1   Can social firms contribute to alleviating the economic burden of psychiatric disabilities
2   for the public healthcare system?

3

4   Abstract

5

6   In a number of countries, unemployment rates for people with psychiatric disabilities are
7   much higher than in the general population. On the one hand, the expenses for mental
8   health reach 3.5% of the total public health and social services budget in Québec. On the
9   other hand, social firms (SFs) receive government subsidies. The objective was to
10  compare public healthcare expenses for people with psychiatric disabilities who work in
11  SFs with those associated with people with a similar condition who are looking for a job
12  in the competitive labour market. This study followed a retrospective comparative design
13  and considered two groups: 122 employees working in SFs, and 64 individuals
14  participating in a supported employment program as job-seekers. Two complementary
15  datasets were used: a self-report questionnaire and public healthcare databases. The cost
16  analysis was performed from the perspective of the public healthcare system and included
17  outpatient visit fees to physicians, outpatient visits to health professionals other than
18  physicians in public healthcare centers, inpatient expenses due to hospitalizations,
19  emergency room visits and amounts reimbursed to patients for medication. Regression
20  analyses using generalized linear models with a gamma distribution and log link were
21  used. Our results revealed that when controlling for sociodemographic variables (gender,
22  age, marital status, education, physical disability), global health (EuroQol EQ-5D-5L),
23  the severity of psychiatric symptoms (18-item Brief Symptom Inventory) and self-
24  declared primary mental health diagnosis, annual healthcare costs paid by the public
25  insurance system were between $1924 and $3912 lower for people working in SFs than
26  for the comparison group. An explanatory hypothesis is that working in SFs could act as
27  a substitute for medical treatments such as outpatient visits and medication use. There
28  might be a form of compensation between supporting SFs and financing the public
29  healthcare system, which provides valuable insights for public decision-making.

30  Word count: 296

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1  What is known about this topic:

2  •  As they offer various types of work accommodations and natural support, social
3  firms have been described as an efficient mechanism and as a means of recovery for
4  people with psychiatric disabilities.

5

6  What this paper adds:

7  •  When controlling for sociodemographic variables, global health, the severity of
8  psychiatric symptoms and self-declared primary mental health diagnosis, annual
9  healthcare costs paid by the public insurance system were between $1924 and $3912
10  lower for people working in social firms than for people registered in supported
11  employment programs.

12  •  A form of compensation may exist between supporting social firms and financing
13  the public healthcare system, which provides valuable insights for public decision-
14  making.

15

16  Word count: 111

1    Can social firms contribute to alleviating the economic burden of psychiatric disabilities

2    for the public healthcare system?

3

4    **Introduction**

5         Unemployment rates for people with psychiatric disabilities such as

6    schizophrenia, bipolar disorders or major depression are much higher than in the general

7    population and are estimated between 70 and 90% in Canada and the UK (Gewurtz et al.,

8    2018; Marwaha et al., 2007).

9         A recent Cochrane meta-analysis (Suijkerbuijk et al., 2017) compared the

10   efficiency of different types of interventions aiming at helping people with a psychiatric

11   condition find and keep a competitive job. In this meta-analysis, supported employment

12   programs, which provide help for people looking for a job and can be integrated with

13   mental health treatment services, were found to be the most effective in terms of job

14   tenure, achieving an average of 22.8 weeks when combined with another psychosocial

15   intervention (e.g., social skills training, cognitive remediation) (Suijkerbuijk et al., 2017).

16   This study therefore suggests that even with the most effective type of intervention, job

17   tenure for people with psychiatric disabilities remains brief (Lanctot, Bergeron-Brossard,

18   Sanquirgo, & Corbière, 2013).

19        An alternative to traditional vocational services contributing to the work

20   integration of people with psychiatric conditions exists in the form of social firms (SFs)

21   (Corbière & Lecomte, 2009; Villotti, Zaniboni, & Fraccaroli, 2014). SFs report a job

22   tenure of up to six years (Lanctôt, Corbière, & Durand, 2012). SFs produce goods and

1   services for the competitive market while pursuing the social objective of offering paid

2   employment to vulnerable individuals, such as people with psychiatric disabilities. A

3   recent study across six European countries (Knapp et al., 2013) carried out a cost-

4   effectiveness analysis from the perspective of the health and social care systems, and

5   compared supported employment programs with standard vocational rehabilitation. It

6   concluded that supported employment programs were more cost-effective. To the best of

7   our knowledge, no such analysis has been conducted for SFs.

