DEVELOPMENT OF A TYPOLOGY OF ANTIDEPRESSANT USERS: THE ROLE OF MENTAL HEALTH DISORDERS AND SUBSTANCE USE

Michel Perreault[1,2]; El Hadj Touré[1]; Marie-Josée Fleury[1,2]; Serge Beaulieu[1,2]; Jean Caron[1,2]

[1]Douglas Mental Health University Institute, Montreal, Quebec, Canada; [2]Department of Psychiatry, McGill University, Montreal, Quebec, Canada

Corresponding Author: michel.perreault@douglas.mcgill.ca

ABSTRACT

Background / Objectives
Antidepressants constitute one of the most consumed classes of psychotropic medication. This study aims to identify a typology of users based on their individual characteristics, such as presence of a mental disorder and use of other psychotropic medication during the last year.

Methods
Antidepressant use for residents in the epidemiological zone of South-West Montreal aged 15 years and older was documented in 2009, 2011, and 2013. Among the 2433 participants from the initial study, 249 had used antidepressants (10%). A cluster analysis, validated with Chi-square tests and Cramer's V measure, was conducted with this sample. The longitidinal profile of the clusters was examined using curve clustering.

Results
Based on clinical variables measured at Time 1, four types of antidepressant users were identified ($p<0,001$; $0,58\leq V\leq 0,81$): *depressed users without anxiety* (15%), *anxio-depressive users with substance dependence and polypharmacy* (26%), *depressed users with polypharmacy and being treated by a psychiatrist* (31%) and *users without mental health disorders* (28%). Follow-ups two and four years later indicate a higher proportion of participants with symptoms of depression persisting over time within the cohort of persons having concurrent anxiety and substance dependence.

Conclusions
Results help improve knowledge about the context of antidepressant use in order to plan appropriate interventions. Depressed persons without anxiety appear to receive treatment from general practitioners, while those with comorbid psychotic disorders and depression may require specialized treatment from a psychiatrist. Anxio-depressive users with substance dependence and polypharmacy may require integrated services from different specialized networks in order to counter symptoms related to comorbidity.

Key Words: *Antidepressants, psychotropic medication, mental health, substance use, longitudinal study, profile of use*

Depression is a major public health problem due to its repercussions on the health of the population. The 2012 Canadian Community Health Survey (CCHS) revealed that 4.7% of Canadians have had episodes of major depression during the previous year.[1] Antidepressants constitute the most commonly used pharmacological treatment for this disorder. According to population-based longitudinal studies conducted in Canada and in the United States, antidepressant use has increased over time.[2,3] In Quebec, after sleep medication (9.1 %) and anxiolytics (6.9 %), antidepressants

(5.2 %) remain the most widely-used psychotropic medication[4], costing nearly 129 million dollars annually.[5]

Though antidepressant use may not be problematic as such, it can often lead to adverse effects, such as interaction with other psychotropic drugs, withdrawal symptoms, abuse, dependence[6] and misuse.[7,8] In literature, antidepressant use has been associated with depression, anxiety disorders[9-11], and polypharmacy.[2] Combining antidepressants with other psychotropic medication is more frequently associated with consulting a psychiatrist.[11] Also, being an adult and unemployed has been found to represent risk factors that may influence antidepressant use.[11] Furthermore, the incidence and prevalence of antidepressant use are related to weak socioeconomic status.[3,11] Prolonged antidepressant use is associated with being female and older in age, being treated by a psychiatrist, and having previously used benzodiazepines.[12]

An array of studies exist on the determinants of antidepressant medication use. However, the users seem to constitute a heterogeneous group for whom medication needs are especially linked to an interaction between depression and other mental health disorders. Nonetheless, scientific literature on the differentiation of antidepressant users according to mental health disorders remains limited.[3] One of the rare typologies identified is based on variables relative to consumption behaviours for antidepressants, anxiolytics and hypnotics.[6] These authors identified three types of paroxetine users that differ based on prescription patterns: non-problematic users, users with non-agreement with practice guidelines related to associated psychotropic drugs, and users at risk for addiction.

Given the lack of psychopharmacological research on the patterns of antidepressant use in general, this exploratory study aims to generate a typology of antidepressant users in an epidemiological zone of South-West Montreal based on variables related to mental health. More precisely, it aims to identify and characterize different types of antidepressant users according to the diagnoses of depression, anxiety, and substance dependence, the use of other psychotropic medication, and the origin of the prescription obtained. The longitudinal profile of clinical types is also examined to gain a better understanding of treatment needs.

