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Paper

Investigating characteristics of patients with mental disorders to predict out-patient physician follow-up within 30 days of emergency department discharge

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Background

Prompt follow-up at emergency department discharge is a key indicator of healthcare quality and patient recovery. To improve services, better knowledge of predictors for out-patient physician follow-up within 30 days after discharge is needed.

Aims

We investigated clinical and sociodemographic characteristics and service use to predict patients with mental disorders with or without physician follow-up after emergency department use.

Method

This study used data extracted from clinical administrative databases for 9514 patients who attended an emergency department in Quebec (Canada) in 2014–2015 (index visit) for mental health reasons. Patient clinical and sociodemographic characteristics from 2012–2013 to 2014–2015, and service use 12 months before the index visit, were investigated as predictors for patients with or without prompt follow-up, using hierarchical logistic regression.

Results

Two-thirds of patients did not receive prompt physician follow-up. Patients with level 1–2 illness acuity at emergency department triage (needing immediate or urgent care); those with adjustment or bipolar disorders, but without alcohol-related disorders (clinical characteristics); and patients with higher continuity of physician care, more psychosocial interventions in community healthcare centres and prior hospital admission (service use characteristics) were more likely to receive prompt out-patient follow-up.

Conclusions

Access to medical care was poor, considering the high needs of this population. The role of the emergency department as a gateway for accessing out-patient care may be strengthened by strategies like screening, brief intervention including motivational treatments, brief case management offered by emergency department staff, timely referral to services and better post-discharge planning. Collaborative care for patients attending emergency departments should also be improved.

Keywords

Emergency department; out-patient services; quality of care; continuity of care; psychiatric epidemiology.

Emergency department overcrowding is an international issue, partly explained by the high prevalence and frequency of emergency department use among patients with mental disorders,[1] including substance-related disorders.[2] As a key component of mental health systems, emergency departments often serve as a gateway for access to out-patient services.[3] Following discharge from the emergency department, patients with a mental disorder generally need prompt out-patient follow-up in response to acute health and psychosocial needs, to prevent return to the emergency department and subsequent hospital admission, or for appropriate recovery.[3] Studies have reported that treatment adherence[4] and prompt out-patient follow-up by a physician within 30 days after an acute mental health episode requiring emergency department use are strong indicators of adequate out-patient care.[5] According to the National Committee for Quality Assurance,[6] out-patient physician follow-up within 30 days after emergency department use (henceforth termed 'prompt emergency department follow-up') is one of the most accurate measures for continuity of care among patients with a mental disorder. Compared with other indicators, prompt emergency department follow-up allows sufficient time for accessing out-patient services, which is an important consideration because of wait lists. Prompt emergency department follow-up is associated with fewer emergency department readmissions and better health outcomes.[3] However, studies have found that only 31–71%[7,8] of patients with a mental disorder received prompt emergency department follow-up.

Overall, few studies have measured prompt emergency department follow-up for patients with a mental disorder, and even fewer were longitudinal studies using diverse clinical administrative databases.[8] Most studies have evaluated specific populations, such as youth with mental disorders[9] and patients with depression,[5] mood disorders[10] or self-harm behaviours.[7] More prompt emergency department follow-up was identified among patients with serious mental disorders such as bipolar disorders[3] or those who engaged in self-harm;[7] unlike patients with depression, mood disorders[8] or substance-related disorders,[3] for whom follow-up was delayed. Women,[8,9] patients residing in areas other than medium-to-high poverty neighbourhoods[11] or urban areas,[12] patients integrated in out-patient programmes with low wait times[4] and those who previously used out-patient mental health services[13] also had greater access to prompt emergency department follow-up. However, prior service use as a predictor of prompt emergency department follow-up has been understudied, especially in terms of the type and intensity of services provided or continuity of care. Access to services and the quality of care received before emergency department use among patients with acute needs would be

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particularly important to understand and predict the nature of follow-up after emergency department discharge. Better knowledge of predictors among patients with or without emergency department follow-up may further suggest targeted interventions for reducing emergency department use, improving out-patient care and responding to the needs of vulnerable patients with a mental disorder who use the emergency department. This study thus aimed to identify predictors among patients with or without prompt (≤30 day) physician follow-up after emergency department discharge, in terms of their clinical and sociodemographic characteristics, and service use. Based on the literature, we hypothesised that the severity of clinical conditions would emerge as the main predictors of prompt emergency department follow-up, followed by high continuity of care before emergency department use.

Method

Background

A major Quebec mental health reform was implemented between 2005 and 2015, with the primary aim of consolidating primary care services and developing within each network one-stop points of entry to services offered in community healthcare centres and specialised care.[14] In Quebec, general practitioners (GPs) are the main primary care mental health providers.[15] Some 65% work in family medicine groups, where patient registration is required and care is delivered in collaboration with nurses or social workers. Family medicine groups also offer extended office hours. Mental health teams providing individual or group psychosocial interventions were also created within the reform of community healthcare centres. Specialised mental healthcare is delivered mainly in hospital settings (e.g. emergency department and in-patient services). However, to receive specialised out-patient care at hospitals, patients had to be referred from a one-stop point of entry in the primary care network. Mental healthcare is also complemented by psychologists working in private clinics or by community-based organisations offering crisis, respite and peer support services. Services for substance-related disorders are available from specialised addiction treatment centres outside the mental health system.[16] The Quebec healthcare system is divided into four types of healthcare regions: university regions that include university and psychiatric hospitals offering ultra-specialised care, teaching and research facilities; remote regions with little specialised care; and peripheral and intermediary regions that offer some mental health coverage, as they are located relatively close to the university regions.[16]

Study population and design

In total, 9514 patients diagnosed with a mental disorder or substance-related disorder who used one of six Quebec emergency department in 2014–2015 (index (first) emergency department visit; fiscal year: April 1–March 31) were identified through clinical administrative databases for this 3-year study. The cohort excluded patients who were hospitalised at the time of their index emergency department visit ($n = 613$, 6%) or during the ≤30-day follow-up period. Participants had to be aged ≥12 years and eligible for the Quebec Health Insurance Plan (Régie de l'assurance maladie du Québec (RAMQ)). They had to receive a diagnosis of a mental disorder or substance-related disorder at least once in the 2 years (2012–2013 to 2013–2014) before their index emergency department visit or at the index visit in 2014–2015. Figure 1 presents the conceptual framework for the study, which links each variable to the databases used. As stated earlier, predictors of 30-day out-patient physician follow-up after emergency department use were measured in terms of patient clinical characteristics 2 years before index emergency department use; patient sociodemographic characteristics at the index emergency department visit in 2014–2015 and service use in the 12 months before the index emergency department visit. However, some clinical and service use variables were measured at the index emergency department visit itself (e.g. reason for emergency department use, illness acuity and referral after emergency department discharge).

