

MENTAL HEALTH SERVICES UTILISATION IN AN INNER-CITY AREA OF MONTREAL: A CAUSAL MODEL APPROACH

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Abstract.

The aim of this study was to examine how predisposing, enabling and need variables act and interact to influence mental health services utilisation. The sample consisted of 227 mental health services users who had at least one mental health diagnosis during the last twelve months. Multivariate linear regressions were performed to assess the influence of predisposing, enabling and need factors on mental health service use followed by path analysis using Ordinary Least Square estimation with robust standard errors. In terms of the results, only the number of diagnoses was associated with mental health service use. In the path analytic model, predisposing factors were associated with facilitating factors which in turn were associated with needs factors. Finally, needs were significantly associated with increased mental health service use. Predisposing and facilitating factors influence indirectly health service use through needs factors. The major contribution of this study is in providing some idea as to how various factors combine to influence the utilisation of mental health services. It is hoped that besides contributing to the research methodology in health services utilisation; this study enhances the understanding of causal relationships among the determinants of mental health services utilisation.

Key Words: Inner-city, Montreal, mental health, services utilisation, path analysis.

JEL Codes: I12, I18, J18, J38, O21, H51.

Résumé. Modèle causal des déterminants de l'utilisation des services en santé mentale dans un secteur déshérité de Montréal

Le but de cette étude était d'examiner comment les variables prédisposant, facilitant et de besoin agissent et inter agissent pour influencer l'utilisation des services en santé mentale. L'étude est menée auprès d'un échantillon de 227 personnes ayant au moins un diagnostic de santé mentale et qui ont utilisé des services de santé mentale au cours des douze derniers mois. À l'aide d'une régression linéaire multiple, nous avons évalué l'influence des facteurs prédisposant, facilitant et de besoin sur l'utilisation des services. Une analyse causale avec l'estimation par la méthode du moindre carré ordinaire a complété notre analyse. En termes de résultats, dans le modèle linéaire, le nombre de diagnostics de trouble mental était associé à l'utilisation des services. Dans le modèle causal cependant, on note que les facteurs prédisposant ont une influence sur les facteurs facilitant lesquels influencent à leur tour les

facteurs de besoin. Finalement, les facteurs de besoin agissent directement sur l'utilisation des services. La contribution majeure de cette étude est la mise au jour de l'influence des variables distales sur l'utilisation des services en santé mentale. En plus de contribuer à l'avancement des méthodologies de recherche dans le domaine de l'utilisation des services, notre étude met en valeur les différentes relations causales qui existent entre les déterminants de l'utilisation des services.

Mots clés : Quartiers déshérités, Montréal, santé mentale, utilisation des services, modèle causale.

Codes JEL : I12, I18, J18, J38, O21, H51.

Introduction

The burden of mental health to individual and societies has been recognised by the World Health Organization as the world's leading cause of disability after cardiovascular disease (Michaud et al, 2001; Warner and de Girolamo, 1995). Previous Canadian studies have reported that 4.5% to 10.9% of Canadians aged 15 and over experienced at least one mental health disorders annually (Lesage et al, 2006; Patten and Beck, 2004). Yet despite these alarming statistics and the pervasive need for treatment, about less than 40% of Canadians who suffer from mental health disorders consult a health care professional for their mental health problems (Vasiliadis et al, 2005; Vasiliadis et al, 2007). Thus, there is a pressing need to identify factors that foster utilisation of mental health services. Seeking help for mental health problems is a complex process that involves personal socio-demographic characteristics, culturally mediated interpretations of symptoms, availability of health care services, economic and socio-structural factors as well as the health care services organisation (Crabb and Hunsley, 2006).

Several epidemiological studies have identified various variables associated with help seeking for mental health reasons. A study using an administrative database founded that in central Toronto, lower socioeconomic status was associated with less likelihood of seeing a psychiatrist and with fewer with family physician for a mental health problem (Kirmayer et al, 2007). Other studies revealed that patient's age (Fox, 1984), level of education (Eisenberg et al, 2007), gender (Hines-Martin et al, 2003), attitude toward health care provider (Dutton, 1978), perceived social support (Flett et al, 1995), severity and duration of mental health symptoms were associated with help seeking for mental disorders (Sullivan et al, 1996; Tessler et al, 1976; Veroff et al, 1981). Compare to younger, older adults are less likely to consult with speciality mental health providers (e.g. psychiatrists, psychologists) and are more likely to consult mostly general medical providers for their mental health problems (Crabb and Hunsley, 2006).

