This is the accepted version of the following article: Predictors of Frequent Emergency Department Utilization for Mental Health Reasons. J Behav Health Serv Res. 2021 Apr;48(2):259-273. doi: 10.1007/s11414-020-09695-4.
This version of the article has been accepted for publication, after peer review (when applicable) and is subject to Springer Nature's AM terms of use, but is not the Version of Record and does not reflect post-acceptance improvements, or any corrections.

Predictors of frequent emergency department utilization for mental health reasons

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Key words: emergency department utilization, frequent use, overcrowding, mental health, predictors

Acknowledgments

We gratefully acknowledge the financial support of the Fonds de la recherche en santé du Québec (FRSQ) and l'Institut Universitaire sur les Dépendances du Québec (Addiction University Institute). We would also like to thank Judith Sabetti for editorial assistance.

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Abstract

Overcrowding in emergency departments (ED) jeopardizes quality and access to health care, which represents a major issue for service delivery. This study determined predictors of frequent ED utilization among 320 patients recruited from six hospital ED in Quebec (Canada). Data collection included patient interviews and administrative databanks. A hierarchical linear regression analysis was performed using Andersen's Behavioral Model as a framework, with variables organized into predisposing, enabling, and needs factors. Results showed needs factors were most strongly associated with ED utilization, particularly schizophrenia and personality disorders. Predisposing and enabling factors each contributed one variable to the model: past hospitalization for MH reasons, and having regular care from an outpatient psychiatrist over the 12 months prior to interview at the ED, respectively. Increasing integration of MH services in networks may reduce unnecessary ED utilization and overcrowding, while providing better accessibility and care continuity for patients who visit ED for MH reasons.

Introduction

Recent studies have demonstrated that emergency department (ED) overcrowding may be attributed to high demand from patients seeking medical attention, not only for urgent treatment but often for treatment occasioned by the lack of availability or inadequacy of health services in the community.[1,2] For instance, the reduction of inpatient beds[2] or limited access to healthcare resources in the community[1] has resulted in the increased probability of ED use. This high influx of patients may leave ED with insufficient resources to provide urgent care services while compromising patient safety, comfort, and satisfaction.[1,2] Excessive ED use may also raise health care costs and ultimately result in reduced quality of health care.[1,2]

The inadequacies in health care that stem from ED overcrowding may be partially explained by the prevalence of people visiting ED for mental health (MH) reasons.[3,4] In fact, research shows that mental disorder (MD) was the primary reason for 4-15% of all ED visits; while 8-27% of those ED visits resulted in hospitalizations lasting 38% longer than those of ED patients without MD.[5,6] Moreover, according to studies conducted in various countries, small numbers of patients with MD make repeated use of ED services, accounting for a disproportionate number of total ED visits.[7-9] High ED utilizers for MH reasons have usually been defined in the field as people who visit the ED three to four, or more, times per year.[10-12] Examining the frequency of visits in a psychiatric ED, a Canadian study reported that 2% of these high utilizers who attended the psychiatric ED accounted for 21% of all ED visits over a fifteen-year period.[11] Studies have also shown that high ED utilizers for MH reasons often have more than one MD, including substance use disorder (SUD), and are often high utilizers of other health services as well.[13,14] Thus, a vital research target has involved the identification of factors

associated with frequent ED utilization in efforts to better manage high ED utilizers, reduce excessive health care expenses, and improve quality of health services.

To better discern factors predicting frequent ED utilization, the Anderson Behavioral Model may be used as a conceptual framework.[15] This model is often applied in evaluative health care research to analyse risk factors, service utilization and outcomes in vulnerable populations, including patients with MD.[16-18] According to this framework, variables of interest are classified as predisposing, enabling, and needs factors.[15] Predisposing factors refer to individual characteristics, such as age, sex, marital status, etc.; enabling factors are those that influence health service use, such as regular sources of care and satisfaction with health services etc.; and needs factors are clinical variables, particularly those referring to the number and types of disorders.[17]

Research has shown that needs factors tend to be the most strongly associated with frequent ED utilization, followed by predisposing and or enabling factors.[19,20] Needs found to be associated with frequent ED utilization include MD such as schizophrenia,[11,21] personality disorders,[9,10,22] anxiety disorders,[21,23,24] affective disorders,[12,23,24] SUD,[11,24-26] as well as comorbid MD/SUD and or chronic physical illnesses.[11,27-29] While such clinical diagnoses are objective health measures, more subjective measures such as patient self-perceptions of physical and mental health may also be considered as needs factors, playing a role in help-seeking for medical care or support.[30,31] However, these types of measures have not been studied in the context of ED utilization.