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008 (approval number: IUSMD-20-26). All procedures involving human patients were approved by the ethics committee of a mental health university institute. As this study was based on clinical administrative data, individual patient consent was not required, but the study was authorised by the Quebec Access to Information Commission.

Data sources

Clinical administrative data, including demographic and socioeconomic information, data on hospital admission and emergency department use, and public psychosocial interventions delivered from community healthcare centres, were collected from the RAMQ databases. RAMQ integrates billing systems for most physician services in Quebec. Only 6% of billing occurred outside the public system in 2016–2017.[17] Data were merged annually for each patient, and all databases were integrated with a unique RAMQ identifier. Diagnostic codes are shown in Table 1, and were based on the ICD-9 and the Canadian version of the ICD-10 (ICD-10-CA). Patient diagnoses were identified by selecting those with a mental disorder diagnosed more than once, those diagnosed during a hospital admission or those with a diagnosis by the patient's physician (particularly a psychiatrist). Chronic physical illnesses are registered in the RAMQ database twice yearly, or once in hospital databases.[18]

Variables

The dependent variable was dichotomous, referring to patients with or without 30-day out-patient physician follow-up after index emergency department use (2014–2015). Prompt emergency department follow-up could be provided by any physician (either a GP or psychiatrist) working at the hospital, or from other out-patient services in the community. Regarding independent variables, patient clinical characteristics included types of mental disorder or substance-related disorder; having chronic physical illnesses or co-occurring disorders (mental disorder, substance-related disorder, chronic physical illness); reasons for index emergency department use, including suicidal ideation, suicide attempt, violence or social issues; and illness acuity (triage priority levels related to index emergency department use). Mental disorders comprised common mental disorders (anxiety, depressive or adjustment disorders), serious mental disorders (schizophrenia spectrum and other psychotic disorders, or bipolar disorders) and personality disorders. Substance-related disorders referred to alcohol- and drug-related disorders (use or induced disorders, intoxication, withdrawal). Based on an adapted version of the Elixhauser Comorbidity Index,[19] severity levels of chronic physical illnesses (scored 0–3) were recorded. Illness acuity, or triage priority level at index emergency department use, was ranked as levels 1–2 (immediate or very urgent care), 3 (urgent care) or 4–5 (less urgent or non-urgent care), based the Canadian Triage Acuity Scale.[19] Emergency department triage nurses well trained in identifying reasons for emergency department use and in determining triage priority recorded this information, providing reliable data.[20]

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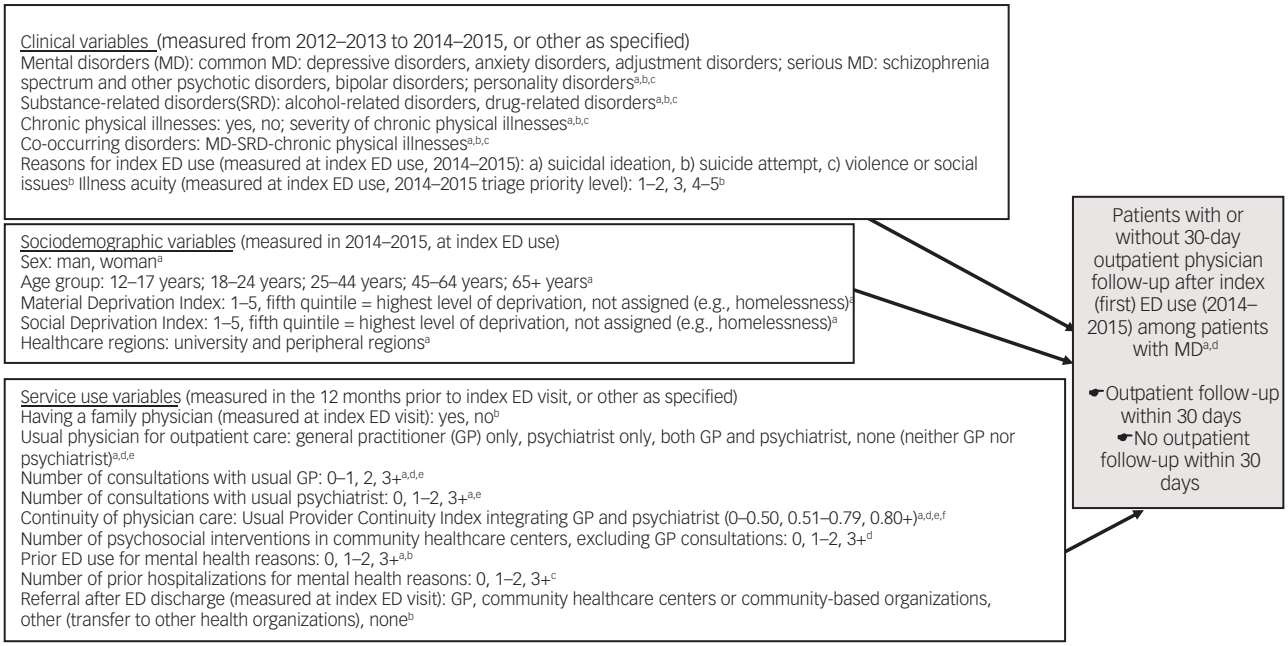

[a]Régie de l'assurance maladie du Québec (RAMQ; Quebec Health Insurance Plan or database);
[b]Banque de données communes des urgences (BDCU; emergency department use database);[c]Maintenance et exploitation des données pour l'étude de la clientèle hospitalière (MED-ÉCHO; hospitalisation database);[d]Système d'information permettant la gestion de l'information clinique et administrative dans le domaine de la santé et des services sociaux (I-CLSC; community healthcare center database);
[e]The usual GP (proxy for 'patient family physician') needs to include a minimum of two consultations with the same GP or with at least two different GPs working in the same family medicine group. For usual psychiatrist, if a patient had only one psychiatrist consultation, they must have had at least two consultations with their GP (all in out-patient care). Regarding usual physician, for'both GP and psychiatrist', the patient must have had at least one psychiatrist consultation and two consultations with their GP in out-patient care.[f]Usual Provider Continuity Index describes the proportion of visits to the usual GP and psychiatrist of all visits made to GPs and psychiatrists in out-patient care, including walk-in clinics. It is ranked low (≤0.50), moderate (0.51-0.79) or high (≥0.80). GP, general practitioner.

