

## Research Article

# Depression Risk and Cancer in Ecuador: The Protective Role of Social Support

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## ABSTRACT

**Introduction:** Depression is a determinant of quality of life for cancer patients and predicts cancer progression and mortality. Our study assessed depression and distress among cancer patients receiving care at the hospital Sociedad de Lucha Contra el Cáncer (SOLCA) in Quito, Ecuador and evaluated the role of interpersonal support in protecting against depression. Awareness of the specific benefit of interpersonal support for cancer patients at risk for depression is critical for the ongoing care provided by PCPs to the patient and family in community.

**Methods:** Computertablets were used to collect demographic information and to administer three questionnaires: the Patient Health Questionnaire (PHQ-9) to assess severity of depression symptoms, the Distress Thermometer to characterize level and nature of distress, and the Experiences in Close Relationships assessment (ECR) to measure social support from one's partner.

**Results:** A high level of depression was reported by 29.1%

of patients ( $N=300$ ). Those with high levels of depression reported significantly more distress. Those demonstrating high levels of depression also reported significantly less support from their partners. The demographic factors found to be related to increased risk of depression were unemployment and lack of higher education; young age was related to increased distress.

**Conclusions:** Depression is common in the cancer patient population and strong support from one's partner is a protective factor. The importance of strengthening support from a patient's partner is emphasized at all levels of care, especially the community based PCP engaged with the patient and family longterm.

**MeSH Headings/Keywords:** Depression, Cancer, Social support

## Introduction

Major depression affects between 25% and 50% of cancer patients [1,2]. Over 90% of PCPs fulfill general medical care roles for patients with cancer, including managing depression [3,4]. This aspect of cancer care cannot be overlooked because depression is a key determinant of quality of life for cancer patients and also predicts cancer progression and mortality [5,6].

There is an association between perceived lack of social support and depression symptoms in cancer patients [7-10]. Latin

American cultures offer opportunities to study the influence of social support on the development and severity of depression in patients with cancer because of the cultural emphasis on family and interpersonal relationships [11]. There is relative uniformity of religious affiliation, over 80% of Ecuadorians are Catholic [12-16]. The present study was conducted at SOLCA hospital in Quito, Ecuador. SOLCA (Sociedad de Lucha Contra el Cáncer) is a cancer care center with a mixed private-public economic model. The ~90,000 yearly outpatient visits at SOLCA include patients from all socioeconomic classes and most geographic

regions of Ecuador, making SOLCA's patients population a uniquely representative cross-section of Ecuador's population.

This study examines depression and distress among cancer patients who receive outpatient care at SOLCA and assesses patients' degree of support from their closest relationships. The standards of cancer care at SOLCA reflect the Western approach to medical cancer management. We hypothesized that patients' level of depressive symptoms would be closely related to the amount of distress that they experienced during cancer treatment. We anticipated that low educational attainment and low socioeconomic status would place patients at increased risk for depression. We predicted that feeling well supported by one's intimate partner or closest friends (for those without a partner) would be a protective factor against depression. We chose this as an area of focus in order to elucidate the value of engaging not just the patient but also the patient's partner in the treatment process. We hope that this study will increase awareness of depression as struggle faced by cancer patients worldwide and improve the ability of PCPs to identify those cancer patients at highest risk for depression.

## Methods

**Participants:** The study population was SOLCA hospital outpatients with cancer who were invited to participate while waiting for appointments or receiving ambulatory chemotherapy. Demographic information was recorded, including ethnicity, place of residence, age, profession, education, and marital status.

**Measures:** Three questionnaires were completed in Spanish using tablets with the "Polldaddy" app: 1) Patient Health Questionnaire (PHQ-9) to assess severity of depression symptoms, 2) Distress Thermometer to characterize level and perceived causes of distress, and 3) Experiences in Close Relationships assessment (ECR-S) to measure social support derived from one's closest personal relationship. The distress thermometer consists of 5 scales: distress, anxiety, depression, anger, and "need help", each scored out of 10 points. The ECR-S is designed specifically for those whose closest relationship is with a spouse or intimate partner. For patients without an intimate partner, an alternate (aECR-S) was developed. The aECR-S included six individually-validated items in which the concept of partner could be appropriately replaced with close friends (Appendix A). The data were synchronized daily to a secure cloud-based server.

