ARCHIVIO ISTITUZIONALE
DELLA RICERCA

Alma Mater Studiorum Università di Bologna
Archivio istituzionale della ricerca

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

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:
Sultan-Taieb, H., Villotti, P., Berbiche, D., Dewa, C.S., Desjardins, E., Fraccaroli, F., et al. (2019). Can social firms contribute to alleviating the economic burden of psychiatric disabilities for the public healthcare system?. HEALTH & SOCIAL CARE IN THE COMMUNITY, 27(5), 1311-1320 [10.1111/hsc.12775].

Availability:
This version is available at: https://hdl.handle.net/11585/727465 since: 2020-02-17

Published:
DOI: http://doi.org/10.1111/hsc.12775

Terms of use:

Some rights reserved. The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (https://cris.unibo.it/).
When citing, please refer to the published version.

(Article begins on next page)

15 September 2026

This is the final peer-reviewed accepted manuscript of:

Sultan-Taïeb, H., Villotti, P., Berbiche, D., Dewa, C. S., Desjardins, É., Fraccaroli, F., Zaniboni, S., Mazaniello-Chézol, M., Lecomte, T., Durand, M.-J., & Corbière, M. (2019). Can social firms contribute to alleviating the economic burden of psychiatric disabilities for the public healthcare system? *Health & Social Care in the Community*, *27*(5), 1311–1320.

The final published version is available online at:

https://doi.org/10.1111/hsc.12775

Rights / License:

The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (https://cris.unibo.it/)

When citing, please refer to the published version.

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

Abstract

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

Word count: 296

Keywords: social firms, severe mental illness, psychiatric disabilities, healthcare costs, public healthcare system, economic evaluation

What is known about this topic:

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

What this paper adds:

- When controlling for sociodemographic variables, global health, the severity of psychiatric symptoms and self-declared primary mental health diagnosis, annual healthcare costs paid by the public insurance system were between $1924 and $3912 lower for people working in social firms than for people registered in supported employment programs.
- A form of compensation may exist between supporting social firms and financing the public healthcare system, which provides valuable insights for public decision-making.

Word count: 111

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

Introduction

Unemployment rates for people with psychiatric disabilities such as schizophrenia, bipolar disorders or major depression are much higher than in the general population and are estimated between 70 and 90% in Canada and the UK (Gewurtz et al., 2018; Marwaha et al., 2007).

A recent Cochrane meta-analysis (Suijkerbuijk et al., 2017) compared the efficiency of different types of interventions aiming at helping people with a psychiatric condition find and keep a competitive job. In this meta-analysis, supported employment programs, which provide help for people looking for a job and can be integrated with mental health treatment services, were found to be the most effective in terms of job tenure, achieving an average of 22.8 weeks when combined with another psychosocial intervention (e.g., social skills training, cognitive remediation) (Suijkerbuijk et al., 2017). This study therefore suggests that even with the most effective type of intervention, job tenure for people with psychiatric disabilities remains brief (Lanctot, Bergeron-Brossard, Sanquirgo, & Corbière, 2013).

An alternative to traditional vocational services contributing to the work integration of people with psychiatric conditions exists in the form of social firms (SFs) (Corbière & Lecomte, 2009; Villotti, Zaniboni, & Fraccaroli, 2014). SFs report a job tenure of up to six years (Lanctôt, Corbière, & Durand, 2012). SFs produce goods and

services for the competitive market while pursuing the social objective of offering paid employment to vulnerable individuals, such as people with psychiatric disabilities. A recent study across six European countries (Knapp et al., 2013) carried out a cost-effectiveness analysis from the perspective of the health and social care systems, and compared supported employment programs with standard vocational rehabilitation. It concluded that supported employment programs were more cost-effective. To the best of our knowledge, no such analysis has been conducted for SFs.