8        Several studies have focused on employment and mental health, showing an

9   improvement in mental health among people who return to work after a period of

10  unemployment (Prause & Dooley, 2001) as well as an association between a decline in

11  mental health and job loss (Olesen, Butterworth, Leach, Kelaher, & Pirkis, 2013;

12  Thomas, Benzeval, & Stansfeld, 2005). However, according to Butterworth et al. (2011),

13  the benefits of a change from unemployment to employment on mental health depends on

14  the quality of work. SFs are described as a means of recovery for people with psychiatric

15  disabilities (Corbière et al., 2018 accepted). Since SFs are non-profit businesses, they

16  often reinvest their profits in the improvement of working conditions. SFs offer various

17  types of work accommodations and natural support, such as support from stakeholders,

18  supervisors and coworkers, training, and flexible working hours (Corbière & Lecomte,

19  2009; Corbière et al., 2018 accepted; Corbière et al., 2014; Villotti, Corbiere, et al.,

20  2017).  They provide an opportunity to perform a meaningful activity in an inclusive

21  social environment with low levels of stigma (Villotti, Corbière, et al., 2017), thus

22  favoring the development of skills, employability, a higher self-reliance and self-esteem

23  (Roy, Donaldson, Baker, & Kerr, 2014; Svanberg, Gumley, & Wilson, 2010).

1      In Québec, some SFs receive a wage subsidy from the federal and the provincial

2      governments (Garon, Paquet, & Simard, 2017). These subsidies are intended to support

3      employers in the effort and investment they make in order to promote accommodations

4      for people with disabilities (Corbière et al., 2018 accepted). Seen from another viewpoint

5      within the framework of public subsidies and social transfer system, the expenses devoted

6      to mental health by the Québec public health system are high: they amounted to $1.072

7      billion Canadian dollars in 2009-2010 (Commissaire à la Santé et au Bien-Etre, 2012),

8      which corresponds to approximately 3.5% of the total public health and social services

9      budget. All things being equal, based on allocations made in the 2015-16 budget, we

10     would estimate expenses devoted to mental health to be approximately $1.367 billion in

11     2015-2016 (MSSS, 2018). The objective of our study was to compare public healthcare

12     expenses for people with psychiatric disabilities who work in SFs to those of people with

13     a similar condition who are seeking work in the competitive labour market via supported

14     employment programs. This comparison can contribute to the knowledge on whether

15     work integration in a SF contributes in alleviating part of the economic burden for the

16     public healthcare system related to severe mental illness among people of working age.

17     Such an evaluation of direct healthcare costs due to mental illness has never been

18     performed before in relation to the integration of workers in SFs in Québec. As

19     emphasized above, the total amount of public health expenses due to mental illness is

20     high. Although SFs may receive subsidies from the government, and consequently

21     represent a cost for public finances, they might nevertheless help reduce the level of

22     public healthcare expenses. Thus, our results may contribute to the public debate

23     regarding the possibility of developing SFs in the economy.

1

2    **Method**

3    This study was part of a broader research project entitled "The factors associated with the

4    work integration of people with psychiatric disabilities in SFs in Canada". In this paper,

5    only data from Québec will be considered.

6    *Study design*

7    This study followed a cross-sectional retrospective comparative design. Two groups of

8    people with psychiatric disabilities were included. One group was composed of people

9    who had been working in a SF for the last nine months (or longer) without interruption.

10   The comparison group included people who had been participating in a supported

11   employment program for the last nine months. The design was cross-sectional since the

12   measures of health outcomes were collected at one point in time, and it was retrospective

13   since we analyzed data relating to the total use of healthcare services and medication over

14   the past year.

15   *Population and procedure*

16   We used a convenience sample of 19 SFs located in the Greater Montreal area, that

17   participated voluntarily in the study. They were identified through a corporate association

18   of social economy stakeholders [Chantier de l'économie sociale], and through the Québec

19   council of adapted enterprises [Conseil Québécois des Entreprises Adaptées]. Employers

20   were contacted by telephone or during meetings and were informed about the purpose of

21   the study. These enterprises had common features, such as: 1) they are non-profit

22   business initiatives operating in a competitive economic environment; 2) they promote

1 innovative solutions to exclusion and unemployment; 3) they have a minimum of 25% of

2 workers with a disability; and 4) they foster collaborative work while focusing on self-

3 empowerment (Corbière et al., 2018 accepted). The participating enterprises represented

