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Family Medicine and Primary Care: Open Access

Morin KA, et al. J Family Med Prim Care Open Acc 2: 111.

DOI: 10.29011/2688-7460.100011

Research Article

The Epidemiological Profile of Patients with Mental Health Disorders in Opioid Agonist Treatment, Accessing Services in Primary Care across Ontario, Canada

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Citation: Morin KA, Eibl JK, Nguyen VPKH, Anderson KE, Marsh DC (2018) The Epidemiological Profile of Patients with Mental Health in Opioid Agonist Treatment, Accessing Services in Primary Care across Ontario, Canada. J Family Med Prim Care Open Acc 2: 111. DOI: 10.29011/2688-7460.100011

Received Date: 22 December, 2017; **Accepted Date:** 12 February, 2018; **Published Date:** 19 February, 2018

Abstract

Objective: To examine the epidemiological profile and health service use patterns of patients enrolled in opioid agonist treatment diagnosed with mental health disorders who access mental health services in a primary care setting across Ontario, Canada.

Methods: We conducted a cross sectional study using secondary data from administrative health databases between January 1, 2008, and March 31, 2014. The data was collected in the province of Ontario and patients were stratified on the bases of place of residence into two groups - Northern and Southern Ontario. Descriptive statistics and standardized differences were calculated between Northern and Southern cohorts. Outcomes of interest included: primary care visits, hospitalizations and emergency department visits.

Results: We identified 19,458 individuals with a mental health diagnosis and opioid use disorder (OUD/MH) between 2008 and 2014. Of the OUD cohort, 13.4% resided in Northern regions and 87.06% resided in Southern regions of Ontario. The mean number of mental health related visits in Northern Ontario was 38.31 (SD ± 36.03); and Southern Ontario 36.02 (SD ± 30.60) ($p<0.05$). The average emergency department visits in Northern Ontario was 2.29, SD ± 3.87, and Southern Ontario, 2.10 ± 4.36 (p 0.039); and hospitalizations in Northern Ontario 0.24 SD ± 0.68, versus Southern Ontario, 0.21 ± 0.74 (p 0.05).

Conclusions: We believe that our findings can ultimately help in the planning and policy decisions relating to opioid use disorder in across geographies.

Keywords: Mental Health; Opioid Agonist Treatment; Opioid Use Disorder; Primary Care; Utilization of Health Services

Introduction

Opioid Use Disorder (OUD) is recognized as a critical healthcare issue across North America [1-6]. Opioid related deaths are a reliable surrogate to assess the extent of the issue. Currently, Ontario ranks second in opioid related deaths in Canada in 2016 - with 865 deaths reported (5.0 to 9.9 deaths per 100,000 population) [7]. This compared to the highest provincial rate in British Columbia, Canada, with 978 deaths in 2016 (20.0 and higher per 100,000 population) and the overall rate in the United states of, 19.8 per 100,000 [8]. The current standard practice for OUD globally is Opioid Agonist Therapy (OAT)-including Methadone Maintenance Treatment (MMT) and Buprenorphine/Naloxone Maintenance Treatment (BMT) [9-11]. The regulations and model of care for OAT in Ontario promotes access but does not incentivize efforts towards coordination with other parts of the health care system. This is important because, approximately 50% of individuals with OUD also have a concurrent mental health disorder [12]. This sub-category of mental health care recipients represents some of the most vulnerable and marginalized individuals in Ontario. Thus, there is a missed opportunity for complex patients with co-occurring mental health and OUD to receive care for their mental

health and substance use disorders concurrently.

Despite the wide range of services being provided in Ontario, maldistribution of the health workforce has been widely acknowledged, with Southern urban populations in Ontario, having greatest access to health care services [13,14]. For instance, the overall psychiatrist supply in Ontario in 2009 was 15.7 psychiatrists per 100 000 residents [15], with the Northern regions of the province being well below the provincial average: 8.3 per 100,000 residents in the North East, and 7.1 per 100,000 residents in the North West [16].

Currently, there is a gap in knowledge with respect to complex patients with OUD who have been diagnosed with concurrent mental health disorders, where access to addiction and mental health services are significantly lower. In this study, we characterized population level demographics and health system usage profiles of individuals with mental health issues and receiving OAT.