Several studies have focused on employment and mental health, showing an improvement in mental health among people who return to work after a period of unemployment (Prause & Dooley, 2001) as well as an association between a decline in mental health and job loss (Olesen, Butterworth, Leach, Kelaher, & Pirkis, 2013; Thomas, Benzeval, & Stansfeld, 2005). However, according to Butterworth et al. (2011), the benefits of a change from unemployment to employment on mental health depends on the quality of work. SFs are described as a means of recovery for people with psychiatric disabilities (Corbière et al., 2018 accepted). Since SFs are non-profit businesses, they often reinvest their profits in the improvement of working conditions. SFs offer various types of work accommodations and natural support, such as support from stakeholders, supervisors and coworkers, training, and flexible working hours (Corbière & Lecomte, 2009; Corbière et al., 2018 accepted; Corbière et al., 2014; Villotti, Corbiere, et al., 2017). They provide an opportunity to perform a meaningful activity in an inclusive social environment with low levels of stigma (Villotti, Corbière, et al., 2017), thus favoring the development of skills, employability, a higher self-reliance and self-esteem (Roy, Donaldson, Baker, & Kerr, 2014; Svanberg, Gumley, & Wilson, 2010).

In Québec, some SFs receive a wage subsidy from the federal and the provincial governments (Garon, Paquet, & Simard, 2017). These subsidies are intended to support employers in the effort and investment they make in order to promote accommodations for people with disabilities (Corbière et al., 2018 accepted). Seen from another viewpoint within the framework of public subsidies and social transfer system, the expenses devoted to mental health by the Québec public health system are high: they amounted to $1.072 billion Canadian dollars in 2009-2010 (Commissaire à la Santé et au Bien-Etre, 2012), which corresponds to approximately 3.5% of the total public health and social services budget. All things being equal, based on allocations made in the 2015-16 budget, we would estimate expenses devoted to mental health to be approximately $1.367 billion in 2015-2016 (MSSS, 2018). The objective of our study was to compare public healthcare expenses for people with psychiatric disabilities who work in SFs to those of people with a similar condition who are seeking work in the competitive labour market via supported employment programs. This comparison can contribute to the knowledge on whether work integration in a SF contributes in alleviating part of the economic burden for the public healthcare system related to severe mental illness among people of working age. Such an evaluation of direct healthcare costs due to mental illness has never been performed before in relation to the integration of workers in SFs in Québec. As emphasized above, the total amount of public health expenses due to mental illness is high. Although SFs may receive subsidies from the government, and consequently represent a cost for public finances, they might nevertheless help reduce the level of public healthcare expenses. Thus, our results may contribute to the public debate regarding the possibility of developing SFs in the economy.

Method

This study was part of a broader research project entitled "The factors associated with the work integration of people with psychiatric disabilities in SFs in Canada". In this paper, only data from Québec will be considered.

Study design

This study followed a cross-sectional retrospective comparative design. Two groups of people with psychiatric disabilities were included. One group was composed of people who had been working in a SF for the last nine months (or longer) without interruption. The comparison group included people who had been participating in a supported employment program for the last nine months. The design was cross-sectional since the measures of health outcomes were collected at one point in time, and it was retrospective since we analyzed data relating to the total use of healthcare services and medication over the past year.

Population and procedure

We used a convenience sample of 19 SFs located in the Greater Montreal area, that participated voluntarily in the study. They were identified through a corporate association of social economy stakeholders [Chantier de l'économie sociale], and through the Québec council of adapted enterprises [Conseil Québécois des Entreprises Adaptées]. Employers were contacted by telephone or during meetings and were informed about the purpose of the study. These enterprises had common features, such as: 1) they are non-profit business initiatives operating in a competitive economic environment; 2) they promote

innovative solutions to exclusion and unemployment; 3) they have a minimum of 25% of workers with a disability; and 4) they foster collaborative work while focusing on self-empowerment (Corbière et al., 2018 accepted). The participating enterprises represented various sectors: manufacturing (n = 7), utilities (n = 1), healthcare and social assistance services (n = 2), wholesale and retail trade (n = 2), administrative and support, waste management and remediation services (n = 1) and other services (n = 6). The size of the enterprises varied from 10 to 350 employees. In these enterprises, the research project was briefly described to all employees who met the inclusion criteria. Inclusion criteria were as follows: aged 18 years or more, able to speak French or English, self-identification as having a psychiatric disability (e.g., schizophrenia, depression, bipolar disorder) and being employed in a SF. Those who were interested in participating were invited to contact the research coordinator. The research team explained that the project required access to the participants' individual data via public healthcare insurance databases using their individual health insurance numbers. To ensure that the data was collected on a voluntary basis, all participants could give (or withhold) their informed consent to trained study staff. As a result, 122 employees working in SFs were included.