4 various sectors: manufacturing (n = 7), utilities (n = 1), healthcare and social assistance

5 services (n = 2), wholesale and retail trade (n = 2), administrative and support, waste

6 management and remediation services (n = 1) and other services (n = 6). The size of the

7 enterprises varied from 10 to 350 employees. In these enterprises, the research project

8 was briefly described to all employees who met the inclusion criteria. Inclusion criteria

9 were as follows: aged 18 years or more, able to speak French or English, self-

10 identification as having a psychiatric disability (e.g., schizophrenia, depression, bipolar

11 disorder) and being employed in a SF. Those who were interested in participating were

12 invited to contact the research coordinator. The research team explained that the project

13 required access to the participants' individual data via public healthcare insurance

14 databases using their individual health insurance numbers. To ensure that the data was

15 collected on a voluntary basis, all participants could give (or withhold) their informed

16 consent to trained study staff. As a result, 122 employees working in SFs were included.

17 The comparison group consisted of individuals participating in two supported

18 employment programs implemented in Montreal. To describe the content of these

19 programs, we used the Quality of Supported Employment Implementation Scale (QSEIS)

20 (Bond, Picone, Mauer, Fishbein, & Stout, 2000) and showed that the implementation of

21 these two programs reached a high level of fidelity to the QSEIS model (Corbiere et al.,

22 2010; Corbiere et al., 2017). The inclusion criteria were similar to those of the group of

23 participants working in SFs (age, language, psychiatric disability). Participants were

1    recruited by vocational counsellors working in the supported employment programs.

2    They gave informed consent after receiving a complete description of the study. As a

3    result, 64 individuals were included in the comparison group. All participants received an

4    honorarium. The research protocol was reviewed and approved by the Research Ethics

5    Boards of the University of Sherbrooke.

6    *Data sources and costs measures*

7    The cost analysis was carried out from the perspective of the public healthcare system (as

8    financed by the Ministry of Health), which adopts a universal program and covers direct

9    healthcare costs such as medical and paramedical services, hospitalization, and

10   medication. Consequently, total healthcare costs included in this study covered outpatient

11   visit fees to general practitioners and specialists, outpatient visits to health professionals

12   other than physicians in public healthcare centers (time spent multiplied by hourly wage),

13   all inpatient expenses due to hospitalizations, emergency room (ER) visits and amounts

14   reimbursed to patients for outpatient medication by the public healthcare insurance

15   system.

16   The first set of data was collected from the participants in both groups who filled out a

17   self-report questionnaire, which included measures of outpatient visits (number and

18   length) to public healthcare centers over the previous six months to see a health

19   professional other than a general practitioner or a specialist, such as a psychologist, a

20   social worker, chiropractor, herbalist, homeopath, naturopath, massage therapist, nursing

21   practitioner, or occupational therapist. We computed the cost of each of these visits by

22   multiplying the length of the visit by the average hourly gross wage available from

23   provincial wage scales in the public sector in 2015. Costs deriving from this estimation

1   were multiplied by two in order to estimate the costs over the previous year (12 months).

2   This questionnaire also provided data on sociodemographic characteristics: gender (man,

3   woman, other), age, physical disability (yes/no), marital status (never married / separated,

4   widowed or divorced / married or in domestic partnership) and education (less than high

5   school / high school graduate / above high school). The questionnaire included an item on

6   self-reported mental health status with an indication of the primary diagnosis category as

7   follows: schizophrenia and other psychotic disorders, bipolar disorder, major depression,

8   anxiety disorder, organic disorder (delirium, dementia), substance-related disorder,

9   personality disorder, specific disorder of childhood/adolescence. Respondents were also

10  asked to fill out the 18-item Brief Symptoms Inventory (BSI), which is a self-report scale

11  that measures the severity of symptoms related to psychiatric disorders (Derogatis &

12  Melisaratos, 1983; Hoe & Brekke, 2008). Answers were rated on a 5-point scale (from

13  'not at all' to 'extremely'). For this study, a global severity index was calculated by

14  summing up all the 18 items, with an internal consistency (Cronbach's alpha) of $\alpha = .89$.

