Social determinants of health and depression in adults presenting to the emergency department

Implications for family medicine

Lilian Shyman MD CCFP Roman Sukhorukov MD CCFP
David Barbic MD FRCPC Steve Mathias MD FRCP
Shannon Chau BSc Adelena Leon BSc Skye Barbic PhD MSc

Abstract

Objective To estimate the extent to which social determinants of health (SDH) predict levels of depression in adults presenting to the emergency department (ED) with an acute mental health crisis.

Design Secondary data analysis.

Setting St Paul's Hospital, an urban tertiary care hospital in Vancouver, BC.

Participants Patients 19 years and older presenting to the ED with an acute mental health crisis.

Main outcome measures Responses to demographic questionnaires focused on SDH and to measures of self-perceived health and depression. Relationships between depression and SDH were described using *t* tests and χ^2 tests. The extent to which SDH variables predicted depression scores, as measured by the Patient Health Questionnaire–9 (PHQ-9), was determined using linear regression.

Results The primary study had 202 participants. Data for the 156 (77%) participants who completed the PHQ-9 were assessed in this secondary analysis. In this sample, 60% of participants identified as men, 37% as women, and 4% as other. The mean (SD) age was 39.1 (13.8) years, with most participants identifying as white (65%) or Indigenous (18%). Thirty-seven percent had a high school diploma or less education, and 72% reported being unemployed. Identifying as a woman, lack of access to clean drinking water, poor food security, feeling unsafe, little structured use of time, lack of a sense of community, and dissatisfaction with housing significantly predicted higher depression scores. Overall, 59% of respondents met the criteria for moderately severe or severe depression (PHQ-9 score ≥ 15), with 37% of those reporting thoughts of suicide nearly every day for the past 2 weeks.

Conclusion This study demonstrates the importance of screening for both depression and SDH in the ED. Because the ED often does not have the capacity to address appropriate levels of follow-up for this population, this study has important implications for primary care. Developing a clear pathway of follow-up support for people with depression and SDH risk factors will be critical to optimize patient outcomes, promote patient safety, enhance patient satisfaction, and optimize the use of resources between the ED and primary care.

Editor's key points

- In the past decade, the number of emergency department (ED) visits for mental health reasons in Canada has increased by nearly 20%, with young adults showing the largest increase in visits. An opportunity exists to leverage the ED as a point of assessment and referral to primary care for appropriate coordination of health and social services.
- The aim of this study was to estimate the extent to which social determinants of health predict levels of depression in adults presenting to the ED with an acute mental health crisis.
- Decreased access to clean drinking water, inadequate food, lack of housing satisfaction, less structured time, identifying as a woman, and feeling unsafe predicted higher Patient Health Questionnaire–9 scores. Increased participation in usual activities and perceived sense of contributing to the community predicted lower Patient Health Questionnaire–9 scores.
- Developing a clear pathway of follow-up support for depression and social determinants of health will be critical to optimize the outcomes of adults with mental illness. Policies to promote enhanced communication between the ED and primary care might improve patient outcomes and optimize the use of resources.

Points de repère du rédacteur

- Au cours de la dernière décennie, au Canada, le nombre de visites au service des urgences (SU) en raison de problèmes de santé mentale a augmenté de près de 20 %, et la hausse la plus importante est attribuable aux jeunes adultes. Il serait possible de miser sur les SU comme initiateurs d'une évaluation et d'une demande de consultation en soins primaires, dans le but d'assurer une coordination appropriée des services sociaux et de santé.
- Cette étude avait pour but d'évaluer la mesure dans laquelle les déterminants sociaux de la santé peuvent prédire les degrés de dépression chez les adultes qui se présentent aux SU en crise aiguë de santé mentale.
- L'accès réduit à de l'eau potable propre, une alimentation insuffisante, l'insatisfaction sur le plan du logement, le manque de structure dans l'emploi du temps, le fait de s'identifier comme étant une femme et le sentiment d'insécurité pouvaient prédire des scores élevés au Questionnaire sur la santé des patients-9. Une participation accrue à des activités habituelles et une impression de contribuer à la communauté étaient des précurseurs de scores plus faibles au Questionnaire sur la santé des patients-9.
- Il sera essentiel d'établir un cheminement clair pour le soutien de suivi en cas de dépression et les déterminants sociaux de la santé afin d'optimiser les résultats chez les adultes souffrant de maladie mentale. Des politiques qui favorisent une meilleure communication entre les SU et les soins primaires pourraient améliorer les résultats chez les patients et optimiser l'utilisation des ressources.

Les déterminants sociaux de la santé et de la dépression chez les adultes rencontrés au service des urgences

Implications pour la médecine familiale

Lilian Shyman MD CCFP Roman Sukhorukov MD CCFP
David Barbic MD FRCPC Steve Mathias MD FRCP
Shannon Chau BSc Adelena Leon BSc Skye Barbic PhD MSc

Résumé

Objectif Évaluer la mesure dans laquelle les déterminants sociaux de la santé (DSS) prédisent les degrés de dépression chez les adultes qui se présentent au service des urgences (SU) en crise aiguë de santé mentale.