METHODS

Data Collection

The target population is composed of persons aged 15 years and older, from the social and psychiatric epidemiological catchment area of South-West Montreal.[13] A longitudinal study was launched based on this population, and the first data collection took place in 2009, according to the procedures and criteria of the Canadian National Population Health Survey (NPHS) study.[14] Initially, the sample consisted of 2,433 participants and was categorized based on geographical location and the density and socioeconomic status of four boroughs. The response rate was 48.7%. Among these participants, 249 used antidepressants (10.2%). They were revisited two and four years later with attrition rates of 23% and 45%, respectively, compared to the initial subsample.

Interviewers specially trained for this study administered the questionnaires. Participants were required to sign consent forms authorizing the team to contact them if a potential psychiatric disorder could be detected based on the information collected, and if they did not currently receive mental health services. The study was approved by the ethics committee of the Douglas Mental Health University Institute.

Variables and Measures

The constitutive variable, *antidepressant use*, was measured using the following question, taken from the Canadian Community Health Survey (cycle 1.2, 2009): “In the past 12 months, did you take antidepressants (such as Prozac, Paxil or Effexor)?”

To generate types of antidepressant users, six dichotomous variables were retained for their clinical pertinence: origin of the *antidepressant prescription* (psychiatrist or other), *polypharmacy* (consumption of at least two classes of psychotropic medication other than antidepressants during the past 12 months), *major depression*, *anxiety disorder* (panic disorder, social phobia or agoraphobia) and *substance dependence during the past 12 months.* Mental health diagnoses were

evaluated using the CCHS 1.2 (Statistics Canada) and the Composite International Diagnostic Interview (CIDI).[15]

In addition, a number of variables were used to differentiate the different types of users. *Psychological distress* during the month prior to the initial study was measured using the K-10 scale.[16] Distress was considered high when the aggregate scores (min=0; max=34) were superior or equal to 9. The *Social Provisions Scale* was used to evaluate the perception of available support, such as attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance.[17] Aggregate scores obtained (min=48; max=96) were dichotomized according to the median (i.e. "high" score if $\geq$ 82). The variables relative to use of psychotropic medication included the *prescription of antidepressants by a general practitioner* and the *use of sleep medication, anxiety medication, antipsychotics or mood regulators*. *Sex*, *age*, *marital status* and *household income* were the four sociodemographic variables considered.

Statistical Analyses

Statistical analyses were carried out using SPSS software. As the objective of the study was to identify distinct groups of antidepressant users (n=249) according to profiles developed based on participant responses, a cluster analysis was performed respecting the steps described by Rapkin and Luke (1993).[18] Six clinical variables were measured at Time 1 (T1). This number is within the usual range used in literature within the health domain for this type of analysis.[19]

The correlations matrix indicates that none of these internal variables are strongly correlated with one another, with the highest correlation not surpassing 0.20. As such, with the risk of multi-colinearity being very weak, a typology was established using the TwoStep method of classification.[20] The log-likelihood statistic was used to measure the proximity between the clusters. To avoid biases related to the reproduction of the structure of the clusters of previous studies[19], the optimal number of clusters was determined a posteriori, according to the Bayesian Information Criterion (BIC). A series of Chi-square tests and Cramer's V measures were conducted to establish the contribution of internal variables in the formation of clusters generated, as well as to validate the profiles according to the complementary variables. As a final analysis, curve clustering was used to describe the trajectories of the clusters, two (T2) and four (T3) years after the initial study in 2009 (T1).

RESULTS

Characteristics of Antidepressant Users

The 249 respondents using antidepressants at T1 were mainly female and on average 46.6 years old ± 11.3 (Table 1). These respondents had perceived low social support and had high psychological distress. For them, the prevalence of mental health disorders during the previous year was 40.1% for depression, 17% for anxiety disorders, and 11.2% for substance dependence. Though only 26.1% had obtained a prescription from a psychiatrist, there were many antidepressant users (58.6%) who had consulted a general practitioner, and nearly a third had used at least two other classes of psychotropic medication.