15  The questionnaire also included the EQ-5D-5L scale from the EuroQol group to measure

16  the global health status of participants. This scale includes five dimensions: mobility,

17  self-care, usual activities, pain/discomfort and anxiety/depression, each being measured

18  on a 5-level scale (no problems, slight problems, moderate problems, severe problems

19  and extreme problems). It also comprises a vertical visual analogue scale for self-rated

20  health. The validity of the EQ-5D-5L has been analyzed for Canada in its English and

21  French versions (Bansback, Tsuchiya, Brazier, & Anis, 2012; Sayah et al., 2016). Scores

22  were computed in accordance with the EQ-5D-5L user guide (van Reenen & Janssen,

23  2015).

1    We used a second set of data obtained from the public healthcare system databases. The

2    RAMQ ([Régie de l'Assurance Maladie du Québec] healthcare insurance board) database

3    provided the costs to the public health insurance system of outpatient physician visits

4    (general practitioners and specialists) over the previous year. This database also provided

5    the gross costs of outpatient medication based on the sales price in pharmacies. It also

6    provided the co-insurance amounts paid by patients, which we subtracted from the gross

7    costs in order to compute the actual amount paid by the public health insurance system

8    for medications.

9    Hospitalization costs of inpatient stays were obtained from the MED-ECHO database

10    ([Maintenance et exploitation des données pour l'étude de la clientèle hospitalière]

11    hospitalization database). These included the costs of hospital stays (laundry, food,

12    administration, maintenance), laboratory tests, physician visits, medical acts and the time

13    spent by health professionals during inpatient stays, consumables and medications. The

14    costs provided in the MED-ECHO database are calculated on the basis of the *direct*

15    *allocation method* according to which each overhead cost (such as central administration

16    costs or housekeeping) is allocated directly to each department or unit based on its

17    contribution to the hospital's activity (Drummond, Sculpher, Claxton, Stoddart, &

18    Torrance, 2015; Vasiliadis et al., 2013). The costs of hospitalization are based on a mean

19    provincial per-diem cost resulting from an aggregation of the data in the reports

20    transmitted to the Ministry of Health by healthcare institutions.

21    The costs of visits to ER were also provided by the MED-ECHO database for each

22    participant over the previous year. For each ER visit, a unitary cost is documented in the

23    database, based on the expenses incurred in healthcare institutions, including the costs of

1    physician visits, the time spent by health professionals, consumables, medications and

2    overheads.

3    The two sets of data (self-report questionnaire and administrative databases) were highly

4    complementary since the RAMQ and MED-ECHO databases do not document the costs

5    of outpatient visits to health professionals other than physicians in public healthcare

6    institutions. All types of healthcare costs were included in our estimates since we

7    measured the costs resulting from participants' mental and physical health conditions.

8    *Data analysis*

9    We first performed chi-squared tests for categorical variables and t-tests for continuous

10    variables to verify whether the two groups were comparable regarding participants'

11    sociodemographic characteristics and mental health status: gender, age, marital status,

12    education, physical disability, BSI total score for severity of psychiatric symptoms, EQ-

13    5D-5L score for the global health status measure and primary mental health diagnosis

14    (see *Data sources* section for a detailed description). Two variables were used

15    alternatively to identify the primary mental health diagnosis: a self-reported psychiatric

16    diagnosis from the questionnaire and the diagnosis provided by the RAMQ database,

17    which corresponds to the diagnosis as coded by a physician or a psychiatrist when the

18    mental illness was first identified. The categories were the same for the two diagnosis

19    variables: bipolar disorder, major depression, schizophrenia, other.

20    Secondly, we compared the two groups with regard to the total costs and cost sub-

21    categories and tested for statistical significance of differences using t-tests. The

22    computation of costs was performed from the public healthcare system perspective by

1   adding together the outpatient physician fees and visits to other health professionals,

2   inpatient expenses, ER visits and outpatient medication, from which we subtracted the

3   amount of co-insurance paid by the patient (see *Data sources and measures* section).

4   Costs were expressed in 2015 Canadian dollars.

5   Thirdly, multivariable regression models were carried out to test for whether the

6   probability for total expenses by the public healthcare system was significantly different

7   between the two groups when controlling for several covariates.

8   The control variables included in the regression were chosen as follows: first, we wanted

9   to measure the difference in costs between the two groups controlling for differences in

10   physical or mental health status. Consequently, we included the EQ-5D-5L score for the

11   global health status measure, the BSI total score for severity of psychiatric symptoms and

12   primary mental health diagnosis. Two variables were used alternatively to identify the

13   primary mental health diagnosis: the self-reported psychiatric diagnosis from the

14   questionnaire and the diagnosis provided by the RAMQ database. Second, we wanted to

15   control for sociodemographic variables for which differences were observed between the

16   two groups (marital status and age, see *Results* section) and we also added gender as a

17   covariate.