Methods

We conducted a cross sectional study of patients with a mental health diagnosis who have received mental health services delivered by a primary care provider, and who have sought treatment for OUD between January 1, 2008, and March 31, 2014, in the province of Ontario.

Cohort Definitions

Mental health service use in primary care was defined as access to services from a primary care physician with Ontario Health Insurance Plan (OHIP) with the fee codes outlined in (Table 1). From the mental health cohort, we extracted the OUD cohort defined as patients with the first OAT treatment between 2008 and 2014, with no previous history of OAT treatment in the year prior to the first OAT treatment (Figure 1). All patients were eligible for public drug coverage through the Ontario Drug Benefit (ODB) plan and were at least 10 years or older (to exclude data entry errors for newborns; patients <18 years accounted for <1% of cohort). Patients with less than 180 days of eligibility for public drug coverage before initiating MMT (as evidenced by no prescriptions for any drug in the 180 to 365 days before cohort entry) were excluded to avoid incomplete drug records. In Ontario, methadone used for addiction treatment is dispensed exclusively in liquid formulation (with very few exceptions). To exclude patients prescribed methadone for pain, we excluded all treatment doses of tablet methadone, which exceeded 20% of total OAT doses. We also excluded patients with missing information regarding place of residence, age, or sex.

Mental health diagnosis codes based on the International classification of diseases version 9 (ICD-9)
291 - Alcoholic psychosis, delirium tremens, Korsakov's psychosis
292 - Drug psychosis
295 - Schizophrenia
296 - Manic depressive psychosis, involution melancholia
297 - Paranoid states
298 - Other psychoses
300 - Anxiety neurosis, hysteria, neurasthenia, obsessive compulsive neurosis, reactive depression
301 - Personality disorders (e.g., paranoid personality, schizoid personality, obsessive compulsive personality)
302 - Sexual deviations
303 - Alcoholism
304 - Drug dependence, drug addiction
305 - Tobacco abuse
307 - Habit spasms, tics, stuttering, tension headaches, anorexia nervosa, sleep disorders, enuresis
309 - Adjustment reaction
311 - Depressive or other non-psychotic disorders, not elsewhere classified
313 - Behaviour disorders of childhood and adolescence
314 - Hyperkinetic syndrome of childhood

Table 1: ICD-9 Mental Health Classifications.

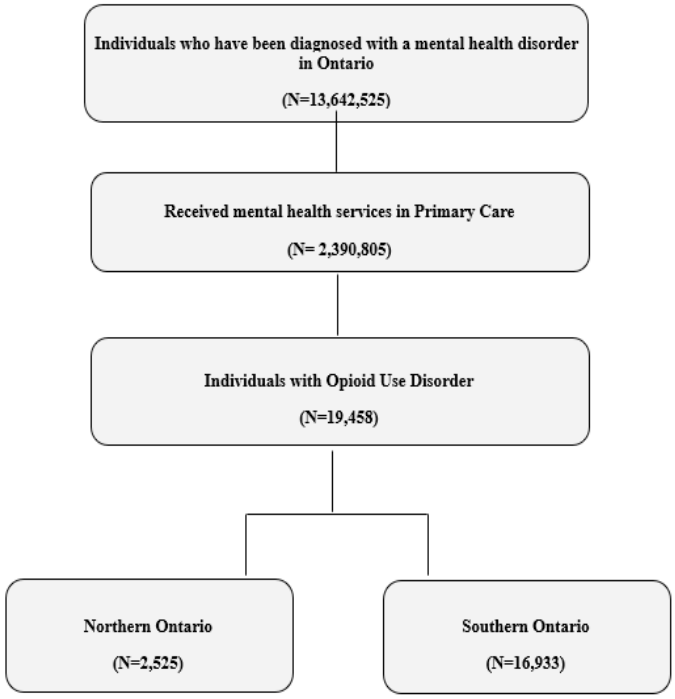

Figure 1: Cohort Definition. Opioid use disorder cohort numbers. Data was obtained from aggregated administrative databases, compiled by the Institute of Clinical and Evaluative Sciences.