TABLE 1 Characteristics of the sample and of antidepressant users

Characteristics	**Complete sample**	**Sample of antidepressant users**
n	2433	249
Sex		
Male	1175 (48.3)	75 (30.3)
Female	1258 (51.7)	174 (69.7)
Age		
15-24 years	392 (16.1)	5 (2.1)
25-44 years	1009 (41.5)	100 (40.3)
45 years and older	1031 (42.4)	143 (57.6)
Average (standard deviation)	40.7 (14.1)	46.6 (11.3)
Marital status		
Living with a partner	1098 (45.2)	86 (34.6)
Single	922 (38.0)	86 (34.6)
Divorced/separated/widowed	409 (16.8)	77 (30.8)
Household income		
0-24999	676 (33.4)	91 (41.0)
25000-69999	685 (33.9)	80 (35.9)
70 000 and more	662 (32.7)	51 (23.1)
Low social support	1100 (49.0)	154 (66.2)
High psychological distress	910 (37.9)	166 (67.3)
Antidepressant prescription		
Psychiatrist	65 (2.7)	65 (26.1)
General practitioner	146 (6.1)	146 (58.6)
N/A / other	2203 (91.2)	38 (15.3)
*Polypharmacy**	125 (5.2)	71 (28.7)
*Depression***	209 (9.0)	91 (40.1)
*Anxiety disorder***	131 (5.6)	41 (17.0)
Substance dependence (drug or alcohol)	150 (6.3)	27 (11.2)

Notes: The entries correspond to frequencies (%). Missing data are excluded in the calculation of percentages. *At least two classes of psychotropic medication other than antidepressants. **As detected by administration of the CIDI.

TABLE 2 Distribution of clusters according to internal variables (n=216)

Internal variables	Typology					
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	X^2	Cramer's
	32 (14.5)	56 (26.2)	67 (31.3)	61 (28)		V
					Test	
Anxiety disorder						
No	32 (100)	16 (28.6)	67 (100)	61 (100)	140.3***	0.81
Yes	0 (0)	40 (71.4)	0 (0)	0 (0)		
Prescription from a psychiatrist					99.3***	0.68
No	32 (100)	44 (78.6)	20 (29.4)	61 (100)		
Yes	0 (0)	12 (21.4)	48 (70.6)	0 (0)		
Depression					91.4***	0.65
No	0 (0)	26 (46.4)	38 (56.7)	61 (100)		
Yes	32 (100)	30 (53.6)	29 (43.3)	0 (0)		
Substance dependence					80.8***	0.61
No	32 (100)	31 (55.4)	67 (100)	61 (100)		
Yes	0 (0)	25 (44.6)	0 (0)	0 (0)		
Polypharmacy					72.6***	0.58
No	32 (100)	32 (58.2)	27 (40.3)	61 (100)		
Yes	0 (0)	23 (41.8)	40 (59.7)	0 (0)		
Labels for antidepressant users	Depressed users without anxiety	Anxio-depressive users with substance dependence and polypharmacy	Depressed users with polypharmacy and being treated by a psychiatrist	Users without mental health disorders		

Notes: Entries correspond to frequencies (percentages). The percentages are calculated within clusters in columns. The non-classified cases (33) are considered missing. ***p<0.001.

Identification of Clusters

Among the 249 participants, 216 could be classified according to the six internal variables measured at T1 (see Table 2). These variables helped to significantly differentiate the four clusters identified ($72.6 \leq \chi^2 \leq 140.3$; $p<0.001$; $0.58 \leq V \leq 0.81$). Cluster 1 includes 32 participants (14.5%), and represents being afflicted with depression but no other mental health problem, as measured in the study: these are *depressed users without anxiety*. Cluster 2 groups 56 participants (26.2%), mainly with depression and substance dependence, and includes all respondents with an anxiety disorder. Nearly half of them used two classes of psychotropic drugs other than antidepressants. Members of this cluster are

characterized as *anxio-depressive users with substance dependence and polypharmacy*. Cluster 3 includes 67 participants (31.3%), and more than half hold a prescription from a psychiatrist for antidepressants and have consumed two other classes of psychotropic drugs. More than half suffer from depression, even if none present an anxiety or substance dependence. They can be classified as *depressed users with polypharmacy and being treated by a psychiatrist.* Finally, cluster 4 includes 61 participants (28%), categorized as *users without mental health disorders during the last year*, since none present any of the mental health disorders evaluated in the study.

Contextual Validation and Longitudinal Profile of Clusters

As shown in Table 3, with the exception of sex and age, all of the complementary variables (those not included in the classification analysis) contributed significantly to the differentiation of the clusters ($13.5 \leq \chi^2 \leq 81.7$; $p<0.05$; $0.22 \leq V \leq 0.61$). The distinctive characteristics of the clusters that were generated and validated at T1 are classified in Table 4. Furthermore, a follow-up two (T2) and four years later (T3) of the clusters demonstrates a significant downward trend for the proportion of respondents still using antidepressants or having depression over time. Only the prevalence of depression significantly differentiated the clusters at each time of measure ($p<0.05$).

