Comprehensiveness of care for women with depression

Association between primary care use and cervical cancer screening

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Abstract

Objective To explore comprehensiveness of care in patients with depression by examining associations between a diagnosis of depression, frequency of primary care visits, and Papanicolaou test completion.

Design Cross-sectional retrospective survey using electronic medical record data from the Canadian Primary Care Sentinel Surveillance Network.

Setting Primary care practices in Ontario.

Participants Women aged 21 to 69 eligible to receive Pap tests in 2015.

Main outcome measures Associations between 2 predictors (depression and number of primary care visits in 2015) and Pap test completion were measured.

Results Overall, 125,258 women were included: 20.5% completed a Pap test and 16.4% had a diagnosis of depression. Having a diagnosis of depression was associated with lower likelihood of Pap test completion (adjusted odds ratio [AOR]=0.92, 95% CI 0.88 to 0.95). A greater number of primary care visits was associated with a higher likelihood of Pap test completion; this association was stronger in women with a diagnosis of depression (AOR=4.9, 95% CI 4.16 to 5.69) than in those without (AOR=3.4, 95% CI 3.25 to 3.60).

Conclusion While depression was associated with fewer completed Pap tests, women with depression who saw their family doctors more often were more likely to be screened for cervical cancer. More primary care visits for depression treatment may be associated with an improved likelihood of screening for cervical cancer.

Editor's key points

- Women with histories of depression are less likely to complete Papanicolaou tests compared with those without histories of depression.
- Patients with more primary care visits are more likely to have Pap tests; this association is stronger among women with depression than among those without.
- Better access to health care enhances cervical cancer screening rates, as more screening opportunities can be associated with higher Pap test completion rates. More research on cervical cancer screening support for those with mental health conditions is warranted.

Points de repère du rédacteur

- Il est moins probable que les femmes qui ont des antécédents de dépression subissent des tests de Papanicolaou que celles qui n'en ont pas.
- Les patientes qui consultent plus souvent en soins primaires sont plus susceptibles de passer un test Pap; cette association est plus forte chez les femmes souffrant de dépression que chez celles qui n'en souffrent pas.
- Un meilleur accès aux soins de santé accroît les taux de dépistage du cancer du col, puisque des possibilités plus nombreuses de dépistage peuvent être associées à des taux plus élevés de tests Pap subis. Il faudrait plus de recherches sur le soutien au dépistage du cancer du col chez les patientes souffrant d'un problème de santé mentale.

Intégralité des soins aux femmes souffrant de dépression

Association entre le recours aux soins primaires et le dépistage du cancer du col

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Résumé

Objectif Explorer l'intégralité des soins aux patientes souffrant de dépression en examinant les associations entre un diagnostic de dépression, la fréquence des consultations en soins primaires et le fait d'avoir subi un test de Papanicolaou.

Type d'étude Une enquête rétrospective transversale à l'aide des données tirées des dossiers médicaux électroniques du Réseau canadien de surveillance sentinelle en soins primaires.

Contexte Des cliniques de soins primaires en Ontario.

Participantes Les femmes âgées de 21 à 69 ans admissibles à subir des tests Pap en 2015.

Principaux paramètres à l'étude Les associations entre 2 facteurs de prédiction (dépression et nombre de consultations en soins primaires en 2015) et les tests Pap administrés ont été mesurées.

Résultats Dans l'ensemble, 125 258 femmes ont fait l'objet de l'étude : 20,5 % avaient subi un test Pap, et 16,4 % avaient reçu un diagnostic de dépression. Le fait d'avoir un diagnostic de dépression était associé à une plus faible probabilité d'avoir subi un test Pap (rapport de cotes rajusté [RRR]=0,92, IC à 95 % de 0,88 à 0,95). Un plus grand nombre de consultations en soins primaires était associé à une probabilité plus forte de subir un test Pap; cette association était plus forte chez les femmes ayant reçu un diagnostic de dépression (RRR=4,9, IC à 95 % de 4,16 à 5,69) que chez celles sans diagnostic de dépression (RRR=3,4, IC à 95 % de 3,25 à 3,60).