Data Sources

The OHIP database was used to identify all patients receiving mental health services in primary care. The OHIP database contains detailed information on physician and specialist billable services, as well as diagnoses. Consistent with the Canada Health Act, all physician services in Ontario are funded through a universal single payer health insurance plan (OHIP). Physicians working in Ontario are reimbursed through billing OHIP in a manner that captures the service provided and the diagnosis for that care. All permanent residents of Ontario are entitled to health care services paid for by OHIP. The Ministry of Health and Long-Term Care pays for a wide range of services deemed medically necessary. Services for this study were identified by OHIP diagnostic fee codes listed in (Table 1). The ODB database was used to identify all patients initiating MMT/BMT and to determine their past medication use. The ODB database contains records of all prescriptions dispensed to Ontario residents eligible for public drug coverage. In Ontario, residents are eligible for public drug coverage if they are aged 65 years or older, reside in a long-term care facility, are disabled, are receiving social benefits for income support, or have high prescription drug costs relative to their net household income. Emergency department (ED) visits were identified using the Canadian Institute for Health Information National Ambulatory Care Reporting System, and hospital admissions were identified using the Canadian Institute for Health Information Discharge Abstract Database. We obtained patient location of residence and demographic information from the Ontario Registered Persons Database, which contains information for each resident who has ever received insured health services. Patient information was linked anonymously across databases using encrypted 10-digit health card numbers. The linking protocol has been described extensively elsewhere [17,18], and is used routinely for health system research in Ontario [19-21].

Geographical Definition

Patient postal codes were used to determine location of residence at the outset of MMT/BMT treatment. Ontario is divided into 14 health care planning areas called Local Health Integration Networks (LHINs) for administrative, funding, and planning purpose. For geographic comparisons, patient data files attached to the North East or North West LHINs were included in the Northern Ontario group for analysis compared to the remaining LHINs for Southern Ontario.

Definition of Income Status

Income status for this study was based on neighbourhood income based on the smallest standard geographic area (400-700 persons). Income was adjusted for household size and categorized into five approximately equal-sized groups. According to Statistics Canada, the average adjusted after-tax income per quintiles ranged from $15,000 to $16,000 in the lowest quintile, $26,500 to $28,000 in the second quintile, $36,000 to $38,500 in the third quintile, $47,700 to $50,600 in the fourth quintile, and $80,200 to $85,500 in the highest quintile. Each patient was assigned a neighbourhood income quintile based on the patient's postal code at the time of diagnosis using Statistics Canada's Postal Code Conversion File [22].

Definition of HIV and Hepatitis Status

Patient HIV status was derived from the Institute for Clinical and Evaluative Sciences (ICES) and only accounts for information on patients receiving treatment for HIV. All Ontarians with HIV are identified using a validated case ascertainment algorithm [23,24]. Data regarding hepatitis C was derived from OHIP and the Discharge Abstract Database in the five years prior to index date.

Definition of Health System Cost

Health system costs for this study were calculated based on costs associated with inpatient hospitalizations, inpatient mental health treatment, same-day surgeries, ED visits, physician billings (including shadow billings), capitation fees, other health care professional billings, diagnostic test and laboratory service billings, and cost of the medication and dispensing fees.

Data Analysis

Descriptive statistics were summarized for baseline characteristics of patients, and standardized differences were used to compare characteristics between Southern and Northern Ontario. We chose the Southern group as the reference group because it represents the majority of mental health and OAT delivery in Ontario. Standardized differences <0.1 are generally not considered to be meaningful [25]. All statistical analyses were carried out using SPSS (V.22). This study was approved by the Research Ethics Board of Laurentian University in Sudbury, Ontario and Sunnybrook Hospital in Toronto, Ontario.

Results

Between 2008 and 2014, we identified 2,390,805 patients receiving an OHIP billable mental health service from their primary care physician in Ontario. Of those, 19,458 had OUD and had engaged in MMT or BMT at least one time within the study window. of the OUD cohort, 2,252 (13.4%) resided in Northern regions (LHIN 13 or 14) and 16,933(87.06%) resided in Southern regions of Ontario (Table 2).

The Northern population was younger, with a mean age of35.88 (SD±11.50) compared to Southern Ontario with a mean age of 38.28(SD ± 12.58) $p<0.001$. There were also gender differences between groups, with a higher proportion of females in the OUD population residing in Northern Ontario (52.51% OUD females) compared to in Southern Ontario (44.56% OUD females)$p<0.001$. The Northern cohort also had a higher proportion of patients in the lowest income quintile compared to the Southern cohort (46.26% North vs. 41.03%). Rates of HIV were higher in Northern Ontario (2.34%) compared to Southern Ontario (1.77%)<p 0.05; however, rates of Hepatitis C were higher in Southern Ontario (16.03%) compared to Northern Ontario (14.53%) p 0.05(Table 2).