TABLE 3 Cluster membership according to complementary variables (n=216)

Internal variables	Typology					
	Cluster 1 32 (14.5)	Cluster 2 56 (26.2)	Cluster 3 67 (31.3)	Cluster 4 61 (28.0)	χ^2 Test	Cramer's V
Sex						
Male	10 (31)	17 (30.4)	27 (40.3)	15 (24.2)	-	-
Female	22 (68.8)	39 (69.6)	40 (59.7)	47 (75.8)		
Age						
15-24 years	0 (0)	1 (1.8)	3 (4.5)	1 (1.6)		
25-44 years	12 (37,5)	30 (54.5)	24 (35.8)	20 (32.3)	-	-
45 years and older	20 (62.5)	24 (43.6)	40 (59.7)	41 (66.1)		
Marital status						
Living with partner	14 (43.8)	17 (30.4)	15 (22.4)	34 (54.8)	20.3**	0.22
Single	7 (21.9)	26 (46.4)	28 (41.8)	16 (25.8)		
Separated/divorced/ widowed	11 (34.4)	13 (23.2)	24 (35.8)	12 (19.4)		
Household income					14.4*	0.20
0-24999	6 (20.7)	24 (50.0)	30 (48.4)	17 (34.0)		
25000-69999	12 (41.4)	18 (37.5)	20 (32.3)	15 (30.0)		
70000 and more	11 (37.9)	6 (12.5)	12 (19.4)	18 (36.0)		

Social support					16.7***	
Low	19 (57.6)	41 (80.4)	49 (76.6)	26 (48.1)		
High	14 (42.4)	10 (19.6)	15 (23.4)	28 (51.9)		
Psychological distress					26.6***	0.35
Low	9 (28.1)	5 (9.1)	20 (29.9)	32 (53.3)		
High	23 (71.9)	50 (90.9)	47 (70.1)	28 (46.7)		
Prescription/general practitioner					81.7***	0.61
No	0 (0)	18 (32.1)	48 (71.6)	4 (6.5)		
Yes	32 (100)	38 (67.9)	19 (28.4)	58 (93.5)		
Other psychotropic medication						
Anxiolytics	2 (6.2)	28 (50)	36 (55.4)	9 (14.5)	40.5***	0.43
Sleep medication	7 (21.9)	22 (39.3)	36 (54.5)	10 (16.4)	23.3***	0.33
Mood regulators	1 (3.1)	7 (13.0)	18 (26.9)	1 (1.6)	21.6***	0.32
Antipsychotics	3 (9.7)	9 (16.7)	17 (25.4)	2 (3.2)	13.5**	0.25

Labels for antidepressant users	Depressed users without anxiety	Anxio-depressive users with substance dependence and polypharmacy	Depressed users with polypharmacy and being treated by a psychiatrist	Users without mental health disorders

Notes: The entries correspond to frequencies (percentages). The percentages are calculated within the clusters in columns. The non-classified cases (33) are considered missing. ***p<0.001; **p<0.01; *p<0.05.

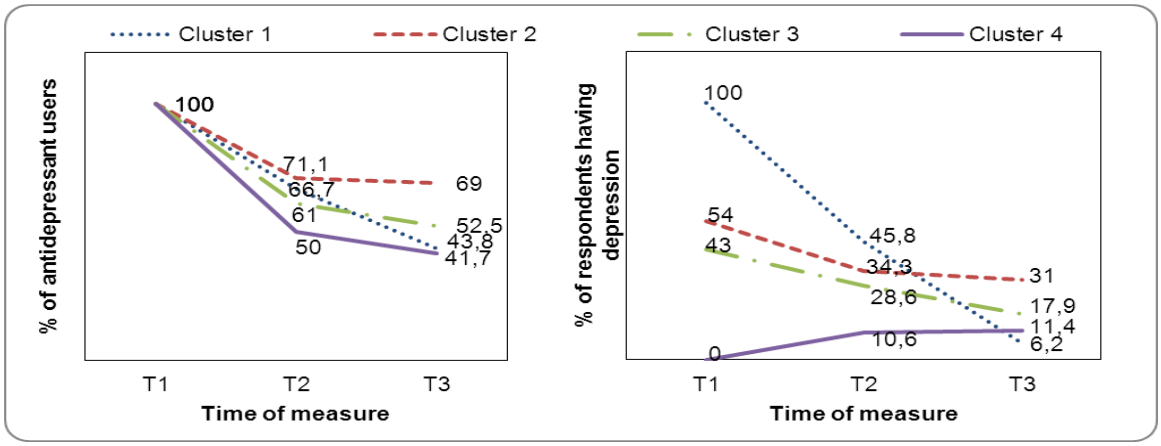
TABLE 4 Overview of characteristics of clusters (n=216)

