

RESEARCH REPORT

THE MOST COMMON SELF-REPORTED REASONS FOR CALLING EMS: A CROSS-SECTIONAL SURVEY OF FREQUENT CALLERS IN ONTARIO

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ABSTRACT

Background: Frequent callers of emergency medical services comprise a disproportionate percentage of emergency department visits. This study aims to describe reasons for calling 911 and associated socio-demographic factors among frequent callers in Ontario.

Methods: This was a cross-sectional research design. A mailed, self-administered survey was sent to EMS patients who were identified and recruited to participate as adult EMS patients (18 years or older) who called EMS over five times in one year in one urban Ontario location. The survey instrument was developed based on a prior qualitative study. Dillman's Total Design Method was used to implement the survey. Data was summarized using frequency distribution. Subgroup analyses were performed to assess for factors associated with reasons for calling in the past, reasons for calling in the future, and health services utilized.

Results: The survey participation rate was 30.88% (n=67): 47.8% were over 65, 50.70% were female, 85.1% were unemployed, and 38.8% lived alone. Most frequently reported reasons for having called 911 were inability to get up after a fall (41.8%), exacerbation of chronic medical conditions (37.3%), inability to get to the hospital (34.3%), experiencing severe pain (34.3%), and anxiety attacks (23.9%). Subgroup analysis showed significant associations: unemployment was associated with having called due to an alcohol or drug overdose (OR=6.50; CI: 1.16, 36.26); age over 65 had lower odds of calling in the future for alcohol or drug overdose (OR=0.06; CI: 0.01, 0.51), for serious allergic response (OR=0.22; CI:0.081, 0.740) or severe pain (OR=0.18; CI: 0.064, 0.518); age over 65 (OR=4.46; CI=1.24-17.41) had higher odds of using Community Care Access Centers; and male participants had lower odds of using telehealth (OR=0.19; CI:0.038, 0.97).

Conclusions: The study results show that the most frequent reasons for calling 911, as self-reported by participants, were calls related to falls, transport to medical care facilities, or anxiety attacks. More appropriate management of these non-urgent calls should be considered to free up ambulance services for more urgent calls.

BACKGROUND

Frequent callers of emergency medical services (EMS) comprise a disproportionate percentage of emergency department (ED) visits, representing a group of vulnerable and medically complex patients who contribute to significant healthcare costs (1–3). Within the Canadian ED literature, the 2.1–3.6% who are frequent callers (defined as seven or more ED visits/year) account for 9.9–13.8% of ED visits (4). Similarly, prehospital systems have experienced strain beyond capacity. In Ontario, ambulance use has increased by 40% from 2007 to 2017, representing 176,425 more patient transports, and between 2010 and 2017, a 22.4% increase in funding (5). Of all ambulance transports, frequent callers comprise 40%. (4,6–10) In a published study surveying EMS use, one-third of EMS dispatches are reported by researchers as non-medical emergencies (11). As such, this population of callers, typically those who call EMS 4 to 5 times or more within twelve months, represents an opportunity for optimizing health services and reducing costs to an increasingly overburdened health system (2,12).

Some current literature discusses frequent callers' reasons for calling emergency medical services, but the results have varied depending on the population and study location. There is a gap in the literature concerning frequent callers in the Canadian emergency healthcare system since most studies have occurred in the USA or the UK. The limited Canadian literature reports that frequent users of ED present more commonly than the general population with psychiatric and substance use-related complaints (6). Studies from the USA and UK present varied data, with some noting that chief complaints are similar to non-frequent callers and some noting distinct differences (6,13,14). Some common complaints among attendees include nausea and vomiting, chest pain, abdominal pain, anxiety, and shortness of breath (6,13,14). However, frequent callers are more likely to call due to chronic condition exacerbations in ambulatory care-sensitive diseases. (15) Chronic diseases that are more prevalent in frequent callers include asthma (16,17), chronic obstructive pulmonary disease, renal failure, sickle cell anemia (18), hypertension, diabetes, depression, renal failure (18,19), coronary artery disease, and stroke (15). Conversely, they were less likely to call for trauma or pregnancy-related reasons. (18,20) Some studies have further sub-stratified participants by age or number of calls. One study found that younger age was associated with calls due to alcohol intoxication, dependence, or withdrawal (18); however, another study reported that the association between frequent calls due to psychiatric issues or substance use was mixed (21). Despite frequent callers' overall higher acuity complaints (12) and increased mortality rates post-ED (22), persistent callers (over 20 times per year) were associated with lower acuity complaints and fewer visits that resulted in admissions (23).