Type d'étude Une analyse secondaire de données.

Contexte L'Hôpital St Paul, un hôpital urbain de soins tertiaires à Vancouver (C.-B.).

Participants Les patients de 19 ans et plus qui se sont présentés au SU en crise aiguë de santé mentale.

Principaux paramètres à l'étude Les réponses à des questionnaires démographiques axés sur les DSS, et les mesures de la santé et de la dépression telles que perçues par les intéressés. Les relations entre la dépression et les DSS ont été décrites à l'aide de tests *t* et de tests χ^2. La mesure dans laquelle les variables dans les DSS prédisaient les scores de dépression, mesurés par le Questionnaire sur la santé des patients-9 (QSP-9), a été déterminée au moyen d'une régression linéaire.

Résultats La première étude comptait 202 participants. Les données concernant les 156 participants (77 %) qui ont répondu au QSP-9 ont été évaluées dans cette deuxième analyse. Dans cet échantillon, 60 % des participants se sont identifiés comme étant un homme, 37 % comme une femme et 4 % comme autre. L'âge moyen (ET) était de 39,1 (13,8) ans, et la plupart des participants ont dit être de race blanche (65 %) ou autochtones (18 %). Quelque 37 % avaient un diplôme d'études secondaires ou moins de scolarité, et 72 % ont signalé être sans emploi. Le fait de s'identifier comme étant une femme, le manque d'accès à de l'eau potable propre, une faible sécurité alimentaire, le sentiment d'insécurité, le manque de structure dans l'emploi du temps, l'absence de sentiment d'appartenance à la communauté et l'insatisfaction sur le plan du logement prédisaient de manière significative des scores de dépression plus élevés. Dans l'ensemble, 59 % des participants répondaient aux critères de dépression de modérée à sévère (scores au QSP-9 de ≥ 15), et 37 % d'entre eux signalaient des pensées suicidaires chaque jour au cours des 2 dernières semaines.

Conclusion Cette étude démontre l'importance du dépistage à la fois de la dépression et des DSS aux SU. Étant donné que les SU n'ont souvent pas la capacité d'assurer des degrés appropriés de suivi à cette population, cette étude a d'importantes implications pour les soins primaires. L'établissement d'un cheminement clair pour un soutien de suivi auprès des personnes souffrant de dépression et ayant des facteurs de risque liés aux DSS sera essentiel pour optimiser les résultats chez les patients, favoriser leur sécurité et améliorer leur satisfaction, et pour une utilisation optimale des ressources entre les SU et les soins primaires.

Twenty percent of Canadians will experience symptoms of mental illness each year,[1] resulting in an annual economic burden of $51 billion.[1-4] Most research to date has focused on understanding the mechanisms of mental illnesses and disorders[5]; but more recently, mental illness has also been studied as a social problem.[6-9] Housing and employment status, level of education, and socioeconomic status have all been associated with increased risk of mental health disorders.[10-14] Increasing evidence suggests that when mental health problems are not effectively treated within the context of a person's needs, they can impair self-care and adherence to medical and mental health treatments, and improperly treated mental health problems are associated with increased morbidity and mortality, increased health care costs, and decreased productivity.[15-19] As Patel and colleagues note, the rationale for coordinated health services for people with mental illness includes improving access to mental health care, providing patient-centred care, avoiding fragmentation of health services, reducing stigma, optimizing both mental and physical health outcomes, and strengthening the overall health system.[7,19] One key area for coordination for people with mental illness is the transition from the emergency department (ED) to primary care.

In the past decade, the number of ED visits for mental health reasons in Canada has increased by nearly 20%,[20] with young adults showing the largest increase in visits.[21,22] It has long been established that many people with mental illness do not receive timely or appropriate follow-up after their ED visits.[23,24] It is not surprising that people continue to present to the ED for reasons such as lack of timely access to community resources, long wait times for treatment, lack of food and shelter, and stigma.[3,25,26] Most Canadian cities and towns have an ED or urgent care clinic. Thus, as the number of visits to the ED for mental health concerns rises,[25] an opportunity exists to use the ED as a point of assessment and referral to primary care for appropriate coordination of health and social services.