Research identifying associations between predisposing and enabling factors, with frequent ED utilization has been less consistent, however. Concerning predisposing factors, some

studies have identified associations between frequent ED utilization and being male, or being in the young adult to early middle-age range.[25,27,32] These high ED utilizers are more likely to be unemployed, to have low income, and little family support as compared with other ED utilizers.[33,34] Therefore, they may lack opportunities for gaining knowledge about MH resources. Moreover, past hospitalization for MH reasons has also been shown to be a strong indicator of an individual's predisposition to make subsequent use of ED and other health services.[35] Patient perceptions of the attitudes held by MH professionals toward them may also be an important predisposing factor for ED use, due to widespread stigmatizing attitudes toward mental illness even among trained MH professionals.[36] Yet no previous study has examined this factor with respect to predictors of ED utilization.

In terms of enabling factors, while some studies have associated frequent ED utilization with frequent use of other health services,[20,37] others have found the contrary: that lower use of community-based MH services may be linked to frequent ED utilization.[38,39] Perhaps this discrepancy may be due to differences in patient satisfaction with respect to the quality of health services (i.e. accessibility, continuity, intensity of care etc.). However, few studies have explored whether ED use is influenced by patient satisfaction with ED and community health services. In fact, research on the influence of community-based service utilization in relation to frequent ED utilization is lacking. While studies such as Huynh et al.[19] found that a regular source of care (i.e. having a family physician) has been associated with higher ED use, this association needs further investigation.

Since profiles of high ED utilizers are heterogenous, factors predicting frequent ED utilization for MH reasons require further examination. Previous research that examined different subgroups of ED utilizers have mostly used administrative databanks, and were conducted in a

single ED setting. This study combines information from both administrative databanks and patient surveys conducted at multiple ED settings. In an effort to address the inconsistencies in the literature concerning predisposing and enabling factors, the survey for this study included several health service utilization variables, as well as other variables that have never or rarely been tested with ED utilizers (e.g. self-rated knowledge about MH resources, service satisfaction, perceived physical and mental health, etc.) Moreover, this study is one of few using the Andersen Behavioral Model as a conceptual framework to analyse the contribution of predisposing, enabling, and needs factors in ED utilization. In this context, the purpose of this study was to determine predictors of frequent ED utilization for MH reasons in a sample of 320 patients from six hospital ED in Quebec. Based on the literature, it was hypothesized that needs factors would be the strongest predictors of frequent ED utilization, but it was also expected to find associated predisposing and enabling factors in the model.

Methods

Setting and data collection

The six ED sites chosen for this study operated in three different Quebec regional health networks. Two ED were situated in Montreal, three in Quebec City, and one in a suburban area. Four were psychiatric ED integrated into general ED; another was a general ED with a psychiatric department, and, finally, a psychiatric ED within a MH university institute.

Participants who presented at ED with mental health concerns as the primary reason for their visits were recruited between January and June 2017. Inclusion in the study was based on the ability of potential participants to provide informed consent, as evaluated by ED staff. Participants also had to provide consent for research team members to access their medical

records for 2016-2017, which would cover the 12 month period prior to information collected from the questionnaire during the interview. Data were collected for study participants on previous diagnoses, hospitalizations, ED and other health service utilization.