Existing studies have primarily taken place in large urban American centers, with far fewer in mid-sized Canadian cities distinct in their universal health insurance, access to primary and ambulatory care, and disease burden. Additionally, most studies are conducted at the ED level, and the current literature needs more data at the pre-hospital EMS level (20). Given that 59.3% of frequent ED attendees arrive by ambulance, as opposed to merely 12% of the general population, studying frequent callers of 911 will contribute to reducing ED overcrowding (24). Describing this population's reasons for calling and access to non-emergency healthcare services will assist in meeting the needs

of this medically and socially complex population with targeted health service planning.

This study aims to determine socio-demographic factors associated with a group of frequent callers in Ontario and to describe their reasons for calling 911, attitudes towards EMS, and healthcare services use.

METHODS

RESEARCH DESIGN

This was a cross-sectional study of community residents in one urban municipality who call 9-1-1 frequently.

PARTICIPANTS

Participants were residents of an urban City in Canada who were 18 years of age or older and had called 911 at least five times between April 1, 2015 and March 31, 2016. A pool of eligible participants was generated from Paramedic Service Electronic Medical Records using a query identifying residents who met these criteria. We aimed to survey 100 participants (n) from this target population. The sample size was based on estimating 95% confidence intervals of proportions with a 10% margin of error, and assuming that 50% of all frequent callers call 9-1-1 for non-emergent service, a conservative estimate for computing sample size for this survey.

DATA GATHERING PROCEDURES

The survey instrument was developed based on qualitative research conducted in a sample of frequent callers of EMS done before the current study. (26) We also included questions assessing the participants' perceptions of emergency health care (comprehensiveness, continuity of care, satisfaction). The survey questionnaire was revised based on face validation and reliability assessment results. Dillman's Total Design Method was used to implement our mailed self-administered survey. We first invited participation in our surveys to all qualified participants, excluding those already participating in phase 1. The participants were given a letter introducing our study objectives and instructions about the survey return procedure, the self-administered survey, a pre-stamped return envelope, and a \$5 gift card. The second mail-out took place a week after the initial mail-out, and it consisted of reminders to participants to complete the survey and return it using the pre-stamped envelope. A final mail-out occurred three to seven weeks after the initial mail-out with a replacement introductory letter, instructions for returning the survey, the survey questionnaire, and a pre-stamped envelope. The second and final mail-out was only done if participants did not respond after the first mail-out. If the participant mailed the survey back, another \$5 gift card was sent to them.

Ethics approval was received from the Hamilton Integrated Research Ethics Board to conduct the research.

OUTCOMES

Data collected included demographic data, reasons participants called 911 in the past and when they might do so in the future, health services most frequently utilized, method of transport to emergency care, and access to/satisfaction with outpatient healthcare.

DATA ANALYSIS

Categorical variables were analyzed using descriptive statistics. Chi-square calculations and odds ratio with 95% confidence intervals were used via Statistical Package for Social Sciences (SPSS) version 20. Dependent variables in the analysis included: reasons for calling in the past and future and health services utilized. Independent variables included age, sex, living situation, and employment status. The reference category for each independent variable in the odds ratio calculation was selected as the lower risk category (i.e., age under 65, female, employed, living with somebody).

RESULTS

DEMOGRAPHICS

400 residents who called 911 for EMS 5 or more times in the urban area during the one-year study period were identified. The response rate was 30.88%. A demographic survey (Table 1) revealed that 47.8% of participants were over 65. Our total resultant sample size was 67. Gender was equally distributed. A significant percentage (85.1%) were unemployed. Regarding living arrangements, 58.2% lived with someone, while 38.8% lived alone. Only 23.9% of participants were normal weight or under; the rest were overweight, obese, or declined to reveal their weight.