There is less information regarding variables that influenced the number of services used by those who seek help for their mental health problems (Ngamini Ngui et al, 2010b). Also, most analyses remain descriptive, few have attempted multivariate analysis (Bush and Osterweis, 1978) and to our knowledge, none has specified an explicit causal model to predict the amount of mental health services used. The purpose of this paper is to assess individual determinants of the number of mental health services used by people diagnosed with mental disorders in the south west sector of Montreal. We use a causal multivariate

model. The advantage of a causal model is that it allows an estimation of how much a hypothetical change in one variable in the system will affect other variables, as well as allowing an estimation of how much variation in the dependent variable can be explained by all of the other variables combined. While many of the variables used to predict the amount of health care use in our model have been previously related to utilisation of mental health services (Horwitz, 1987; Pescosolido et al, 1998; Wang et al, 2005), our model explicates their interrelationships and relative importance.

The purpose of this study is to investigate the magnitude and interrelationships of the direct and indirect causal effects of specific predictors of the amount of health services use.

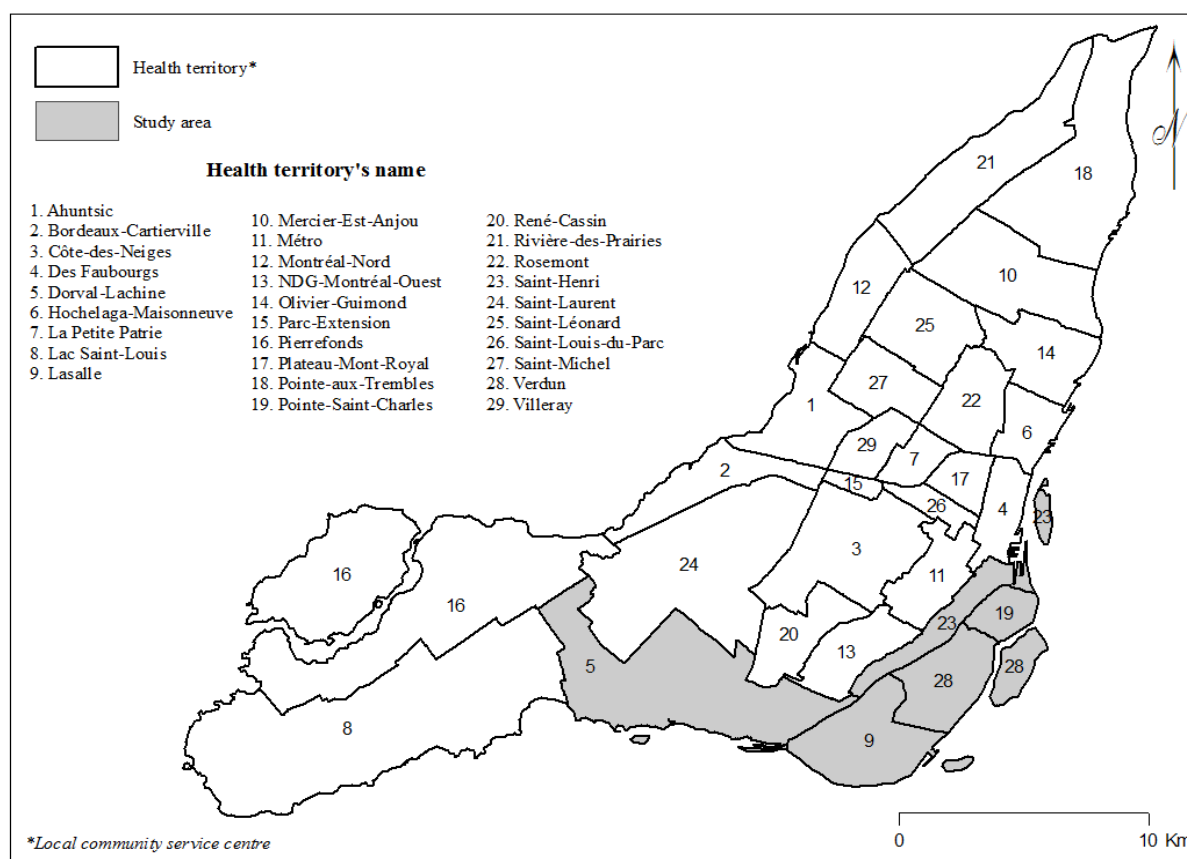
Methods

The present study is part of a broader research project on the development of an epidemiological catchment area in the south-west of Montreal (Caron et al, 2007). Individuals were recruited from May 2007 to August 2008. We aimed to obtain a representative sample of the target population, both geographically, i.e. recruiting participants from all areas of the territory, and in proportion to the population density, as well as in terms of SES, that is, representative of the educational attainment structure of the territory. We constructed a target sample of 3,708 addresses for recruitment. We used a list of addresses provided by the 2004 valuation role and attributed expected response rates based on the 2001 Census educational attainment of the Enumeration Area. Phone numbers for the list of 3,708 addresses was provided by an external company, allowing initial recruitment to take place via phone contact. Recruiters would call these numbers and solicit interest in participating. This initial phase, held between April and October 2007, resulted in the recruitment of 261 participants. But due to the relative inefficiency and low response rates obtained by telephone, a second phase of door-to-door recruitment was launched. In order to improve efficiency of the recruitment teams, it was decided to extend the original address that was targeted to a range of 14 neighbouring addresses. This range of 14 potential addresses comprised the original address, the three closest addresses on each side of the original address, and the seven addresses on the opposite side of the street. This new strategy permitted to contact 4,269 potential participants. Among those 4,269 potential eligible candidates that were met, 1,405 declined to participate in the study (32.9%). Some 730 respondents initially agreed to be part of the study at first contact with the door-to-door recruitment team, but later declined to participate, mainly when being re-contacted by phone to confirm an appointment for the interview (17%). Finally, 2,434 participants accepted and completed the interview (50.1%). Among those who completed the questionnaire, 423 had at least one mental health diagnosis during the last twelve and 227 had used at least one health service during the last twelve months. Analyses for this study are based on these 227 mental health services users. The project was approved by an ethics committee, and participants were asked to sign a consent form.

Study Area