The comparison group consisted of individuals participating in two supported employment programs implemented in Montreal. To describe the content of these programs, we used the Quality of Supported Employment Implementation Scale (QSEIS) (Bond, Picone, Mauer, Fishbein, & Stout, 2000) and showed that the implementation of these two programs reached a high level of fidelity to the QSEIS model (Corbiere et al., 2010; Corbiere et al., 2017). The inclusion criteria were similar to those of the group of participants working in SFs (age, language, psychiatric disability). Participants were

recruited by vocational counsellors working in the supported employment programs. They gave informed consent after receiving a complete description of the study. As a result, 64 individuals were included in the comparison group. All participants received an honorarium. The research protocol was reviewed and approved by the Research Ethics Boards of the University of Sherbrooke.

Data sources and costs measures

The cost analysis was carried out from the perspective of the public healthcare system (as financed by the Ministry of Health), which adopts a universal program and covers direct healthcare costs such as medical and paramedical services, hospitalization, and medication. Consequently, total healthcare costs included in this study covered outpatient visit fees to general practitioners and specialists, outpatient visits to health professionals other than physicians in public healthcare centers (time spent multiplied by hourly wage), all inpatient expenses due to hospitalizations, emergency room (ER) visits and amounts reimbursed to patients for outpatient medication by the public healthcare insurance system.

The first set of data was collected from the participants in both groups who filled out a self-report questionnaire, which included measures of outpatient visits (number and length) to public healthcare centers over the previous six months to see a health professional other than a general practitioner or a specialist, such as a psychologist, a social worker, chiropractor, herbalist, homeopath, naturopath, massage therapist, nursing practitioner, or occupational therapist. We computed the cost of each of these visits by multiplying the length of the visit by the average hourly gross wage available from provincial wage scales in the public sector in 2015. Costs deriving from this estimation

were multiplied by two in order to estimate the costs over the previous year (12 months). This questionnaire also provided data on sociodemographic characteristics: gender (man, woman, other), age, physical disability (yes/no), marital status (never married / separated, widowed or divorced / married or in domestic partnership) and education (less than high school / high school graduate / above high school). The questionnaire included an item on self-reported mental health status with an indication of the primary diagnosis category as follows: schizophrenia and other psychotic disorders, bipolar disorder, major depression, anxiety disorder, organic disorder (delirium, dementia), substance-related disorder, personality disorder, specific disorder of childhood/adolescence. Respondents were also asked to fill out the 18-item Brief Symptoms Inventory (BSI), which is a self-report scale that measures the severity of symptoms related to psychiatric disorders (Derogatis & Melisaratos, 1983; Hoe & Brekke, 2008). Answers were rated on a 5-point scale (from 'not at all' to 'extremely'). For this study, a global severity index was calculated by summing up all the 18 items, with an internal consistency (Cronbach's alpha) of $\alpha = .89$. The questionnaire also included the EQ-5D-5L scale from the EuroQol group to measure the global health status of participants. This scale includes five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression, each being measured on a 5-level scale (no problems, slight problems, moderate problems, severe problems and extreme problems). It also comprises a vertical visual analogue scale for self-rated health. The validity of the EQ-5D-5L has been analyzed for Canada in its English and French versions (Bansback, Tsuchiya, Brazier, & Anis, 2012; Sayah et al., 2016). Scores were computed in accordance with the EQ-5D-5L user guide (van Reenen & Janssen, 2015).

We used a second set of data obtained from the public healthcare system databases. The RAMQ ([Régie de l'Assurance Maladie du Québec] healthcare insurance board) database provided the costs to the public health insurance system of outpatient physician visits (general practitioners and specialists) over the previous year. This database also provided the gross costs of outpatient medication based on the sales price in pharmacies. It also provided the co-insurance amounts paid by patients, which we subtracted from the gross costs in order to compute the actual amount paid by the public health insurance system for medications.