Participant interviews were conducted on-site at ED but in separate offices, and at various times and days of the week, especially when ED were operating at peak capacity. In cases where the conditions of participants prevented them from following through with interviews at the time of recruitment, interviews were postponed until the patients had stabilized, whether during or after hospitalization. A structured patient questionnaire was administered, requiring about 30 minutes to complete. Questions were adapted from the Canadian Community Health Survey-MH,[40] and included: socio-demographic and socio-economic characteristics, patient health beliefs (e.g. self-rated knowledge about MH resources), utilization and satisfaction with health services (e.g. family physician), as well as perceived physical and mental health. SUD was also assessed in the questionnaire using two standardized scales: the Alcohol Use Disorders Identification Test (AUDIT),[41] measuring consequences of alcohol use (10 items) with a score of ≥8 indicating an alcohol use disorder; and the Drug Abuse Screening Test-20 (DAST-20),[42] measuring consequences of drug use (10 items) with a score of ≥6 indicating a drug use disorder. The Cronbach's alpha in the original validation was 0.88 for the AUDIT[43] and 0.74 for the DAST-20.[42]

Data were also obtained from two provincial health administrative databanks: 1) the Quebec Health Insurance Regime (RAMQ), which includes information on ED and other health service utilization, medical diagnoses and MD, and 2) the hospitalization databank (MED-ECHO) for hospitalization and discharge records. RAMQ and MED-ECHO data were retrieved from these databanks for the years 2016-2017 to provide a more comprehensive medical and

service use history for participants. These data were merged with the questionnaire responses of each participant. The study was approved by a MH university institute research ethics board.

Conceptual framework and study variables

Based on the Andersen Behavioral Model[15] and literature on ED and other service use for MH reasons, independent variables were identified, and organized into predisposing, enabling, and needs factors for analysis with the dependent variable: number of ED visits for MH reasons over the 12 months prior to interview at the ED (**Figure 1**). The dependent variable was collected from the questionnaire. Predisposing factors included: age, sex, education level, employment status, household income, having social support from family or friends, self-rated knowledge about MH resources, and patient perceptions on attitudes held by MH professionals (outside the ED) toward them – collected by the questionnaire; while data on past hospitalization for MH reasons (frequency and number of days) came from the databanks. Enabling factors included: having a regular source of care (outside the ED or hospitalization) over the 12 months prior to interview at the ED and satisfaction with regular care received from a family physician, an outpatient psychiatrist, and or a case manager – collected from the questionnaire; while data on frequency of family physician and outpatient psychiatrist consultations for MH reasons (outside the ED or hospitalization) came from the databanks. Needs factors included: perceived physical and mental health, and SUD (AUDIT score $\geq$8; DAST-20 score $\geq$6) – collected by the questionnaire; and clinical diagnoses (anxiety, depression, schizophrenia, bipolar disorder, personality disorders, and number of chronic physical illnesses), came from the databanks.

Data analyses

Univariate, bivariate and multivariate analyses were carried out. Univariate analyses were

comprised of frequency distribution for categorical variables (number and percentages), mean values and corresponding standard deviations for continuous variables. The dependent variable, number of visits to ED for MH reasons over the 12 months prior to interview at the ED, was assessed with regard to normality assumptions (skewness and kurtosis). Bivariate analyses were comprised of simple linear regression analyses, to assess associations (with the alpha value set at $p < 0.10$) between each independent variable and the dependent variable, separately. Multivariate analyses were performed for significantly associated variables introduced by blocks into the hierarchical linear regression model, using Backward elimination method. Following the hypothesis, variables in the needs block were entered into the model first, followed by variables in the predisposing and enabling blocks. For each block of predictors, the total variance explained, and the model fit were generated.

Results

The participant response rate was 88%, with 328 participants accepted into the study and 43 individuals who declined to participate in the study of a total of 371 initially invited. Eight participants were later removed from the study due to missing data, resulting in a final sample of 320 participants for the analyses. Participant characteristics (N = 320) are reported in **Table 1**. Mean age was 39 years old and 52% of participants were female. About 56% of participants had more than a secondary education level, and 33% were currently employed. Regarding household income, 44% earned less than CAN$21,000/year. Over 90% of participants reported having social support from family or friends. About 40% rated their knowledge about MH resources as poor, while more than 75% had positive perceptions of MH professionals (outside the ED) or viewed themselves as treated fairly by them. Regarding past hospitalization for MH reasons, average frequency was about one hospitalization within a year, with the average number of days