18   To take account of the non-normal distribution of costs, regression analyses using

19   generalized linear models with a gamma distribution and log link were used (Diehr,

20   Yanez, Ash, Hornbrook, & Lin, 1999; McCullagh & Nelder, 1983; Pregibon, 1980). We

21   compared the results of two models. A first log-gamma regression model was performed

22   using the self-report psychiatric diagnosis from the questionnaire. A second model was

23   tested using the other psychiatric diagnosis variable as provided by the RAMQ database.

1    Testing our model alternatively with these two diagnosis variables enhanced the

2    robustness of our results, since the type of primary diagnosis might have an impact on the

3    differences in healthcare expenses between participants. The software package SAS

4    version 9.4 was used for statistical analyses.

5    **Results**

6    As presented in Table 1, there were no significant differences between the two groups of

7    participants regarding gender, education, and physical disability. Moreover, the global

8    health status (as measured by the EQ-5D-5L), the severity of psychiatric symptoms (as

9    measured by the BSI score) and self-reported primary mental health diagnosis were not

10   statistically different between the two groups (Table 1). Our results also showed that the

11   primary mental health diagnosis as provided by the RAMQ databases, which corresponds

12   to the diagnosis coded by the physician when the mental illness was first identified, was

13   not statistically different between the two groups ($X^2(3)=1.74$, p=.63). As a result, the

14   two groups were similar regarding the mental and physical health status of participants.

15   The two groups differed significantly only on age and marital status. The participants

16   working in SFs were on average older (46 years, as compared to 40 years) and more

17   likely to be married or in a domestic partnership than those registered in supported

18   employment programs (see Table 1).

19   Men were in the majority in both groups. Some presented with a physical disability:

20   19.2% in the group working in SFs and 12.5% in the comparison group. Schizophrenia

21   was the most prevalent mental illness across both groups (47.9% in the working group

22   and 60.9% in the comparison group), and was more prevalent than bipolar disorder

23   (respectively 7.4% and 9.4%) or major depression (16.5% and 7.8%). Almost half the

1    population in both groups had a level of education above high school. Most participants

2    had never been married.

3    *Insert Table 1 here*

4    The analysis of costs between the two groups revealed significant differences, as

5    presented in Table 2. Without controlling for covariates, the comparison of average costs

6    between the two groups showed that total annual healthcare expenses per individual for

7    the public healthcare system were $3600 in the group working in SFs and $9403 in the

8    comparison group, a difference of $5803 (95% Confidence Interval (CI): 3433.2 - 8173.3;

9    $p<0.001$).

10   When the total healthcare costs were broken down into the different cost components, the

11   unadjusted results showed large discrepancies between the two groups for fees relating to

12   outpatient visits to physicians, inpatient stays and medication costs, with these three cost

13   categories being lower for the group working in SFs than for the comparison group.

14   Expenses for outpatient visits to physicians were lower by $991.8 per patient for the

15   group working in SFs (95% CI: 479.5 - 1504.1; $p<0.01$). Mean costs for inpatient stays

16   were $2541.9 lower for the group working in SFs (95% CI: 935.8 - 4148.1; $p<0.05$). The

17   mean public healthcare system expenses for medications per patient (amount reimbursed

18   to the patient after co-insurance contribution) were $2121.4 lower for the group working

19   in SFs (95% CI: 933.6 – 3309.3; $p<0.001$). The average co-insurance contribution per

20   patient was $269.1 in the group working in SFs and $44.9 in the comparison group,

21   showing a significant difference of $224.2 (t(183.9)=5.72; $p<0.001$). As a result, co-

22   insurance amounts paid by patients working in SFs widened the gap between the two

23   groups. We also took into account that in Québec part of the population is not covered by

1   the public healthcare insurance system for their medications because they can choose to

2   be covered by a private insurance financed by their employer. Our analysis showed that

3   in the group of participants working in SFs, a lower proportion of people were insured for

4   medication expenses by the public healthcare insurance system than in the comparison

5   group: only 90 out of 122 participants working in SFs as compared to 62 out of 64 in the

6   comparison group ($X^2(1)=15.0$, $p<0.001$). Consequently, we compared the average

7   medication expenses per individual while including only those insured by the public

8   healthcare insurance system (90 in SFs and 62 in the comparison group). This

9   comparison showed that public expenses per individual were $1583.9 lower in the group

10  working in SFs than in the comparison group (95% CI: 313.0 – 2854.7; $p<0.05$).