Fig. 1 Conceptual framework of predictors for patients with mental disorders with or without out-patient physician follow-up within 30 days after emergency department discharge in 2014–2015.

Sociodemographic characteristics included age group, gender, Material and Social Deprivation Indices, and healthcare region. Based on the smallest dissemination areas established for the 2011 Canadian census, the Material Deprivation Index was derived from the ratio of population employment, average income and number of individuals without a high school diploma; the Social Deprivation Index measured proportions of individuals living alone, single-parent families and those without a spouse.[21] Both indices were classified in five quintiles, not including unassigned areas (e.g. homelessness), with the fifth quintile representing highest level of deprivation. Healthcare regions for the study included university and peripheral regions.

Service use variables for the 12 months before index emergency department use included: having a family physician; usual physician (GP only, psychiatrist only, both GP and psychiatrist, or none); number of consultations with usual GP or usual psychiatrist; continuity of physician care; number of psychosocial interventions in community healthcare centres, excluding GP consultations; and prior emergency department use or hospital admissions for mental health reasons. Referrals at discharge from index emergency department visit were also assessed, whether to a GP, community healthcare centres or community-based services, other health organisations or none. Patients with a usual GP needed to have at least two consultations with the same GP or with at least two GPs working in the same family medicine group. Usual GP was considered a proxy for a family physician.[22] To qualify as having a usual psychiatrist, patients needed to have at least two consultations with this provider, or only one consultation for those who had a usual GP, which was considered a proxy for collaborative care.[23] Continuity of physician care was measured with the Usual Provider Continuity Index, which describes the proportion of visits to the usual GP and psychiatrist of all visits made to GPs and psychiatrists in out-patient care, including walk-in clinics.[24] A score of <0.50 was considered low continuity of physician care, 0.51–0.79 was considered moderate and ≥0.80 was considered high.[25]

Statistical analyses

Descriptive and bivariate analyses were performed on the sample and included two-way frequency tables. Since the clustering effect (106 hospital units) was small (intraclass correlation coefficient: 0.018), a multilevel model was not needed. Collinearity statistics were tested with variance inflation factors (VIFs) and tolerance tests, with 5 as the maximum level of VIF. Independent variables without collinearity were entered into a logistic hierarchical regression model, with alpha set at <0.10. The reference category for the dependent variable was patients without prompt emergency department follow-up (i.e., no out-patient physician follow-up, whether GP or psychiatrist, within 30 days of index emergency department use). Independent variables were selected based on previous studies and entered by blocks as follows: patient clinical characteristics first, then patient sociodemographic characteristics, followed by service use variables. All possible combinations of blocks of variables

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Table 1 Codes for mental disorders including substance-related disorders and chronic physical illnesses, according to the ICD-9 and ICD-10-CA

