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Research

Use of mental health services by children and youth in Ontario military families compared with the general population: a retrospective cohort study

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Abstract

Background: In Canada, more than 64 000 children are growing up with 1 or both parents in the military. We compared mental health service use by children and youth in military families versus the general population, to understand potential mental health service gaps.

Methods: This was a matched retrospective cohort study of children and youth (aged < 20 yr) of members of the Canadian Armed Forces posted to Ontario between Apr. 1, 2008, and Mar. 31, 2013, with follow-up to Mar. 31, 2017, using provincial administrative health data at ICES. We created a comparison group of children and youth in the general population, matched 4:1 by age, sex and geography. We compared the use and frequency of mental health–related physician visits, emergency department visits and hospital admissions, and the time to first service use, using regression models.

Results: This study included 5478 children and youth in military families and a matched cohort of 21 912 children and youth in the general population. For visits and admissions for mental health reasons, children and youth in military families were more likely to see a family physician (adjusted relative risk [RR] 1.25, 95% confidence interval [CI] 1.17 to 1.34), less likely to see a pediatrician (adjusted RR 0.87, 95% CI 0.79 to 0.96), equally likely to see a psychiatrist, and as likely to visit an emergency department or be admitted to hospital as the matched cohort. Children and youth in military families had the same frequency of use of outpatient mental health services. The time to first visit for mental health reasons was shorter to see a family physician (adjusted days difference [DD] –57, 95% CI –80 to –33) and longer to see a psychiatrist (adjusted DD 103, 95% CI 43 to 163) for children and youth in military families.

Interpretation: Children and youth in military families use mental health services differently from those in the general population. Provincial policies aimed at increasing access to mental health specialists for children and youth in military families, alongside targeted federal services and programming through military organizations, are needed.

There are more than 57 000 Canadian Armed Forces families that include 64 000 children growing up with at least 1 parent who is an active service member and receives health care through provincial and territorial systems.[1,2] Children and youth with a military-connected parent experience benefits of parental military service, but also unique challenges to their mental health, such as parental deployment, prolonged absences or separations from the serving parent, concern about risk of death or injury to the parent, and military culture.[3–5] Data from the United States suggest that children and youth in military-connected families are 2.5 times more likely to develop psychological problems than their peers,[6] and are more likely to report higher levels of mental health disorders, sadness and worry.[4,5]

Relocation is a common and potentially disorienting experience for military families; Canadian military families relocate within and across provinces 3 or 4 times more frequently than civilian families.[1,7] Families often lose their established health services and must navigate to build new networks. Spouses of military members have reported difficulty in finding a new family doctor; lengthy, disrupted waits for specialist treatment; and difficulty in transferring medical records across jurisdictions after relocations.[3,8,9] Families of military members have consistently identified continuity of care and access to high-quality health care as key concerns.[3,4,10–12]

Disrupted health care may have a greater impact on use of mental health care services, considering these services are harder to access than non–mental health services, which makes them more prone to disruptions, in addition to intra- and interprovincial variability in resources.[13–15] Therefore, we compared publicly funded mental health service use by children and youth in military families to children and youth in

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the general population, matched by age, sex and geography. We hypothesized that children and youth from military families would use more mental health services and have a longer interval to a first specialist physician visit for mental health reasons than children and youth not from military families.

Methods

Study design and population

This was a retrospective, matched cohort study. The study was conducted in the province of Ontario, at ICES. Ontario is home to 8 of the 38 Canadian federal military bases, including Canadian Forces Bases in Kingston, Trenton and Petawawa, the Royal Military College of Canada and the Department of National Defence Headquarters. As of 2007, Ontario granted immediate access to provincial health services for the spouses and dependents of military regular forces members returning or new to the province after an out-of-province or out-of-country posting, and to the families of reservists who were activated out of province under the *Fairness for Military Families Act*.

The study population consisted of the child and youth dependents of serving military members in Ontario, and a matched sample of the Ontario general population. We identified the cohort of military-connected children and youth using administrative data from Ontario provincial health insurance applications. A specific administrative code flagged the applications of military dependents to waive their waiting period for health services. This flag was shared with the study team via a data-sharing agreement and linked to the ICES data holdings.