11  Therefore, the difference in average medication expenses per patient paid by the public

12  healthcare insurance system remained significant even when only patients covered by

13  public insurance were included in the analysis.

14  *Insert Table 2 here*

15  To determine whether there was a difference between the two groups in healthcare costs

16  when controlling for covariates, a log-gamma regression model was carried out and the

17  results are presented in Table 3. Controlling for gender, age, marital status, EQ-5D-5L

18  score for global health status, BSI score for severity of psychiatric symptoms and the self-

19  reported primary mental health diagnosis, the multivariable analysis showed that the

20  annual costs per patient were significantly lower for the group of participants working in

21  SFs ($1923.9 lower, 95% CI: 1146.3 – 3127.7; $p=0.004$). In the second regression model,

22  controlling for the primary mental health diagnosis provided by RAMQ databases instead

23  of self-declared diagnosis (the other covariates remaining the same), the difference was

1 even larger: the annual cost per patient was $3911.8 lower (95% CI: 2171.9 – 6973.6; *p*=

2 0.0004) for the group of participants working in SFs than for the comparison group.

3 Being older and being a woman (as compared to a man) were associated with lower

4 healthcare costs in both regression models (see Table 2).

5 *Insert Table 3 here*

6 **Discussion**

7 The goal of this study was to compare public healthcare expenses for people with

8 psychiatric disabilities who work in SFs to people with a similar condition who are

9 registered in supportive employment programs and looking for a job in the competitive

10 labour market. When controlling for sociodemographic variables, global health, the

11 severity of psychiatric symptoms and self-declared primary mental health diagnosis, the

12 annual healthcare costs paid by the public insurance system per patient were $2850 for

13 people working in SFs and $4774 for participants registered in supported employment

14 programs, a difference of $1923.9. When controlling for the same variables but using the

15 RAMQ primary mental health diagnosis instead of the self-declared diagnosis, the

16 difference was even greater: $4302 for people working in SFs, $8213 for participants in

17 the comparison group, a difference of $3912 per patient with psychiatric disabilities for

18 the public healthcare system.

19 Medication expenses are a component of total healthcare costs that require a closer

20 analysis. The fact that medication expenses to the public healthcare insurance system

21 were lower in the group of participants working in SFs may be explained by three

22 different factors. First, co-insurance contributions by patients were significantly higher

1    for people working in SFs. In Québec, all patients whose medication is covered by the

2    public healthcare insurance pay a co-insurance amount equal to a fixed amount per month

3    plus a percentage of the price of purchased drugs. Although the co-insurance contribution

4    is calculated in the same way for all patients, some patients are entitled to prescription

5    medications free of charge (i.e. without co-insurance) because of their social status

6    (unemployed or very low income level). Our results suggest that people in the

7    comparison group received medications free of charge more often than those working in

8    SFs. This was to be expected as participants in the comparison group were unemployed.

9    As a result, the amounts paid by patients who were working in SFs widened the gap

10   between the two groups regarding public healthcare expenses for medications. The

11   second explanatory factor is related to the fact that, as shown by our results, the

12   individuals who were working in SFs were less often insured for medications by the

13   public healthcare insurance system than those in the comparison group. Consequently

14   there were no public insurance expenses for these non-insured individuals. Some

15   employers offer private insurance to their employees as a company welfare benefit. This

16   resulted in lower amounts being reimbursed for medication per patient in this group.

17   However, when all participants not insured for medications by the public healthcare

18   insurance system were excluded from the two groups, the average medication costs per

19   patient remained significantly lower for those who were working in SFs. This indicates

20   that the difference in medication costs is not only due to a difference in insurance

21   coverage between the two groups. Therefore, the third explanatory factor of lower

22   medication expenses in the group working in SFs is that this group uses less medication

1   than the comparison group, irrespective of the differences in co-insurance fees and

2   insurance coverage between the two groups.