Transitions between health services and the effects of such transitions on health outcomes are areas in the literature that are increasingly being explored.[7,27-30] Advantages of having transition standards for people with chronic mental illness include improved patient experiences and outcomes.[19,24,29,31,32] An analysis by the Canadian Institute for Health Information found that ED visits and hospitalizations for people with mental illnesses could potentially be avoided with adequate primary health care.[33] For example, an estimated 50% of Canadians who present to the ED with mental health concerns for the first time have had no previous contact with mental health care.[34] Use of the ED as a first point of contact for mental health care in Canada is notable for people aged 12 to 24 years,[22] people of low socioeconomic status,[3,25,35] immigrants,[34,36] those who identify as gender nonbinary,[37] those with co-occurring substance use disorders,[38] and those who experience homelessness or are marginally housed.[10,39] The data suggest that assessment of mental illness alone is not enough to understand the full range of needs of these populations. Assessing the social determinants of health (SDH) is also critical to informing the development of coordinated, person-centred health plans that support patients as equal partners in planning, developing, and monitoring care to make sure it meets their needs and priorities over time.

Several SDH models exist,[40-42] with most emphasizing a range of personal, social, economic, and environmental factors that determine individual and population health. Health Canada lists the main SDH as follows[43]:

- income and social status,
- employment and working conditions,
- education and literacy,
- childhood experiences,
- physical environments,
- social supports and coping skills,
- healthy behaviour,
- access to health services,
- biology and genetic endowment,
- gender, and
- culture.

While the ED might not be the place to assess all of these factors, it may be a timely point of care for connecting people to the most appropriate place for treatment and referral to specialized services to address their SDH needs. This might include the care needed to help patients with chronic mental health conditions get out of poverty, increase their social safety net, and access primary care and community-based mental health services.[44]

This study begins exploring this topic by understanding how best to use the ED as a point of assessment for people presenting with depressive symptoms. People with high levels of depression, across all age groups, frequently need emergency care for acute mental health crises.[45-47] Health care providers can assess a patient's level of depression using an assessment tool such as the Patient Health Questionnaire–9[48,49] (PHQ-9). However, such standardized screening is still not common practice in the ED[50-53] or in primary care,[54,55] despite nearly 40 years of recommendations for standardized screening for depression and suicidal thoughts.[53,56] Given the cross-exposure that the ED and family medicine often have for people with depressive symptoms, health care providers are encouraged to coordinate comprehensive assessment and follow-up for this population, and they should be provided with the tools to do so.

The aim of this study was to estimate the extent to which SDH predict levels of depression in adults presenting to the ED with an acute mental health crisis. By measuring levels of both depression and SDH, we sought to understand how to best use the ED as a point of assessment and how to triage patients to primary care for follow-up to optimize long-term health outcomes and quality of life for this population.

Methods

Study design

We performed a secondary data analysis of a prospective cross-sectional survey of the SDH of adults aged 19 years and older presenting to the ED. Data were collected from an urban tertiary care hospital—St Paul's Hospital in Vancouver, BC—between August 31, 2016, and October 30, 2016. This ED receives an estimated 87 000 visits per year. We obtained ethics approval for this study from the University of British Columbia Providence Health Care Behavioural Research Ethics Board.

Rationale for study design

We chose to perform a secondary data analysis because the data were readily available to the research team to answer our research question. This approach allowed us to efficiently maximize the use of these data and to consider how to best apply our findings to primary care.

Study participants

Participants included patients presenting to the ED at St Paul's Hospital. The research team identified patients using the department's electronic tracking board, SunRise ED Manager. We asked emergency physicians and nurses, psychiatric liaison nurses, and social workers to assess these patients for eligibility and to contact the research team if a patient met the criteria for the study. The criteria included any patients 19 years of age or older presenting with acute mental health concerns at triage. We excluded participants if they were unable to speak and read English; had acute behavioural agitation requiring emergency pharmacologic treatment and physical restraints; presented owing to acute substance use, as judged by the responsible treating emergency physician; or were identified by ED physicians or nurses as not medically capable or lacking the capacity to complete the questionnaire package.

Study procedures

For the primary study, a trained research assistant (S.C.) approached eligible participants to provide them with information about the study and an invitation to participate. If the patient agreed, the research assistant reviewed and obtained informed written consent from the participant. Next, we gave participants a research package consisting of 6 questionnaires. Each questionnaire had a participant number that prevented identification of the participant. After participants completed the package, the research assistant collected the package and gave each participant a thank you card and an honorarium as compensation for their time.

Study variables and measures

Independent variables. The study package included a demographic questionnaire focused on SDH. We used a model of SDH defined by Dahlgren and Whitehead (**Figure 1**).[57] The rationale for selecting this model was its simplicity, its common use in primary care and other medical fields, and its organizational structure.

The specific SDH variables that we collected included gender (man, woman, or other), education, ethnicity, employment status and work conditions, housing status and satisfaction, income, food security, access to clean drinking water, access to health and social services, and social and community networks.