Conclusion Bien que la dépression ait été associée à un moins grand nombre de tests Pap subis, les femmes souffrant de dépression qui consultaient leur médecin de famille plus souvent étaient plus susceptibles d'avoir fait l'objet d'un dépistage du cancer du col. Un plus grand nombre de visites en soins primaires pour un traitement de la dépression peut être associé à une plus grande probabilité de dépistage du cancer du col.

There is increasing evidence of an association between mental illness and adverse physical health outcomes, the effects of which could be mitigated by maximizing screening and prevention.[1-4] Since preventive care is one of the pillars of primary care in Canada and mental health is increasingly and frequently managed in family practice,[5] exploring ways to ensure completion of routine preventive services, such as cancer screening, in those living with mental health disorders is important.

Depression is highly prevalent in the Canadian population, and it has been shown that those with histories of depression have more encounters with primary care providers (PCPs) than those without such histories.[6,7] Moreover, cervical cancer screening through Papanicolaou and human papillomavirus testing is the only type of cancer for which screening samples can be obtained in an office by a PCP.[8]

Lack of access to health care has been reported as one of the main barriers to preventive care completion,[9] but even within populations with good access to health care, having more complex health problems is a strong predictor of lower cancer screening rates.[10] The presence of a mental health condition can be particularly complex to manage, and women with serious mental illness, such as those with schizophrenia, have been found to be less likely to receive cervical cancer screening.[11,12] However, to date, 3 Canadian population-level studies examining the effect of depression on cervical cancer screening have not found overall significant associations between depression and likelihood of receiving a Pap test.[13-15]

Managing depression in primary care usually means additional office encounters beyond the initial diagnosis and could mean more opportunities for Pap testing, but it is possible that these visits could be used to focus solely on managing psychological distress and not to provide routine preventive services. We wished to investigate whether the extra visits were associated with more cervical cancer screening. Therefore, the aim of this study was to explore comprehensiveness of care for patients with depression by examining associations between a depression diagnosis, frequency of primary care visits, and Pap test completion.

Methods

This was a cross-sectional, retrospective survey. We used STROBE (STrengthening the Reporting of OBservational studies in Epidemiology)[16] and RECORD (REporting of studies Conducted using Observational Routinely-collected Data)[17] checklists to report the findings of this study.

Setting and data source

Our study examined patterns of cervical cancer screening in Ontario. We focused on Ontario because there are differences among screening guidelines, incentives, and billing codes across Canadian provinces and territories. We used data from 2 Ontario practice-based research networks (PBRNs) participating in the Canadian Primary Care Sentinel Surveillance Network (CPCSSN): the Eastern Ontario Network and the University of Toronto PBRN. These covered the geographic region of eastern Ontario (Belleville, Kingston, Brockville), the greater Toronto area, and Ottawa. The CPCSSN is a network of 11 PBRNs across Canada that collect deidentified clinical data from electronic medical records (EMRs) of participating, consenting PCPs. Both family physicians and nurse practitioners are eligible to participate, but at the time of the study, only data from family physicians were available. Eight chronic disease definitions have been developed and validated by the CPCSSN, including a case-finding algorithm for depression.[18] Data from January 1, 2013, to December 31, 2015, were extracted after January 1, 2016.

Participants

The study population included active patients (anyone who visited their PCPs at least once in 2015) who were eligible for cervical cancer screening in 2015. Eligibility for cervical cancer screening was defined by the following criteria: female; birth year between 1946 and 1994 (aged 21 to 69 in 2015); no recorded hysterectomy or no exclusion code (Q140A) billed to the Ontario Health Insurance Plan (OHIP); and no record of a Pap test in the previous 2 years, from January 1, 2013, to December 31, 2014.

Variables

The main exposure variables were a diagnosis of depression in or before 2015 and primary care use (number of encounters in 2015). The outcome was Pap test completion in 2015. In Ontario, since the cost of human papillomavirus testing is not covered by OHIP for the patient, it is usually done only to follow up on an abnormal Pap test result and is not part of routine screening guidelines; hence why we focused on Pap test completion as the outcome.