3   Our results showed that unadjusted public healthcare system expenses for outpatient

4   visits to physicians and for inpatient stays were significantly lower for the group working

5   in SFs than for the comparison group, whereas we did not observe significant differences

6   in the severity of mental health symptoms between the two groups, either in the primary

7   mental health diagnosis, or in the global health status. The results of the multivariable

8   regression strengthened these findings. When controlling for covariates related to mental

9   and physical health, healthcare expenses were significantly lower for people who were

10   working in SFs. This finding is noteworthy since it suggests that the difference in costs

11   cannot be attributed to a healthy worker effect (Li & Sung, 1999). Indeed, a selection bias

12   between working people and unemployed people may exist in the general population,

13   since better health is a favourable factor for finding and keeping a job. In contrast, in our

14   study, this difference in healthcare costs should not be interpreted as a result of different

15   health status, but rather as a result of different needs or different access to healthcare

16   services. As suggested in a previous work (Dewa et al., 2018), one explanatory

17   hypothesis might be that working in SFs could act as a substitute for medical treatments

18   such as outpatient visits, medication use and hospitalizations. Social support from

19   colleagues and supervisors is often provided in SFs (Corbière & Lecomte, 2009; Corbière

20   et al., 2018 accepted; Corbière et al., 2014; Villotti, Corbière, et al., 2017) and this may

21   create an environment where people have less need for healthcare services. SFs provide

22   meaningful activities and a purpose in life, an opportunity to gain knowledge and new

23   competencies, a sense of group acceptance and belonging, and may increase self-

1    confidence (Svanberg et al., 2010). Working in SFs helps people with psychiatric

2    disabilities to develop a sense of timing and structure and promotes social inclusion

3    through an environment with less stigma (Villotti, Corbière, et al., 2017). As a result,

4    people working in such an environment may have a lesser need for healthcare services

5    and medication than job-seekers with similar physical and mental health status. Another

6    explanatory hypothesis could be formulated in terms of *access* to healthcare services and

7    not in terms of *need* for healthcare services. People working in SFs might have a tighter

8    schedule than people looking for a job and have less time to get healthcare services.

9    However, further studies would be needed in order to validate this latter hypothesis.

10    Studies comparable to ours are very rare in the literature. Dewa et al. (2018) conducted a

11    similar study in Ontario as part of the same research project. However, in this study there

12    were no significant differences in the total healthcare costs between the group of people

13    working in SFs and the group of job-seekers. Nevertheless, there were significant

14    differences for some cost components. The cost of ER and community mental health

15    supports were lower for those working in SFs, whereas the costs of psychiatric visits were

16    significantly higher. These cost differences remained significant when adjusting for

17    covariates. These differences in findings between the two studies may be due to the fact

18    that Dewa et al's study included costs more specifically related to mental illness such as

19    psychiatric hospitalizations and psychiatrist visits, whereas our study included all

20    healthcare costs. Our results might reflect the global health situation of participants,

21    including comorbidities due to psychiatric condition. Moreover, the differences may be

22    due to different healthcare systems and health-related behaviours in Québec and Ontario.

23    *Limitations*

1   The study design was cross-sectional and therefore does not allow us to establish a cause-

2   effect relationship between working in SFs and lower healthcare costs to the public

3   healthcare system. This would require a longitudinal analysis and an experimental design.

4   It was not possible to estimate the response rate of employees since the information

5   regarding the total number of employees in each SF who met our inclusion criteria could

6   not be collected. As a result, we could not control for potential selection biases due to

7   non-response rates. Moreover, we could not randomize study participants into the two

8   groups so there might be a selection bias regarding personal choice of supported

9   employment program. Furthermore, social and work functioning was not assessed in this

10  study.

11  The sample size was relatively limited, with a total of 186 participants. The comparison

12  group consisted only of people registered in supported employment programs and was

13  therefore not representative of the overall population of job-seekers with psychiatric

14  disabilities.

15  Another issue relates to the limited generalizability of the results since we used a non-

16  randomized convenience sample of enterprises and participants, who agreed to be

17  included in this study. Thus, this sample cannot be considered as representative of the

18  general population of people working in SFs or participating in supported employment

19  programs, as is often the case of studies based on data collected in work settings.

20  **Conclusion**

21  Our study showed that among people with psychiatric disabilities, people working in SFs

22  had a lower utilization of healthcare services than job-seekers registered in supported

1    employment programs, regardless of socio-demographic characteristics, mental and

2    physical status. The main explanatory hypothesis is that SFs provide a work environment

3    that offers a high level of social support from supervisors and colleagues, an opportunity

4    to develop a sense of timing and structure, self-confidence and group inclusion, which

5    may act as a substitute for some of the medical treatments and support provided by the

6    healthcare system.