	Northern Ontario	Southern Ontario	P-VALUE
	N=2525	n=16933	
Age			
Mean ± SD	35.88 ± 11.50	38.28 ± 12.58	<0.05
Median (IQR)	34 (26-44)	37 (28-47)	
Gender, n (%)			
Female	1,326 (52.51%)	7,545 (44.56%)	<0.05
Male	1,199 (47.49%)	9,388 (55.44%)	
Low income, n (%)	1,168 (46.26%)	6,948 (41.03%)	
HIV, n (%)	59 (2.34%)	299 (1.77%)	0.046
Hepatitis, n (%)	367 (14.53%)	2,715 (16.03%)	0.054

Table 2: Characteristics of Geographic Patient Groups.

Demographic characteristics of patients diagnosed with a mental health disorder and OUD grouped by geographical location. Data was obtained from secondary analysis of administrative data files compiled by the Institute of Clinical and Evaluative Sciences.

Of the 19,458OUDpatients receiving mental health services in a primary care setting, the number of outpatient medical doctor (MD) visits in primary care setting were high in both regions; the mean number of mental health related visits in Northern Ontario was 38.31 (SD ± 36.03); and Southern Ontario 36.02 (SD ± 30.60) ($p<0.05$). Additionally, the average ED visits in Northern Ontario was 2.29(SD ± 3.87), and Southern Ontario, 2.10 (SD ± 4.36) (p 0.039); and hospitalizations in Northern Ontario 0.24 (SD ± 0.68), versus Southern Ontario, 0.21 (SD ± 0.74) (p 0.053) (Table 3).

	Northern Ontario	Southern Ontario	P-VALUE
	n=2525	n=16933	
Number of Outpatient MD Visits for Mental Health Issues			
Mean ± SD	38.31 ± 36.03	36.02 ± 30.60	<0.05
Median (IQR)	23 (8-66)	30 (9-55)	0.653
Number of Outpatient MD Visits for non-Mental Health Issues			
Mean ± SD	14.36 ± 24.56	10.58 ± 15.25	<0.05
Median (IQR)	4 (1-13)	5 (1-13)	<0.05
Number of Emergency Department Visits			
Mean ± SD	2.29 ± 3.87	2.10 ± 4.36	0.039
Median (IQR)	1 (0-3)	1 (0-2)	<0.05
Number of Hospitalizations			
Mean ± SD	0.24 ± 0.68	0.21 ± 0.74	0.05
Median (IQR)	0 (0-0)	0 (0-0)	<0.05

Table 3: Health System Usage during the Course of OAT Treatment Episode by Geographic Patient Groups.

Health service utilization during the course of opioid agonist treatment episodes for patients in Northern and Southern Ontario with a mental health disorder. Data was obtained from secondary analysis of administrative data files compiled by the Institute of Clinical and Evaluative Sciences.

Discussion

Our study findings demonstrated that individuals with OUD are frequent users of acute care and primary care services within the Ontario health care system. Additionally, our analysis determined that individuals residing in Northern Ontario have complex health profiles with regards to age, income level, HIV diagnosis and use of acute care services when compared to individuals residing in southern Ontario.

Our primary finding highlights that individual residing in Northern Ontario use acute care services significantly more frequently when compared to individuals residing in Southern Ontario. The difference between North and South are consistent with a recent report by the Ontario Drug Policy Research Network (ODPRN): Opioid Use and Related Adverse Events in Ontario [26]. Studies have consistently demonstrated that Northern regions of Ontario have limited access to health care resources, specifically specialty services [16,27]. High utilization of acute care services by our study population may be correlated with the well documented limited community mental health and psychiatry in rural and Northern Ontario [28].

