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UNMET NEEDS REPORTED BY ADULTS WITH CHRONIC CONDITIONS: AN ANALYSIS OF DATA FROM THE CANADIAN COMMUNITY HEALTH SURVEY

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ABSTRACT

Background: Maximizing function in daily life is a primary goal for persons with chronic conditions.Persons with chronic conditions have reported moderate to severe disability in daily living and frequently use complex and costly healthcare services. Unmet rehabilitation needs can limit activities, restrict participation, cause deterioration of health, increase dependence on others and decrease quality of life. The purpose of the study is to analyze self reported unmet needs of adults with one or more of a specific list of chronic conditions who resided in Ontario, Alberta or British Columbia, Canada (the study population) using data from the Canadian Community Health Survey (CCHS) (Cycles 2001, 2003, and 2005).

Methods: Public use micro data files were downloaded for each CCHS cycle. Patterns of missing data were investigated and accounted for by multivariate imputation using chained equations. The dependent variables of availability, affordability, and acceptability, (three dimensions of access to care), were derived from existing data. Descriptive analysis and logistic regressions were completed to identify relationships between each dependent variable and independent variables. Results: Unmet need for treatment of a physical health condition (physical unmet need) was the most common type of need reported by adults in the study population in three CCHS cycles. Significant associations were identified for age (> 50 years) and sex (female) with each of the dimensions of access to care.

Conclusions: Physical unmet need associated with availability, affordability and acceptability of care was identified in the study population in each of the survey cycles. Physiotherapists are well positioned to address this unmet need.

Keywords: Unmet need, physical health problem, physiotherapy, secondary data analyses

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INTRODUCTION

Physical function is recognized in rehabilitation research and practice as a key component in the evaluation of an individual's wellbeing. Functional status and wellbeing are essential outcomes of medical care due to the high value placed on these concepts by patients [1]. There is also mounting evidence that functional status data are vital to clinical practice to determine patient outcomes and substantiate health system performance [2]. However, people with chronic conditions often have poorer physical health [3].

Maximizing function in everyday life is a primary goal for patients with chronic conditions [1,4]. Changes in physical function can predict the loss of self-management skills better than chronological age [4]. Persons with chronic conditions have reported moderate to severe disability in daily living [4] and frequently use complex and costly healthcare services [5]. Persons with chronic conditions also struggle to access required health services, and health services often fall short of meeting patients' with chronic conditions ongoing needs [5].

Impairments related to many health conditions, and general function improve with rehabilitation [6]. Evidence supports the use of physiotherapy (PT) in the management of chronic conditions, including hypertension, [7] diabetes,[8] arthritis/rheumatism [9-11] and heart disease [12]. In addition, PT management of chronic diseases, such as osteoarthritis, alleviates wait times for physician services by addressing pain and functional issues and reduces the need for more costly surgical interventions [13]. For example, a systematic review by Jansen et al (2011) [14] found that exercise therapy and manual mobilizations combined had a moderate (effect size 0.69, 95% CI 0.42 – 0.96) onpain reduction as measured by the Western Ontario McMaster Universities Index (WOMAC), Lequesne Index and / or visual analogue scale (VAS), in people with knee osteoarthritis. Physiotherapists help persons restore or maintain mobility and independence, as well as maintain or improve strength and function [15].

Unmet need is "…any need for health care that remains because appropriate care was not received," [16] although "need" may be defined differently based on who identifies it [17]. Unmet rehabilitation needs, which may include PT, can limit activities, restrict participation, cause deterioration of health, increase dependence on others and decrease quality of life [6]. These outcomes can have social and financial implications for persons, families and communities. Analysis of three Canadian Community Health Survey (CCHS) cycles (2001, 2003, 2005) identified that persons with chronic conditions were more likely to report an unmet need for health care, than persons without a chronic condition (OR 1.51, 95% CI 1.45 – 1.59) [18]. In addition, data from the 1998 -1999 National Population Health Survey (NPHS) identified more personswho were high users of the health care system (i.e. 8 or more visits to a family physician over the last 12 months) reported an activity limitation with heavy household chores (29.6%)

compared to low to moderate users (6.2%) and non users (2.0%)(p<0.0001). More high users of the health care system also reported having a chronic illness (85.2%) compared to low to moderate users (61%) and non-users (37.3%) (p<0.0001) [19]. The same persons reported the highest rate of unmet needs (18%), compared to low to moderate users (6.4%) and non users (3.9%) (p<0.0001) [19].The most common service needed, but not received, by high users of the health system was care for a physical health problem (68.6%) compared to care of a mental health problem (15.7%), care of an injury (8.3%) or need for a regular checkup (5.2%) [19].

McIntyre et al (2009) [20] propose a framework that describes access to care as an influence on an individual's health care seeking behaviours in various settings. The three dimentions of access in this framework are: availability, affordability, and acceptability of care [20]. Table 1 defines the three dimensions. Understanding the opportunities and constraints of health care use by persons with chronic conditions who have physical unmet needs is essential for physiotherapists who are well positioned to address this need.