at 16.71. Approximately 40% of participants reported having a regular source of care (outside the ED or hospitalization) during the previous 12 months; with 65% receiving care from a family physician, 45% from an outpatient psychiatrist, and 39% from a case manager. Around 33% were satisfied or totally satisfied with regular care received from an outpatient psychiatrist or from a case manager. The mean frequency of visits to a family physician was 1.07, and to an outpatient psychiatrist was 8.06. More than 40% of participants rated their physical and mental health as poor or fair. The three most prevalent MD were: depression (46%), anxiety (31%), and schizophrenia (30%). The dependent variable, number of ED visits for MH reasons over the 12 months prior to interview at the ED, ranged from 0 to 40, with a mean of 2 (SD=4). Within this distribution, 14% of participants qualified as high ED utilizers (≥4 ED visits or more during the year). The dependent variable was normally distributed, with a skewness of 0.845, and a kurtosis of 0.298.

Bivariate analyses are presented in **Table 2**, including variables significantly associated with the dependent variable based on a 90% confidence interval. These variables were used to build the hierarchical linear regression model (**Table 3**), on the basis of needs factors, followed by predisposing, and enabling factors. Among needs factors, the first block, five predictors were retained: anxiety, depression, schizophrenia, bipolar disorder, and personality disorders. With the addition of the second block, predisposing factors, only one variable was retained: frequency of past hospitalization for MH reasons (2015-2016). Likewise, only one variable was retained after the introduction of the third block, enabling factors: having regular care from an outpatient psychiatrist (outside the ED) over the 12 months prior to interview at the ED. All the predictors retained remained positively and significantly associated in the regression model with introduction of the three blocks, and with a 95% confidence level. The total variance explained

by variables in the model was 56%, with 47% attributed to needs factors, 8% to predisposing factors, and 1% to enabling factors. The model fit, as determined by the ANOVA F test, was acceptable.

Discussion

This study examined predictors of frequent ED utilization for MH reasons, in relation to predisposing, enabling and needs factors, for a sample of 320 participants recruited from six ED in Quebec. Participants reported an average of two ED visits per year, and the number of high ED utilizers (14% at ≥4 visits per year) was comparable to frequencies reported in the literature, which vary from less than 1% to 18%.[44] Results of the study confirmed the hypothesis that needs factors were most strongly associated with ED utilization (47%), followed by predisposing and enabling factors.

The result that needs factors were the strongest predictors confirms findings from previous studies that identified MD as highly associated with frequent ED utilization.[19,20] Among the MD tested in this study, personality disorders and schizophrenia were found to be the strongest predictors of frequent ED utilization. Previous studies have found that patients with these chronic and severe MD account for a large proportion of patients considered high ED utilizers.[11,21,24] Moreover, individuals with anxiety or affective disorders may also experience severe symptoms that compromise their health and lead them to seek care at the ED.[12,19] These MD may also produce unpleasant physical symptoms (e.g. gastrointestinal symptoms, headache, sleep disturbance, pain, etc.) or mimic serious medical conditions like heart attack.[45,46] Many patients with MD, especially those with severe MD, have also reported life-threatening behaviors or conditions such as self-harm, suicidal ideation or attempt,[33] which are highly associated with ED visits for MH reasons.[47]

Among the predisposing factors, past hospitalization for MH reasons was identified as the only predictor of frequent ED utilization in this study. This finding is supported by previous studies that have reported frequent ED utilization as highly associated with past hospitalization,[25,48] and also subsequent hospitalization for MH reasons.[17] A recent study conducted in Montreal, Canada showed that one-third of patients with MD visiting the ED, or hospitalized following an ED visit, made return visits to the ED within 30 days of discharge,[49] suggesting a persistence of high unmet needs due to inadequate care. Furthermore, since treating severe MD, comorbid MD/SUD, or MD/chronic physical illnesses in a single ED visit is difficult, patients with these conditions and whose MH needs tend to remain unmet, particularly those who have been previously hospitalized, may continue to seek help at ED on a frequent basis.[17,50,51]