Depression was determined by a validated algorithm that drew from a combination of diagnostic codes, free-text searches from the case definition list, billing codes, and medication histories.[18,19] Patients were classified as having depression if they met this definition at any point in their lives. Primary care use was defined by the number of primary care visits recorded in 2015, excluding any encounter during which the patient had a Pap test completed. Primary care use was then categorized into low (0 visits other than a visit with a Pap test), moderate (1 to 3 visits other than a Pap test), and high (>3 visits other than a Pap test) use based on the median number of encounters reported in the study group. The outcome was Pap test completion, which was defined by having 1 of the following OHIP billing codes submitted in 2015: G365 (performing a Pap test), E430 (Pap test tray fee), or Q001 or Q011 (preventive care tracking codes for Pap tests).

Covariates included factors that could affect the provision of Pap tests, including patient age, urban versus rural location, socioeconomic status, and number of chronic conditions.[20-22] Rurality was indicated by the presence of a 0 in the second digit of the postal code, as per Statistics Canada.[23] A neighbourhood-level deprivation index based on residential postal code was used as a proxy for socioeconomic status. Measures of material and social deprivation were derived from census data through the Canadian Population Health Initiative deprivation index[24]; these were linked to residential postal codes using the Statistics Canada Postal Code Conversion File. The deprivation index uses various socioeconomic indicators including education, employment, and income (the material component), as well as marital status and family structure (the social component), to assign scores to dissemination areas in the form of population quintiles. The presence of comorbidities was examined using CPCSSN case definitions for other chronic conditions, including diabetes, hypertension, chronic obstructive pulmonary disease, osteoarthritis, epilepsy, Parkinson disease, and dementia.[18]

Statistical analysis

All analyses were done using SAS, version 9.4. Logistic regression was performed with Pap test completion as the binomial outcome (yes or no) and history of depression as the primary explanatory variable. Covariates analyzed included age, location, social deprivation, material deprivation, and presence of chronic disease. Bivariate and multivariate analysis were then performed on those with and without histories of depression as parallel cohorts in order to compare Pap test completion with primary care use, along with patient demographic characteristics and presence of chronic disease.

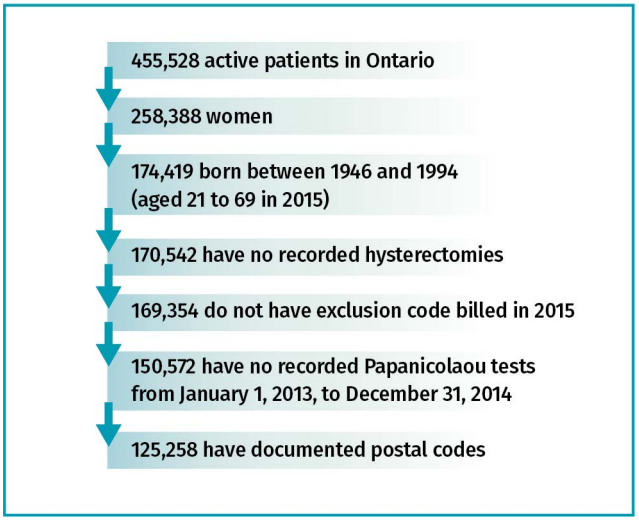
This study was reviewed and approved by the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board. All participating PCPs provided written informed consent for the collection and analysis of their EMR data as part of their involvement with CPCSSN.

Results

Figure 1 shows the generation of the study population; there were 125,258 patients who met the inclusion criteria. Overall, 20,595 women (16.4%) had lifetime histories of depression and 20.5% of the study population had completed Pap tests in 2015. The demographic and clinical characteristics of the study population, grouped by low, moderate, and high primary care use, are shown in **Table 1**.[18]

We found that 19.4% of eligible women with histories of depression and 20.8% of women without histories of depression had Pap tests completed in 2015. As shown in **Table 2**,[18] having a history of depression was associated with a lower adjusted odds ratio (AOR) of having a Pap test done (AOR=0.92, 95% CI 0.88 to 0.95).