REASONS FOR CALLING

The most frequently reported reasons for having called 911 in the preceding year were being unable to get up after a fall, being unable to get to the hospital, experiencing a chronic medical condition exacerbation, experiencing severe pain, and experiencing an anxiety attack (Table 2). The least frequently reported were feeling alone and afraid, feeling lonely, significant bleeding, or severe allergic responses. These actual reasons differed slightly from the potential reasons why individuals would call in the future. The top reasons included heart attack, falling and being unable to get up, chronic medical exacerbation, injuries/broken bones, and significant bleeding.

PERCEPTIONS OF EMERGENCY MEDICAL SERVICES

Participants reported high levels of satisfaction with EMS services (83.5%), with many reporting that the information paramedics provide helps calm them down (74.7%) and that they feel better after paramedics arrive on the scene (71.7%). Over 44% felt better simply after calling 911. Interestingly, 46.3% had never tried to use non-emergency services in the past, 43.3% said that the non-emergency services they had used previously were not adequate for their needs, and 59.7% stated they would use non-emergency

Variable		Frequency (%) (N=67)
Age (yrs)	18-24	1 (1.5)
	25-40	7 (10.4)
	41-64	27 (40.3)
	65-74	15 (22.4)
	75 and older	17 (25.4)
Sex	Male	33 (49.3)
	Female	34 (50.7)
Employment Status	Employed	9 (13.4)
	Not employed	57 (85.1)
	Declined to answer	1 (1.5)
BMI	Underweight (<18.5)	3 (4.5)
	Normal Weight (18.5-24.9)	13 (19.4)
	Overweight (25.0-29.9)	17 (25.4)
	Obese Class I (30.0-34.9)	10 (14.9)
	Obese Class II (35.0-39.9)	6 (9.0)
	Obese Class III (>= 40.0)	3 (4.5)
	Declined to answer	15 (22.4)
Living Arrangement	Lives alone	26 (38.8)
	Lives with someone	39 (58.2)
	Declined to answer	2 (3.0)

Table 1. Demographic Data

Reason	Frequency (%)
Could not get up after a fall	28 (41.8)
Could not get to the hospital	23 (34.3)
Chronic medical condition leading to medical emergency	25 (37.3)
Severe Pain	23 (34.3)
Anxiety attack	16 (23.9)
Heart Attack	11 (16.4)
Injuries or broken bones	10 (14.9)
Vomiting and diarrhea	9 (13.4)
Alcohol/drug overdose	7 (10.4)
Fainting and dizziness	7 (10.4)
Felt alone and afraid	6 (9.0)
Bleeding and significant blood loss	5 (7.5)
Felt lonely	3 (4.5)
Serious allergic response	1 (1.5)

Table 2. Reasons for Calling 911 in the last 12 months

addressing minor and major medical issues. Concerning minor medical issues, the most frequently answered modes of transportation were by having somebody drive them (49.3%) and by ambulance (44.8%). A secondary proportion answered they would utilize public transit (22.4%). Only a small minority responded that they would drive their vehicle (9.0%) or walk or bike (4.5%).

services in non-emergency situations if they knew about such services. Lastly, 41.8% believed the paramedics' role was to help in emergency and non-emergency cases, while 68.7% believed EMS should only be used as a last resort (Table 3).

HEALTH SERVICES

The majority of participants had accessed their family physician and urgent care services in the past year (86.6% and 56.7%), but few had accessed specialized outpatient clinics (26.9%), walk-in clinics (23.9%), telehealth services (16.4%) or community comprehensive care programs (9.0%). Concerning community services, less than half had accessed community social programs, assisted transportation services, or Meals on Wheels.

Besides accessing emergency services, participants also had good access to outpatient non-emergent healthcare (Table 4). The majority of participants answered "yes" in response to whether they visited a particular healthcare provider (HCP) when they were concerned about their health (89.6%). Additionally, 53.7% answered "often" or "almost always" in response to how often they visit their HCP. Satisfaction levels were also high at 68.7%, answering "satisfied" or "very satisfied."