Dependent variable: depression severity. To quantify depression severity, we used the PHQ-9.[49] The PHQ-9 includes 9 items, each scored on a response scale from 0 to 3, with higher scores indicating more mental distress. A PHQ-9 score of 11 or greater has been shown to have a sensitivity of 89.5% and specificity of 77.5% for detecting adults meeting the *Diagnostic and Statistical Manual of Mental Disorders,* 4th edition, criteria for major depression, assessed against an independent structured mental health interview, the Diagnostic Interview Schedule for Children IV.[58] On receiver operating characteristic curve analysis, the PHQ-9 had an area under the curve of 0.88 (95% CI 0.82 to 0.94), and the cut point of 11 was optimal for maximizing sensitivity without loss of specificity. Increasing PHQ-9 scores have been shown to be statistically significantly correlated with increasing levels of functional impairment.[58] The sensitivity and specificity of the PHQ-9 for young adults (ages 19 to 24, inclusive) are similar to those for adult populations.[58-60]

Exploratory patient-reported outcome measures also collected in this study included the following.

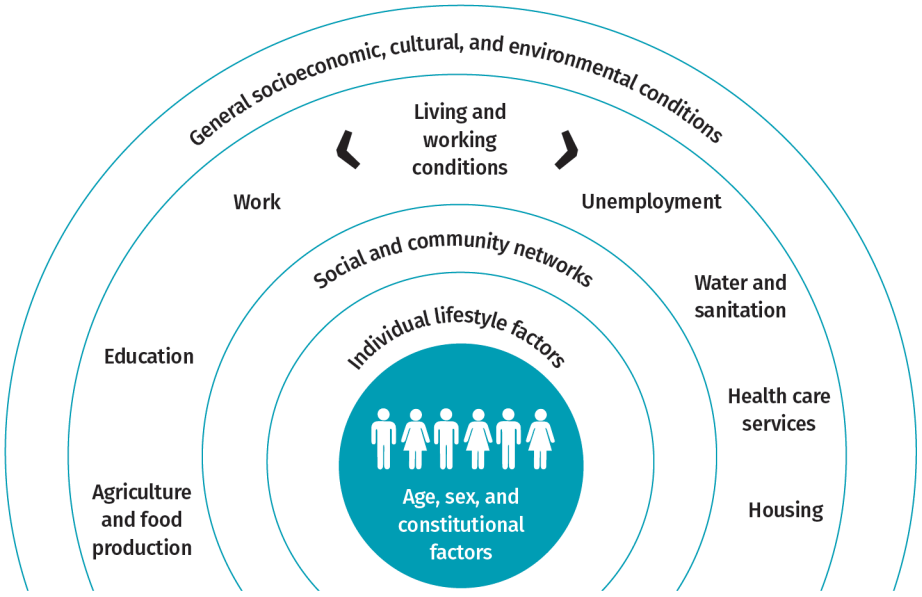
Illness Management and Recovery (IMR)[61]: The IMR is a 15-item self-report measure of self-management and pursuit of recovery goals. The IMR has adequate internal reliability ($\alpha = 0.72$) and good test-retest reliability ($\alpha = 0.81$).[61] Although a total score is traditionally used in research, we looked at the individual item scores, specifically at self-reported structured time, coping, and social support networks.

Canadian Personal Recovery Outcome Measure (C-PROM): The C-PROM is a 30-item self-report measure currently being developed using Rasch measurement theory. The items were developed to measure mental health recovery among community-dwelling individuals with mental illness living in Canada. The C-PROM possesses excellent clinical utility and construct validity. It has also been shown to have strong reliability ($\alpha = 0.91$) (S. Barbic, S.A. Kidd, K. McKenzie, unpublished data).

The EQ-5D: The EQ-5D[62] measures health-related quality of life. It provides a health utility between 0 and 1, representing the value placed on life lived in the current health state. The EQ-5D is optimized for economic analyses and comparisons across health conditions.

The Timeline Followback Method Assessment (TLFB): The TLFB[63] is a tool used to assess an individual's

Figure 1. Social determinants of health model used to guide this study



Reproduced with permission from Dahlgren and Whitehead.[57]

alcohol and substance intake. This tool has been validated across several populations.[63-68] The TLFB has been reported to be reliable and valid for quantifying and qualifying substance use in a 1-week period.[66-69] It has also been shown to be effectively self-administered.[69]

Statistical analysis

We used SPSS, version 23.0, to analyze the data, and descriptive statistics to summarize the information from the data set (Excel; SPSS, version 23.0). We used means and SDs for normally distributed variables, and medians and interquartile ranges for nonnormally distributed variables. We analyzed and summarized the data by performing independent-sample *t* tests and χ^2 goodness-of-fit tests to compare the sociodemographic characteristics of participants. We used the Levene test for equality of variances[70] and corrected for any violated assumptions.

We tested associations between SDH variables—age, gender, ethnicity, education, housing status, employment status, social network, access to health services—and the dependent variable of interest, depression severity (PHQ-9 total score), using a Spearman correlation coefficient to account for both nonnormally distributed data and the relatively small sample size of the cohort.