Table 1: Definitions of Availability, Affordability, Acceptability [20]

> **Availability:** Physical access to services (i.e. are clinics open when people are able to seek care – such as before / after 'work' hours or on weekends)
>
> **Affordability:** *Financial* access to, or the ability to pay for, services (i.e. those who require the services can pay the provider considering aspects such as third party insurance coverage)
>
> **Acceptability**: Cultural access to services (i.e. the fit between the provider and the patient including attitude towards and expectations of each other)

The purpose of this paper is to investigate the self-reported unmet needs in the CCHS (2001, 2003, and 2005) using cross-sectional analyses of Statistics Canada's public use micro data files (PUMF). A PUMF provides anonymous, primarily non-aggregated survey responses and allows the investigation of relationships between variables using different statistical methods [21]. The PUMF version of the CCHS provides data for health regions on a wide range of topics including presence of chronic health conditions, use of health care services, socio-demographic, income and labour force characteristics [22].

Three research questions guided the analysis:

1. What is the level of physical unmet need (defined by the respondent) compared to other needs (i.e. injury, regular check up, emotional health problems) for adults with one or more specific chronic conditions?

2. How are the reasons for physical unmet need attributed to issues of affordability, availability, acceptability of services?

3. What variables associated with physical unmet needcan be attributed to affordability, availability, and acceptability?

METHODS

The analyses for this study were completed as part of a larger secondary data analysis investigating the impact of public policy decisions on access to physiotherapy services. The results identified from these analyses will contribute to a growing body of literature exploring unmet need for physiotherapy services in Canada.

Study Population

The CCHS is a cross sectional survey that collects information related to health status, health care utilization and determinants of health for Canadians [23]. The CCHS began collecting data in 2001 and was completed every two years until 2005 with a sample of approximately 130,000 respondents [22-23]. In 2007 the sample size was reduced to 65,000 and the survey was completed annually [22,23]. Further changes that included the creation of new optional and core modules (i.e. stages of change for physical activities) and merging health regions to reflect changes to Health Region geography were initiated in 2012[24]. The CCHS was further redesigned to include a new collection strategy as well as to undergo major content revisions for the 2015 cycle [25]. As the CCHS cycles 2001, 2003 and 2005 used the same survey questions, associations between physical unmet need and affordability, availability and acceptability within and between each of these cycles can be investigated.

A description of the methods used to conduct the CCHS in 2001, 2003 and 2005, including how the sampling frame was established, has been described elsewhere [23]. In summary, the CCHS covers the population ≥12 years living in each Canadian province and territory, excluding Aboriginal peoples, full time members of the Canadian Forces, the institutionalized population and two rural Quebec health regions [23]. For the purposes of this paper, CCHS respondents were included if the following inclusion criteria were met: adults >19 years, reported a diagnosis of one or more of the chronic conditions of interest (hypertension, and/or diabetes, and /or arthritis/rheumatism and /or heart disease) and resided in Ontario, On., Alberta, Alb., or British Columbia, BC. These three Canadian provinces were selected for this analysis as all three provinces decreased the available provincial insurance coverage for physiotherapy services, but at different points in time. Specifically, decreased provincial insurance for physiotherapy services were made in Alb. in 1995 [26]; in BC. in 2002 [27]; and in Ont. in 2005 [28].

Study Variables

An approach similar to Chen and Hou (2002) [29] was used to derive the variables of availability, affordability, and acceptability. Respondents were initially identified as having an unmet need if they: responded 'yes' to the question "during the past 12 months, was there ever a time when you felt that you needed health care but you did not receive it". Respondents who indicated 'yes' were then asked to identify the type of care needed but not received: "treatment of a physical health problem" (physical unmet need), "treat-

ment of a emotional health problem" (emotional unmet need), "care for an injury" (injury care), "a regular check up", or "other". The variables of availability, affordability and acceptability were then derived for respondents who indicated an unmet need for a "physical health problem"

Statistical Analysis

The 2001, 2003, and 2005 CCHS PUMFs were downloaded from Ontario Data Documentation, Extraction Service and Infrastructure [30]. A pooled dataset was generated by combining the 3 CCHS cycles. From this pooled dataset, a new database was generated which contained the variables required to derive the variables of interest in addition to the other socio demographic variables from each of the three provinces. Following assembly of the dataset, patterns of missing data were investigated [31]. Multivariate imputation using chained equations were used for the imputation process [32]. This replaces missing values for multiple variables iteratively [33]. To obtain 10 imputations, the total number of iterations performed was 100 (using a burn-in of 10 to converge to a stationary distribution).