Regarding enabling factors, having regular care from an outpatient psychiatrist over the 12 months prior to interview at the ED was the only predictor of frequent ED utilization. Few patients were followed by a psychiatrist regularly, and they usually presented with more severe MD or complex profiles, which may explain their frequent use of ED. These types of patients may also exhibit serious needs in other areas such, as housing or food adequacy.[52] However, the accessibility and intensity of care provided by outpatient psychiatrists may be insufficient, and thereby lead patients to seek help from ED for their unment needs or relief in crisis situations during the intervals between scheduled psychiatric appointments. Studies have also shown that frequent ED utilization is associated with inadequate primary care or services in the community,[38,39] as well as poor integration or coordination within and across MH service networks.[44,53]

It was surprising that some factors known to be strongly associated with frequent ED utilization did not emerge as significant predictors of ED utilization in this study. For example,

there was a high prevalence of SUD in the study sample with about one-third scoring above the cut-offs for AUDIT and DAST-scores; yet neither alcohol or drug consumption were found to be strongly associated with frequent ED utilization in the hierarchical analyses. While studies on high ED utilizers have identified SUD as a strong indicator of ED utilization,[24,44] the results may be explained by the possibility that participants visiting the ED for MH reasons may have denied or underreported their alcohol and or drug consumption. This often occurs among patients with SUD, according to previous research.[19,54]

Concerning predisposing factors, this sample represented a highly deprived group in terms of sociodemographic indicators, with two-thirds unemployed and about half with a household income below CAN$21,000/year. Although poor socioeconomic conditions are known to act as stressors to physical and mental health that may lead people to seek ED services,[55] the socioeconomic differences among participants in this study may not have been sufficient to predict differences in their frequency of ED utilization, whether single or multiple ED visits.

Finally, it was surprising that having either a family physician or a case manager did not emerge as a significant protective factor against frequent ED utilization. In the case of family physicians, there is currently a shortage in Quebec where only 55% of patients with MD have been reported to have a family physician.[49,56] Moreover, family physicians are considered to have limited ability to treat MD, making the ED a more logical choice for patients seeking MH care.[57,58] With respect to case managers, while they provide follow-up that may act as a protective measure against repeated ED visits, in crisis situations for instance, these professionals may also encourage patients to seek help from ED services.[59,60] Overall, follow-up by case managers in Quebec such as in assertive community treatment and intensive case management

programs,[61,62] also tends to focus on patients with severe MD, who are known to be high utilizers of ED and other health services.

This study has some limitations. First, as the research was conducted exclusively in urban areas, the findings may not be generalizable to semi-urban or rural areas. Second, the study settings were all located in Quebec, which has a specific configuration of MH care services integrated within a universal health care system. Therefore, the study findings may not apply in countries that have very different MH care systems, especially those, such as the US, with more privatized health care arrangements. Third, data on patient health, perceived physical/mental health and satisfaction with heath services were self-reported, and therefore may have presented a risk of bias. Finally, patterns of service use related to physical health were not considered in this study.

Implications for Behavioral Health

This is the first study to identify predictors of frequent ED utilization for MH reasons using the Andersen Behavioral Model, merged data from a questionnaire and databanks, and a hierarchical regression analysis. The hypothesis that needs factors would explain most variation in frequency of ED utilization was confirmed, with schizophrenia and personality disorders as the strongest predictors. Two other variables among the predisposing and enabling factors, also emerged contributing to the model: having a history of hospitalization for MH reasons, and regular care from an outpatient psychiatrist over the 12 months prior to interview at the ED.

These findings suggest that frequent ED utilization may be reduced by addressing unmet needs for MH care among ED utilizers, especially patients with severe MD like schizophrenia and personality disorders and those more likely to have a history of hospitalization or to see a

psychiatrist as part of regular care. Strategies that may reduce frequent ED use for MH reasons include: assertive community treatment, home treatment teams, and intensive case management. These practices enhance access to care and follow-up for MH needs, thereby reducing ED use. These strategies also have benefits for patients with other severe or complex MH profiles and unmet needs. Other measures aimed at minimizing ED utilization for MH reasons include: post-ED care planning, shared-care, case management, and improved coordination between ED and primary care (e.g. crisis centers). Increasing integration of MH service networks around ED should also improve accessibility and continuity of care for high ED utilizers, thereby reducing unnecessary ED utilization and overcrowding.