We also tested the psychometric properties of the PHQ-9 to ensure it was fit for purpose for the target population and this study. To do this, we used the Cronbach α and Rasch measurement methods to determine the scale targeting, unidimensionality, and extent to which the PHQ-9 items covered the full range of the depression construct we were trying to measure. Analysis of these items showed moderate fit to the Rasch model ($\chi^2_{16}=30.5$, $P=.02$), good reliability ($r_p=0.82$), an ordered 4-point response scale structure, and no item bias for gender, age, level of education, or employment status.

Based on the results, and secure in the knowledge that the PHQ-9 was fit for our purpose, we used simple linear regression to understand the extent to which depression severity scores were predicted by demographic characteristics, clinical variables, and factors associated with SDH. First, we evaluated the association between each SDH and the total PHQ-9 score. We stratified by gender (male vs female), age (<40 years vs ≥40 years), ethnicity (Indigenous vs other), and diagnosis (depression vs other) to evaluate the transferability of the results between different groups. Gender was categorized as a binary variable, as the study was insufficiently powered to include the category of other. We then compared all SDH variables using multiple linear regression analyses. We only entered in factors that showed significant correlation ($P<.01$) in the univariate correlation analysis. To prevent an artificially high R^2 due to forced entry in the model of highly correlated factors, we used a hierarchical stepwise technique with 2 blocks of variables. Block 1 consisted of sociodemographic variables, and block 2 had the SDH variables. Using a subsequent backward elimination process in every step, we excluded the variable with the lower β value if no significance was achieved ($P>.01$).

We verified that all assumptions were appropriate. This approach has been commonly used for similar analyses predicting health outcomes.[71]

Results

Demographic characteristics and SDH

A total of 202 individuals participated in the primary study. Within this sample, 156 (77%) completed the PHQ-9 and were included to answer our research question for the secondary analysis. Of note, the 156 respondents for this study did not differ from the complete sample in terms of age, gender, or diagnosis. A summary of the sociodemographic characteristics of our sample is displayed in **Table 1**. Of the 156 respondents, 60% identified as men, 37% as women, and 4% as other. The mean (SD) age was 39.1 (13.8) years, and most participants identified as white (65%) or Indigenous (18%). Thirty-seven percent of the sample had a high school diploma or less education. More than half of participants (56%) had at some point in their lives been diagnosed with depression, followed by bipolar disorder (10%) and schizophrenia or schizoaffective disorder (10%). Despite their past medical history, participants with a history of depression were no more or less likely to receive a high PHQ-9 score than participants with other diagnoses were, even after adjusting ANCOVA (analyses of covariance) for age and gender.

For the other SDH variables studied, 52% of participants reported not having enough money to meet their basic needs, 72% reported being unemployed, and 7% reported not having access to clean drinking water (**Figure 2**). A total of 56% of participants reported not being satisfied with their housing, and 67% reported that they were looking to move to a new residence. More than half (52%) reported that they "feel safe" less than half the time, with 15% reporting that they never feel safe. Regarding food security, 27% reported that they worried that their food would run out, an additional 40% worried that the food they bought would not last and they would not have enough money to buy more, and an additional 41% reported that they cut the size of meals or skipped meals because there was not enough money for food. Half of respondents indicated that they do not have access to the health and social services that they need.

Concerning social and community networks, 31% of respondents reported having no family or friends involved in their health treatment. As shown in **Figure 3**, when asked about contact with people outside of their family, 38% reported talking to someone less than 2 times per week. Finally, 41% of the sample reported doing less than 2 hours of structured activity per week, where *structured activity* was defined as any time spent being "a student [or] parent, volunteering, working, taking care of someone else, or [doing] any activity that is expected of you."

Regression analysis

Table 2 summarizes the severity of participants' depression according to PHQ-9 scores by gender. Overall, 59% of respondents met the criteria for moderately severe

Table 1. Participant demographic characteristics: *N = 156.*

CHARACTERISTICS	VALUES*
Age, y	
• Mean (SD)	39.1 (13.8)
• Median	38
• Range	19-84
Gender, n (%)	
• Women	57 (37)
• Men	93 (60)
• Other	6 (4)
Education, n (%)	
• Less than high school	40 (26)
• High school	18 (12)
• Some college	33 (21)
• Some university	13 (8)
• College or technical degree	12 (8)
• Bachelor's degree	23 (15)
• Master's degree	8 (5)
• PhD, MD, or other professional degree	2 (1)
• Other or missing	7 (4)
Ethnicity, n (%)	
• White	102 (65)
• African	4 (3)
• African-Caribbean	1 (1)
• Asian	10 (6)
• Indigenous	28 (18)
• Other or missing	11 (7)
Self-reported primary diagnosis, n (%)	
• Schizophrenia or schizoaffective disorder	16 (10)
• Depression	87 (56)
• Bipolar disorder	16 (10)
• Other	37 (24)
Employed, n (%)	
• No	118 (72)
• Yes	38 (24)
Cigarette smoking, n (%)	
• No	64 (41)
• Yes	91 (58)
• Missing	1 (1)
Cannabis use, n (%)	
• No	86 (55)
• Yes	68 (44)
• Missing	2 (1)

*Percentages might not add to 100% owing to rounding.