Hospitalization costs of inpatient stays were obtained from the MED-ECHO database ([Maintenance et exploitation des données pour l'étude de la clientèle hospitalière] hospitalization database). These included the costs of hospital stays (laundry, food, administration, maintenance), laboratory tests, physician visits, medical acts and the time spent by health professionals during inpatient stays, consumables and medications. The costs provided in the MED-ECHO database are calculated on the basis of the *direct allocation method* according to which each overhead cost (such as central administration costs or housekeeping) is allocated directly to each department or unit based on its contribution to the hospital's activity (Drummond, Sculpher, Claxton, Stoddart, & Torrance, 2015; Vasiliadis et al., 2013). The costs of hospitalization are based on a mean provincial per-diem cost resulting from an aggregation of the data in the reports transmitted to the Ministry of Health by healthcare institutions.

The costs of visits to ER were also provided by the MED-ECHO database for each participant over the previous year. For each ER visit, a unitary cost is documented in the database, based on the expenses incurred in healthcare institutions, including the costs of

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

The two sets of data (self-report questionnaire and administrative databases) were highly complementary since the RAMQ and MED-ECHO databases do not document the costs of outpatient visits to health professionals other than physicians in public healthcare institutions. All types of healthcare costs were included in our estimates since we measured the costs resulting from participants' mental and physical health conditions.

Data analysis

We first performed chi-squared tests for categorical variables and t-tests for continuous variables to verify whether the two groups were comparable regarding participants' sociodemographic characteristics and mental health status: gender, age, marital status, education, physical disability, BSI total score for severity of psychiatric symptoms, EQ-5D-5L score for the global health status measure and primary mental health diagnosis (see *Data sources* section for a detailed description). Two variables were used alternatively to identify the primary mental health diagnosis: a self-reported psychiatric diagnosis from the questionnaire and the diagnosis provided by the RAMQ database, which corresponds to the diagnosis as coded by a physician or a psychiatrist when the mental illness was first identified. The categories were the same for the two diagnosis variables: bipolar disorder, major depression, schizophrenia, other.

Secondly, we compared the two groups with regard to the total costs and cost sub-categories and tested for statistical significance of differences using t-tests. The computation of costs was performed from the public healthcare system perspective by

adding together the outpatient physician fees and visits to other health professionals, inpatient expenses, ER visits and outpatient medication, from which we subtracted the amount of co-insurance paid by the patient (see *Data sources and measures* section). Costs were expressed in 2015 Canadian dollars.

Thirdly, multivariable regression models were carried out to test for whether the probability for total expenses by the public healthcare system was significantly different between the two groups when controlling for several covariates.

The control variables included in the regression were chosen as follows: first, we wanted to measure the difference in costs between the two groups controlling for differences in physical or mental health status. Consequently, we included the EQ-5D-5L score for the global health status measure, the BSI total score for severity of psychiatric symptoms and primary mental health diagnosis. Two variables were used alternatively to identify the primary mental health diagnosis: the self-reported psychiatric diagnosis from the questionnaire and the diagnosis provided by the RAMQ database. Second, we wanted to control for sociodemographic variables for which differences were observed between the two groups (marital status and age, see *Results* section) and we also added gender as a covariate.

To take account of the non-normal distribution of costs, regression analyses using generalized linear models with a gamma distribution and log link were used (Diehr, Yanez, Ash, Hornbrook, & Lin, 1999; McCullagh & Nelder, 1983; Pregibon, 1980). We compared the results of two models. A first log-gamma regression model was performed using the self-report psychiatric diagnosis from the questionnaire. A second model was tested using the other psychiatric diagnosis variable as provided by the RAMQ database.

Testing our model alternatively with these two diagnosis variables enhanced the robustness of our results, since the type of primary diagnosis might have an impact on the differences in healthcare expenses between participants. The software package SAS version 9.4 was used for statistical analyses.

Results

As presented in Table 1, there were no significant differences between the two groups of participants regarding gender, education, and physical disability. Moreover, the global health status (as measured by the EQ-5D-5L), the severity of psychiatric symptoms (as measured by the BSI score) and self-reported primary mental health diagnosis were not statistically different between the two groups (Table 1). Our results also showed that the primary mental health diagnosis as provided by the RAMQ databases, which corresponds to the diagnosis coded by the physician when the mental illness was first identified, was not statistically different between the two groups ($X^2(3)=1.74$, $p=.63$). As a result, the two groups were similar regarding the mental and physical health status of participants. The two groups differed significantly only on age and marital status. The participants working in SFs were on average older (46 years, as compared to 40 years) and more likely to be married or in a domestic partnership than those registered in supported employment programs (see Table 1).