Figure 1. Generation of the study population



Unadjusted percentages of eligible women by number of visits to PCPs are shown in **Table 3**. Data indicated that 15.1% of women with depression and 21.0% without depression had no primary care visits in 2015 beyond visits where Pap tests were provided, and 60.4% of women with histories of depression and 43.7% of those without had 4 or more additional encounters with PCPs.

Table 4 provides unadjusted ORs and AORs of having had a Pap test completed in 2015.[18] The provision of more primary care visits was associated with higher AORs of having had a Pap test; this association was stronger in women with histories of depression than in women without one. The AOR of having had a Pap test done for those with 4 or more additional visits, compared with no additional visits beyond the encounters with Pap tests, was 4.9 (95% CI 4.16 to 5.69) for women with histories of depression. For those without histories of depression, the AOR was 3.4 (95% CI 3.25 to 3.60).

Adjusted odds ratios for Pap test completion were lower for patients living in rural settings, for those who were more materially or socially deprived, and for those who had 2 or more other chronic diseases. These results are similar to findings in other studies.[20-22]

Discussion

We found that women with histories of depression were less likely to have Pap tests compared with those without histories of depression. We also found that patients with more primary care visits were more likely to have Pap tests; this association was stronger among women with histories of depression than among women without such histories.

Our results are consistent with previous studies showing that better access to health care enhances cervical cancer screening,[9] indicating that more screening opportunities can be associated with higher rates of Pap test completion. However, we found an association between

Table 1. Demographic and clinical characteristics of females aged 21 to 69 eligible for Pap tests in 2015

CHARACTERISTIC	PRIMARY CARE VISITS IN 2015, n		
	0*	1-3*	>3*
Female patients, n	25,111	41,975	58,172
Depression, n (%)			
• Yes	3105 (12.37)	5058 (12.05)	12,432 (21.37)
• No	22,006 (87.63)	36,917 (87.95)	45,740 (78.63)
Age range, n (%)			
• 21-45	15,089 (60.09)	21,858 (52.07)	24,098 (41.43)
• 46-69	10,022 (39.91)	20,117 (47.93)	34,074 (58.57)
Patient location, n (%)			
• Rural	4020 (16.01)	7987 (19.03)	12,484 (21.46)
• Urban	21,091 (83.99)	33,988 (80.97)	45,688 (78.54)
Material deprivation index, n (%)			
• 1 (least)	7859 (31.30)	13,347 (31.80)	15,475 (26.60)
• 2	6583 (26.22)	11,595 (27.62)	16,217 (27.88)
• 3	4633 (18.45)	7841 (18.68)	11,338 (19.49)
• 4	3456 (13.76)	5618 (13.38)	8823 (15.17)
• 5 (most)	2580 (10.27)	3574 (8.51)	6319 (10.86)
Social deprivation index, n (%)			
• 1 (least)	5808 (23.13)	9986 (23.79)	12,154 (20.89)
• 2	5639 (22.46)	10,170 (24.23)	14,317 (24.61)
• 3	4744 (18.89)	8140 (19.39)	11,443 (19.67)
• 4	4339 (17.28)	7108 (16.93)	10,002 (17.19)
• 5 (most)	4581 (18.24)	6571 (15.65)	10,256 (17.63)
Presence of chronic disease, n (%)†			
• None	21,850 (87.01)	33,776 (80.47)	35,631 (61.25)
• 1	2664 (10.16)	6813 (16.23)	15,510 (26.66)
• ≥2	597 (2.38)	1386 (3.30)	7031 (12.09)

CPCSSN—Canadian Primary Care Sentinel Surveillance Network, Pap—Papanicolaou.
*Number of encounters with primary care in 2015, excluding any visits where Pap tests were completed (outcome).
†Includes CPCSSN-validated comorbidities only (hypertension, chronic obstructive pulmonary disease, depression, osteoarthritis, dementia, epilepsy, Parkinson disease).[18]