Diagnoses	ICD-9	ICD-10-CA
Mental disorders[a]		
Common		
Depressive disorders	300.4*, 311.9*	F32.0- F32.3, F32.8, F32.9, F33.0- F33.3, F33.8, F33.9, F34.8, F34.9, F38.0, F38.1, F38.8, F39, F41.2*
Anxiety disorders	300 (except 300.4)	F40-F48, F68
Adjustment disorders	309.0–309.4, 309.8, 309.9	F43.0-F43.2, F43.8, F43.9
Serious		
Schizophrenia spectrum and other psychotic disorders	295*, 297*, 298*	F20*, F21, F22*, F23, F24*, F25*, F28*, F29*, F44.89
Bipolar disorders	296.0–296.6, 296.8, 296.9	F30.0- F30.2, F30.8, F30.9, F31.0-F31.9
Personality disorders	301	F60, F07.0, F34.0, F34.1, F48.8, F61
Substance-related disorders[a]		
Alcohol-related disorders	303.0*, 303.9*, 305.0* (alcohol misuse or dependence); 291.0*, 291.8* (alcohol withdrawal); 291.1–291.5*, 291.9*, 357.5, 425.5, 535.3, 571.0–571.3 (other alcohol-induced disorders); 980.0, 980.1, 980,8, 980.9 (alcohol intoxication)	F10.1*, F10.2* (alcohol misuse or dependence); F10.3, F10.4* (alcohol withdrawal); F10.5-F10.9*, K70.0-K70.4*, K70.9*, G62.1*, I42.6, K29.2*, K85.2, K86.0, E24.4, G31.2, G72.1, O35.4 (other alcohol-induced disorders); F10.0*, T51.0, T51.1*, T51.8, T51.9 (alcohol intoxication)
Drug-related disorders	304.0–304.9, 305.2–305.7, 305.9 (drug misuse or dependence); 292.0 (drug withdrawal); 292.1, 292.2, 292.8, 292.9 (other drug-induced disorders); 965.0, 965.8, 967.0, 967.6, 967.8, 967.9, 969.4–969.9, 970.8, 982.0, 982.8 (drug intoxication)	F11.1, F12.1, F13.1, F14.1, F15.1, F16.1, F18.1, F19.1, F11.2, F12.2, F13.2, F14.2, F15.2, F16.2, F18.2, F19.2, F55 (drug misuse or dependence); F11.3-F11.4, F12.3, F12.4, F13.3-F13.4, F14.3-F14.4, F15.3-F15.4, F16.3-F16.4, F18.3-F18.4, F19.4-F19.4 (drug withdrawal); F11.5-F11.9, F12.5-F12.9; F13.5-F13.9, F14.5-F14.9, F15.5-F15.9, F16.5-F16.9, F18.5-F18.9, F19.5-F19.9 (other drug-induced disorders); F11.0, F12.0, F13.0, F14.0, F15.0, F16.0, F18.0, F19.0, T40.0-T40.9, T42.3, T42.4, T42.6, T42.7, T43.5, T43.6, T43.8, T43.9, T50.9, T52.8, T52.9 (drug intoxication)
Chronic physical illnesses[a,b]		
Renal failure	403.0, 403.1, 403.9, 404.0, 404.1, 404.9, 585, 586, 588.0, V42.0, V45.1, V56	I12.0, I13.1, N18, N19, N25.0, Z49, Z94.0, Z99.2
Cerebrovascular illnesses	362.3, 430–438	G45, G46, I60-I69
Neurological illnesses	331.9, 332.0, 332.1, 333.4, 333.5, 333.9, 334–335, 336.2, 340, 341, 345, 348.1, 348.3, 780.3, 784.3	G10–G12, G13, G20, G21–G22, G25.4, G25.5, G31.8, G31.9, G32, G35, G36, G37, G40, G41, G93.1, G93.4, R47.0, R56
Endocrine illnesses (hypothyroidism, fluid electrolyte disorders and obesity)	240.9, 243, 244, 246.1, 246.8, 278.0, 253.6, 276	E66, E00, E01, E02, E03, E89.0, E22.2, E86, E87
Any tumour with or without metastasis and metastatic cancer	140–172, 174, 175, 179–195, 196–199, 200, 201, 202, 203.0, 238.6, 273.3	C00–C26, C30–C34, C37–C41, C43, C45-C58, C60–C76, C77-C79, C80, C81-C85, C88, C90.0, C90.2, C96
Chronic pulmonary illnesses	490–505, 506.4, 508.1, 508.8	I27.8, I27.9, J40-J47, J60-J64, J65, J66, J67, J68.4, J70.1, J70.3
Diabetes, complicated and uncomplicated	250.0–250.2, 250.3, 250.4–250.9	E10.2-E10.8, E11.2-E11.8, E13.2-E13.8, E14.2-E14.8, E10.0, E10.1, E10.9, E11.0, E11.1, E11.9, E13.0, E13.1, E13.9, E14.0, E14.1, E14.9
Cardiovascular illnesses (congestive heart failure, cardiac arrhythmias, peripheral vascular illnesses, valvular illnesses, myocardial infarction, hypertension) and pulmonary circulation illnesses	394–397, 424, 746.3–746.6, V42.2, V43.3, 401, 402–405, 437.2, 398.9, 402.0, 402.1, 402.9, 410, 412, 415.0, 415.1, 416, 417.0, 417.8, 417.9, 428, 426.0, 426.1, 426.5–426.7, 426.9, 427.0–427.4, 427.6–427.9, 437.2, 785.0, 996.0, V45.0, V53.3, 093, 440, 441, 443.1–443.9, 447.1, 557.1, 557.9, V43.4	I05–I08, I09.1, I09.8, I10, I11–I13, I15, I67.4, I09.9, I11.0, I13.0, I13.2, I21, I22, I25.2, I25.5, I26, I27, I28.0, I28.8, I28.9, I34–I39, I42.0, 142.5, I42.7-I42.9, I43, I50, P29.0, I44.1–I44.3, I45.6, I45.9, I47–I49, Q23.0–Q23.3, Q23.8, Q23.9 R00.0, R00.1, R00.8, T82.1, Z45.0, Z95.0, Z95.2, Z95.3, Z95.4, A52.0, I70, I71, I72, I73.0, I73.1, I73.8, I73.9, I77.1, I79.0, K55.1, K55.8, K55.9, Z95.8, Z95.9
Other chronic physical illness categories (blood loss anaemia, ulcer illnesses, liver illnesses, AIDS/HIV, rheumatoid arthritis/collagen vascular illnesses, coagulopathy, weight loss, paralysis, deficiency anaemia)	280.0, 280.9, 286, 287.1, 287.3–287.5, 531.7, 531.9, 532.7, 532.9, 533.7, 533.9, 534.7, 534.9, 070.2,070.3, 070.4, 070.5, 456.0–456.2, 572.3, 572.8, 573.3, 573.4, 573.9, V42.7, 042–044, 136.1, 446, 701.0, 710.0–710.4, 710.5, 710.8, 710.9, 711.2, 714, 719.3, 720, 725, 728.5, 728.8, 260–263, 783.2, 799.4, 334.1, 342, 343, 344.0–344.6, 344.8, 344.9, 280.1, 280.9, 281, 285.9	B20-B24, D50.0, D65–D68, D69.1, D69.3-D69.6, K25.7, K25.9, K26.7, K26.9, K27.7, K27.9, K28.7, K28.9, B18, I85, I86.4, I98.2, K71.1, K71.3–K71.5, K71.6, K71.7, K72.1, K72.9, K73, K74, K75.4, K76.0, K76.1, K76.3, K76.4, K76.5, K76.6, K76.8, K76.9, Z94.4, L90.0, L94.0, L94.1,L94.3, M05, M06, M08, M12.0, M12.3, M30, M31, M32–M35, M45, M46.0, M46.1, M46.8, M46.9, G04.1, G11.4, G80, G81, G82, G83, E40–E46, R63.4, R64, D50.1, D50.8, D50.9, D51–D53, D63, D64.9

a. All diagnoses identified in the Régie de l'Assurance Maladie du Québec (Quebec Health Insurance Plan or database) were based on the ICD-9, which included a four-digit code. The ICD-10-CA was used for the Maintenance et Exploitation des Données pour l'étude de la Clientèle Hospitalière (MED-ECHO; hospitalisation database) and Banque de Données Commune des Urgences (emergency department use database). Diagnoses related to all the above databases were considered, and all data were integrated each year for each patient. The MED-ECHO is the only database including several diagnoses, both primary and secondary diagnoses. In this database, mental disorders were considered only when listed as the primary diagnosis, but substance-related disorders as primary or secondary diagnoses were included, as these are often underdiagnosed.
b. The list of chronic physical illnesses is based on an adapted and validated version of the Elixhauser Comorbidity Index, integrating the Charlson Index, which consists of 32 major categories of physical illnesses (see 'Method' section). In this list of chronic physical illnesses, three categories of mental disorders and two of substance-related disorders (identified with *) were also included in the list of co-occurring mental and substance-related disorders, thus appearing twice.