Characteristics	Cluster 1	Cluster 2	Cluster 3	Cluster 4
n (%)	32 (14.5%)	56 (26.2%)	67 (31.3%)	61 (28%)
Labels for antidepressant users	Depressed users without anxiety	Anxio-depressive users with substance dependence and polypharmacy	Depressed users with polypharmacy and being treated by a psychiatrist	Users without mental health disorders
Internal variables	Depression No anxiety No substance dependence No prescription from a psychiatrist No polypharmacy	Depression Anxiety Substance dependence Polypharmacy	Depression No anxiety No substance dependence Prescription from a psychiatrist Polypharmacy	No depression No anxiety No substance dependence No prescription from a psychiatrist No polypharmacy
External variables	Prescription/general practitioner Living with a partner Higher income High distress	Prescription/general practitioner Anxiolytics Sleep medication Single Lower income Low social support High distress	 Anxiolytics Sleep medication Mood regulators Antipsychotics Lower income Low social support High distress	Prescription/general practitioner Living with a partner High income Higher social support Low distress

Comprised of persons living with a partner and using antidepressants prescribed by a general practitioner, the *depressed users without anxiety* (cluster 1) follow a pronounced downward path with regard to the prevalence of depressive disorders, falling from 100% at T1, to 45.8% at T2, and 6.2% at T3. Those who are single and have low income and social support, the *anxio-depressive users with substance dependence* (cluster 2) reveal a high level of distress and consume anxiolytics and sleep medication. Of the 30 persons with depression at T1 in this group (54%), 67% persisted at T2, and 25% at T3. Those who are most susceptible of becoming *depressed users with polypharmacy and being treated by a psychiatrist* (cluster 3), are participants having low income and social support, and who use all classes of psychotropic medication, including antipsychotics. In this group, among the 29 persons having depression at T1 (43%), 56% still had depression at T2, while at T3, none presented a diagnosis of depression.

However, *users without mental health disorders* (cluster 4) tend to present lower distress levels and belong to a household that earns $70,000 or more annually. With this group, an upward trend can be observed, with the prevalence of depression passing from 0% at T1, to 10.6% at T2, and 11.4% at T3. All of these participants with depression (11.4%) are new cases, and had not been diagnosed with depression at T1 or at T2 (see Figure 1).

FIG. 1 Evolution of antidepressant use and of the prevalance of depression within clusters (n=216)



Note: Generated at T1, the clusters are followed at T2, then at T3.
The percentages are therefore calculated within the clusters and not within the cohorts of depressed persons, for example.

DISCUSSION

In the present study, a typology of antidepressant users from the epidemiological zone of South-West Montreal has been developed. Results indicate that the annual consumption rate of antidepressants is 10.2% (n=2433). This rate is higher than the rate reported for Quebec (5.2%) in a study using a similar methodology.[4] Using data from the Canadian Community Health Survey, another study estimates that the annual antidepressant consumption rate in Canada is 4.8%.[21] The elevated rate observed in South-West Montreal can be explained in part by the presence of a psychiatric hospital and by its low socio-economic status, with a high poverty index (6.2) compared to other areas of Montreal.[22] There is also a higher prevalence of mental health disorders and a more frequent use of psychotropic medication.[23]

Antidepressant Users: A Heterogeneous Group

Based on data from a subscale of 249 antidepressant users, the cluster analysis generated four distinct profiles based on mental health disorders. Cluster 1 represents *depressed users without anxiety* (14.5%), since all members have depression, but no other mental health problem, as measured in the study. This profile confirms that major depression is the principal reason justifying the prescription of antidepressants.[9,11,24] *Depressed users without anxiety* all received prescriptions from a general practitioner. Their profile demonstrates, as have various other studies, that antidepressants are most often prescribed by general practitioners.[5,25] These general practitioners act as first-line resources for patients with mental disorders. Psychiatrists, for whom access is more restricted, intervene as second-line resources, namely when symptoms have become persistent and more complex (cluster 3).