The study area consists of about 85.07 km² in the south-west of Montreal (Figure 1). The area had 301,091 inhabitants in 2006. About 24% of residents were recent immigrants, i.e have immigrated in Canada during the past five years, 23% had English as first language. Also, 30% live only on social welfare and more than 30% of younger aged 20 years old have not attended secondary school (Statistique Canada, 2010). The area is also divided into five territories of local community services centre and three of them (Saint-Henri, Pointe-Saint-Charles and Verdun) are the most deprived health territories in Montreal (Ngamini Ngui et al, 2010a).

FIGURE 1 Location of the Study Area



Measurements

Diagnosed mental disorders

The World Health Organization's World Mental Health Survey Initiative version of the Composite International Diagnostic Interview (WHM-CIDI), a fully structured diagnostic interview, was used to assess the presence of mental disorders for 12 months with the

definitions and criteria of the American Psychiatric Association's diagnostic and statistical manual of mental health disorders fourth edition (DSM-IV) (Wang et al, 2005). The disorders considered in this analysis include agoraphobia, panic disorder, mania, depression, social phobia, panic disorder, alcohol and drug abuse and dependence. All diagnoses were made with CIDI organic exclusion rules, which ascertain that the symptoms are not due to a physical cause of medication or drug (Wang et al, 2007).

Dependent Variable

The number of services used during the past 12 months was assessed by adding different type of services used for mental health reasons. These services were offered in medical clinics, walking clinics, general hospitals, psychiatric hospitals, centres offering specialised services, community organisation specialised in mental health, health office at the work place, health office in school and local community service centre (CLSCs).

Predictor Variables

We used Andersen's conceptual model (Aday and Andersen, 1974; Andersen, 1995; Andersen and Newman, 1973; Anderson, 1972) to identify the variables that may influence the quantity of services use. The model posits that health services use is determined by societal factors, health services system factors and individual factors. Individual factors are categorised as predisposing, enabling and need factors.

Predisposing: Predisposing variables considered in this study are essentially individual characteristics (marital status, age, gender and education).

Enabling: Enabling characteristics include per capita income, social support, social stigma and quality of life.

Per capita income: Family income divided by the number of persons in the household.

Social support: Help that a person would expect from other persons if he/she had a problem. Social support was measured by *Social Provisions Scale (SPS)* developed by Cutrona (1989) and validated in Quebec by Caron (1996). The scale measures the perception and the availability of six dimensions of social support: emotional support, social integration, reassurance of one's value, material help, advices and information, the need to feel useful (Caron, 1996).

Perceived stigma: Perceived stigma was measured by the *Perceived Devaluation Discrimination Scale* of Bruce Link. The scale is use to evaluate how mental health persons think they are discriminated and devaluated by others. It contains 12 Likert items on six points. The sum of scores for each individual is then divided by the numbers of items answered.

Quality of life: Quality of life refers to life satisfaction which is a cognitive judgmental process. Diener et al (1985) define life satisfaction as "a global assessment of a person's quality of life according to his chosen criteria" (Diener et

al, 1985). Quality of life was assessed with the *Satisfaction with Life Domains Scale* of Baker and Intagliata.

Need: Need characteristics included self-rated mental health, number of diagnoses, and psychological distress.