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were entered and tested, with no impact on the final model or in the identification of significant variables. A forward model selection was also used to enter variables into the hierarchical logistic regression model for the estimation of parameters. Akaike's Information Criterion (AIC) was used for selection of the model, with choice of the final multivariate model based on the smallest AIC. Odds ratios were calculated, with 95% confidence intervals. All analyses were performed with software SPSS version 24.0 for Windows.

Results

Of the 9514 patients, 3152 (33.1%) received at least one prompt emergency department follow-up consultation (9.0% with GP, 8.9% with psychiatrist, 15.0% with both GP and psychiatrist). In all, 84.2% patients had common mental disorders, 56.1% had serious mental disorders and 20.0% had substance-related disorders (see Table 2, which also includes bivariate analyses); 32.0% had chronic physical illnesses, although severity levels were low in 77.5% of cases (index 0). Co-occurring mental disorders and substance-related disorders affected 12.9% of patients, co-occurring mental disorders and chronic physical illnesses affected 14.1% and co-occurring substance-related disorders and chronic physical illnesses affected 6.2%. A total of 19.1% presented to the emergency department for suicidal ideation, 4.9% for suicide attempt and 5.3% for violence or social issues. Concerning illness acuity at emergency department triage, 49.7% registered at levels 4 or 5. Of the total cohort, 51.3% were women, 38.2% were in the 25–44 years age group, 45.6 and 63.3% lived in the most materially and socially deprived areas (quintiles 4, 5 or areas not assigned) and 82.7% lived in university healthcare regions. With regards to service use, 50.8% had a family physician, 43.3% had both a GP and psychiatrist, 16.3% had a GP only and 13.7% had a psychiatrist only as usual physicians, and 26.8% had no usual physician. In the 12 months before emergency department use, 43.1% had three or more consultations with their GP and 30.7% had three or more consultations with their psychiatrist; 50.4% received high (≥0.80) continuity of physician care; 22.6% of patients received psychosocial interventions in community healthcare centres; 27.6% had made prior use of the emergency department and 23.4% were previously hospitalised. After emergency department discharge, 74.2% of patients received no further referrals to services.

Based on the final hierarchical multivariate model for clinical variables (Table 3), patients diagnosed with adjustment or bipolar disorders were more likely to receive prompt emergency department follow-up (model 1). By contrast, patients with alcohol-related disorders and those needing less immediate or urgent care (acuity levels 3–5) at index emergency department use were less likely to receive prompt emergency department follow-up. Adding sociodemographic characteristics (model 2) revealed that patients aged 25–44 years had more likelihood of receiving follow-up compared with younger patients. However, with the introduction of service use variables (model 3), the age association was no longer significant. Regarding service use, patients with average (0.51–0.79) or high (≥0.80) continuity of physician care were more likely to receive prompt emergency department follow-up. Those with at least three prior psychosocial interventions in community healthcare centres or prior hospital admissions were also more likely to receive prompt emergency department follow-up. In the final model, clinical characteristics accounted for 73.0% of the total variance, service use accounted for 27.0% and sociodemographic characteristics accounted for 0%.

Discussion

This study revealed that only 33.1% of patients with a mental disorder received prompt out-patient physician follow-up after index emergency department use, locating them at the low end of the 31–71% range established mainly through research conducted in the USA, among the few studies available. Studies that investigated self-harm[7] or depression[4] produced the lowest follow-up rates, whereas studies on schizophrenia[26] and youth studies[9–11] reported the highest rates. The low follow-up rate in this study may be explained by long wait lists for accessing services in the Quebec healthcare system, compared with health systems in other industrialised countries, especially the wait for usual GPs and psychiatrists,[27,28] and by the integration of the full spectrum of mental disorders in the present study. As patients with a mental disorder or substance-related disorder often have issues with adherence to treatment, missed appointments may also have influenced the low results on prompt emergency department follow-up. Given the high medical needs of patients living in poor overall social and health conditions who present to the emergency department, not only was their rate of prompt emergency department follow-up suboptimal, but so was their level of 12-month service use before the index emergency department visit, which ranged from 22.7% for patients who received psychosocial interventions in community healthcare centres to 55.6% for those who consulted their usual GP. However, roughly half of patients with prompt emergency department follow-up received services from both GPs and psychiatrists, as these professionals had also been the main providers for these patients before the index emergency department use. This result supports the idea that collaborative care may be more appropriate for follow-up in this population of patients presenting to the emergency department.

The study findings confirmed the first hypothesis that severity of patients' clinical conditions would emerge as the main predictor of prompt emergency department follow-up. A key association was found between illness severity and prompt emergency department follow-up, as patients attending the emergency department who were prioritised for immediate or very urgent care (levels 1–2) received more prompt emergency department follow-up than those at acuity levels 3–5. This association is interesting, as acuity levels have generally been used to manage treatment priority for patients presenting to the emergency department, but not to determine patient follow-up disposition after emergency department discharge. This suggests that the response of the Quebec out-patient medical system should be improved for patients who present to the emergency department with less urgent or acute needs. Studies have highlighted the importance of prompt intervention for patient recovery, especially during acute phases of illness and in cases of severe mental disorders.[29] Regarding adjustment and bipolar disorders, these conditions often involve intense psychological distress or crisis situations, which may explain their high priority for prompt emergency department follow-up.[30] Rates were also high for patients with adjustment disorders who may have consulted more frequently with their usual GP, as these physicians are usually more interested in addressing the mental health concerns of 'everyday' patients.[31] Prompt emergency department follow-up was previously reported for patients with bipolar disorders[3] reputed to be 'frequent service users'.[32] Concerning patients with alcohol-related disorders, less prompt emergency department follow-up for this group may reflect their difficulties in accessing out-patient care,[33] which is often a result of stigma,[34] low treatment adherence[3] or forced abstinence as a condition for entering services.[35] These patients also tend to avoid services, using the emergency department as a last resort when faced with serious problems.[36] GPs are also known for their lack of interest in treating patients with

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Table 2 Characteristics of patients with mental disorders with or without out-patient physician follow-up within 30 days of discharge after emergency department use