Children and youth who relocated with their families to Ontario between Jan. 1, 2008, and Dec. 31, 2013, were included. Children and youth were initially defined as dependents per provincial policy: a child younger than 22 years or a dependent older than 22 years with a mental or physical disability. Given the age and sex distribution of the data, we defined a child or youth as being younger than 20 years.[12]

We created a comparator group of children and youth by individually matching 4 members of the Ontario general population on year of birth, sex and geographic region of the province. We determined region of the province using postal codes linked to 1 of 14 Local Health Integration Networks, entities previously used by the provincial government to allocate and plan health services. We selected region as a matching variable to account for differences in the delivery and availability of mental health services across regions of the province and based on previous work identifying that more than 80% of military family members had relocated to 3 health regions near military bases and wings (physical locations that house supplies and personnel, and sustain training and operations).[16]

Data sources

Data sets were linked at the individual level using unique encoded identifiers and analyzed at ICES. The Registered Persons Database, which includes community-level census information, provided demographic data (age, sex, community-level income, rurality of residence and geography). The Ontario Health Insurance Plan (OHIP) database provided information on mental health–related physician services and diagnostic information. We measured physician specialty using the ICES Physician Database. The National Ambulatory Care Reporting System provided diagnostic and service information on mental health–related emergency department visits. The Canadian Institute for Health Information Discharge Abstract Database and the Ontario Mental Health Reporting System provided information on psychiatric hospital admissions.

We assigned military-connected children and youth a cohort index date based on their date of insurance registration. We gave this index date to their 4 matched comparators from the general population. We followed individuals from the index date for 3 years, or until out-of-province relocation or death, whichever occurred first. This period was chosen to reflect common timings between military postings.

Outcomes

Publicly funded mental health services provided by physicians in both outpatient and inpatient settings were the study outcomes. We identified mental health–specific encounters using *International Classification of Diseases, 9th Revision* (ICD-9)–based diagnosis codes in OHIP and ICD-10 diagnosis codes (Appendix 1, Supplementary Table S1, available at www.cmajopen.ca/content/10/1/E119/suppl/DC1). We considered all hospital admissions with a record in the Ontario Mental Health Reporting System to be related to mental health. We included all mental health visits to family physicians, pediatricians, psychiatrists and emergency departments, and hospital admissions for mental health reasons. We measured use of each mental health service as both a dichotomous variable (used or did not use) and a count variable (number of times used). We measured the time from index date to use of each mental health service in days.

Covariates

We measured age at index date and sex using the Registered Persons Database. We determined age categories (0–6, 7–9, 10–14 and 15–19 yr) by a combination of data distribution and comparability to existing general population reports. We determined median community income as a proxy for personal family income using Statistics Canada Census information linked to postal codes (lowest, 2, 3, 4, highest). We categorized region of residence as previously described. Rurality of residence (rural v. urban) followed the Statistics Canada definitions of community population size and metropolitan influence zones.[17]

Statistical analysis

We presented descriptive statistics overall and stratified them between children and youth in military families and the matched cohort. We made comparisons between children and youth in military families and those in the general population using χ^2 tests, Student t tests and Kruskal–Wallis tests. Age- and sex-specific summaries of mental health services use were visually presented and compared between children and youth in military families and those in the general population.

We compared the likelihood of using mental health services (yes or no) between children and youth in military

families and the general population comparator groups using multivariable modified Poisson regression with robust error variance (≥ 1 family physician visit, ≥ 1 pediatrician visit) and multivariable logistic regression (≥ 1 psychiatrist visit, emergency department visit for mental health reasons and ≥ 1 hospital admission for mental health reasons). We interpreted odds ratios (ORs) derived from the logistic regression according to the rare outcome theory equating OR with relative risks (RRs). Adjusted RR and 95% confidence intervals (CIs) were presented.

We compared the frequencies of use of mental health services using multivariable Poisson regression and completed them among subsets of the populations with at least 1 visit. We presented adjusted relative rates and 95% CIs. Using multivariable linear regression, we compared the time intervals to first mental health–related family physician visit and psychiatrist visit among those with at least 1 visit.

We adjusted all comparisons for age (continuous), sex, geographic region of residence, median community income (quintiles) and rurality of residence (rural or urban). We included matching variables in the multivariable analysis as recommended to account for the matched cohort design.[18] We performed all analyses using SAS V9.4 (SAS Institute Inc.).

Ethics approval

The study was approved by the Health Sciences and Affiliated Teaching Hospitals Research Ethics Board at Queen's University, Kingston, Ontario. ICES is an independent, nonprofit research institute whose legal status under Ontario's health information privacy law allows it to collect and analyze health care and demographic data, without consent, for health system evaluation and improvement.

Results

This study included 5478 children and youth in military families posted to Ontario from another province, or returning from out-of-country postings, with 21912 age-, sex- and geography-matched Ontarians. Among children and youth in military families, half were younger than 7 years and half were girls (Table 1). Compared with the general population group, a significantly smaller proportion of children and youth in military families lived in communities with the lowest median income ($p < 0.001$), and a larger proportion lived in urban residences ($p < 0.001$). Mean follow-up time was 1037 days for children and youth in military families and 1085 days for the comparator cohort; 88% of those in military families had 3 years of follow-up compared with 98% of the comparator cohort.