Self-rated mental health: This measures how the person rated his/her proper mental health. Self-rated mental health was evaluated by a single question: "During the last 12 months, can you say that your mental health was 1) excellent; 2) very good; 3) good; 4) poor or 5) bad?".

The number of symptoms was measured by adding all the mental health diagnoses of the questionnaire (mania, panic disorder, phobia, agoraphobia, depression, alcohol dependence and drug abuse).

Psychological distress: This is a 10-item questionnaire intended to yield a global measure of distress based on questions about anxiety and depressive symptoms that a person has experienced in the most recent 4 week period. The numbers attached to the patients 10 responses are added up and the total score is the score on the Kessler Psychological Distress Scale (K10). Scores will range from 10 to 50. Score under 20 are likely to be well; score 20-24 are likely to have a mild mental disorder, score 25-29 are likely to have moderate mental disorder and score 30 and over are likely to have a severe mental disorder.

Statistical Analysis

We used path analysis to predict the direct and indirect relationships between predisposing, enabling and need variables and the quantity of services used. Path analysis is primarily a theoretical framework for analyzing data from multiple regression (Ciferi and Bressler, 1982; Lewis-Beck, 1974). Before proceeding with the data analysis, all variables were screened for possible code and statistical assumption violations, as well as for missing values and outliers. Results of evaluation of assumptions led to transformation of the variable psychological distress to reduce its skewness, number of outliers, and improve its normality, linearity and homoscedasticity of residuals. With the use of a $p < .001$ criterion for Mahalanobis distance (Tabachnick and Fidell, 2007), no outliers among the variables were found. Ordinary least squares model was used to estimate standardised path coefficients (*betas*) which will also serve as an indicator of the relative importance of the predictors of use of services (Katz, 2006; Meyers et al, 2006). We are aware that most of the time, there has been a discussion on the use of non standardised or standardised variables in the estimation of parameters of linear structural equations. Following Blalock's advice, we have used standardised coefficients for estimation (Blalock, 1967). All analyses presented in this article were weighted using age and gender.

Results

The respondent's characteristics and the distribution of dependent variables are noted in Table 1. Men represent only 31.1% of the respondents. The age distribution ranged from 16 to 65 years old and the mean age was 39.95 with a standard deviation of 11.62. The great majority (86.4% of respondents) were white. Results of per capita income show that respondents are in majority under the threshold of low income which is about \$22,441 CAD in Montreal (Giles, 2004) for a single person.

The mean number of diagnosis is 1.52 (SD=0.14). Only 3.4% of our sample rate their mental health as excellent and 10.2% as very good. The mean psychological distress after natural log transformation is 1.52. Each respondent have used at least two health services during the last twelve months.

TABLE 1 Variable Distribution (n=227 respondents)

Variable	
Predisposing variables	
Gender	
<i>Women</i>	68.9 %
Age	<i>mean: 39.95 years (SD: 11.62)</i>
Academic diploma	
<i>None or less than secondary school diploma</i>	45.8 %
<i>Secondary school diploma</i>	31.1 %
<i>Some post secondary diploma</i>	4.5 %
<i>Post secondary diploma</i>	18.6 %
Marital status	
<i>Live alone</i>	68.9%
<i>Live in a couple</i>	31.1%
Enabling variables	
Per capita income	<i>mean: \$20 714.82 (SD: 15 932.87)</i>
Household Size	<i>mean: 2.3 persons (SD: 1.22)</i>
Social support	<i>mean: 77.22 (SD: 22.75)</i>
Perceived stigma	<i>mean: 2.84 (SD: .39)</i>
Need variables	
Quality of life	<i>mean: 104.07 (SD: 35.27)</i>
Number of diagnoses	<i>mean: 1.54 (SD: .84)</i>
Self rated mental health	
<i>Excellent</i>	3.4 %
<i>Very good</i>	10.2 %
<i>Good</i>	45.8 %
<i>Fair</i>	30.5 %
<i>Bad</i>	10.2 %
In Psychological distress	<i>mean: 1.52 (SD: .14)</i>
Number of services used	<i>mean: 2.10 (SD: 1.38)</i>

Table 2 presents the correlation matrix of predisposing, enabling and need factors and utilisation. Only the number of diagnosis was significantly associated with mental health services utilisation. There were also significant associations among the predisposing, enabling and need factors suggesting that path analysis would be an appropriate analytical model. In our hierarchical multiple regression (Table 3), the number of diagnosis remain the significant determinant of mental health services utilisation after controlling for all covariates. Each augmentation of one diagnosis increases use of mental health services by .38 (p<.001).