Overall	Total, *N* (%), *N* = 9514 (100%)	30-Day out-patient physician follow-up in 2014–2015: Yes,[a] *n* (%), *n* = 3152 (33.1%)	30-Day out-patient physician follow-up in 2014–2015: No,[a] *n* (%), *n* = 6362 (66.9%)	*P*-value
Clinical variables (measured from 2012–2013 to 2014–2015, or other as specified)				
Mental disorders[a]				
Common mental disorders				
Depressive disorders	2900 (30.5)	1078 (34.2)	1822 (28.6)	<0.001
Anxiety disorders	3737 (39.3)	1310 (41.6)	2427 (38.1)	0.001
Adjustment disorders	1313 (14.4)	583 (18.5)	790 (12.4)	<0.001
Serious mental disorders				
Schizophrenia spectrum and other psychotic disorders	2198 (23.1)	1225 (38.9)	973 (15.3)	<0.001
Bipolar disorders	1625 (17.1)	850 (27.0)	775 (12.2)	<0.001
Personality disorders	1514 (15.9)	589 (18.7)	925 (14.5)	<0.001
Substance-related disorders	1907 (20.0)	490 (15.5)	1417 (22.3)	<0.001
Alcohol-related disorders	1191 (12.5)	273 (8.7)	918 (14.4)	<0.001
Drug-related disorders	989 (10.4)	301 (9.5)	688 (10.8)	0.030
Chronic physical illnesses (2012–13 to 2013–14), adapted version of …	3049 (32.0)	1201 (38.1)	1848 (29.0)	<0.001
Adapted version of the Elixhauser Comorbidity Index[b]				<0.001
0	7370 (77.5)	2373 (75.3)	4997 (78.5)	
1	914 (9.6)	305 (9.7)	609 (9.6)	
2	521 (5.5)	199 (6.3)	322 (5.1)	
≥3	709 (7.5)	275 (8.7)	434 (6.8)	
Co-occurring disorders (2012–2013 to 2013–2014)				
Co-occurring mental and substance-related disorders	1225 (12.9)	451 (14.3)	774 (12.2)	0.002
Co-occurring mental disorder and chronic physical illness	1624 (14.1)	540 (17.1)	1084 (17.0)	0.465
Co-occurring substance-related disorder and chronic physical illness	594 (6.2)	163 (5.2)	431 (6.8)	0.001
Reason for emergency department use (index emergency department use, 2014–2015)				
Suicidal ideation	1817 (19.1)	575 (18.2)	1242 (19.5)	0.071
Suicide attempt	464 (4.9)	166 (5.3)	298 (4.7)	0.117
Violence or social issues	504 (5.3)	166 (5.3)	338 (5.3)	0.483
Illness acuity (triage priority level) (at index emergency department use, 2014–2015)				<0.001
Levels 1 and 2 (immediate or very urgent care)	1705 (17.9)	783 (24.8)	922 (14.5)	
Level 3 (urgent care)	3082 (32.4)	932 (29.6)	2150 (33.8)	
Levels 4 and 5 (less urgent or non-urgent care)	4727 (49.7)	1437 (45.6)	3290 (51.7)	
Sociodemographic variables (measured in 2014–2015)				
Age group, years				<0.001
12–17	645 (6.8)	174 (5.5)	471 (7.4)	
18–24	1626 (17.1)	476 (15.1)	1150 (18.1)	
25–44	3634 (38.2)	1224 (38.8)	2410 (37.9)	
45–64	2670 (28.1)	963 (30.6)	1707 (26.8)	
≥65	939 (9.9)	315 (10.0)	624 (9.8)	
Gender				0.013
Male	4632 (48.7)	1483 (47.0)	3149 (49.5)	
Female	4882 (51.3)	1669 (53.0)	3213 (50.5)	
Material Deprivation Index				0.681
1 (least deprived)	1992 (20.9)	664 (21.1)	1328 (20.9)	
2	1491 (15.7)	488 (15.5)	1003 (15.8)	
3	1692 (17.8)	552 (17.5)	1140 (17.9)	
4	1661 (17.5)	568 (18.0)	1093 (17.2)	
5 (most deprived)	1837 (19.3)	619 (19.6)	1218 (19.1)	
Not assigned[c]	841 (8.8)	261 (8.3)	580 (9.1)	
Social Deprivation Index				0.281
1 (least deprived)	1155 (12.1)	355 (11.3)	800 (12.6)	
2	1053 (11.1)	359 (11.4)	694 (10.9)	
3	1285 (13.5)	441 (14.0)	844 (13.3)	
4	2130 (22.4)	715 (22.7)	1415 (22.2)	
5 (most deprived)	3050 (32.1)	1021 (32.4)	2029 (31.9)	
Not assigned[c]	841 (8.8)	261 (8.3)	580 (9.1)	
Healthcare regions				<0.001
University	7864 (82.7)	2690 (85.3)	5174 (81.3)	
Peripheral	1650 (17.3)	462 (14.7)	1188 (18.7)	
Service use variables (measured 12 months before index emergency department visit, or other as specified)				
Having a family physician (at index emergency department use, 2014–2015)	4684 (50.8)	1585 (50.3)	3245 (51.0)	0.261
Usual physician[d]				<0.001
General practitioner only	1547 (16.3)	759 (24.1)	788 (12.4)	
Psychiatrist only	1300 (13.7)	703 (22.3)	597 (9.4)	
Both general practitioner and psychiatrist	4116 (43.3)	986 (31.3)	3130 (49.2)	
None (neither general practitioner nor psychiatrist)	2551 (26.8)	704 (22.3)	1847 (29.0)	

(*Continued*)

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Table 2 (*Continued*)