Multiple imputation (10 imputations) by province and survey cycle was used to account for missing data for household income, highest level of education completed, number of visits to a physiotherapist, usual number of hours worked per week, and visible minority status. Full response variables used to inform the imputation were: gender, age, marital status, self-perceived health and self-perceived health compared to one year ago. Descriptive analysis of key variables to identify proportions, standard error and 95% confidence intervals (CI) for the variables of availability affordability and acceptability were completed. Means from each sample were compared for significant differences using a 95% level of confidence [34]. Logistic regression was used to determine the relationship between each of the access dimensions and the independent variables of age, sex, total house hold (income), highest level of education attained (education), work and immigration status, visible minority status, and types of self-reported unmet need. Definitions for each of the independent variables are available from Statistics Canada [35]. The general equation for the logistic regressions is:

Logit(pi) = *intercept+age+ sex+ income+ education+ employment status+ immigrant status + visible minority status + type of self reported unmet need + province of residence + time of survey completion +the random error term for the ith individual*

All analyses used the CCHS master survey weight that take into account the survey designs, cycles and non response [35]. This adjusted weight estimates unbiased coefficients given the complex survey design used in the CCHS cycles [35]. All analyses were completed using STATA 13.1 SE.

RESULTS

Table 2 displays the total sample response rates at the household and person level, as reported by Statistics Canada for the 2001,[36]2003 [37] and 2005 [38]CCHS Cycles. The total sample sizes (non-weighted) were 130,827, 134,072 and

132,947 for 2001, 2003 and 2005 cycles respectively. The combined total sample size of all three PUMF CCHS cycles was 397,846. Table 3 identifies the sample size by province and CCHS cycle based on the stated inclusion criteria.

Table 2: Response Rates at the National and Provincial Level (On., Alb., and BC.) for the 2001, 2003, and 2005 CCHS cycles

	Total Sample Response Rate (%)		
CCHS Cycle	Household	Person	Combined
2005[34]	84.9	92.9	78.9
2003[33]	87.1	92.6	80.7
2001[32]	91.4	91.9	84.7

Table 3: Sample Size by Province and CCHS Cycle Based on Stated Inclusion Criteria

	CCHS Cycle			
	2001	**2003**	**2005**	**TOTAL**
On.	12933	15391	15141	**43465**
Alb.	4016	4265	3639	**11920**
BC.	5266	5259	4978	**15503**
Total	22215	24915	23758	**70888**

Missing data

There were 63,497 (16%) respondents with some missing data in the study population. Missing responses were imputed for income (n=57,079), education (n=7023), number of consultations with a physiotherapist (n=459), total usual hours worked per week (n=8396) and visible minority status (n=9310). Missing data for the variables that were used to derive the dependent variables were found to be not missing completely at random [38]. Data were missing more frequently for men compared to women (OR 0.49, p= 0.004, 95% CI 0.31 – 0.80) and for persons with lower compared to higher income (OR 0.60, p,0.0001, 95% CI 0.47-0.76). In addition to using variables that had no missing data (i.e. age, gender, marital status, self-perceived health and self-perceived health compared to one year ago), variables that were imputed were also used in the imputation regressions where appropriate; in other words, most full response and imputed variables would contribute to the estimation of imputed values

Descriptive Analysis

Table 4 summarizes demographic characteristics for the study population in the un-weighted data set.

Table 4: Demographic Data for Sample of Interest in CCHS *

Variables									
Cycle	**Age (yrs.) (%)**			**Gender (%)**		**Chronic Condition (%)***			
	20 – 49	50- 79	80+	M	F	Arthritis / rheumatism	HBP	Diabetes	Heart Disease
Ontario									
2001	24.8	64.4	10.8	40.6	59.4	63	47.5	15.5	20.1
2003	19.0	69.8	11.2	40.8	59.2	65.2	50.9	16.09	20.1
2005	19.4	68.7	12.0	41.0	59.0	63.4	53.0	17.2	18.6
Alberta									
2001	29.3	60.7	9.9	43.2	56.8	65.8	44.3	14.5	14.9
2003	23.5	65.0	11.4	41.4	58.6	66.0	48.5	14.9	15.3
2005	22.3	65.3	12.3	42.6	57.4	64.0	51.7	16.2	15.4
British Columbia									
2001	23.9	64.1	11.9	41.9	58.1	62.0	45.7	15.4	18.8
2003	19.3	7.4	13.3	42.3	57.7	62.4	49.5	16.8	18.5
2005	17.3	67.6	15.0	41.0	59.0	61.0	49.9	17.0	17.2

n = un-weighted sample for each CCHS cycle with one of the specific chronic conditions who live in On., Alb. or BC.

Research Question 1: What is the level of physical unmet need (defined by the respondent) compared to other needs (i.e. injury, regular check up, emotional health problems) for adults with one or more specific chronic conditions?

In each CCHS cycle among persons with one or more specific chronic conditions who reported an unmet need in the previous 12 months, a larger proportion reported a physi

cal unmet need (71.8%, 95% CI 70.4% - 73.2%) compared to any other unmet needs (i.e. other, injury, regular check-up, and emotional health problem). Residents of Alb. and BC. had significantly higher proportions of people reporting a physical unmet need compared to On.in 2005 (Table 5).