TABLE 2 Correlation Matrix Using Pearson’s Correlation Coefficient (n=227 Respondents)

	X1	X2	X3	X4	X5	X5	X7	X8	X9	X10	X11	X12	X13
X1	1	,065	,002	,029	,057	-,136	,004	-,185*	-,007	,002	-,022	-,019	,093
X2		1	-,042	,078	,078	-,363**	-,064	,009	,028	-,106	,010	-,059	,038
X3			1	-,078	,237**	-,095	-,108	,135	,055	-,044	-,037	,148*	,062
X4				1	-,160*	-,398**	-,036	,110	-,076	,070	,062	-,138	,005
X5					1	-,298**	,131	,042	,030	-,048	,009	,029	-,001
X6							1	,014	-,065	-,048	-,085	-,015	,066
X7								1	-,113	,226**	,050	-,008	-,044
X8									1	-,195**	,074	,202**	-,121
X9										1	-,220**	-,317**	,294**
X10											1	,270**	-,323**
X11												1	-,476**
X12													1
X13													

Note: ** Correlation is significant at the 0.01 level (2-tailed). X1=Gender, X2=Age, X3=Academic diploma, X4=Marital status, X5=Per capita income, X6=Household size, X7=Social support, X8=Perceived stigma, X9=Quality of life, X10=Number of diagnosis, X11=Self related mental health, X12=Ln psychological distress, X13=Number of services used

Figure 2 shows the final path analytic model for the number of health services used. All paths presented are significant at the .05 level or below and the standardised betas in the regressions provided the path coefficients for the model. The path diagram shows that only psychological distress and number of diagnosis have a direct effect on the number of services used. However, predisposing factors (age, education and marital status) have a direct effect on facilitating factors which in turn affect need. They then have indirect and cascading effect on the number of services used. Marital status for instance increases social

support and social support decreases psychological distress and psychological distress increases use. Marital status affects indirectly the number of services used.

TABLE 3 Stepwise Hierarchical Multiple Regression with Predisposing, Enabling and Need Factors Explaining Number of Services Used

	Model 1	Model 2	Model 3	Full model
Variable	β	β	β	B
Predisposing variables				
Gender (Male)	.11*			.10
Age	.54**			.12
Academic diploma	.14*			.06
Marital status (Live alone)	.14*			-.03
Enabling variables				
Per capita income		.01		-.02
Household Size		-.03		-.01
Social support		.13		.02
Perceived stigma		.79**		.36
Quality of life		-.06		-.12
Need variables				
Number of diagnosis			.39**	.38**
Self rated mental health			-.10	-.23
In Psychological distress			.58**	.30