Table 1: Baseline characteristics of children and youth in Canadian Armed Forces families and children and youth in the general population, matched by age, sex and geography

Characteristic	No. (%) in CAF *n* = 5478	No. (%) in general population *n* = 21912	*p* value
Age category, yr*			–
0–6	2673 (48.8)	10 692 (48.8)	
7–9	867 (15.8)	3468 (15.8)	
10–14	1249 (22.8)	4996 (22.8)	
15–19	689 (12.6)	2756 (12.6)	
Sex, female*	2665 (48.6)	10 660 (48.6)	–
Geography*			–
South East	1379 (25.2)	5516 (25.2)	–
Champlain	2527 (46.1)	10 108 (46.1)	
North Simcoe Muskoka	1096 (20.0)	4384 (20.0)	
North East	177 (3.2)	708 (3.2)	
Other	299 (5.5)	1196 (5.5)	
Median community income quintile			< 0.001
Lowest	457 (8.3)	4031 (18.4)	
2	878 (16.0)	3904 (17.8)	
3	1277 (23.3)	4363 (19.9)	
4	1513 (27.6)	4873 (22.2)	
Highest	1341 (24.5)	4577 (20.9)	
Missing	12 (0.2)	164 (0.7)	
Rural residence	1147 (20.9)	5574 (25.4)	< 0.001

Note: CAF = Canadian Armed Forces, other = all other regions of Ontario.
*A matching variable, therefore not compared statistically.

Use of mental health services

For visits and admissions for mental health reasons, 17% of children and youth in military families saw a family physician at least once during the study period, 7.8% had at least 1 visit with a pediatrician, 2.5% had at least 1 visit with a psychiatrist, 2.1% presented at an emergency department and 0.6% were admitted to hospital. The patterns of mental health services use between children and youth in military families and the general population varied by both age and sex (Appendix 1, Supplementary Figures S1–S8). Table 2 outlines the likelihood of using outpatient and inpatient mental health services for children and youth in military families compared with the general population. After we adjusted for age, sex, geography and community income, children and youth in military families were 25% more likely to visit a family physician for mental health reasons (95% CI 1.17 to 1.34), 13% less likely to see a pediatrician for mental health reasons (95% CI 0.79 to 0.96), 19% more likely to visit the emergency department for a mental health reason (95% CI 0.97 to 1.45) — although this finding was not statistically significant — and as likely to see a psychiatrist or be admitted to hospital for mental health reasons.

Frequency of use of mental health services

Among children and youth in military families who had at least 1 mental health–related visit with a family physician, pediatrician or psychiatrist, the average was 2.5, 3.7 and 5.5 visits per person, respectively; the average number of per-person emergency department visits for mental health reasons was 1.6. Table 3 reports the comparisons of frequency of outpatient encounters related to mental health between children and youth in military families versus the general population. After we adjusted for age, sex, geography and income, the rates of mental health–related family physician visits, psychiatrist visits and emergency department visits were not different between the 2 groups. The adjusted rate of mental health–related pediatrician visits was 11% higher in children and youth in military families than in the general population (95% CI 1.00 to 1.23).

Interval to first outpatient physician visit related to mental health

Among those with at least 1 visit, the median time to first outpatient visit related to mental health in children and youth in military families was 432 (interquartile range [IQR] 135–674) days for a mental health–related family physician visit, 405 (IQR 201–684) days for a mental health–related pediatrician visit and 583 (IQR 354–854) days for a psychiatrist visit (Appendix 1, Supplementary Table S2). Table 4 contains comparisons of the mean interval to first mental health–related family physician, pediatrician and psychiatrist visit between children and youth in military families versus the general population. After we adjusted for age, sex, geography and community income, the mean number of days to the first mental health–related family physician visit was 57 days shorter for children and youth in military families (95% CI –80 to –33 d), while the interval to first mental health–related pediatrician visit was 30 days longer (95% CI –1 to 62 d) — although this finding was not

Table 2: Likelihood of use of mental health services in children and youth in Canadian Armed Forces families (*n* = 5478) compared with general population group (*n* = 21 912), matched by age, sex and geography