Men were in the majority in both groups. Some presented with a physical disability: 19.2% in the group working in SFs and 12.5% in the comparison group. Schizophrenia was the most prevalent mental illness across both groups (47.9% in the working group and 60.9% in the comparison group), and was more prevalent than bipolar disorder (respectively 7.4% and 9.4%) or major depression (16.5% and 7.8%). Almost half the

population in both groups had a level of education above high school. Most participants had never been married.

Insert Table 1 here

The analysis of costs between the two groups revealed significant differences, as presented in Table 2. Without controlling for covariates, the comparison of average costs between the two groups showed that total annual healthcare expenses per individual for the public healthcare system were $3600 in the group working in SFs and $9403 in the comparison group, a difference of $5803 (95% Confidence Interval (CI): 3433.2 - 8173.3; $p<0.001$).

When the total healthcare costs were broken down into the different cost components, the unadjusted results showed large discrepancies between the two groups for fees relating to outpatient visits to physicians, inpatient stays and medication costs, with these three cost categories being lower for the group working in SFs than for the comparison group. Expenses for outpatient visits to physicians were lower by $991.8 per patient for the group working in SFs (95% CI: 479.5 - 1504.1; $p<0.01$). Mean costs for inpatient stays were $2541.9 lower for the group working in SFs (95% CI: 935.8 - 4148.1; $p<0.05$). The mean public healthcare system expenses for medications per patient (amount reimbursed to the patient after co-insurance contribution) were $2121.4 lower for the group working in SFs (95% CI: 933.6 – 3309.3; $p<0.001$). The average co-insurance contribution per patient was $269.1 in the group working in SFs and $44.9 in the comparison group, showing a significant difference of $224.2 ($t(183.9)=5.72$; $p<0.001$). As a result, co-insurance amounts paid by patients working in SFs widened the gap between the two groups. We also took into account that in Québec part of the population is not covered by

the public healthcare insurance system for their medications because they can choose to be covered by a private insurance financed by their employer. Our analysis showed that in the group of participants working in SFs, a lower proportion of people were insured for medication expenses by the public healthcare insurance system than in the comparison group: only 90 out of 122 participants working in SFs as compared to 62 out of 64 in the comparison group ($X^2(1)=15.0$, $p<0.001$). Consequently, we compared the average medication expenses per individual while including only those insured by the public healthcare insurance system (90 in SFs and 62 in the comparison group). This comparison showed that public expenses per individual were $1583.9 lower in the group working in SFs than in the comparison group (95% CI: 313.0 – 2854.7; $p<0.05$). Therefore, the difference in average medication expenses per patient paid by the public healthcare insurance system remained significant even when only patients covered by public insurance were included in the analysis.

Insert Table 2 here

To determine whether there was a difference between the two groups in healthcare costs when controlling for covariates, a log-gamma regression model was carried out and the results are presented in Table 3. Controlling for gender, age, marital status, EQ-5D-5L score for global health status, BSI score for severity of psychiatric symptoms and the self-reported primary mental health diagnosis, the multivariable analysis showed that the annual costs per patient were significantly lower for the group of participants working in SFs ($1923.9 lower, 95% CI: 1146.3 – 3127.7; $p=0.004$). In the second regression model, controlling for the primary mental health diagnosis provided by RAMQ databases instead of self-declared diagnosis (the other covariates remaining the same), the difference was

even larger: the annual cost per patient was $3911.8 lower (95% CI: 2171.9 – 6973.6; *p*= 0.0004) for the group of participants working in SFs than for the comparison group. Being older and being a woman (as compared to a man) were associated with lower healthcare costs in both regression models (see Table 2).

Insert Table 3 here

Discussion

The goal of this study was to compare public healthcare expenses for people with psychiatric disabilities who work in SFs to people with a similar condition who are registered in supportive employment programs and looking for a job in the competitive labour market. When controlling for sociodemographic variables, global health, the severity of psychiatric symptoms and self-declared primary mental health diagnosis, the annual healthcare costs paid by the public insurance system per patient were $2850 for people working in SFs and $4774 for participants registered in supported employment programs, a difference of $1923.9. When controlling for the same variables but using the RAMQ primary mental health diagnosis instead of the self-declared diagnosis, the difference was even greater: $4302 for people working in SFs, $8213 for participants in the comparison group, a difference of $3912 per patient with psychiatric disabilities for the public healthcare system.