Figure 2. Participants' self-reported social determinants of health: ***N = 156.***

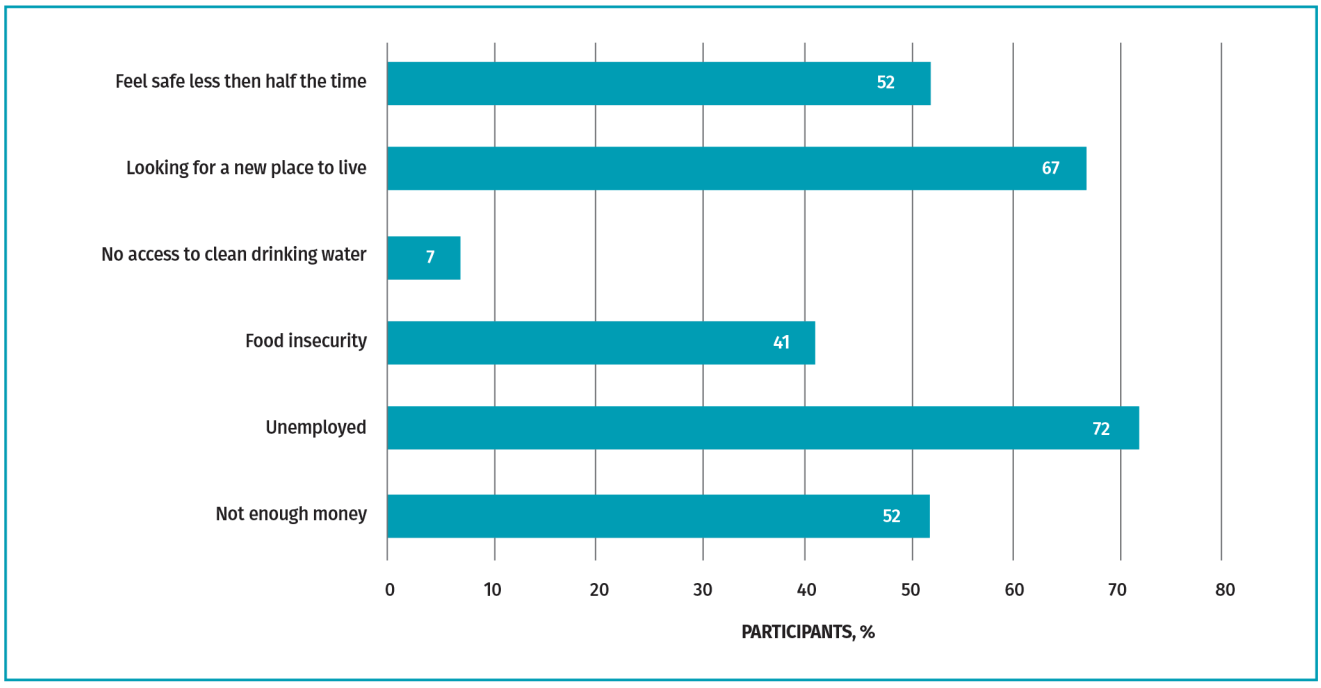
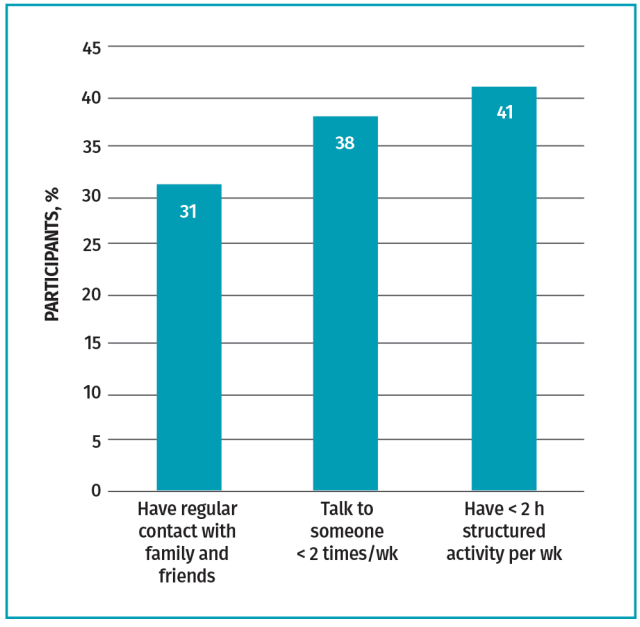