Table 2. Fully adjusted logistic regression model of female patients aged 21 to 69 with completed Pap tests

VARIABLE	PAP TEST COMPLETION, AOR (95% CI)
Depression, yes vs no	0.92 (0.88-0.95)
Covariate	
• Age	1.00 (1.00-1.00)
• Patient location, urban vs rural	1.12 (1.08-1.16)
• Material deprivation index quintile, 1 vs 5*	1.28 (1.21-1.35)
• Social deprivation index quintile, 1 vs 5*	1.33 (1.27-1.40)
• Presence of chronic disease, 0 vs ≥1†	1.03 (0.99-1.06)

AOR—adjusted odds ratio, CPCSSN—Canadian Primary Care Sentinel Surveillance Network, Pap—Papanicolaou.
*Where 1 is least deprived and 5 is most deprived.
†Includes CPCSSN-validated comorbidities only (hypertension, chronic obstructive pulmonary disease, depression, osteoarthritis, dementia, epilepsy, Parkinson disease).[18]

depression and lower screening rates, which is discordant with Canadian studies that found no such association.[13-15] These studies used survey data to determine the presence of depression, which can have limitations, including recall bias. Instead, we used a validated definition of depression derived from primary care EMR data.

Patients who had only single visits in 2015 that included cervical cancer screening may have booked for Pap tests or for periodic health checks. They likely benefited from reminder letters sent through the Ontario Cervical Screening Program.[15] Those with histories of depression may have had more complex medical or social situations, possibly making cervical cancer screening less of a priority, for both patients and providers, owing to competing demands. This may have decreased a patient's likelihood of responding to a reminder letter and booking an appointment specifically for a Pap test, as well as the likelihood of a provider performing a Pap test when the focus was on managing the patient's other concerns.

While we found that more contacts with primary care for all women were associated with a higher likelihood of cervical cancer screening, in patients with diagnoses of depression, seeing their PCPs more often was associated with an even higher likelihood of having had Pap tests. This could be owing to better patient engagement and more reminders by their health care teams. Further research could explore other screening methods and aspects of practice and system organization that support comprehensiveness of care in patients living with depression.

We found that rural residence and lower socioeconomic status were also associated with lower rates of Pap test completion. This was the case for both women with and without histories of depression. This is congruent with previous findings that have shown disparities in care among those in remote communities and in those with lower income levels and social support.[16,18]

Table 3. Unadjusted percentages of female patients aged 21 to 69 by number of encounters with primary care providers in 2015

PRIMARY CARE USE (VISITS IN 2015, n)	HISTORY OF DEPRESSION, n (%)	NO HISTORY OF DEPRESSION, n (%)
0*	3105 (15.1)	22,006 (21.0)
1-3*	5058 (24.6)	36,917 (35.3)
>3*	12,432 (60.4)	45,740 (43.7)

Pap—Papanicolaou.
*Number of encounters with primary care in 2015, excluding any visits where Pap tests were completed (outcome).

Limitations

This study used a large data set derived from primary care EMRs. However, this was an observational study, so we do not make claims of causation. This was also a convenience sample of primary care practices that contributed EMR data to the Eastern Ontario Network and the University of Toronto PBRN, rather than a random sample. These physicians and their patients may not represent the general population.

Table 4. Likelihood of female patients having completed Pap tests based on comparisons of patient characteristics for those with and without histories of depression