Medication expenses are a component of total healthcare costs that require a closer analysis. The fact that medication expenses to the public healthcare insurance system were lower in the group of participants working in SFs may be explained by three different factors. First, co-insurance contributions by patients were significantly higher

for people working in SFs. In Québec, all patients whose medication is covered by the public healthcare insurance pay a co-insurance amount equal to a fixed amount per month plus a percentage of the price of purchased drugs. Although the co-insurance contribution is calculated in the same way for all patients, some patients are entitled to prescription medications free of charge (i.e. without co-insurance) because of their social status (unemployed or very low income level). Our results suggest that people in the comparison group received medications free of charge more often than those working in SFs. This was to be expected as participants in the comparison group were unemployed. As a result, the amounts paid by patients who were working in SFs widened the gap between the two groups regarding public healthcare expenses for medications. The second explanatory factor is related to the fact that, as shown by our results, the individuals who were working in SFs were less often insured for medications by the public healthcare insurance system than those in the comparison group. Consequently there were no public insurance expenses for these non-insured individuals. Some employers offer private insurance to their employees as a company welfare benefit. This resulted in lower amounts being reimbursed for medication per patient in this group. However, when all participants not insured for medications by the public healthcare insurance system were excluded from the two groups, the average medication costs per patient remained significantly lower for those who were working in SFs. This indicates that the difference in medication costs is not only due to a difference in insurance coverage between the two groups. Therefore, the third explanatory factor of lower medication expenses in the group working in SFs is that this group uses less medication

than the comparison group, irrespective of the differences in co-insurance fees and insurance coverage between the two groups.

Our results showed that unadjusted public healthcare system expenses for outpatient visits to physicians and for inpatient stays were significantly lower for the group working in SFs than for the comparison group, whereas we did not observe significant differences in the severity of mental health symptoms between the two groups, either in the primary mental health diagnosis, or in the global health status. The results of the multivariable regression strengthened these findings. When controlling for covariates related to mental and physical health, healthcare expenses were significantly lower for people who were working in SFs. This finding is noteworthy since it suggests that the difference in costs cannot be attributed to a healthy worker effect (Li & Sung, 1999). Indeed, a selection bias between working people and unemployed people may exist in the general population, since better health is a favourable factor for finding and keeping a job. In contrast, in our study, this difference in healthcare costs should not be interpreted as a result of different health status, but rather as a result of different needs or different access to healthcare services. As suggested in a previous work (Dewa et al., 2018), one explanatory hypothesis might be that working in SFs could act as a substitute for medical treatments such as outpatient visits, medication use and hospitalizations. Social support from colleagues and supervisors is often provided in SFs (Corbière & Lecomte, 2009; Corbière et al., 2018 accepted; Corbière et al., 2014; Villotti, Corbière, et al., 2017) and this may create an environment where people have less need for healthcare services. SFs provide meaningful activities and a purpose in life, an opportunity to gain knowledge and new competencies, a sense of group acceptance and belonging, and may increase self-

confidence (Svanberg et al., 2010). Working in SFs helps people with psychiatric disabilities to develop a sense of timing and structure and promotes social inclusion through an environment with less stigma (Villotti, Corbière, et al., 2017). As a result, people working in such an environment may have a lesser need for healthcare services and medication than job-seekers with similar physical and mental health status. Another explanatory hypothesis could be formulated in terms of *access* to healthcare services and not in terms of *need* for healthcare services. People working in SFs might have a tighter schedule than people looking for a job and have less time to get healthcare services. However, further studies would be needed in order to validate this latter hypothesis.