Notes: **p<.001 *p<.05

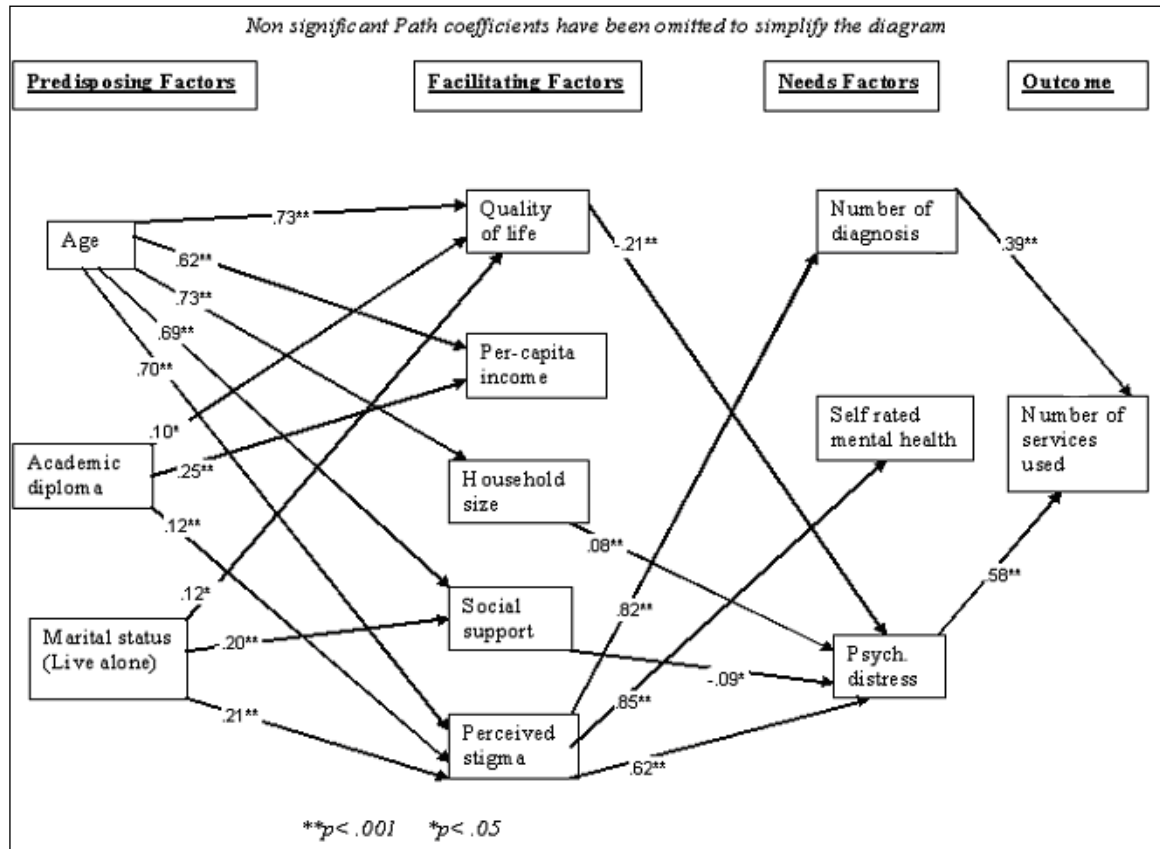
Discussion and Conclusion

The aim of this study was to examine through a path analysis, the relative importance of how predisposing, enabling and need factors act and interact to predict use of health services for mental health reasons. Our findings are not directly comparable with other studies mainly because of our design which is slightly different of other studies. In fact, authors usually use linear or logistic regression models to assess determinants of health services utilisation. These approaches are far different from path analysis. Our path analysis showed that the number of health services used is immediately affected by need for services, but also, as we have seen in the analyses, by predisposing and enabling factors.

It has been long known that age (Leaf et al, 1987), number of mental health diagnosis (Cochran et al, 2003; Narrow et al, 2000), social stigma (Cooper et al, 2003; Coorigan, 2004; Ertugrul and Ulug, 2004) and psychological distress (Tessler et al, 1976) are the main determinants of mental health services utilisation. Our findings suggest that these factors act in complex ways to explain use of mental health services.

Our results show that about 47 % of people with mental health diagnostic in the south west of Montréal at the time of the study did not consult for their symptoms during the past twelve month period. However since our study used a cross sectional design, longitudinal research on the determinants of mental service utilisation appears to be necessary in order complete or to confirm our findings. Also, ecological studies might also contribute to our understanding of individual and neighbourhood factors related to utilisation or non-utilisation of health services among individuals with a probable psychiatric disorder.

FIGURE 2 Causal Diagram of Mental Health Services Used



The implication of our study is twofold: methodological and practical. The methodological contribution is that the study disentangles complex interactions among variables that influence health services utilisation. Classical linear or logistic regressions models would not have shown indirect influence of variables such as education or the quality of life on the number of services used in our study. The practical benefit of our study is that by showing interactions among determinants of health services utilisation, it contributes to the development of new strategies to combat stigma and other factors that hindered health services use. For instance, encouraging education may contribute in increasing quality of live which will in turn lower psychological distress.

Limitations

Our study has several limitations. The cross sectional nature of the data limits the ability to make causal inferences. However our model is a well grounded in theory (Blalock, 1967; Bush and Osterweis, 1978; Wright, 1960). Self reported mental health utilisation data is also subject to bias that may lead to over estimation or underestimation of the outcome. It's also well established that recall bias plays an important factor in recall of symptoms (Pfefferle and Spitznagel, 2009). Whatever the case, it is hoped that besides contributing to the research methodology in health services utilisation; this study enhances the understanding of causal relationships among the determinants of mental health services

utilisation. Furthermore, the path analytical techniques presented here can serve to provide pertinent information for health planning and to identify the priorities of mental and community health services.