Within cluster 2 are *anxio-depressive users with substance dependence and polypharmacy* (26.2%), who not only mainly have depression, but also have an anxiety disorder. The association between antidepressant use and the presence of multiple mental health disorders is clearly established in scientific literature.[9,10,26] In particular, the treatment of major depression becomes more complex with the presence of an anxiety disorder.[11] Similarly, substance dependence can accentuate the effects of depression and increase psychosocial vulnerability. *Anxio-depressive users* generally have a weak social support system and tend to have a high level of psychological distress. A recent study has demonstrated the significant role of psychosocial context in the prescription of antidepressants, namely in general medicine.[9] Moreover, low social support is often associated with low income[27,28] and can bring about an increased use of alcohol, drugs or medication. In addition to antidepressants, *anxio-depressive users with substance dependence* use sleep medication and anxiolytics which, combined with alcohol or with drugs, can be used as a form of auto-medication, and can lead to the risk for addiction. These results correspond to those from a recent study that revealed an association between antidepressant use and the co-prescription of sedatives/hypnotics.[2,11]

Depressed users with polypharmacy and being treated by a psychiatrist (cluster 3) represent the clinical group that is most common in the study (31.3%). Contrary to members of cluster 2, these individuals are more likely to obtain prescriptions from a psychiatrist. These tend to be psychotropic medications, such as antidepressants, anxiolytics and especially antipsychotics. In fact, a study showed that consulting a psychiatrist is associated with the use of several psychotropic drugs.[11] Suffering from depression, members of cluster 3 have the particularity of being treated by a psychiatrist, most likely due to a severe or persistent mental health problem for which treatment requires a combination of various psychotropic medications. Predictably, the majority continue to use antidepressants two and four years later, with respective rates of 71% and 69%. This continued use can be explained by the complexity of their problems which require prolonged specialized treatment, and the concurrent use of antipsychotics.[5]

Cluster 4 represents *users without mental health disorders during the last year* (28%), as none displayed any of the mental health disorders targeted in the study. These persons seem to correspond to "non-problematic users" of paroxetine identified in a French transversal study.[6] According to the authors of this particular study, this profile is not associated with polypharmacy nor with consultation of a psychiatrist, which confirms the latent structure of the results. This profile may reflect the existence of expanded prescription practices without clear and precisely-established diagnoses. According to a study conducted by the Quebec Medication Council, no diagnosis of mental health was detected for 63.3% of new adult antidepressant users covered by the public medication insurance plan.[24] A Dutch study on mental health established that nearly half of antidepressant users in the community did not exhibit symptoms of depression or anxiety disorders, but rather displayed emotional symptoms, namely during their first consultation with a general practitioner.[8] While the reasoning behind some of these prescriptions may be unclear[7], there could be a number of other purposes for prescribing antidepressants, as they can be used in lower dosages as sleep medication or in the treatment of asymptomatic patients due to a remote history of chronic depression, or even to treat crisis situations caused by relational problems that may seem like depression. However, though no mental health disorders were identified at the start of this study for cluster 4 participants, some were afflicted with a major depression two years later, with an incidence of 10.6%. These symptoms diminished for the entire cohort after two more years, while 11.4% of new diagnosed cases appeared. These longitudinal results suggest that cluster 4 is probably a group with lifetime disorders.

Finally, the longitudinal data illustrates the persistance of the diagnosis of depression among the cohort of *anxio-depressive users with substance dependence and polypharmacy* (cluster 2). However, the diagnosis does not persist for more than four years for persons with depression (at T1) who are treated by a psychiatrist, and whose treatment appears to be effective (cluster 3).

Additionally, for persons without mental health disorders (at T1) grouped under cluster 4, the incidental symptomatology no longer manifests itself after two years because it can be observed that the new cases diagnosed at T2 no longer presented symptoms at T3. It is in the group where depression is associated with anxiety and substance dependence (cluster 2) that the largest proportion of persons for whom signs of depression persist for a long time is found. Furthermore, as recovery occurs more rapidly for persons who do not have antecedents of dysthymia or comorbidity in particular (i.e. cluster 4), the results of this study appear to correspond to those of Azar et al. (2010) who report that the non-remission of depressed persons can be explained by the severity of the depression, the comorbidity with anxiety, and the comorbidity with general medical problems.[29]

Methodological Considerations

This study involves methodological limitations which should be considered for the interpretation of results and future research. The first limitation concerns the measure of antidepressant use. The principal question was formulated such that respondents identified and classified the medication that they consumed, without specifying the name(s) and the number within the same class, which does not enable the determination of quantity or dosage of antidepressant use. As a recent study demonstrated a tendency to prescribe more than one psychotropic medication for mental disorders[30], this could increase the error that could be attributed to the judgment of the participants. The questionnaire suggested some names of medications belonging to the category in question (such as Prozac, Paxil or Effexor) to facilitate the identification task. Furthermore, the questionnaire did not cover the purpose of the prescribed medication. This presents certain shortcomings, since certain medications are prescribed as antipsychotics, anxiolytics or antidepressants, such as Seroquel, whose clinical effects vary according to the dosage and the diagnosis treated.[31]