ACCESS TO HOSPITAL

Patients were surveyed concerning how they would go to the hospital when

However, when addressing major medical issues, a much greater percentage answered that they would call an ambulance (91%) than all other transportation forms. The second most frequent answer was having somebody drive them (16.4%).

ASSOCIATIONS

Statistical analysis was done to assess if participant characteristics were associated with reasons for calling 911 or using other healthcare services. Few significant associations were found. In terms of reasons for calling 911, being unemployed was associated with having called due to an alcohol or drug overdose both in the past (OR=6.50; 95% CI: 1.16-36.26) as well as calling in the future (OR=4.27; 95% CI: 0.96-19.03). Age over 65 had lower odds of calling in the future for an alcohol or drug overdose (OR=0.06;95% CI: 0.01-0.51). Older participants had lower odds of calling in the future for a serious allergic response (OR= 0.22; 95% CI=0.08-0.74) or for severe pain (OR=0.18; 95% CI=0.06-0.52). In terms of using health services, male participants had lower odds of using telehealth (OR=0.19; 95% CI=0.04-0.97), age over 65 had lower odds of using specialized outpatient clinics (OR=0.33; 95%CI=0.09-1.01). Unemployment (OR=0.10; 95%CI=0.01-1.02) and age over 65 (OR=4.46; 95%CI=1.24-17.41) had higher odds of using Community Care Access Centers.

DISCUSSION

Our results are consistent with the current literature, which shows that this population of frequent callers is more medically and psychosocially complex (21,27). 37.5% of participants in this study reported calling for chronic medical disease exacerbations, representing overall poor control in the community. This is consistent with current literature, which reports high rates of chronic disease among frequent callers (12, 19, 27). However, literature suggests that it is not merely the presence of a chronic disease diagnosis that may push one toward recurrent calls to 911 but other factors adding to the complexity. In fact, 44% of Canadians overall have been diagnosed with a chronic medical condition (2016) (28) but are not frequent callers of EMS and make up merely 2.1-3.6% of the Canadian EMS transport population (4).

	Characteristic	n	Percent (%)
License	EMT	417	37.5
	Paramedic	695	62.5
Gender	Female	398	35.9
	Male	671	60.3
	Other	42	3.8
Compensation	Paid	473	42.5
	Volunteer	107	9.6
	Paid and Volunteer at least 20 hours/week of	532	47.9

Table 3. Perceptions of EMS

Variable		N (%)
Do you visit a particular healthcare provider (HCP) when you are concerned about your health?	Yes	60 (89.6)
	No	7 (10.4)
How often do you visit the HCP?	Almost never	3 (4.5)
	Seldom	9 (13.4)
	Sometimes	19 (28.4)
	Often	26 (38.8)
	Almost always	10 (14.9)
How satisfied or dissatisfied you feel about the care from above HCP	Very dissatisfied	7 (10.4)
	Dissatisfied	6 (9.0)
	Neutral	7 (10.4)
	Satisfied	26 (38.8)
	Very satisfied	20 (29.9)
	Did not answer	1 (2.5)

Table 4. Access to Outpatient Healthcare

We hypothesize that due to the psychosocial complexity of our population, they are more prone to exacerbations of chronic medical illnesses and manage them more poorly than the general population. Psychosocial factors such as social support and socioeconomic status play a role in the control of chronic diseases such as hypertension (29), COPD (30), and diabetes (31). poverty (32), substance use disorders (33), and psychiatric illnesses (34) are associated with poorer control of chronic medical illnesses. Additionally, patients with comorbid chronic medical conditions with mental health disorders have higher acute care requirements (35). This is particularly relevant to our study, as 85.1% of participants were not employed, and 38.8% lived alone and were, therefore in the lower socioeconomic bracket, with less access to healthcare resources that can be used to support chronic disease management in the community. Participants may have lower financial capacity to manage their medical issues or to develop beneficial lifestyle habits such as diet and exercise, which prevent chronic illness. Low-income status may also be related to the fact that nearly half of our participants were over 65 years old and likely to be dependent on pensions. However, the fact remains that their low-income status may result in higher EMS service use. Similarly, 10.4% of our study's participants called due to an alcohol or drug overdose, and 23.9% called due to an anxiety attack. Such high rates suggest that participants called not only due to chronic medical illness but also to chronic illness exacerbations superimposed onto psychosocial complexity.