References

- Aday, L. A. and R.M. Andersen. 1974. "A Framework for the Study of Access to Medical Care". *Health Services Research* 1974(Fall): 208-220.
- Andersen, R. M. 1995. "Revisiting the Behavioral Model and Access to Medical Care: Does it matter?" *Journal of Health and Social Behavior* 36 (March): 1-10.
- Andersen, R. M. and J.F. Newman. 1973. "Societal and Individual Determinants of Medical Care Utilization in the United States". *The Milbank Memorial Fund Quarterly. Health and Society* 51(1): 95-124.
- Anderson, J. G. 1972. "Causal Model of a Health Services System". *Health Services Research* 7(1): 23-42.
- Blalock, H. M., Jr. 1967. "Path Coefficients versus Regression Coefficients". *The American Journal of Sociology* 72(6): 675-676.
- Bush, P. J. and M. Osterweis, M. 1978. "Pathways to Medicine Use". *Journal of Health and Social Behavior* 9(19): 179-189.
- Caron, J. 1996. « L'Échelle de Provisions Sociales: la validation québécoise du Social Provisions Scale ». *Santé mentale au Québec* 21(2): 158 -180.
- Caron, J., M. Tousignant, D. Pedersen, M.J. Fleury, M. Cargo, M. Daniel, Y. Kestin, A. Crocker, M. Perreault, A. Brunet, J. Tremblay, G. Turecky, G. and S. Beaulieu. 2007. «La création d'une nouvelle génération d'études épidémiologiques en santé mentale ». *Santé mentale au Québec* 32(2): 225-238.
- Ciferi, W. B. and D. Bressler. 1982. "Social and Health Service Utilization: A Path analysis". Boston: 35th Annual Scientific Meeting of the Gerontology Society of America.
- Cochran, S. D., G.J. Sullivan and V.M. Mays. 2003. "Prevalence of Mental Disorders, Psychological Distress, and Mental Health Services Use Among Lesbians, Gay, and Bisexual Adults in the United States". *Journal of Consulting and Clinical Psychology* 71(1): 53-61.
- Cooper, A. E., P.W. Corrigan and A.C. Watson. 2003. "Mental Illness Stigma and Care Seeking". *The Journal of Nervous and Mental Disease* 191(5): 339-341.
- Coorigan, P. 2004. "How Stigma Interfers With Mental Health Care". *American Psychologist* 59(7): 614-625.
- Crabb, R. and J. Hunsley. 2006. "Utilization of Mental Health care Services Among Older Adults With Depression". *Journal of Clinical Psychology* 62(3): 299-312.
- Diener, E., R.A. Emmons, R.J., Larsen and S. Griffin, S. 1985. "The Satisfaction With Life Scale". *Journal of Personality Assessment* 49(1): 71-75.
- Dutton, D. 1978. "Explaining the Low Use of Health Services by Poor: Costs, Attitudes or Delivery Systems?" *American Sociological Review* 43 (June): 348-368.
- Eisenberg, D., Golberstein, E., and Gollust, S. E. 2007. "Help-Seeking and Access to Mental Health Care in a University Student Population". *Medical Care* 45(7): 594-601.

- Ertugrul, A. and B. Ulug. 2004. "Perception of Stigma among Patients with Schizophrenia". *Soc Psychiatry Psychiatr Epidemiol* 39: 73-77.
- Flett, G. L., K.R. Blankstein, J.D. Hicken and M.S. Watson M. S. 1995. "Social Support and Help-Seeking in daily Hassles Versus Major Life Events Stress". *Journal of Applied Social Psychology* 25(1): 49-58.
- Fox, J. W. 1984. "Sex, Marital Status, and Age as Social Selection Factors in Recent Psychiatric Treatment". *Journal of Health and Social Behavior* 25: 394-405.
- Giles, P. 2004. *Mesure de faible revenu au Canada*. Ottawa: Statistique Canada. Division de la statistique du revenu.
- Hines-Martin, V., A. Brown-Piper, S. Kim and M. Malone, M. 2003. "Enabling Factors of Mental Health Service Use Among African Americans". *Archives of Psychiatric Nursing* XVII(5): 197-294.
- Horwitz, A. V. 1987. "Help-Seeking Process and Mental Health Services". In: D. Mechanic (ed.), *Improving Mental Health Services: What the Social Sciences Can Tell Us*, Vol. 36: 33-45. San Francisco: Jossey-Bass.
- Katz, M. H. 2006. *Study Design and Statistical Analysis: A Practical Guide for Clinicians*. Cambridge: Cambridge University Press.
- Kirmayer, I. J., M. Weinfeld, G. Burgos, G.G. Du Fort, J.-C. Lasry and A. Young. 2007. "Use of Health Care Services for Psychological Distress by Immigrants in an Urban Multicultural Milieu". *The Canadian Journal of Psychiatry* 52(5): 295 - 304.
- Leaf, P. J., M.L. Bruce, G.L. Tischler and C.E. Hozler. 1987. "The Relationship between Demographic Factors and Attitudes toward Mental Health Services". *Journal of Community Psychology* 15 (April): 275-284.
- Lesage, A., H.-M. Vasiliadis, M.-A. Gagné, S. Dudgeon, N. Kasman and C. Hay. 2006. *Prévalence de la maladie mentale et utilisation des services connexes: une analyse des données de l'Enquête sur la santé dans les collectivités canadiennes: Initiative Canadienne de Collaboration en Santé Mentale*.
- Lewis-Beck, M. S. 1974. "Determining the Importance of an Independent Variable: A Path Analytic Solution". *Social Science Research* 3: 95-107.
- Meyers, S. L., G. Gamst and A.J. Guarino. 2006. *Applied Multivariate Research*. London: SAGE.
- Michaud, C. M., C.J. Murray and B.R. Blonn. 2001. "Burden of disease: Implications for future research". *JAMA* 285: 535-539.
- Narrow, W. E., D.A. Regier, G. Norquist, D.S. Rae, C. Kennedy and B. Arons, B. 2000. "Mental Health Service Use by Americans with Severe Mental Illnesses". *Soc Psychiatry and Psychiatric Epidemiology* 35: 147-155.
- Ngamini Ngui, A., M.-J. Fleury, J. Caron and M. Perreault, M. 2010a. *Territoire et utilisation des services en santé mentale dans le sud ouest de Montréal, Québec*. Paper presented at the Colloque international Espace et Santé, Marseille, France.
- Ngamini Ngui, A., M.-J. Fleury, J. Caron and M. Perreault. 2010b. "A Path Analysis Model of Mental Health Service Utilization". *Int. J. Adv. Stud. Res. Africa* 1(2): 177-186.
- Patten, S. B. and C.A. Beck. 2004. "Major Depression and Mental Health care Utilization in Canada: 1994 to 2000". *Can. J. Psychiatry* 49(5): 303-309.