Another methodological limitation is related to the participation rate of the study at T1 (48.7%), which remains modest, even though it is higher than the median rate reported in a meta-analysis of epidemiological studies.[32] This response rate could result in an underrepresentation of the most vulnerable persons, who are often the most difficult to recruit in this type of study. Given that participation is affected by family and medical history of eligible persons who are contacted[32], the proportion of persons with mental health disorders may be underestimated, especially since psychotic and generalized anxiety disorders are not considered in this study. Regarding participation rates at T2 and at T3 for antidepressant users, they correspond approximately to the median rate of 75% reported in a meta-analysis of longitudinal epidemiological studies.[33]

CONCLUSION

The present study identifies and characterizes four types of antidepressant users in the epidemiological zone of South-West Montreal. It represents one of the rare studies to explore the links among different mental health disorders and antidepressant use. Given the increase of problems related to psychopharmacological medication[34], the typology of this study improves knowledge about the context of antidepressant use, for the purpose of helping to select appropriate interventions. Anxio-depressive users with substance dependence and polypharmacy (cluster 2) may require integrated services to counter symptoms related to the co-ocurrence of mental health and substance use disorders. While individuals who only suffer from a depressive disorder may benefit from primary care intervention received by a general practicioner (cluster 1), those struggling with depression and other mental disorders associated to polypharmacy represent the most prevalent clinical group, and since they use antipsychotic medications in a large proportion, they may benefit from the services of a psychiatrist (cluster 3).

Concerning the *users without mental health disorders during the last year* (cluster 4), it would be pertinent to study in more depth this group of antidepressant users to gain a better understanding of the different motivations justifying prescription practices. A further typology should consider lifetime prevalence and other mental health problems such as psychotic and generalized anxiety disorders, as well as physical illnesses.

Acknowledgements

The authors would like to thank the Canadian Institutes of Health Research (CTP-79839), who provided funding for this research, as well as the participants who took part in the study.