Overall		30-Day out-patient physician follow-up in 2014–2015		
	Total, *N* (%), *N* = 9514 (100%)	Yes,[a] *n* (%), *n* = 3152 (33.1%)	No,[a] *n* (%), *n* = 6362 (66.9%)	*P*-value
Number of consultations with usual general practitioner[d]				<0.001
0–1	4226 (44.4)	1324 (42.0)	2902 (45.6)	
2	1190 (12.5)	365 (11.6)	825 (13.0)	
≥3	4098 (43.1)	1463 (46.5)	2635 (41.4)	
Number of consultations with usual psychiatrist[d]				<0.001
0	6025 (63.3)	1422 (45.1)	4603 (72.4)	
1–2	569 (6.0)	180 (5.7)	389 (6.1)	
≥3	2920 (30.7)	1550 (49.2)	1370 (21.5)	
Continuity of physician care				
Usual Provider Continuity Index for both general practitioner and psychiatrist[e]				<0.001
0–0.50	2903 (30.5)	646 (20.5)	2257 (35.5)	
0.51–0.79	1817 (19.1)	731 (23.2)	1086 (17.1)	
≥0.80	4794 (50.4)	1775 (56.3)	3019 (47.5)	
Number of psychosocial interventions in community healthcare centres, excluding general practitioner consultations				<0.001
0	7359 (77.3)	2330 (73.9)	5029 (79.0)	
1–2	696 (7.3)	245 (7.8)	451 (7.1)	
≥3	1459 (15.3)	577 (18.3)	882 (13.9)	
Number of prior emergency department use for mental health reasons				0.846
0	6888 (72.4)	2272 (72.1)	4616 (72.6)	
1–2	1798 (18.9)	606 (19.2)	1192 (18.7)	
≥3	828 (8.7)	274 (8.7)	554 (8.7)	
Number of prior hospital admissions for mental health reasons				<0.001
0	7280 (76.5)	2124 (67.4)	5156 (81.0)	
1–2	1868 (19.6)	821 (26.0)	1047 (16.5)	
≥3	366 (3.8)	207 (6.6)	159 (2.5)	
Referral after emergency department discharge (measured at index emergency department use)				<0.001
General practitioner	603 (6.3)	318 (10.1)	285 (4.5)	
Community healthcare centres or community-based services	588 (6.2)	276 (8.8)	312 (4.9)	
Other health organisations	1263 (13.3)	345 (10.9)	918 (14.4)	
None	7060 (74.2)	2213 (70.2)	4847 (76.2)	

χ^2: Comparisons were produced for each row reporting percentages for categorical variables.
a. Patients may have more than one mental disorder, so total percentage may exceed 100%.
b. This index includes the following chronic physical illnesses: renal failure, cerebrovascular illnesses, neurological illnesses, hypothyroidism, fluid electrolyte illnesses, obesity, any tumour without metastasis, metastatic cancer, chronic pulmonary illnesses, diabetes (both complicated and uncomplicated), congestive heart failure, peripheral vascular illnesses, valvular illnesses, myocardial infarction, hypertension, pulmonary circulation illnesses, blood loss anaemia, ulcer illnesses, liver illnesses, AIDS/HIV, rheumatoid arthritis/collagen vascular illnesses, coagulopathy, weight loss, paralysis and deficiency anaemia.
c. This is related to missing address or living in an area where index assignment is not feasible. An index cannot usually be assigned to residents of long-term healthcare units or those who are homeless.
d. Usual general practitioner (proxy for 'patient family physician') needs to include a minimum of two consultations with the same practitioner or with at least two different practitioners working in the same family medicine group (all in out-patient care). For usual psychiatrist, if a patient had only one psychiatrist consultation, they must have had at least two consultations with their general practitioner. Regarding usual physician, for 'both general practitioner and psychiatrist', patients must have had at least one psychiatrist consultation and two consultations with their general practitioner in out-patient care.
e. Usual Provider Continuity Index describes the proportion of visits to the usual general practitioner and psychiatrist of all visits made to general practitioner and psychiatrists, including walk-in clinics. It is ranked low (≤0.50), moderate (0.51–0.79) or high (≥0.80).

substance-related disorders or co-occurring mental disorder and substance-related disorder.[37] Few Quebec physicians specialise in substance-related disorders, which further hinders medical follow-up for addiction.[38] Outreach interventions dedicated to improving out-patient follow-up may be promoted for these patients presenting to the emergency department.

The second study hypothesis was also confirmed, as patients with moderate or high continuity of physician care 12 months before index emergency department use were more likely to access prompt emergency department follow-up. It seems logical that patients enjoying continuity of physician care before emergency department use would receive more prompt emergency department follow-up. GPs or psychiatrists may have referred their own patients to the emergency department for a serious mental health episode or crisis that they were unable to treat, which would explain more prompt emergency department follow-up for these patients. The availability of both GPs and psychiatrists with busy practices,[39] or mental health expertise in the case of GPs, has often been reported as inadequate for treating complex mental disorders or crisis situations,[40] suggesting another possible reason for low rates of prompt emergency department follow-up. The findings that receipt of more intensive mental health services in community healthcare centres and prior hospital admissions predicted more prompt emergency department follow-up reinforces the study hypothesis that patients with more serious problems, including psychosocial issues, or those in crisis situations, would be prioritised for closer follow-up. These results suggest that management practices around access to out-patient care in the Quebec mental health system are good, although long wait lists for out-patient care are the norm[15] and require urgent attention. Based on the 2005 Quebec mental health reform, the one-stop point of entry implemented in the mental health programmes of local community healthcare centres also prioritised patients with more severe and acute mental disorders for access to both mental health services in these centres, and to psychiatrists in specialised out-patient care. Community healthcare centres are known to treat vulnerable patients who need intense and continuous care.[7] Patients with a history of psychiatric hospital admission also have more severe and often co-occurring health problems.[31] These patients in

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Table 3 Predictors of patients with mental disorders with or without out-patient physician follow-up within 30 days of discharge after emergency department use in 2014–2015