Figure 3. Self-reported engagement in meaningful activity and social connection per week: ***N = 156.***



or severe depression (PHQ-9 score ≥ 15), with 37% of those reporting thoughts of suicide nearly every day for the past 2 weeks. We performed bivariate correlations between the PHQ-9 total score and sociodemographic and clinical variables (block 1) and SDH variables (block 2). A Pearson correlation coefficient confirmed whether a linear relationship was present; otherwise, we used Spearman ρ. The only block 1 variables that were significantly associated (ie, $P < .05$) with PHQ-9 score were diagnosis ($r = 0.167$, $P = .043$) and gender ($r = 0.167$, $P = .036$). Employment status, age, and ethnicity were not significantly associated. Block 2 variables that were significantly associated with PHQ-9 score included safety ($r = 0.456$, $P < .001$), food security ($r = 0.302$, $P < .001$), satisfaction with housing ($r = -0.191$, $P < .001$), participation in usual activities ($r = 0.316$, $P < .001$), structured time ($r = 0.486$, $P < .001$), access to health and social services ($r = -0.401$, $P < .001$), feeling part of one's community ($r = 0.446$, $P < .001$), and contributing to one's community ($r = 0.202$, $P = .013$).

All significant variables were entered into the multiple regression analysis, with the PHQ-9 total score—the severity of depression—as the dependent variable (**Table 3**). Diagnosis and gender were entered in the first block. Of these, gender ($\beta = 2.113$, $P = .036$) remained. In block 2, food security ($\beta = -1.597$, $P = .005$), safety ($\beta = -1.788$, $P < .001$), housing satisfaction ($\beta = -2.065$, $P = .093$), structured time ($\beta = -2.530$, $P < .001$), and access to clean drinking water ($\beta = -3.327$, $P = .100$) were significant. (Although the P values for housing satisfaction and clean drinking water are not statistically significant, we decided that the variables are clinically significant.) The algebraic signs for these predictors indicate that decreased access to clean drinking water, inadequate food, lack of housing satisfaction, and less structured time predicted higher PHQ-9 scores. Participation in usual activities ($\beta = -1.216$, $P = .007$) and contribution to one's community ($\beta = -1.716$, $P = .001$) remained as well. Of note, the algebraic signs for both indicated that increased participation in usual activities and perceived sense of contributing to the community

Table 2. Severity of depression (based on PHQ-9 score) by gender among patients (N = 156) presenting to the emergency department with acute mental health concerns

PHQ-9 SCORING	TOTAL (N = 156), N (%)	MALE (N = 93), N (%)*	FEMALE (N = 57), N (%)*	OTHER (N = 6), N (%)
Level of depression (PHQ-9 score)				
• No depression (1-4)	16 (10)	9 (10)	7 (12)	0 (0)
• Mild (5-10)	28 (18)	20 (22)	9 (16)	0 (0)
• Moderate (11-14)	20 (13)	15 (16)	3 (5)	1 (20)
• Moderately severe (15-20)	44 (28)	24 (26)	19 (33)	1 (20)
• Severe (21-27)	48 (31)	25 (27)	19 (33)	3 (60)

PHQ-9—Patient Health Questionnaire–9.
*Percentages do not add to 100% owing to rounding.

Table 3. Predictors of severity of depression assessed by stepwise multiple regression model: $R^2 = 0.393$, adjusted $R^2 = 0.344$, $F = 8.078$; $P < .001$.

DEPENDENT VARIABLE: PHQ-9 SCORE	β	SE	*t*	*P* VALUE*
Block 1 included				
• Gender (man, woman)†	2.113	0.997	2.119	.036
Block 2 included				
• Safety (no, yes)	-1.788	0.390	-4.578	< .001
• Food security (no, yes)	-1.597	0.560	2.850	.005
• Access to clean drinking water (no, yes)	-3.327	2.357	1.411	.100‡
• Housing satisfaction (no, yes)	-2.065	1.220	-1.693	.093‡
• Structured time (< 2 h/wk, > 2 h/wk)	-2.530	0.560	-4.52	< .001
• Participation in usual activities (no, yes)	-1.216	0.447	2.720	.007
• Part of the community (no, yes)	-1.716	0.526	-3.331	.001
Block 1 variables excluded				
• Age (< 40 y vs ≥ 40 y)	-0.544	1.496	-0.364	.171
• Ethnicity (Indigenous vs other)	0.370	1.554	0.238	.812
• Employment status (no, yes)	0.497	1.508	1.387	.742

PHQ-9—Patient Health Questionnaire–9, SE—standard error.
*Threshold for significance is $P < .05$.
†Gender was treated as a binary variable because the study was insufficiently powered to include the category of other.
‡Although these values are not statistically significant, we determined the variables were clinically significant.

predicted lower PHQ-9 scores in our study sample. The adjusted R^2 of the final model was 0.344, indicating that the revealed predictors leave a notable amount of variation in the dependent variable, the PHQ-9 score, unexplained.