Poor functional status is another factor that may lower the threshold for calling EMS in our study population; 41.8% reported that they called due to falling and being unable to get up. Additionally, 34.3% answered that they could not get to the hospital because of having called EMS. This reflects a population with poor functional status who would be less equipped to manage acute exacerbations of medical conditions than the general population. Additionally, these individuals would likely have greater difficulty with transport to ambulatory outpatient care, even in non-emergency situations [36]. This means that their medical and psychiatric conditions may be poorer controlled at baseline. In our study, 85.1% were unemployed so this factor may be amplified with those individuals in our research; perhaps their difficulty accessing outpatient appointments led to unmanaged health conditions for which they called EMS.

Altogether, though, EMS and EDs are not well equipped and are under-resourced to meet the needs of frequent callers. Concerning psychosocial complexity, 23.9% of our participants answered that they have called for anxiety attacks, and 24.5% would call in the future for anxiety attacks. This is comparable to Ontario statistics from 2016/2017, which showed 22.7% of frequent callers called for mental health due to substance use (35). Qualitative data on studying frequent users of ED have noted that regardless of actual acuity, patients call or visit ED due to fear, anxiety, and desperation in response to physical symptoms (35). Patients often seek symptom interpretation and reassurance despite feeling satisfied with their care (29). Therefore, frequent callers may not truly require emergency services but cannot find the reassurance they need from other sources, such as traditional ambulatory care and social services or EMS. Services specifically tailored to these individuals could reduce frequent calls to EMS. Such programs could include frequent multidisciplinary follow-ups providing chronic medical disease management, health education, psychiatric care, and increased social support; patients

could be triaged at the level of dispatch for alternative services, thus rendering EMS attendance unnecessary. Secondly, a prevalent issue in our population was falling and being unable to get up. Because this does not usually require EMS activation, an urgent service could be established to address this need. Lastly, bolstering the mental health support and social services may greatly benefit this population.

Alternative models of care may provide increased quality of service for reduced health-care costs, such as those in which paramedics refer or manage patients to reduce non-acute transports to the ED (36). Some programs divert callers to telemedicine services, provide advice themselves, or refer patients to their regular outpatient follow-up (37). Similar models could be explored in Southern Ontario, but with a holistic view of patients to address non-medical issues such as poor mobility, low socioeconomic status, and social isolation.

Our study had some limitations. Since this was a self-administered survey, responses were subjective and were prone to recall bias. There was also a small study sample because of the small number recruited and relatively low response rate despite our best efforts. However, expanding recruitment beyond one year might lead to more recall bias and difficulty finding contact information. Given that this population was hard to reach, a 30% response rate was acceptable, which is at par with most mailed surveys. A larger sample size would be ideal, but the age and gender distribution was what we expected and a good sign that we reached a representative target population.

CONCLUSIONS

Among our frequent caller participants, the most common reasons for calling 911 were inability to get up after a fall, inability to get to the hospital for medical care, experiencing a chronic medical condition exacerbation, experiencing severe pain, and experiencing an anxiety attack. Most of these reasons for calling may be managed in non-emergency care settings. Most have accessed non-emergency health care services, including family physicians, urgent care services, specialized outpatient clinics, walk-in clinics, and telehealth services. However, over 40% still believe that the paramedic role includes attending to non-emergency care, possibly because they call 911 despite having access to alternative health care services. Overall, participants reported high levels of satisfaction with EMS services, with many reporting that the information paramedics provide helps calm them down and that they feel better after paramedics arrive on scene.

Based on these findings, we believe that the policymakers and leaders in healthcare delivery should review why frequent call 911 and implement a system to help frequent callers use more appropriate healthcare services. This may free up ambulance services to urgent calls and decrease the expense of using more emergency services for non-emergency conditions.

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