Type of mental health service	No. (%) of events	RR* (95% CI)	RR† (95% CI)
Family physician visit‡			
CAF	935 (17.1)	1.25 (1.17 to 1.33)	1.25 (1.17 to 1.34)
General population	2993 (13.7)	Ref.	Ref.
Pediatrician visit‡			
CAF	426 (7.8)	0.85 (0.77 to 0.94)	0.87 (0.79 to 0.96)
General population	1993 (9.1)	Ref.	Ref.
Psychiatrist visit§			
CAF	137 (2.5)	0.92 (0.77 to 1.10)	0.95 (0.79 to 1.14)
General population	594 (2.7)	Ref.	Ref.
ED visit§			
CAF	116 (2.1)	1.13 (0.93 to 1.37)	1.19 (0.97 to 1.45)
General population	411 (1.9)	Ref.	Ref.
Hospital admission§			
CAF	32 (0.6)	0.96 (0.65 to 1.39)	0.99 (0.67 to 1.46)
General population	134 (0.6)	Ref.	Ref.

Note: CAF = Canadian Armed Forces, CI = confidence interval, ED = emergency department, RR = relative risk, ref. = reference category.
*Adjusted for age (continuous), sex and region.
†Adjusted for age (continuous), sex, region, median community income and rurality.
‡Derived from modified Poisson regression with robust error variance.
§Derived from logistic regression and interpreted according to the rare outcome theory equating odds ratios with relative risks.

Table 3: Frequency of use of outpatient mental health services between children and youth in Canadian Armed Forces families compared with general population group, matched by age, sex and geography*

Type of mental health visit	Mean no. of visits ± SD	RR†‡ (95% CI)	RR‡§ (95% CI)
Family physician			
CAF	2.51 ± 2.82	1.04 (0.95 to 1.14)	1.06 (0.96 to 1.17)
General population	2.51 ± 4.79	Ref.	Ref.
Pediatrician			
CAF	3.73 ± 3.57	1.09 (0.98 to 1.20)	1.11 (1.00 to 1.23)
General population	3.44 ± 3.77	Ref.	Ref.
Psychiatrist			
CAF	5.46 ± 13.50	0.98 (0.64 to 1.51)	0.99 (0.65 to 1.52)
General population	5.67 ± 9.66	Ref.	Ref.
Emergency department			
CAF	1.55 ± 1.71	1.00 (0.80 to 1.25)	1.01 (0.80 to 1.26)
General population	1.59 ± 1.66	Ref.	Ref.

Note: CAF = Canadian Armed Forces, ref. = reference, RR = relative risk, SD = standard deviation.
*Among those who had at least 1 visit.
†Adjusted for age (continuous), sex and region.
‡Derived from Poisson regression with an offset of follow-up time.
§Adjusted for age (continuous), sex, region, median community income and rurality.

Table 4: Comparison of mean time to first mental health–related visit between children and youth in Canadian Armed Forces families and a general population comparator group, matched by age, sex and geography*

Type of mental health visit	Mean no. of days ± SD	Adjusted DD†‡ (95% CI)	Adjusted DD‡§ (95% CI)
Family physician			
CAF	450 ± 321	–55 (–79 to –32)	–57 (–80 to –33)
General population	505 ± 323	Ref.	Ref.
Pediatrician			
CAF	449 ± 297	33 (2 to 64)	30 (–1 to 62)
General population	420 ± 329	Ref.	Ref.
Psychiatrist			
CAF	580 ± 309	108 (49 to 167)	103 (43 to 163)
General population	479 ± 340	Ref.	Ref.

Note: CAF = Canadian Armed Forces, DD = days difference, ref. = reference, SD = standard deviation.
*Among those who had at least 1 visit.
†Adjusted for age (continuous), sex and region.
‡Derived from linear regression.
§Adjusted for age (continuous), sex, region, median community income and rurality.

statistically significant — and the interval to first psychiatrist visit was 103 days longer (95% CI 43 to 163 d).

Interpretation

In this population-based study comparing the use of publicly funded mental health services by children and youth in Canadian military families versus use by the general population, we observed that children and youth in military families were more likely to see a family physician for mental health reasons, less likely to see a pediatrician, equally likely to see a psychiatrist, and as likely to visit an emergency department or be admitted to hospital for mental health reasons as children and youth in the general population. Once connected with a provider, children and youth in military families used the same intensity of outpatient mental health services. The average time to first mental health–related visit was shorter to see a family physician and longer to see a psychiatrist for children and youth in military families, compared with the general population.

The findings of this Canadian study provide information to help develop provincial and defence health policy to support the delivery of services to military families. Interprovincial agreements, such as lateral placements in wait times or incentives for pediatricians serving military families, could reduce the impact of the military lifestyle on use of mental health services by children and youth in military families. Concurrently, capacity-building with provincial health care providers is needed. Recent work responding to a gap in provider awareness and knowledge[19,20] through the creation and validation of a military family cultural competency framework[21,22] provides guidance to support effective health care transactions between military families and health care providers. Federal initiatives focusing on families in policy and programming could also address the mental health and well-being of military families; examples include the Canadian Military Family Plan,[23] the provision of virtual physician services[24] and targeted regional programming to children and youth in military families through organizations such as Military Family Resource Centres.