- Pescosolido, B. A., C.B. Gardner and K.M. Lubell. 1998. "How People Get into Mental Health Services: Stories of Choice, Coercion and "Muddling Through" from "First-Timers" ". *Soc. Sci. Med.* 46(2): 275-286.
- Pfefferle, S. G. and E.L. Spitznagel. 2009. "Children's Mental Health Service Use and Maternal Mental Health: A Path Analytic Model". *Children and Youth Services Review* 31: 378-382.
- Statistique Canada. 2010. Dictionnaire du Recensement de 2006, Vol. No 92-566-X. Ottawa: Ministre de l'Industrie.
- Sullivan, G., C.A. Jackson and K.L. Spritzer. 1996. "Characteristics and Service Use of Seriously Mentally Ill Persons Living in Rural Areas". *Psychiatric Services* 47(1): 57-61.
- Tabachnick, B. G. and L.S. Fidell. 2007. *Using Multivariate Statistics* (5th ed.). Boston: Pearson Education.
- Tessler, R., D. Mechanic, D. and M. Dimond, M. 1976. "The Effect of Psychological Distress on Physician Utilization: A Prospective Study". *Journal of Health and Social Behavior* 17(4): 353-364.
- Vasiliadis, H.-M., A. Lesage, C. Adair and R. Boyer, R. 2005. "Service Use for Mental Health Reasons: Cross-Provincial Differences in Rates, Determinants, and Equity of Access". *Can. J. Psychiatry* 50(10): 614-619.
- Vasiliadis, H.-M., A. Lesage, C. Adair, P.S. Wang, P. S. and R.C. Kessler, R. C. 2007. "Do Canada and the United States Differ in Prevalence of Depression and Utilization of Services?" *Psychiatric Services* 58(1): 63-71.
- Veroff, J., R.A. Kulka and E. Douvan. 1981. *Mental Health in America: Patterns of Help Seeking from 1957 to 1976*. New York: Basic Books.
- Wang, P. S., S. Aguilar-Gaxiola, J. Alonso, M.C. Angermeyer, G. Borges, E.J. Bromet, R. Bruffaerts, G. de Girolamo, R. de Graaf, O. Gureje, J.M. Haro, E.G. Karam, R.C. Kessler and V. Kovess, V. 2007. "Use of Mental Health Services for Anxiety, Mood, and Substance Disorders in 17 Countries in the WHO World Mental Health Surveys". *The Lancet* 370(9590): 841-850
- Wang, P. S., M. Lane, M. Olfson, H.A. Pincus, K.B. Wells and R.C.Kessler. 2005. "Twelve-Month Use of Mental Health Services in the United States: Results from the National Comorbidity Survey Replication". *Arch. Gen. Psychiatry* 62 (June): 629-640.
- Warner, R. and G. de Girolamo. 1995. *Épidémiologie des troubles mentaux et des problèmes psychosociaux: Schizophrénie*. Geneva: Organisation Mondiale de la Santé.
- Wright, S. 1960. "Path Coefficients and Path Regressions: Alternative or Complementary Concepts?" *Biometrics* 16(2): 189-202.

Acknowledgements

The epidemiological catchment area project was supported by a grant from the Canadian Institutes of Health Research (CIHR). A. Ngamini Ngui received two doctoral grants from the Chaire GETOS (Gouverne et la transformation des organisations de santé) and the FRSQ (Fonds de la recherche en santé du Québec) for this article.