Table 5: Proportion of respondents 19 years of age or older with one or more specific chronic condition(s)who reported unmet needs in On., Alb., and BC. in 2001, 2003 and 2005

	Other		Injury		Regular Check Up		Emotional Health Problem		Physical Health Problem	
	Prop.*	95% CI	Prop.	95% CI	Prop.	95% CI	Prop.	95% CI	Prop.	95% CI
Ontario										
2001	0.06	0.05 - 0.07	0.07	0.05 - 0.09	0.05	0.03 - 0.06	0.06	0.05 - 0.08	0.73	0.70 - 0.80
2003	0.09	0.06 - 0.11	0.04	0.03- 0.05	0.06	0.04 - 0.08	0.06	0.04 - 0.08	0.70	0.67 - 0.74
2005	0.09	0.07 - 0.11	0.03	0.02- 0.04	0.06	0.05-0.08	0.04	0.03 - 0.06	0.71	0.68 - 0.74
Alberta										
2001	0.06	0.04 - 0.09	0.07	0.04 -0.10	0.04	0.02- 0.06	0.05	0.03 - 0.08	0.72	0.67 - 0.77
2003	0.06	0.03- 0.08	0.05	0.03-0.08	0.04	0.01 - 0.07	0.07	0.03 - 0.12	0.70	0.63 - 0.77
2005	0.05	0.02 - 0.07	0.07	0.02- 0.12	0.05	0.02 - 0.08	0.04	0.01- 0.06	0.75	0.69 - 0.81
British Columbia										
2001	0.07	0.05 - 0.09	0.08	0.05- 0.10	0.05	0.03 - 0.07	0.05	0.03 - 0.07	0.71	0.67 - 0.75
2003	0.09	0.07 - 0.12	0.04	0.03-0.06	0.02	0.00-0.03	0.05	0.03-0.75	0.73	0.69 - 0.78
2005	0.07	0.05 - 0.09	0.05	0.02-0.08	0.03	0.02-0.05	0.05	0.03-0.08	0.75	0.70 - 0.79

Prop = proportion

Research Question 2: How are the reasons for physical unmet need attributed to issues of affordability, availability, acceptability of services?

A summary of the results is presented below by province, dependent variable, and by time; Figure 1 presents the means and Table 6 presents the mean differences and test statistics of the mean differences over time comparisons.
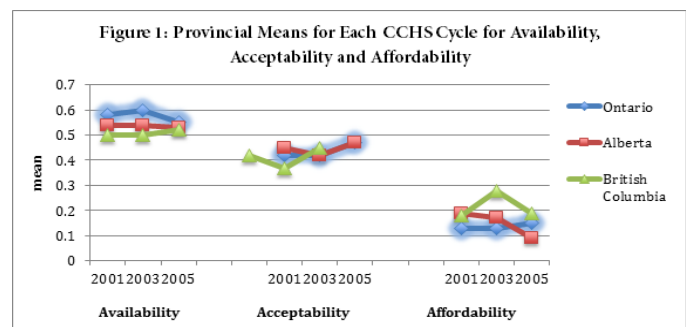

Figure 1: Provincial Means for Each CCHS Cycle for Availability, Acceptability and Affordability

Table 6: Mean differences over time comparisons for availability, affordability, and acceptability

	Ontario			Alberta			British Columbia		
	Avail.	Afford.	Accept.	Avail.	Afford.	Accept.	Avail.	Afford.	Accept.
Mean									
2001	0.58	0.13	0.42	0.54	0.19	0.45	0.50	0.18	0.42
2003	0.60	0.13	0.42	0.54	0.17	0.42	0.50	0.28	0.37
2005	0.55	0.15	0.47	0.53	0.09	0.47	0.52	0.19	0.45
Mean Difference									
2001 vs. 2003	-0.02	0.00	0.00	0.00	0.02	0.03	0.00	-0.10	0.05
2001 vs 2005	-0.03	-0.02	-0.05	0.01	0.10	-0.02	-0.02	-0.01	-0.03
2003 vs 2005	0.05	-0.02	-0.05	0.01	0.08	-0.05	-0.02	0.09	-0.08
Test Statistic									
2001 vs. 2003	-0.05	-0.04	-0.06	-0.12	-0.07	-0.08	-0.08	0.03*	-0.02
2001 vs. 2005	-0.03	-0.02	-0.01	-0.09	0.04*	-0.09	-0.05	-0.06	-0.06
2003 vs. 2005	-0.02	-0.03	-0.01	-0.11	0.01*	-0.07	-0.06	0.02*	-0.004

* = significant at 0.05 based on $((x_1-x_2)-1.96*\sqrt{(SE_1^2 + SE_2^2))}$ [34]

Avail. = availability   Afford. = affordability   Accept. = acceptability

Ontario

No significant difference between means were found between cycles (i.e. 2001 vs. 2003, 2003 vs. 2005 and /or 2001 vs. 2005) related to the proportion of respondents who reported availability, affordability or acceptability as reasons forphysical unmet need.