Conflict of Interests

The authors declare no conflicts of interest with respect to the research, authorship, and or publication of this article.

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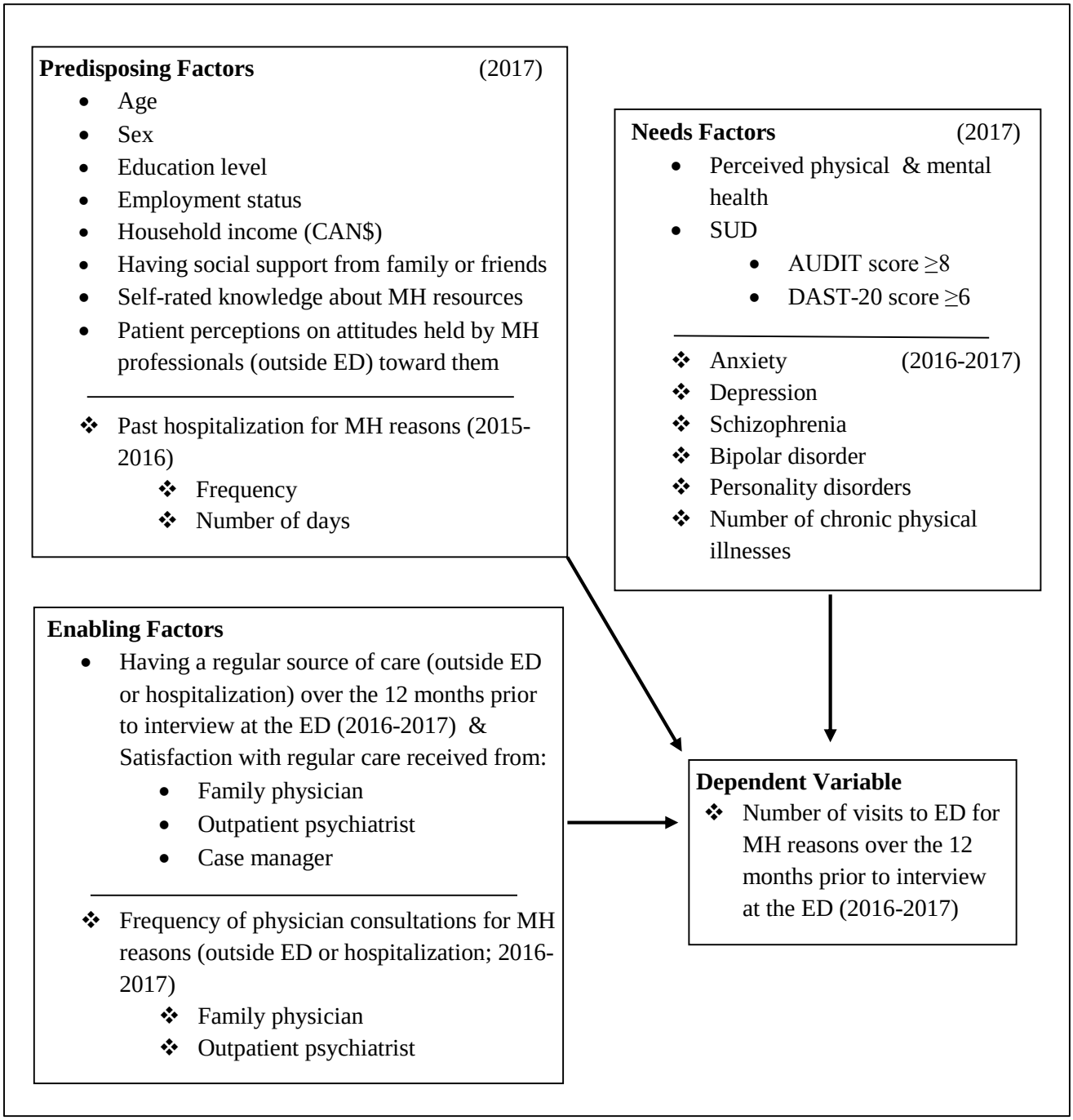
Figure