REFERENCES

1. Public Health Agency of Canada. What is depression? Available at: http://www.phac-aspc.gc.ca/cd-mc/mi-mm/depression-eng.php Accessed on: 2015-06-25.
2. Hanlon JT, Handler SM, Castle NG. Antidepressant prescribing in US nursing homes between 1996 and 2006 and its relationship to staffing patterns and use of other psychotropic medications. J Am Med Dir Assoc Jun 2010;11(5):320-4.
3. Raymond C, Morgan S, Caetano P. Antidepressant utilization in British Columbia from 1996 to 2004: increasing prevalence but not incidence. Psychiatr Serv 2007;58(1):79-84.
4. Lesage A, Rhéaume J, Vasiliadis HM. Utilisation de services et consommation de médicaments liées aux problèmes de santé mentale chez les adultes québécois. Enquête sur la santé dans les collectivités canadiennes (cycle 1.2). Québec: Institut de la statistique du Québec; 2008:53.
5. Gouvernement du Québec. Portrait de l'usage des antidépresseurs chez les adultes assurés par le régime public d'assurance médicaments du Québec. Québec: Conseil du médicament;2011.
6. Wainstein L, Victorri-Vigneau C, Sébille V, et al. Pharmacoepidemiological characterization of psychotropic drugs consumption using a latent class analysis. Int Clin Psychopharmacol 2011;26:54–62.
7. Milea D. Usage et mésusage dans la prescription des antidépresseurs : l'apport des bases de données: École doctorale (Épidémiologie), Université Lyon 1;2010.
8. Muskens E, Eveleigh R, Lucassen P, et al. Prescribing Antidepressants Appropriately (PANDA): a cluster randomized controlled trial in primary care. BMC Fam Pract 2013;14(6):14-26.
9. Barre-Détrimont C. Les facteurs influençant la prescription d'antidépresseurs en médecine générale, Thèse de doctorat, Université de Rouen, Rouen: Faculté de médecine et de pharmacie de Rouen; 2013.
10. Beck C, Patten S, Williams J, et al. Antidepressant utilization in Canada. Soc Psychiatry Psychiatr Epidemiol 2005;40(10):799-807.
11. Sanyal C, Asbridge M, Kisely S, et al. The utilization of antidepressants and benzodiazepines among people with major depression in Canada. Can J Psychiatry 2011;56(11):667-76.
12. Meijer W, Heerdink E, Leufkens H, et al. Incidence and determinants of long-term use of antidepressants. Eur J Clin Pharmacol 2004;60(1):57-61.
13. Caron J, Fleury MJ, Perreault M, et al. Prevalence of psychological distress and mental disorders, and use of mental health services in the epidemiological catchment area of Montreal South-West. BMC Psychiatry Oct 30 2012;12(1):183.
14. National Population Health Survey (NPHS). Available at: http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/population/index-eng.php (consulted September 15, 2011).
15. Kessler R, Andrews G, Mroczek D, et al. The World Health Organisation Composite International Diagnostic Interview Short_Form (CIDISF). Int J Methods Psychiatr Res 1998;7:171-85.
16. Kessler R, Barker P, Colpe L, et al. Screening for serious mental illness in the general population. Arch Gen Psychiatry 2003;60(2):184-9.
17. Cutrona CE, Russell DW. The provisions of social support and adaptation to stress. Advance in Personal Relationships 1987;1:37-67.
18. Rapkin BD, Luke DA. Cluster analysis in community research: Epistemology and practice. Am J Community Psychol 1993;21(2):247–77.
19. Clatworthy J, Buick D, Hankins M, et al. The use and reporting of cluster analysis in health psychology: a review. Br J Health Psychol 2005;10(3):329-58.
20. Norusis MJ. Chapter 16- Cluster Analysis. SPSS 17.0. Statistical Procedures Companion. Upper Saddle River, N.J.: Prentice Hall; 2008.
21. Patten S, Wang J, Williams J, et al. Descriptive epidemiology of major depression in Canada. Can J Psychiatry 2006;51(2):84-90.
22. Turpide B, Joseph G. Portrait sociodémographique, socioéconomique et scolaire de la région de Montréal. Québec en forme vis ton énergie. Available at: http://www.centre123go.ca/upload/documents/62A2B479-2DA8-0507-B71E-33334FA113D1-portrait_montreal_QEF.pdf (consulté le 12 septembre 2011).
23. Perreault M, Djemaâ-Samia M-T, Fleury M-J, et al. Facteurs associés à l'exposition élevée aux médicaments psychotropes identifiés lors d'une étude épidémiologique montréalaise. Santé Mentale au Québec 2013;38(1):259-78.
24. Turgeon M. Portrait de l'usage des antidépresseurs chez les adultes assurés par le régime public d'assurance médicaments du Québec. Québec: Conseil du Médicament du Québec; 2011.

25. Olfson M, Marcus S. National patterns in antidepressant medication treatment. Arch Gen Psychiatry 2009;66(8):848-56.
26. Furukawa T, Streiner D, Young L, et al. Antidepressants plus benzodiazepines for major depression. In: Art I, ed. Cochrane Database of Systematic Reviews 2001: The Cochrane Collaboration; 2009.
27. Caron J, Liu A. Predictors of psychological distress in the Canadian population: a comparison of low-income and non low-income populations. Community Ment Health J 2011;47(3):318-30.
28. Caron J, Latimer E, Tousignant M. Predictors of psychological distress in low income populations of Montreal. Can J Public Health 2007;98:35-44.
29. Azar AR, Chopra MP, Cho LY, et al. Remission in major depression: results from a geriatric primary care population. Int J Geriatr Psychiatry 2010;26(1):48-55.
30. Mojtabai R, Olfson M. National trends in psychotropic medication polypharmacy in office-based psychiatry. Arch Gen Psychiatry 2010;67(1):26-36.
31. Zhornitsky S, Potvin S, Moteshafi H, et al. Dose-response and comparative efficacy and tolerability of quetiapine across psychiatric disorders: a systematic review of the placebo-controlled monotherapy and add-on trials. Int Clin Psychopharmacol 2010;26(4):183-92.
32. Morton LM, Cahill J, Hartge P. Reporting participation in epidemiologic studies: a survey of practice. Am J Epidemiol 2006;163:197-203.
33. Tooth L, Ware R, Bain C, et al. Quality of Reporting of Observational Longitudinal Research. Am J Epidemiol 2005;161(3):280-8.
34. Nordfjærn T, Bjerkeset O, Bratberg G, et al. Socio-demographic, lifestyle and psychological predictors of benzodiazepine and z-hypnotic use patterns. Nordic J Psychiatry 2013;0:1-10.