Alberta

A significant difference between the means was identified for the domain "affordability". A smaller proportion of Alb. respondents reported physical unmet need due to affordability in 2005 ($\bar{x}$= 0.09, SE 0.02, 95%CI 0.05-0.12) compared to 2001 ($\bar{x}$= 0.19, SE 0.03, 95%CI 0.14 – 0.25) and in 2005 ($\bar{x}$= 0.09, SE 0.02, 95%CI 0.05-0.12) compared to 2003 ($\bar{x}$= 0.17, SE 0.04, 95% CI 0.10 – 0.24).

British Columbia

An increased proportion of BC respondents reported unmet physical need due to affordability in 2003 ($\bar{x}$= 0.28, SE 0.03, 95%CI 0.23 – 0.34) compared to both 2001 and 2005 ($\bar{x}$= 0.18, SE 0.02, 95%CI 0.14-0.22; $\bar{x}$=0.19, SE 0.03, 95%CI 0.14-0.24, respectively).

In summary, the analysis identified that the affordability dimension had significant differences in Alberta and British Columbia in 2005 and 2003 respectively. Significant differences for acceptability and availability were not identified for any province.

Research Question 3: Which variables associated with physical unmet need can be attributed to affordability, availability, and acceptability?

Logistic regression was used to determine which variables are associated with self-reported physical unmet needs for adults with specific chronic conditions. Consistent and significant associations were found between each of the access dimensions and the independent variables age and sex. In particular, adults with one or more of the specific conditions who were > 50 years were significantly less likely than adults 40 – 45 years (reference group), and men were less likely than women to report a physical unmet need due to each of availability, affordability and acceptability. Other significant findings with the independent variables were also identified for each of the access dimensions (see Table 7).

Table 7: Logit regression results for the three dimensions of access to care (availability, affordability, acceptability) for physical unmet need

Dependent Variable	Availability						Affordability						Acceptability					
	OR	SE	t	P-Value	95% CI		OR	SE	t	P-Value	95% CI		OR	SE	t	P-Value	95% CI	
Variable					Lower	Upper					Lower	Upper					Lower	Upper
Age (yrs)																		
20 - 29	1.13	0.14	0.97	0.33	0.88	1.44	1.50	0.33	1.86	0.06	0.98	2.31	2.23	0.33	5.39	0.00*	1.67	2.99
30 - 39	1.12	0.10	1.17	0.24	0.93	1.34	0.83	0.15	-1.02	0.31	0.59	1.18	1.30	0.15	2.32	0.02*	1.04	1.63
50 - 59	0.81	0.06	-2.58	0.01*	0.70	0.95	0.64	0.10	-2.71	0.01*	0.47	0.89	0.79	0.07	-2.63	0.01*	0.66	0.94
60-69	0.55	0.05	-7.20	0.00*	0.47	0.65	0.36	0.06	-6.18	0.00*	0.26	0.49	0.47	0.05	-7.49	0.00*	0.39	0.57
70 - 79	0.40	0.04	-9.20	0.00*	0.33	0.49	0.27	0.06	-6.16	0.00*	0.17	0.41	0.44	0.05	-7.04	0.00*	0.35	0.55
> 80	0.30	0.04	-10.19	0.00*	0.24	0.38	0.25	0.06	-6.02	0.00*	0.16	0.39	0.35	0.05	-7.85	0.00*	0.27	0.46
Sex																		
Female	1.31	0.07	5.10	0.00*	1.18	1.45	1.40	0.16	3.02	0.00*	1.13	1.75	1.14	0.07	2.15	0.03*	1.01	1.30
Household Income ($)																		
0 -14999	1.06	0.10	0.61	0.55	0.88	1.28	5.34	1.17	7.65	0.00*	3.47	8.21	1.85	0.25	4.53	0.00*	1.42	2.43
15000-29999	1.05	0.09	0.57	0.57	0.88	1.25	3.05	0.65	5.21	0.00*	2.00	4.64	1.48	0.17	3.38	0.00*	1.17	1.85
30000 - 49999	0.99	0.08	-0.13	0.90	0.85	1.16	2.68	0.58	4.58	0.00*	1.76	4.09	1.30	0.14	2.40	0.02*	1.05	1.60
50000 -79999	0.99	0.08	-0.18	0.86	0.85	1.15	1.75	0.38	2.58	0.01*	1.14	2.67	1.05	0.11	0.44	0.66	0.85	1.28
Education																		
Little secondary	0.88	0.07	-1.64	0.10	0.75	1.03	1.09	0.18	0.55	0.58	0.79	1.51	1.00	0.10	0.04	0.97	0.83	1.21
Other Post Secondary	1.10	0.12	0.89	0.37	0.89	1.36	0.87	0.16	-0.75	0.45	0.61	1.25	1.39	0.18	2.54	0.01*	1.08	1.80
Post Secondary Graduate	1.15	0.08	2.09	0.04*	1.01	1.32	1.15	0.16	1.04	0.30	0.88	1.51	1.14	0.10	1.39	0.16	0.95	1.36
Employment Status																		
Part time	0.80	0.07	-2.48	0.01*	0.67	0.95	1.06	0.22	0.29	0.77	0.71	1.60	0.88	0.09	-1.18	0.24	0.72	1.09
Full time	0.80	0.06	-3.15	0.00*	0.70	0.92	0.65	0.09	-3.10	0.00*	0.50	0.85	0.91	0.08	-1.16	0.25	0.77	1.07
Years since Immigrating to Canada																		
0 - 9	1.53	0.29	2.20	0.03*	1.05	2.23	1.74	0.46	2.08	0.04*	1.03	2.92	1.42	0.34	1.49	0.14	0.89	2.27
>10	0.95	0.06	-0.81	0.42	0.84	1.08	1.32	0.17	2.19	0.03*	1.03	1.70	0.89	0.07	-1.53	0.13	0.76	1.03
Visible Minority																		
Yes	0.96	0.10	-0.39	0.70	0.79	1.17	1.31	0.22	1.62	0.11	0.95	1.80	0.89	0.10	-1.03	0.31	0.72	1.11
Type of Unmet Need																		
Unmet mental health need	1.69	0.31	2.93	0.00*	1.19	2.41	3.09	0.73	4.74	0.00*	1.94	4.92	2.81	0.44	6.57	0.00*	2.06	3.82
Unmet need for a check-up	1.66	0.32	2.63	0.01*	1.14	2.43	2.17	0.66	2.54	0.01*	1.19	3.94	1.27	0.27	1.12	0.26	0.84	1.94
Unmet need for care of an injury	2.25	0.37	4.86	0.00*	1.62	3.12	3.42	0.88	4.77	0.00*	2.06	5.66	1.74	0.37	2.65	0.01*	1.16	2.63
Other unmet need	0.71	0.16	-1.51	0.13	0.45	1.11	1.69	0.49	1.81	0.07	0.96	2.99	1.11	0.32	0.38	0.71	0.64	1.95
Province of Residence																		
Alberta	0.93	0.06	-1.06	0.29	0.81	1.06	1.21	0.17	1.39	0.16	0.93	1.58	1.01	0.08	0.14	0.89	0.86	1.19
Bristish Columbia	0.92	0.06	-1.40	0.16	0.82	1.03	1.58	0.17	4.24	0.00*	1.28	1.94	1.00	0.07	-0.01	1.00	0.88	1.14
Time of Survey Completion																		
2003	0.82	0.05	-3.44	0.00*	0.73	0.92	0.98	0.12	-0.16	0.87	0.78	1.24	0.81	0.06	-2.82	0.01*	0.70	0.94
2005	0.86	0.05	-2.47	0.01*	0.76	0.97	1.02	0.13	0.18	0.86	0.80	1.30	1.05	0.08	0.68	0.50	0.91	1.21
Constant	0.09	0.01	-18.93	0.00*	0.07	0.12	0.01	0.00	-17.48	0.00*	0.00	0.01	0.05	0.01	-20.19	0.00*	0.04	0.07