**Data Analysis:** Pearson's correlation coefficients were calculated to test the bivariate association among continuous variables; two sample independent student's t-tests were used to compare the mean of the outcome variables between different levels of categorical variables. Multiple variable linear regression models were conducted to examine how close relationships would predict depression level (PHQ9) after adjusting other covariates in the same models such as age, gender, urban/suburban location, education, employment status, psychiatric treatment status, and whether or not the tumor was breast cancer. All the analyses were conducted using SAS 9.3 (Cary, NC, USA). Ethical approval from the University of Michigan and Ecuadorian authorities was granted for this study.

## Results

**Participant Characteristics:** Among the 300 total participants, 65% were female (Table 1), consistent

with the gender distribution of SOLCA's patient population. Eighty-one percent of all participants self-identified as having European and Indigenous mixed-ancestry (*mestizo*) compared to 71% nationwide [16]. Afro-Ecuadorian and Indigenous Ecuadorians were under-represented at 1% and 3%, respectively, with white Ecuadorians over-represented at 11%. The educational and socioeconomic background of participants was diverse, reflecting SOLCA's sliding-scale and mixed economic payment method (Table 1). Of note, 30.7% of participants stated that they work in the home and 51% of participants described themselves as currently unemployed. Breast and gastric cancers were the first and second most frequent diagnoses in the study population (Figure 1).

**Depression, Distress and Social Support Findings:** Twenty-nine percent of study participants reported an elevated level of depression symptoms (defined as a score of 8 or more out of 27 on the PHQ-9). The mean PHQ-9 scores were 6.3 +/- 5.0 for women and 5.2 +/- 5.1 for men. Those with at least a university level education had significantly lower PHQ-9 scores ( $p=0.001$ ) while participants who were unemployed had significantly higher PHQ-9 scores ( $p=0.002$ ). Demographic factors such as gender, cancer type, residing outside of Quito, and marital status were not associated with depression scores (Table 2b).

The mean score on the Distress Thermometer was 17.0 +/- 12.0. Distress thermometer scores were positively correlated with PHQ9 scores across the score distributions ( $r=0.57$ ,  $p<0.001$ ). Age was the only demographic factor significantly correlated with distress scores ( $r=-0.13$ ,  $p=0.02$ ), with younger patients experiencing greater distress.

Among those with a partner, the ECR-S correlated significantly with PHQ-9 scores ( $r=-0.36$ ,  $p<0.001$ ) (Figure 2). There was no correlation between depression and social support among those without an intimate partner (Table 2a).

## Discussion

Depression is common among cancer patients attending SOLCA. This study utilized the PHQ-9 to quantify depressive symptoms, the Distress Thermometer to gauge emotional distress, and the ECR-S to assess social support from one's partner. We found that a patient's degree of depressive symptoms is closely associated with the amount of distress that he or she experiences during cancer treatment, as we had anticipated. Our findings also confirmed our hypothesis that strong support from one's intimate partner is a protective factor associated with lower levels of depression. Our hypotheses regarding risk factors, however, were not entirely supported. The demographic factors found to be related to increased risk of depression were unemployment and lacking higher education; young age was related to increased distress (Table 2b). Primary care interactions are an ideal venue for screening and identifying vulnerability to depression in the cancer survivor based on the social support available to the individual.

Computer tablets proved to be an easy and secure medium for administering screening questionnaires at SOLCA. The majority of participants were eager to use the tablet and learned the technology within minutes. Patients who struggled were often symptomatic (i.e., in significant pain), geriatric or had