7    These findings provide valuable insights for public decision-making. On the one hand,

8    we know that a proportion of SFs get subsidies from the federal and provincial

9    governments (Québec) for accommodating people with psychiatric disabilities. Our study

10   shows that, on the other hand, healthcare costs to the public healthcare system are lower

11   for people working in SFs than for job-seekers registered in supported employment

12   programs. As a result, there might be a form of compensation between supporting SFs

13   and financing the public healthcare system. Further analyses from a broader economic

14   perspective, including all public expenses such as the costs of SFs subsidies and

15   supported employment programs, would be required to be able to interpret these results

16   with regards to the total costs incurred by the government.

17   **Words: 5095**

18

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Table 1: Sociodemographic characteristics (self-reported)

| Variable | Group in social firms n(%), mean (SD) | Comparison group n(%), mean (SD) | *p*- value |
|---|---|---|---|
| *Gender* | | | 0.129 |
| Male | 74(60.7) | 46(71.9) | |
| Female | 48(39.3) | 18(28.1) | |
| *Age in years, mean(SD)* | 46 (9.5) | 39.9(10.4) | *p*<0.001 |
| *Marital status* | | | 0.003 |
| Never married | 83(68) | 54(85.7) | |
| Separated or divorced or widowed | 15(12.3) | 8(12.7) | |
| Married or in domestic partnership | 24(19.7) | 1(1.6) | |
| *Education* | | | 0.46 |
| Less than high school | 25(20.7) | 9(14.3) | |
| High school graduate | 37(30.6) | 23(36.5) | |
| Above high school | 59(48.8) | 31(49.2) | |
| *Self-reported physical disability* | 23(19.2) | 8(12.5) | 0.25 |
| *Primary mental health diagnosis* | | | 0.210 |
| Schizophrenia | 58(47.9) | 39(60.9) | |
| Bipolar disorder | 9(7.4) | 6(9.4) | |
| Major depression | 20(16.5) | 5(7.8) | |
| Others | 34(28.1) | 14(21.9) | |
| *BSI score, mean(SD)* | 1.78(0.58) | 1.91(0.7) | 0.144 |
| *EQ-5D-5L score, mean(SD)* | 76.87(15.62) | 72.6(15.28) | 0.079 |

Table 2: Average costs per person and per year for the public healthcare system, difference between the two groups, in Canadian dollars in 2015 (unadjusted estimates)

| | | Outpatient visits to a physician | Outpatient visits to a healthcare professional | Inpatient stays | Emergency room visits | Medications (amount reimbursed) | Total expenses |
|---|---|---|---|---|---|---|---|
| Group (1) of participants working in social firms (n=122) | Mean | 1037.5 | 72.6 | 501.9 | 35.1 | 1880 | 3599.7 |
| | Standard deviation | 1216.3 | 200.4 | 2068.8 | 149.7 | 2991.7 | 4304 |
| Comparison group (2) (n=64) | Mean | 2029.3 | 160 | 3043.8 | 8.4 | 4001.5 | 9403 |
| | Standard deviation | 2329 | 423.6 | 8545.9 | 66.9 | 4269 | 11888.9 |
| Differences (2)-(1) | Mean | 991.8 | 87.4 | 2541.9 | -26.7 | 2121.4 | 5803 |
| | *p*-value | 0.002 | 0.122 | 0.022 | 0.095 | 0.0006 | 0.0003 |

Table 3: Multivariable analysis (Log gamma regression model) of healthcare costs for the public healthcare system

| Variable | β | 95% Confidence Interval | | p-value |
|---|---|---|---|---|
| Intercept | 8.95 | 7.31 | 10.64 | <0.0001 |
| Working in social firms (ref: comparison group) | -0.52 | -0.87 | -0.17 | 0.004 |
| Women (ref: men) | -0.46 | -0.82 | -0.11 | 0.01 |
| Age | -0.03 | -0.05 | -0.01 | 0.005 |
| Marital status (ref: married): | | | | |
| *Single* | 0.17 | -0.33 | 0.64 | 0.48 |
| *Separated, widowed or divorced* | 0.12 | -0.51 | 0.75 | 0.71 |
| EQ-5D-5L score | 0.003 | -0.008 | 0.02 | 0.57 |
| Self-report primary mental health diagnosis (ref: Schizophrenia): | | | | |
| *Bipolar disorder* | 1.04 | 0.65 | 1.42 | <0.0001 |
| *Major depression* | 0.25 | -0.37 | 0.93 | 0.45 |
| *Others* | 0.21 | -0.35 | 0.80 | 0.47 |
| BSI total score | 0.12 | -0.14 | 0.39 | 0.36 |