Discussion

The objective of this study was to determine the extent to which SDH predict depression severity in adults presenting to the ED with an acute mental health crisis. Fifty-nine percent of participants in this study scored positive for depression using the validated PHQ-9 cut-off score of 15 or above, with women reporting more severe levels of depression. Fifty-six percent of participants reported having a past diagnosis of depression at some point in their lives, and half of the participants reported not having enough money to meet their basic needs. Most participants (69%) reported being worried about food insecurity or not having enough to eat, and slightly more than half of the participants (52%) reported feeling safe less than half of the time. Finally, our study also found that only 59% of respondents were engaged in more than 2 hours of structured meaningful activity each week. Not surprisingly, severity of depression was predicted by each of these areas (**Table 3**).

Global data, including Canadian data, suggest that SDH are linked with mental health and patient outcomes.[15,42,43,72] Some of these SDH factors (education, income, housing, and employment) are modifiable, whereas others (age, gender) are not. The literature

suggests that all SDH factors should be considered in assessment and treatment of people with mental illness, no matter what the treatment context.[10,14] In terms of modifiable outcomes, effective interventions are available that treat SDH factors identified as predictors of depression in this study, including poverty,[14] housing status,[6,39,73] employment status,[74] and structured time and loneliness.[6,75,76] However, across studies, emphasis is placed on the need to initiate and facilitate a cross-sectoral approach to address the full range of patient needs and to form partnerships between different stakeholders to prevent "siloing" of services.[14,24]

The ED and primary care are an ideal point of contact in the Canadian health care system to enhance the patient experience and bridge services through clear, coordinated care pathways. We advocate for continued research and policy development to understand the epidemiologic impact of SDH on patients struggling with mental illness, and to develop effective, evidence-based interventions between the ED and primary care networks that can help improve health and social outcomes for this population.

Limitations

There are important limitations to our study. This study was conducted in a single ED, with patients presenting with an acute mental health crisis and not in a primary care setting. However, we believe our findings likely translate to a primary care setting. Second, we did not enrol a control group of patients with low PHQ-9 scores to determine if there were differences in their SDH. In addition, we only enrolled participants able to speak and understand English. It is unclear if patients primarily speaking other languages have different SDH profiles and PHQ-9 scores. As well, even though many studies demonstrate that the PHQ-9 is sensitive and specific to reveal depression,[49,77,78] the final diagnosis of this population was not confirmed by chart review. That is, although many of our participants scored high on the PHQ-9, only 56% had received a diagnosis of depression. We also acknowledge that our study excluded those individuals at most risk (eg, those with intoxication or extreme agitation). More research is needed to understand the SDH risk factors for this population. We also acknowledge that our recruitment time was limited to when the research associates were present. As such, we may not have captured all eligible patients presenting over a 24-hour period. As well, we acknowledge that future studies should also account for comorbidities and how they influence depression and are associated with SDH. Despite the small sample size, our study emphasizes the importance of SDH in depression and provides an opportunity to consider the role of primary care to support this population.

Conclusion

This study supports the importance of screening for both depression and SDH in the ED. Although depression may present in isolation, our study highlights that SDH play an important role in this outcome for people presenting to the ED with an acute mental health crisis. The implications of this study for primary care are substantial, as the ED may not be the optimal point of care to address appropriate levels of follow-up for this population. Developing a clear pathway of follow-up support for depression and SDH will be critical to optimize the outcomes of adults with mental illness. The aim of this pathway should be to develop real-world, patient-centred guidelines to enhance the quality of care provided to patients presenting with an acute mental health crisis. Policies to promote enhanced communication between the ED and primary care may improve patient outcomes, promote patient safety, enhance patient satisfaction, and optimize the use of resources between the ED and primary care. In accordance with Canada's Strategy for Patient-Oriented Research,[79] key stakeholders, including emergency physicians, primary care practitioners, patients, and families, are critical to develop pathways of care that ensure the right patient receives the right care at the right time.

Dr Lilian Shyman is a family physician in Kelowna, BC. **Dr Roman Sukhorukov** is a family physician in Kamloops, BC. **Dr David Barbic** is an emergency physician at St Paul's Hospital in Vancouver, BC. **Dr Steve Mathias** is a psychiatrist at St Paul's Hospital and Executive Director of Foundry. **Shannon Chau** is a graduate student in the Dietetics Program at the University of British Columbia (UBC) in Vancouver and was a co-op student for this study. **Adelena Leon** is a research coordinator at UBC. **Dr Skye Barbic** is a health systems researcher, Research Lead at Foundry, and Assistant Professor in the Department of Occupational Science and Occupational Therapy at UBC.

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Contributors

All authors contributed to the concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

Competing interests

None declared

Correspondence

Dr Skye Barbic; e-mail **skye.barbic@ubc.ca**

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