OR = odds ratio   SE = standard error   95% CI = 95% Confidence Interval   yrs. = years

*Indicates significant at p <0.05

Referent categories of Table 7: Age 40 – 49 years; Income > $80,000, Education – high school completed; Employment –not employed; Non-immigrant; Not a visible minority; Unmet need for treatment of a physical health problem; Province of residence – Ontario; Time of Survey completion 2001

Availability

Persons≥50 years old reported significantly less physical unmet need compared to adults 40 – 45 years due to availability (Table 7). Persons who worked part time, full time, or who responded to the survey in 2003 or 2005 were also significantly less likely to report a physical unmet need due to availability compared to persons who were not employed and who responded to the CCHS in 2001respectively. However, women, recent immigrants (≥9 years), and persons with an unmet emotional health need, unmet check-up needs or unmet injury care were significantly more likely to report an unmet need due to availability than men and persons with a physical unmet need respectively. Province of residence and income were not significant.

Affordability

Similar to the findings for availability, persons who were ≥50 years of age or persons who worked full time were significantly less likely to report a physical unmet need due to affordability compared to persons 40 – 49 years or persons who did not work respectively (Table 7). Women, persons with unmet mental health unmet need, unmet check up need, or unmet injury need, were also significantly more likely to report an unmet need due to affordability then men or persons with physical unmet needs (Table 7). Unlike the findings for availability, a significant positive association was identified for income. In this analysis all income categories had an increased likelihood of reporting an unmet need due to affordability compared to persons with the highest annual income (>=$80,000) (reference category) (Table 7). In addition, immigrants and BC residents were significantly more likely to report a physical unmet need due to affordability compared to non-immigrants and residents of On. (Table7). Time of survey completion, education and visible minority status were not significant.

Acceptability

The analysis where acceptability was the dependent variable identified the fewest significant associations (Table 7). Persons >/=50 years were significantly less likely to report a physical unmet need due to acceptability compared to persons 40 – 49 years. Women were also significantly more likely to report a physical unmet need due to acceptability compared to men. Unlike the previous analyses, persons< 39 years were also significantly more likely to report a physical unmet need due to acceptability compared to persons 40 – 49 years.