Figure 1

Conceptual framework based on the Andersen Behavioral Model[15]

Study variables organized into dependent variable, predisposing, enabling, and needs factors. Data collected from the questionnaire (•) and from the 2015-2016 medical administrative databanks (❖). MH = mental health; ED = emergency department; MD = mental disorder; SUD = substance use disorder; AUDIT = Alcohol Use Disorders Identification Test; DAST-20 = Drug Abuse Screening Test-20



Table

Table 1

Participant characteristics (N = 320)

			Min	Max	N/Mean	%/SD
Predisposing factors	Age		17.00	83.00	38.92	13.56
	Sex	Female			165	51.6
		Male			155	48.4
	Education level	Elementary			8	2.5
		Secondary			133	41.6
		Post-secondary or higher			179	55.9
	Currently employed				107	33.4
	Household income	<CAN$21,000/year			141	44.1
		CAN$21,000-50,000/year			123	38.4
		>CAN$50,000/year			56	17.5
	Having social support from family or friends				289	90.3
	Self-rated knowledge about MH resources	Poor or fair			131	40.9
		Good			95	29.7
		Very good			52	16.3
		Excellent			42	13.1
	Patient perceptions on attitudes held by MH professionals (outside ED) toward them: “Practitioners outside of the ED have a good opinion of me or treat me fairly despite my problems”	Totally disagree			11	3.4
		Somewhat disagree			21	6.6
		Somewhat agree			46	14.4
		Agree			105	32.8
		Totally agree			137	42.8
	Past hospitalization for MH reasons (2016-2017)	Frequency	0.00	11.00	0.85	1.34
		Number of days	0.00	279.00	16.71	36.96
Enabling factors	Having a regular source of care (outside ED or hospitalization) over the 12 months prior to interview at the ED	Family physician			207	64.7
		Outpatient psychiatrist			145	45.3
		Case manager			126	39.4
	Satisfaction with regular care received from an outpatient psychiatrist (outside ED or hospitalization)	Not at all unsatisfied			11	3.4
		A little unsatisfied			6	1.9
		Fairly satisfied			24	7.5
		Satisfied			34	10.6
		Totally satisfied			71	22.2
		Not applicable			174	54.4
	Satisfaction with regular care received from a case manager (outside ED or hospitalization)	Not at all unsatisfied			2	0.6
		A little unsatisfied			3	0.9
		Fairly satisfied			17	5.3
		Satisfied			38	11.9
		Totally satisfied			71	22.2
		Not applicable			189	59.1
	Frequency of physician consultations for MH reasons (outside ED or hospitalization; 2016-2017)	Family physician	0.00	17	1.07	2.23
		Outpatient psychiatrist	0.00	98	8.06	15.28

MH = mental health; ED = emergency department; MD = mental disorder

Table 1 (continued)

Participant characteristics (N = 320)

			Min	Max	N/Mean	%/SD
Needs factors	Perceived physical health	Poor or fair			129	40.3
		Good			104	32.5
		Very good			47	14.7
		Excellent			40	12.5
	Perceived MH	Poor or fair			199	62.2
		Good			67	20.9
		Very good			30	9.4
		Excellent			24	7.5
	SUD	AUDIT score ≥8			98	30.6
		DAST-20 score ≥6			90	28.1
	Anxiety				98	30.6
	Depression				146	45.6
	Schizophrenia				95	29.7
	Bipolar disorder				60	18.8
	Personality disorders				50	15.6
	Number of chronic physical illnesses		0.00	5.00	0.45	0.81
Dependent Variable	Number of visits to ED for MH reasons over the 12 months prior to interview at the ED		0.00	40.00	1.79	3.74