Our study adds to existing international literature. A 2020 scoping review found no studies comparing use of mental health services between children and youth in military families versus those in the general population.[25] Our study explored the total effect of military family membership on use of mental health services, including the impact of relocation. Our observations support research from the United States that suggests the use of mental health services increases for military-connected youth in the year after a relocation and other key military lifestyle milestones such as parental deployments.[5,26–31] Our study also supports evidence from the US that youth in military families may experience barriers to use of mental health services.[5,26–31] Canadian research is needed on how individual factors of the military lifestyle — such as relocation, parental risk or deployment — contribute to the use of mental health services by military families. Our findings regarding mental health also support findings on general use of health services, where children and youth with a parent in the military were more likely than civilian families to use the emergency department as their first contact with the health care system, and were less likely to see a pediatrician than their civilian peers.[12]

Evidence from jurisdictions outside of Canada suggests children and youth in military families have a greater burden of mental illness than the general population, including being more likely to report depressive symptoms, suicidal ideation and substance use.[5,27–31] In our study in Ontario, we found greater use of primary care for mental health reasons and similar use of specialist and acute care services, with a longer interval to accessing specialized care. If the increased need for mental health services observed in other jurisdictions is generalizable to the Canadian setting, then the patterns we have observed could suggest unmet need or indicate that military-connected children and youth are experiencing discontinuous mental health care owing to relocation.[32] However, if children and youth in Canadian military families have less need for mental health services than those in other jurisdictions, this interpretation would not hold. In this case, children and youth in military families would have good access to primary care where their needs are being met, or they are appropriately being triaged to psychiatry. In either interpretation, the lower use of pediatricians and longer time to first psychiatrist visit provide evidence that relocation disrupts access to specialists — resources already known to be in shortest supply.

Canadian research into the mental health and well-being of children and youth is missing from the international narrative on military families. This work should build on strengths of military families, defence communities and our health care systems to improve and integrate access and use of mental health services for children and youth in military families. Canadian studies defining the underlying burden of mental illness and needs of military families and their health care experiences are needed and could include a study outlining differences in the most responsible condition for visits related to mental health. Canadian epidemiologic studies quantifying burden and need among members of military families would complement work done to understand the mental health of Canadian military members, active and ex-serving.

Limitations

The results of this study may not be generalizable to children and youth in military families who do not experience relocation or who have not relocated recently. We were unable to account for clustering within military families; siblings from military families were included, but we could not match them to siblings from the general population. We were unable to measure the need for mental health services, given the limitations of administrative data. Studies quantifying the underlying burden of mental disorders in children and youth in military families, relative to the general population, are needed to provide context to our observations.

Children and youth in military families may have better access to mental health care as the result of their higher family income.[33] We adjusted for differences in median community income in our analyses. Residual confounding may still remain in the absence of personal income. In addition, military children and youth may have better access to mental health care through emergency social services provided federally at Military Family Resource Centres, virtual mental health service coverage through organizations with Defence contracts such as Strongest Families, or covered through the private health insurance held by all military members. These nonpublicly funded services cannot be measured from the available data sets and would bias the results away from the null, potentially underestimating the use of mental health services by military children and youth. However, the availability of services is not uniform across geographic regions[34] and military families cite a lack of confidentiality and stigma related to using military-specific mental health resources.[27] ICES mental health data do not include records of interactions with many health professionals, including school counsellors, social workers, psychologists or nurse practitioners.

Conclusion

Children and youth in military families used mental health services differently from those in the general population, which may be the result of disruptions as part of the military lifestyle. Relocations, for example, may disrupt access to usual supports,

including mental health care. If and when children and youth in a military family need help, it is critical that there be pathways in place to ensure that the mental health and well-being of children and youth are not affected negatively as a consequence of their parent's military service. Provincial policies aimed at increasing access to mental health specialists for children and youth in military families alongside targeted federal services and programming through military organizations are needed.

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Data sharing: The data set from this study is held securely in coded form at ICES. While data sharing agreements prohibit ICES from making the data set publicly available, access may be granted to those who meet prespecified criteria for confidential access, available at https://www.ices.on.ca/DAS. The full data set creation plan and underlying analytic code are available from the authors upon request, understanding that the programs may rely upon coding templates or macros that are unique to ICES.

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