Income had a positive significant association with physical unmet need for persons who reported an income<$49,999 compared to persons with an income≥ $80,000. In addition, persons who completed some 'other' post-secondary education (i.e. trades certificate), or had mental health un-met needs, or injury unmet need were significantly more likely to report an unmet need due to acceptability compared to persons with no education or physical unmet needs respectively (Table 7). Persons who completed the CCHS in 2003 were less likely to report an unmet need due to acceptability compared to persons in 2001. Employment, immigrant and visible minority status as well as province of residence were not significant factors.

DISCUSSION

Kasman & Badley (2004) [40], Law et al (2005) [41],Wu et al (2005) [42] and Ronksley et al (2012) [18] have all identified population groups with increased likelihood of reporting unmet need for health care in Canada. These groups include persons with the following characteristics: in worse health, <69 years, with higher education, with lower income, without prescription drug coverage and who are female [40-43]. In Canada, the percentage of people reporting an unmet need for health care rose from 4.2% in 1994/1995 to 12.5% in 2000/01 [43].However, it is not known how many Canadians have an unmet need for PT services.

The descriptive analysis in this study identified physical unmet need as the most common type of need reported in three CCHS survey cycles (2001, 2003, and 2005) by adults >19 yrs. with one or more specific chronic condition (hypertension, and/or diabetes, and /or arthritis/rheumatism and /or heart disease) from On., Alb. or BC. This finding is consistent with other research investigating unmet needs in Canada. For example, Shortt and McColl (2006)[19] found that treatment for a physical health problem was the most common need identified, but treatment not sought for, in an analysis of the 1998-1999 Canadian National Population Health Survey (NPHS). Statistics Canada also reported that in 2014, approximately 3.4 million Canadians ≥ 12 years old reported that they did not receive health care when they felt that they needed it, and the largest proportion of unmet need was for the treatment of physical health problems (65.1%) compared to any other type [44]. The trend of unmet need for treatment of a physical health problem for adults with chronic conditions is concerning. In 2014 the Centre for Chronic Disease Prevention, at the Public Health Agency of Canada, identified at least 21.4% of the population ≥20 years in Canada has at least one major chronic disease, and 38.4% have at least one of ten main chronic diseases (heart disease, stroke, cancer, asthma, chronic obstructive pulmonary disease, diabetes, arthritis, Alzheimer's or other dementia, mood disorder [depression], and anxiety) [45].In addition, Elmslie (no date) [46] noted that there is a 14% increase in chronic diseases annually and treatment of chronic disease costs the Canadian economy $190 billion annually, with $68 billion attributed to treatment and the remainder to lost productivity [46]. Thus, if physical health problems continue to be inadequately addressed, the implications may impact the health of many Canadians and may contribute to the costs associated with lost productivity. Additional analyses are required to understand how existing health services may

be mobilized to address this long-standing gap in the care of adults with chronic conditions.

The descriptive analyses completed as part of this study also identified affordability as the only domain of access that demonstrated significant changes between CCHS Cycles. Specifically, this analysis identified significant differences in Alb. between 2001 and 2005 and 2003 and 2005, and in BC. between 2001 and 2003 and 2003 and 2005. The nature of descriptive analyses in this study do not allow for the direct determination of why differences between cycles for specific provinces exist. However, it is possible that the provincial differences may be attributed to the fact that the oversight of health care in Canada is provincially driven [47]. Each province independently decides the extent to which services not considered "medically necessary" are funded [46]. Thus, the unique health care structures with each of the provinces studied may have created environments that impact unmet need differently. In addition, as most Canadian health systems have been in a state of transformation or reform over the past 20 years, health care resources available to persons with chronic conditions may have changed between CCHS cycles. It was beyond the scope of this paper to investigate the health policies that existed within each of the three provinces across the CCHS cycles, or to determine whether the provincial variations account for the identified differences in affordability. Thus, additional research is required to determine what,if any, policies either contribute to, or protect persons with chronic conditionsfrom,reporting affordability as the rationale for unmet health care needs.

The regression analyses in this study also identified significant associations between age and sex and each of availability, affordability, and acceptability dependent variables. Specifically, the results from this study indicated women were more likely than men, and older persons were less likely than persons 40 – 45 years, to report a physical unmet need due to any of the three dimensions of access to care.These findings are consistent with the existing literature. For example, multiple studies have demonstrated that in Canada women report more unmet need for health care than men,[42,43,47,49] despite accessing health services more frequently than men [48]. Levesque et al (2008) [48] identified that a higher proportion of women (53.2%, 95% CI 50.3 – 56.0) compared to men (46.8%, 95% CI 44.0 – 49.7) reported an unmet need for health services in a survey of 9,206 adults who resided in Montreal or Monteregie, Quebec, Canada in 2005. However, Bryant et al (2009) [50] have also identified that women tend to assume the responsibility of primary care giving of family members, and women who work outside the house may have increased responsibilities that threaten their own health [50]. These responsibilities may affect women's health directly through the stress of greater responsibilities, or indirectly through difficulties with scheduling and meeting medical appointments [50]. Despite the volume of research documenting disparities in women's access to health services, most services are neither funded nor delivered with gender or

sex based considerations [51]. Thus, physiotherapists are challenged to consider if current delivery systems could be modified to address concerns related to availability, affordability and acceptability in order to ensure that structural and health system barriers do not prevent women with chronic conditions from achieving their health potential [51].