**Table 1:** Demographics of participants.

| Demographics             |   |
|--------------------------|---|
| Percent Female           | 65%   |
| Mean Age                 | 53.9 ± 15.3   |
| Residing in Quito Canton | 56.00%  |
| Residing in Urban area   | 78.00%  |
| Ethnicity                | Mestizo: 81.00%   |
|                          | White: 10.67%   |
|                          | Indigenous: 3%  |
|                          | Mulato: 2.67%   |
|                          | Afro-Ecuadorian: 1%   |
|                          | Others: 1%  |
| Education                | Did not begin or complete primary education (0-5 years): 11.7%              |
|                          | Completed primary education or some secondary/technical (6-11 years): 17.7% |
|                          | Completed secondary or technical education (12 years): 36.7%                |
|                          | Completed university and above (16+ years): 16.7%                           |
|                          | Unknown (participant did not know or respond): 16.7%                        |
| Profession               | Homemaker: 30.7%  |
|                          | High-income profession: 29%   |
|                          | Unskilled labor: 19%  |
|                          | Skilled labor: 8%   |
|                          | Student: 1.7%   |
| Currently Employed*      | No occupation: 11%  |
|                          | 48.33%  |
| Marital Status           | Married/Common Law: 67.7%   |
|                          | Single: 14%   |
|                          | Divorced/Separated: 9.7%  |
|                          | Widowed: 5.7%   |

\*The majority of homemakers (60.8%) self-identified as currently unemployed

**Table 2A:** Analysis of continuous variables.

| Variable  | DF  | Correlation Coefficient | p value |
|---|-----|-------------------------|---------|
| ECR-S score for single patients compared to PHQ-9 score         | 78  | -0.06479                | 0.5731  |
| ECR-S score for patients with a partner compared to PHQ-9 score | 210 | -0.35641                | <.0001  |
| Distress Thermometer scores compared to PHQ-9 scores            | 293 | 0.56623                 | <.0001  |

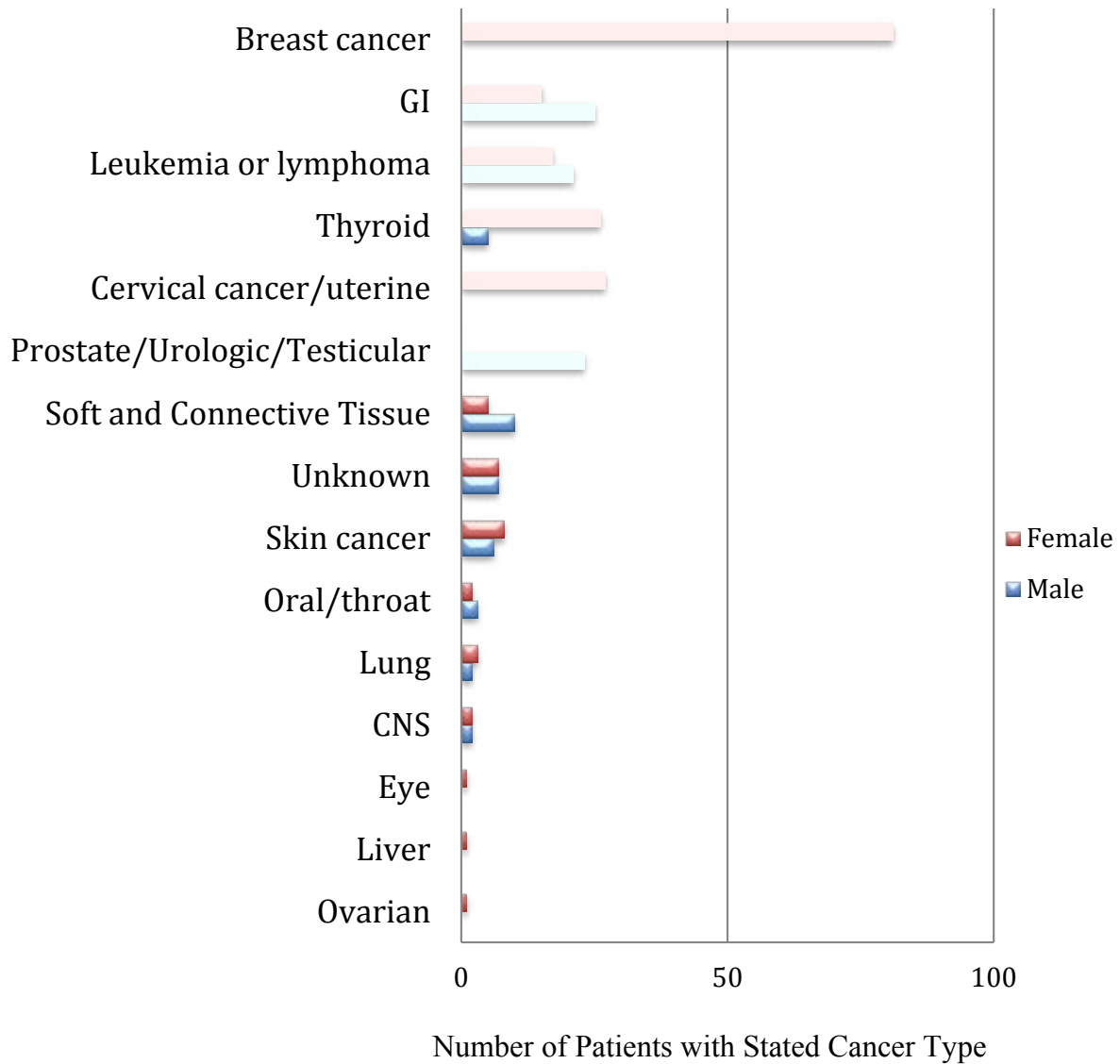
**Table 2B:** Analysis of bivariate variables.