With respect to use of primary care, our findings indicate that primary care physicians are a common point of access for individuals with concurrent mental health and OUD. The Canadian Mental Health Association Ontario (CMHA) suggests that there is an opportunity to better coordinate care for individuals with mental health and substance use disorders through family physicians [29-31]. Additionally, studies have shown that the best results for individuals with OUD and concurrent mental health co-morbidities are linked to coordinated onsite services to treat both their mental health and substance dependence [32-35]. Interestingly, the two primary pharmaceutical options currently available in Ontario for the treatment of OUD include methadone (MMT) and buprenorphine (BMT), both of which can be prescribed in a primary care setting. Currently, methadone is classified as a

controlled drug in accordance with section 56 of the Controlled Drugs and Substances Act, requiring physicians to receive authorization to prescribe the medication via an exemption from Health Canada, and undergo additional training and peer audits. This is an important difference between MMT and BMT provision in Ontario. BMT can be initiated by a general practitioner who does not need to hold a methadone exemption [36]; therefore, BMT has the potential to be more broadly accessible through primary care.

Our study has strengths and limitations that merit discussion. The use of a large database allowed us to robustly examine a large the issue of OUD and mental health co morbidities on a population level over a period of seven years. Our use of a population health approach enabled us to broadly analyze and compare a specified group of patients for geographic differences in Ontario. This type of critical analysis would be very difficult to achieve if we studied a more targeted group in a smaller scale study; however, using secondary data has its limitations. Firstly, social factors specific to communities-which can strongly influence service use patterns-are not included in the analysis. Also, factors such as service volume and quality of care are missed in this type of population health approach. We were not able to include patients who may be accessing services which are not OHIP billed.

Our findings suggest that patients seeking OAT in Ontario with concurrent mental health disorders are high users of health care services, and that primary care is a common point of contact for this patient group. At the time of publication there was a commitment from the Federal and Provincial governments in Canada to address the opioid crisis [37]. We suggest directing resources to ensure that primary care physicians are equipped to treat increasing rates of OUD may help to improve outcomes for individuals with complex health profiles and in-turn reduce the burden on the health care system. We recommend focusing policies and intervention to target family physicians as a way to improve the condition of treatment for individuals with concurrent mental health and OUD, especially where access to resources are limited. We recommend educational interventions on mechanisms of support and referral for patients with mental health and concurrent substance use disorders; creating incentives and/or removing barriers for physicians to refer to specialized services in their community; informing and incentivising physicians to refer patients to alternative social service options, which may fall outside of the health care system and lastly; providing education and incentives for family practitioners to provide various treatment options in their clinic, including OAT, harm reduction options and counselling to their patients.

Here we are making recommendations to address a small component of the issue by recommending targeted interventions in primary care. Our findings can ultimately assist in planning and policy decisions relating to opioid use disorder in Ontario and across North America.

Acknowledgement

We thank members of our research including Alexandra Franklyn and Melissa Spence who assisted with formatting and editing of this manuscript.

Author Contribution and Conflict of Interest

Dr. David Marsh is the corresponding author for this manuscript; he was involved in the conception, design, interpretation of results, as well as the review for this manuscript. Dr. Marsh maintains the following roles: Chief Medical Director at CATC (Canadian Addiction Treatment Center), opioid agonist therapy provider, and Associate Dean of Community Engagement and Deputy Dean of the Northern Ontario School of Medicine. Dr. Marsh has no ownership stake in the CATC as a stipendiary employee. We do not foresee any conflict of interest as data will be made freely available to the public and the CATC, and the Universities have no ability to prevent publication and dissemination of knowledge. The authors have no conflicts declared.

Kristen A. Morin, MPH, PhD c. was involved in the analysis and interpretation of the results, as well as the writing of the manuscript. Kristen has no conflicts to declare

Dr. Joseph K Eibl, PhD, was involved in the analysis and interpretation of the results, as well as the writing and reviewing of the manuscript. Dr. Eibl has no conflicts to declare.

Dr. Vicky PKH Nguyen, MD, PhD, was involved in the conception, design, collection of data and review for this manuscript. Dr. Nguyen has no conflicts to declare.

Dr. Katie E. Anderson, MD was involved in the conception, design, and review for this manuscript. Dr. Anderson has no conflicts to declare.

Financial Support

This research was partially supported by the NOAMA Clinical Innovation Grant AFP Innovation.

Fund - Project #A-17-05

Dr. Eibl received funding as a successful recipient of the 2014-2015 CANOC Scholarship Awards Programme; (this programme is supported through the Centres Grant [CIHR 711314]).

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