MH = mental health; ED = emergency department; MD = mental disorder; SUD = substance use disorder; AUDIT = Alcohol Use Disorders Identification Test; DAST-20 = Drug Abuse Screening Test-20

Table 2

Predictors of frequent ED utilization for MH reasons: Bivariate analyses

Model		Standardized Coefficients	t	P	95% Confidence Interval for B	
		Beta			Lower Bound	Upper Bound
Predisposing factors	Currently employed	0.100	1.788	0.075	-0.079	1.659
	Household income	-0.130	-2.345	0.020	-0.306	-0.027
	Having social support from family or friends	0.202	3.687	<0.001	1.192	3.922
	Self-rated knowledge about MH resources	0.153	2.769	0.006	0.158	0.936
	Patient perceptions on attitudes held by MH professionals (outside ED) toward them	-0.099	-1.777	0.077	-0.731	0.037
	Frequency of past hospitalization for MH reasons (2016-2017)	0.221	4.048	<0.001	0.012	0.033
Enabling factors	Having regular care from an outpatient psychiatrist (outside ED or hospitalization) over the 12 months prior to interview at the ED	0.243	4.470	<0.001	1.022	2.629
	Having regular care from a case manager (outside ED or hospitalization) over the 12 months prior to interview at the ED	0.186	3.380	0.001	0.595	2.253
	Satisfaction with regular care received from an outpatient psychiatrist (outside ED or hospitalization)	0.191	3.468	0.001	0.143	0.517
	Satisfaction with regular care received from a case manager (outside ED or hospitalization)	0.138	2.487	0.013	0.049	0.420
Needs factors	DAST-20 score ≥6	0.119	2.143	0.033	0.081	1.901
	Anxiety	0.268	4.966	<0.001	1.313	3.036
	Depression	0.207	3.766	<0.001	0.740	2.359
	Schizophrenia	0.257	4.736	<0.001	1.227	2.971
	Bipolar disorder	0.201	3.658	<0.001	0.889	2.957
	Personality disorders	0.363	6.951	<0.001	2.679	4.794
	Number of chronic physical illnesses	0.160	2.881	0.004	0.235	1.246

MH = mental health; ED = emergency department; MD = mental disorder; DAST-20 = Drug Abuse Screening Test-20

Table 3

Predictors of frequent ED utilitaion for MH reasons: Hierarchical linear regression model

Model		Bloc 1		Bloc 2		Bloc 3						
		Standardized Coefficients Beta	P	Standardized Coefficients Beta	P	Standardized Coefficients Beta	t	P	95% Confidence Interval for B		Collinearity Statistics	
									Lower Bound	Upper Bound	Tolerance	VIF
Needs factors	(Constant)		<0.0001		<0.0001		-13.213	<0.0001	-0.962	-0.713		
	Anxiety	0.215	<0.0001	0.200	<0.0001	0.199	5.162	<0.0001	0.263	0.587	0.931	1.074
	Depression	0.200	<0.0001	0.135	0.001	0.120	2.972	0.003	0.080	0.395	0.847	1.180
	Schizophrenia	0.409	<0.0001	0.287	<0.0001	0.260	6.233	<0.0001	0.383	0.737	0.796	1.257
	Bipolar disorder	0.184	<0.0001	0.138	0.001	0.127	3.257	0.001	0.127	0.514	0.910	1.099
	Personality disorders	0.370	<0.0001	0.262	<0.0001	0.266	6.553	<0.0001	0.504	0.936	0.843	1.186
Predisposing factors	Frequency of past hospitalization for MH reasons (2016-2017)			0.337	<0.0001	0.317	7.042	<0.0001	0.169	0.299	0.683	1.465
Enabling factors	Having regular care from an outpatient psychiatrist (outside ED or hospitalization) over the 12 months prior to interview at the ED					0.123	3.049	0.002	0.086	0.399	0.858	1.165
Adjusted R Squared		0.467		0.546		0.558						
ANOVA	F	56.871		64.944		58.470						
	P	<0.0001		<0.0001		<0.0001						

MH = mental health; ED = emergency department; MD = mental disorder