| Variable  | p value |
|---|---------|
| Correlation of male gender to elevated PHQ-9 score                    | 0.0871  |
| Correlation of increased age to elevated PHQ-9 score                  | 0.0014  |
| Correlation of residence's distance to Quito to elevated PHQ-9 scores | 0.7136  |
| Correlation of university education to elevated PHQ-9 scores          | 0.0014  |
| Correlation of employment to elevated PHQ-9 scores                    | 0.0024  |
| Correlation of psychological treatment to elevated PHQ-9 scores       | 0.1762  |
| Correlation of breast cancer diagnosis to PHQ-9 scores                | 0.6630  |

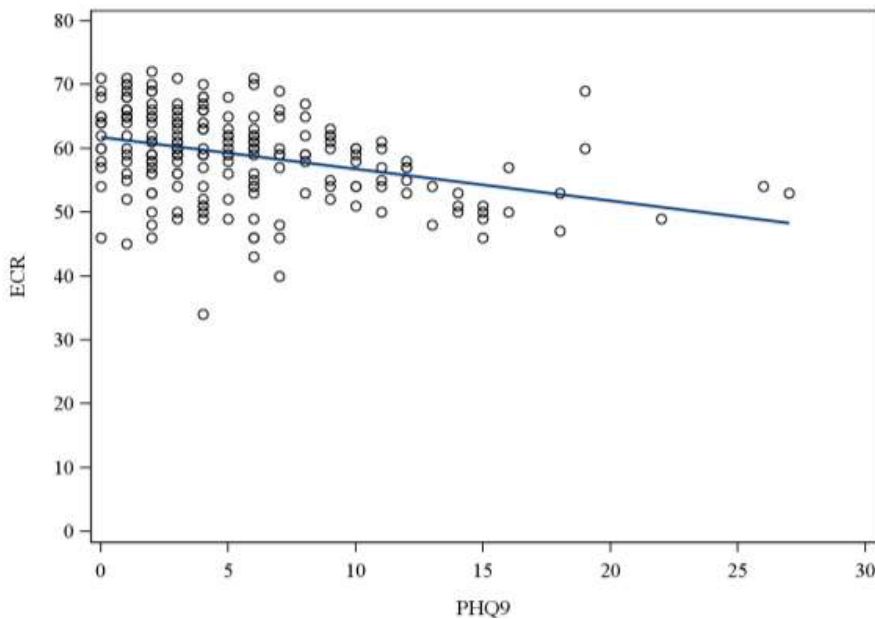
low levels of education (itself associated with depression); nevertheless, even these subgroups were able to complete the surveys with coaching. The mobility of the device allowed patients privacy while participating in the screenings. Responses were automatically uploaded by PollDaddy, which removes the need for data entry, improving data security and accuracy.

This study also demonstrated the utility of the PHQ-9, one of

the most succinct depression measures available; its feasibility has been established in primary care settings in Quito, Honduras and Chile [17-19]. A lower PHQ-9 threshold of 8 (instead of the standard 10) was used because lowering the diagnostic threshold has been found to improve PHQ-9 sensitivity, which is especially important in Latin America where depression and depressive symptoms are often less likely to be acknowledged [20-22].



**Figure 1:** Prevalence of cancer types in number of patients with primary diagnosis.



**Figure 2:** Linear regression of PHQ9 scores of all participants in an intimate relationship versus ECR-S Scores ( $r=-0.36$ ,  $p<0.001$ ).

