supporting data

"Data sharing not applicable to this article as no datasets were generated or analyzed during the current study"

#### Competing interests

"The authors declare that they have no competing interests."

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#### Authors' contributions

DC and BM were involved in the conception and the design of the study. DB took part in data collection. RR, DB, DC were responsible for data analysis and interpretation. DB, RR were involved with drafting the manuscript or revisions for manuscript submission. DC and BM conceived the study design and participated in coordination and helped with the manuscript. All authors read and approved the final manuscript.

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