	Model 1			Model 2			Model 3		
Overall	*P*-value	Odds ratio	95% CI	*P*-value	Odds ratio	95% CI	*P*-value	Odds ratio	95% CI
Clinical variables (measured from 2012–2013 to 2014–2015, or other as specified)									
Mental disorders									
Common									
Anxiety disorders	0.012	1.123	1.026–1.229	0.017	1.117	1.020–1.223	0.523	1.031	0.939–1.131
Adjustment disorders	<0.001	1.444	1.278–1.632	<0.001	1.465	1.295–1.657	0.021	1.164	1.024–1.324
Serious									
Bipolar disorders	<0.001	2.604	2.328–2.912	<0.001	2.541	2.270–2.844	<0.001	2.055	1.827–2.311
Substance-related disorders									
Alcohol-related disorders	<0.001	0.495	0.427–0.574	<0.001	0.482	0.415–0.559	<0.001	0.436	0.374–0.509
Chronic physical illnesses, adapted version of the Elixhauser Comorbidity Index (2012–2013 to 2013–2014) (reference: 0)[a]									
1	0.991	0.999	0.859–1.162	0.879	0.998	0.849–1.150	0.109	0.882	0.756–1.028
2	0.032	1.231	1.018–1.490	0.051	1.212	0.999–1.469	0.987	1.002	0.822–1.220
≥3	0.008	1.252	1.060–1.478	0.020	1.227	1.033–1.457	0.765	0.973	0.814–1.163
Illness acuity (at index emergency department use, 2014–2015) (reference: level 1–2, immediate or very urgent care)									
Level 3 (urgent care)	<0.001	0.505	0.445–0.572	<0.001	0.512	0.451–0.580	<0.001	0.494	0.434–0.562
Levels 4 and 5 (less urgent or non-urgent care)	<0.001	0.482	0.428–0.542	<0.001	0.485	0.431–0.545	<0.001	0.475	0.422–0.536
Sociodemographic variables (measured in 2014–2015)									
Age (reference: 12–17 years), years									
18–24				0.379	1.099	0.891–1.355	0.670	1.047	0.847–1.296
25–44				0.035	1.232	1.015–1.495	0.178	1.145	0.940–1.394
45–64				0.011	1.294	1.060–1.580	0.172	1.152	0.940–1.411
≥65				0.172	1.176	0.932–1.485	0.762	0.964	0.759–1.224
Service use variables (measured in the 12 months before index emergency department visit)									
Continuity of physician care (Usual Provider Continuity Index for both general practitioner and psychiatrist (reference: 0–0.50))[b]									
0.51–0.79							<0.001	1.804	1.570–2.072
≥0.80							<0.001	1.714	1.531–1.920
Number of psychosocial interventions in community healthcare centres, excluding general practitioner consultations (reference: 0)									
1–2							0.834	0.982	0.825–1.168
≥3							0.016	1.163	1.028–1.317
Number of hospital admissions for mental health reasons (reference: 0)									
1–2							<0.001	1.558	1.386–1.750
≥3							<0.001	1.714	1.531–1.920
Hosmer and Lemeshow test									
χ^2	12.900			7.157			13.537		
d.f.	7			8			8		
P-value	0.075			0.520			0.095		

All models are adjusted logistic regression models.
a. This index includes chronic physical illnesses: renal failure, cerebrovascular illnesses, neurological illnesses, hypothyroidism, fluid electrolyte illnesses, obesity, any tumour without metastasis, metastatic cancer, chronic pulmonary illnesses, diabetes (both complicated and uncomplicated), congestive heart failure, peripheral vascular illnesses, valvular illnesses, myocardial infarction, hypertension, pulmonary circulation illnesses, blood loss anaemia, ulcer illnesses, liver illnesses, AIDS/HIV, rheumatoid arthritis/collagen vascular illnesses, coagulopathy, weight loss, paralysis and deficiency anaemia.
b. The Usual Provider Continuity Index describes the proportion of visits to the usual general practitioner and psychiatrist of all visits made to general practitioners and psychiatrists, including walk-in clinics. It is ranked as low (≤0.50), moderate (0.51–0.79) or high (≥0.80).

particular would be slated for close medical follow-up, explaining their easier access to prompt emergency department follow-up.[40]

The overall study results underline the fact that patients known to the mental health system were more likely to receive prompt emergency department follow-up than those without support from mental health services before emergency department use. Emergency department studies have outlined the importance of developing innovative interventions at the emergency department for improving services for both patients without access to out-patient care and those known to have higher needs and vulnerability. Finally, referral after emergency department discharge did not contribute to the final multivariate model, which may be explained by the high rate of patients discharged without a referral to out-patient care. This suggests that the role of emergency department as a gateway for accessing out-patient care, and for ensuring that patients receive services responding to their needs, particularly patients in urgent or crisis situations, may be greatly improved.

To the best of our knowledge, this study was the first to identify predictors of prompt (≤30 day) out-patient physician follow-up after emergency department discharge among patients with mental disorders, based on an investigation of innovative clinical, sociodemographic and service use variables. Results demonstrated that access to medical care was poor for this high-needs population using Quebec emergency department, with only a third of patients receiving prompt physician follow-up. The role of emergency department as a gateway for accessing out-patient physician care should be greatly reinforced to increase prompt emergency department follow-up for vulnerable populations. Nonetheless, patients with more severe and acute conditions were identified as more likely to receive prompt emergency department follow-up, including those with acuity levels 1–2 at emergency department triage, patients with prior hospital admissions, those provided with psychosocial interventions in community healthcare centres and patients with adjustment and bipolar disorders. By contrast, patients with alcohol-related disorders and those with acuity levels 3–5 at emergency department triage were identified as less likely to receive prompt emergency department follow-up. Interventions like screening, brief intervention including motivational treatment or brief case management offered by emergency department staff, and adequate referral to appropriate medical

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out-patient services may help reach patients without prompt emergency department follow-up. A key contribution of this study was the finding that greater continuity of prior physician care predicted higher levels of prompt emergency department follow-up, suggesting that care continuity should be reinforced. Generally, more biopsychosocial and collaborative care, and post-emergency department discharge planning, is needed to improve mental health services for this underserved population of patients presenting to the emergency department.

Limitations

This study had certain limitations. First, Quebec databases were primary developed for financial purposes, and thus provide data that only approximate patient needs. Second, psychosocial interventions provided by hospitals, family medicine groups and care provided by psychologists working in private clinics or addiction treatment centres could not be examined, as these data were unavailable in RAMQ databases. The provision of such services by patients before emergency department use may have influenced prompt emergency department follow-up, whereas the inclusion of these resources among the follow-up measures may have increased the proportion of patients with prompt emergency department follow-up after emergency department discharge. Third, data on race/ethnicity, cognitive impairment, intellectual disability or the patient care experience were also unavailable. Fourth, excluding potential study participants who were in-patients at index emergency department use or within the 30-day limits for prompt emergency department follow-up may have resulted in an underrepresentation of severe cases. Finally, results may be not generalisable to all healthcare systems, particularly settings without universal coverage and those located in rural or remote regions.

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Data availability

The data that support the findings of this study are available from the corresponding author, M.-J.F., upon reasonable request.

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Author contribution

M.-J.F. was responsible for project administration and resources. M.G. and M.-J. F. designed the manuscript. L.G. was responsible for data analysis. M.G., L.G. and M.-J. F. wrote the article. A.L. revised the final version of the manuscript.

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Declaration of interest

None.

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