The Distress Thermometer is used routinely in many U.S. cancer centers [23] and has been validated extensively, but notably not in a Spanish-speaking South American country [24]. The strong correlation between the Distress Thermometer and PHQ-9 scores in this study demonstrates that either screening instrument works well in this patient population. The Distress Thermometer may have added benefit because it uses simple rating scales to quantify emotions that all patients can relate to (distress, anxiety, depression, anger, and need for help). This questionnaire seemed easier to understand than the PHQ-9 for patients with a low level of education and those for whom Spanish was their second language (e.g. patients from indigenous populations).

The Estimates of Close Relationships (ECR-S) scores from patients in an intimate relationship correlated significantly with PHQ-9 scores. The version of the ECR-S used in the study was developed and validated in Spain. The shortened version of the ECR-S developed by the research team for patients without an intimate partner did not have a significant correlation with PHQ-9 scores, suggesting that further revisions are needed to adequately screen patients in Latin America without an intimate partner.

Evaluation for depression and emotional distress must be emphasized for all patients with a recent diagnosis of cancer. However special consideration should be afforded to the younger patients, the unemployed, and those lacking in supportive intimate relationships. The diagnosis of cancer represents a significant health crisis for all, but in particular for the young with the immediate threats to their capacity for role fulfillment and supporting their family. The unemployed may see this as a further burden in their capacity to provide for themselves and family, and diminishes the likelihood of procuring further employment. Finally, an individual with no close intimate relationship is very vulnerable because of the lack of a trusted supportive confidant. Depression and distress in the cancer patient is a complex interaction involving the patient, the illnesses, family, and environment in the broadest sense. Addressing and strengthening social support, and specifically intimate relationships is one of several important strategies to help people with cancer.

### Limitations

This study is limited to one institution, SOLCA, and may not be reflective of the general population of Ecuador. Even though SOLCA provides services to patients of all socio-economic backgrounds, the Ecuadorian health system also includes private and public hospitals and a better cross-section of Ecuadorian society could be obtained from collaborations with other hospitals. There are many additional limitations to this study. No information was gathered specifically on lifestyle, level of indoor or outdoor physical activity. Data on non-medical interventions such as traditional healers or herbal medications was not gathered. In Ecuador, over 90% of people identify religion as important and 80% are Catholic which implies considerable homogeneity in their religion and cultural base; however there may be variation in the intensity and importance of the religious experience that comes into play in a time of emotional crisis such as receiving a cancer diagnosis.

Breast and gastric cancers were the two most common cancers in the study population. Breast cancer is slightly overrepresented while the study population fails to reflect that prostate cancer is the most commonly diagnosed cancer among men and cervical cancer is the second most common cancer among women [25]. This discrepancy could be due to low rates of prostate and cervical cancer screening in Latin America, which often results in a later diagnosis and higher mortality [26,27].

### Implications

Depression and distress are common among cancer patients and appear to be greater when patients lack the support of a close intimate partner. It is therefore important to target care not just at the patient with cancer but also at the patient-partner dyad. A PCP may be able to significantly impact a patient's cancer experience by engaging the patient's partner and eliciting strong support during the treatment process. Our findings also suggest the importance of interventions that enhance support systems for patients. Support groups have been demonstrated to improve depression and subsequent survival among breast cancer patients [28,29]. It was observed that many SOLCA patients form informal support groups while receiving treatment; formalizing support groups would harness and strengthen these existing relationships between patients. Including patients' partners in support groups may maximize the benefit of the groups.

Establishing effective, efficient tools for assessing depression among cancer patients is crucial given the high rate of depression in this population and the well-established role of depression in cancer mortality [30]. The PHQ-9, the Distress Thermometer, and items from the ECR-S may be useful in developing a consolidated screening tool. The Distress Thermometer may have added benefit in patients with limited literacy because it uses simple rating scales with pictures and assesses emotions that all patients can relate to. This study also demonstrates the utility of computer tablets in disseminating screening. Future directions for this project could include piloting a consolidated screening tool at SOLCA using computer tablets. The tool could then be trialed more broadly, for example at other Latin American hospitals and/or among Latin American patients in the United States.

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