	HISTORY OF DEPRESSION		NO HISTORY OF DEPRESSION	
CHARACTERISTIC COMPARISONS	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Primary care use*				
• 1-3 vs 0	4.16 (3.53-4.91)	4.11 (3.48-4.85)	3.14 (2.98-3.31)	3.15 (2.99-3.32)
• >3 vs 0	4.60 (3.94-5.38)	4.86 (4.16-5.69)	3.26 (3.10-3.43)	3.42 (3.25-3.60)
Age range				
• 21-45 vs 46-69	0.99 (0.92-1.06)	0.96 (0.89-1.04)	1.12 (1.08-1.15)	1.07 (1.03-1.10)
Patient location				
• Urban vs rural	1.19 (1.09-1.31)	1.22 (1.10-1.34)	1.11 (1.07-1.16)	1.16 (1.11-1.21)
Social deprivation index†				
• 1 vs 5	1.34 (1.20-1.50)	1.30 (1.16-1.46)	1.35 (1.28-1.42)	1.35 (1.29-1.43)
• 2 vs 5	1.29 (1.16-1.44)	1.24 (1.11-1.39)	1.25 (1.19-1.32)	1.25 (1.19-1.32)
• 3 vs 5	1.28 (1.15-1.44)	1.23 (1.09-1.38)	1.27 (1.21-1.34)	1.27 (1.21-1.34)
• 4 vs 5	1.18 (1.06-1.33)	1.12 (0.99-1.26)	1.17 (1.11-1.23)	1.15 (1.09-1.22)
Material deprivation index†				
• 1 vs 5	1.67 (1.46-1.91)	1.58 (1.38-1.82)	1.32 (1.24-1.39)	1.25 (1.18-1.32)
• 2 vs 5	1.66 (1.45-1.90)	1.56 (1.36-1.80)	1.25 (1.18-1.32)	1.17 (1.10-1.24)
• 3 vs 5	1.41 (1.22-1.62)	1.38 (1.19-1.59)	1.14 (1.07-1.21)	1.09 (1.03-1.16)
• 4 vs 5	1.07 (0.91-1.24)	1.04 (0.89-1.22)	0.94 (0.88-0.99)	0.90 (0.84-0.96)
Presence of chronic disease‡				
• 1 vs 0	1.00 (0.92-1.09)	0.93 (0.85-1.01)	1.07 (1.03-1.11)	0.91 (0.88-0.95)
• ≥2 vs 0	0.86 (0.76-0.96)	0.77 (0.68-0.87)	0.92 (0.86-0.97)	0.75 (0.70-0.80)

AOR—adjusted odds ratio, CPCSSN—Canadian Primary Care Sentinel Surveillance Network, OR—odds ratio, Pap—Papanicolaou.
*Number of encounters with primary care in 2015, other than visit where a Pap test was completed.
†A score of 1 is the lowest while a score of 5 is the highest.
‡Includes CPCSSN-validated comorbidities only (hypertension, chronic obstructive pulmonary disease, depression, osteoarthritis, dementia, epilepsy, Parkinson disease).[18]

We were unable to determine whether women were experiencing depression during the period of observation owing to data limitations, as the algorithm determines whether depression was present at any point in a person's life. However, studies show that at least 50% of patients will have a recurrent episode of depression.[25]

Since our method of determining Pap test completion was based on billing codes submitted via primary care, we may be missing Pap tests that were done in other settings, such as in other specialists' practices. Nevertheless, we found that 20.5% of our study population completed Pap tests in 2015, a rate that is consistent with Cancer Care Ontario reports that show approximately 65% of eligible women in Ontario completed Pap tests in a 3-year period (2013 to 2015)[8]; dividing this rate by 3 produces a rough annual percentage (21.7%) similar to that seen in our study. Furthermore, the use of primary care billing codes may allow us to be more specific as we focus on primary care practices, which may reveal factors that could be addressed within these practices. It may be useful in future studies to extend the eligibility period for inclusion, such as including Pap tests that were performed more than 3 years apart.

Finally, given that cervical cancer guidelines vary between provinces and territories, it would be beneficial to evaluate data from all of Canada to examine these associations further.

Conclusion

Although women with depression may be less likely to get Pap tests, the likelihood of getting Pap tests increases if they see their family physicians more often. This study offers support for the management of mental health conditions in ways that are integrated with primary care through more numerous contacts in that setting. Further research on support for and sustainability of elements of primary care comprehensiveness, such as cancer screening, for patients with mental health conditions would be worthwhile.

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Contributors

All authors of this paper have directly participated in the planning, execution, or analysis of the study; all have read and approved the final submitted version.

Competing interests

None declared

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