This study also identified that adults (> 50 years) are less likely to report physical unmet need due to any of the three dimensions of access to care. This is also consistent with existing research. For example, Sanmartin & Ross (2006) [52] identified significant factors associated with having difficulties accessing first contact healthcare services using population data from two Canadian surveys – the Health Services Access Survey and the CCHS (2003). Sanmartin and Ross (2006) [52] noted that among persons who had trouble accessing routine care, younger persons (< 65 years) had significantly higher odds of reporting difficulties than older persons (> 65 years) (OR= 1.95 for persons < 35 years, CI 1.41 – 2.72, p<0.05 and OR= 1.90, 95% CI 1.43-2.56 p < 0.05 for persons 35-64 years) [52]. This difference in unmet need may be due to older persons having increased support from the health system as their need for services increases [48]. Levesque et al (2008) [48] identified that older adults may have less unmet need because very few older adults do not have a family physician. However, it is possible that certain barriers related to the use of health care, including older adults' perceived acceptability of services, and/or if the availability of publicly funded services meet older adults' needs, have not been explored sufficiently. As the prevalence of chronic conditions and associated comorbidities continues to rise, it is imperative for physiotherapists to consider how they can contribute to the delivery of quality care for all persons through identifying strategies to address the unmet health care needs of younger persons with chronic conditions.

A number of significant associations between the independent variables and each of the three dimensions of access to care consistent with other findings in the literature were also identified in this study. For example, Ronksley et al (2012) [18] reported an association between income and unmet need. In the current study income was also significantly associated with affordability. Specifically, the results from this study found persons who reported lower income had significantly higher unmet needs due to affordability compared to persons with an income > $80,000. However, affordability was the only access dimension with significant findings in both the descriptive and regression analysis. Additionally, an analysis of the '2000 Medical Expenditure Panel Survey', a set of large scale surveys of individuals and families, their medical providers and employer across the United States of America (USA), by the Centre on an Aging Society at Georgetown University, identified that relative to people in similar age groups, people with multiple chronic conditions are more likely to have incomes of =/< $20,000 and less likely to have incomes of > $50,000 [53]. This same analysis identified that among adults < 65 years,

with two or more chronic conditions, more than 25% are not working because they have a disability [53]. However, the findings from this study are also different from other research that has identified availability as the most commonly reported reason for unmet need across Canadian provinces [43]. It is possible that the specific population selected in this secondary data analysis, adults with chronic conditions who resided in one of three Canadian provinces, may have unique characteristics related to income that contribute to these differences. Persons with chronic conditions may have limited resources that can be allocated to seeking health care. While availability was not identified as the main barrier in this study, it is feasible to consider that persons with chronic condition's limited resources for health care, could be perceived as either influencing the perceived of affordability of services if only private, fee for services are available, or the perceived availability of subsidized or publicly funded services, depending on persons' experiences with the health system. Thus, as provinces continue to consider, and implement, health care reform physiotherapists need to be engaged in finding cost effective solutions for the delivery of health care which maximize the opportunities for adults with chronic conditions to be able to access, and benefit from, physiotherapy services.

Limitations

The data used to explore physical unmet need in this analysis are cross sectional (i.e. persons are not followed across time), and as such do not allow for causality between physical unmet needs and availability, affordability and acceptability to be assessed [54]. Only adults with specific chronic conditions for which there is evidence to support a role for physiotherapy interventions were included in the analyses. As a result it is possible that these results may not be generalizable to the unmet needs of the general population. However, unmet need for treatment of a physical health problem was identified as the most common service needed but not received when type of need was compared in each CCHS cycle analyzed in this study and more recently by Statistics Canada in 2014 [43].

CONCLUSIONS

This study has shown that unmet need for treatment of a physical health problem was the most common type of need reported in three CCHS survey cycles (2001, 2003, and 2005) by adults >19 yrs. with one or more specific chronic condition (hypertension, and/or diabetes, and /or arthritis/rheumatism and /or heart disease) who resided in On., Alb. and BC. In addition, significant associations between sex and age were identified for each of availability, affordability and acceptability. However, affordability was the only access dimension found to have significant results through the analyses used to answer each of the three research questions guiding this paper. These results contribute to a consistent theme within the literature of unmet health care needs associated with physical health problems for persons with chronic conditions. The analyses also provide physiotherapists and policy makers, who

are well positioned to address physical health problems, with evidence about which barriers may prevent adults with chronic conditions accessing services. As physical function is an essential aspect to an individual's well being, this data can inform policy and practice changes in order to enhance the delivery of physiotherapy services for persons in need. As the delivery of health care services continues to evolve, physiotherapists are encouraged to seize the opportunity to demonstrate the professions' expertise and value in maximizing physical function and preventing functional decline for adults with chronic conditions.

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