Studies comparable to ours are very rare in the literature. Dewa et al. (2018) conducted a similar study in Ontario as part of the same research project. However, in this study there were no significant differences in the total healthcare costs between the group of people working in SFs and the group of job-seekers. Nevertheless, there were significant differences for some cost components. The cost of ER and community mental health supports were lower for those working in SFs, whereas the costs of psychiatric visits were significantly higher. These cost differences remained significant when adjusting for covariates. These differences in findings between the two studies may be due to the fact that Dewa et al's study included costs more specifically related to mental illness such as psychiatric hospitalizations and psychiatrist visits, whereas our study included all healthcare costs. Our results might reflect the global health situation of participants, including comorbidities due to psychiatric condition. Moreover, the differences may be due to different healthcare systems and health-related behaviours in Québec and Ontario.

Limitations

The study design was cross-sectional and therefore does not allow us to establish a cause-effect relationship between working in SFs and lower healthcare costs to the public healthcare system. This would require a longitudinal analysis and an experimental design.

It was not possible to estimate the response rate of employees since the information regarding the total number of employees in each SF who met our inclusion criteria could not be collected. As a result, we could not control for potential selection biases due to non-response rates. Moreover, we could not randomize study participants into the two groups so there might be a selection bias regarding personal choice of supported employment program. Furthermore, social and work functioning was not assessed in this study.

The sample size was relatively limited, with a total of 186 participants. The comparison group consisted only of people registered in supported employment programs and was therefore not representative of the overall population of job-seekers with psychiatric disabilities.

Another issue relates to the limited generalizability of the results since we used a non-randomized convenience sample of enterprises and participants, who agreed to be included in this study. Thus, this sample cannot be considered as representative of the general population of people working in SFs or participating in supported employment programs, as is often the case of studies based on data collected in work settings.

Conclusion

Our study showed that among people with psychiatric disabilities, people working in SFs had a lower utilization of healthcare services than job-seekers registered in supported

employment programs, regardless of socio-demographic characteristics, mental and physical status. The main explanatory hypothesis is that SFs provide a work environment that offers a high level of social support from supervisors and colleagues, an opportunity to develop a sense of timing and structure, self-confidence and group inclusion, which may act as a substitute for some of the medical treatments and support provided by the healthcare system.

These findings provide valuable insights for public decision-making. On the one hand, we know that a proportion of SFs get subsidies from the federal and provincial governments (Québec) for accommodating people with psychiatric disabilities. Our study shows that, on the other hand, healthcare costs to the public healthcare system are lower for people working in SFs than for job-seekers registered in supported employment programs. As a result, there might be a form of compensation between supporting SFs and financing the public healthcare system. Further analyses from a broader economic perspective, including all public expenses such as the costs of SFs subsidies and supported employment programs, would be required to be able to interpret these results with regards to the total costs incurred by the government.

Words: 5095

Funding

This work was supported by the Canadian Institutes of Health Research (CIHR) under Grant #RN121629-245479.

References

Bansback, N., Tsuchiya, A., Brazier, J., & Anis, A. (2012). Canadian Valuation of EQ-5D Health States: Preliminary Value Set and Considerations for Future Valuation Studies. *PLOS ONE, 7*(2), e31115. doi:10.1371/journal.pone.0031115

Bond, G., Picone, J., Mauer, B., Fishbein, S., & Stout, R. (2000). The Quality of Supported Employment Implementation Scale. *Journal of Vocational Rehabilitation, 14*, 201-212.

Butterworth, P., Leach, L. S., Strazdins, L., Olesen, S. C., Rodgers, B., & Broom, D. H. (2011). The psychosocial quality of work determines whether employment has benefits for mental health: results from a longitudinal national household panel survey. *Occup Environ Med, 68*(11), 806-812. doi:10.1136/oem.2010.059030

Commissaire à la Santé et au Bien-Etre. (2012). *État de situation sur la santé mentale au Québec et réponse du système de santé et de services sociaux*. Québec Retrieved from https://www.csbe.gouv.qc.ca/fileadmin/www/2012/SanteMentale/CSBE_Rapport_Appreciation_SanteMentale_2012.pdf.

Corbiere, M., Lanctot, N., Lecomte, T., Latimer, E., Goering, P., Kirsh, B., . . . Kamagiannis, T. (2010). A pan-Canadian evaluation of supported employment

programs dedicated to people with severe mental disorders. *Community Ment Health J, 46*(1), 44-55. doi:10.1007/s10597-009-9207-6

Corbière, M., & Lecomte, T. (2009). Vocational services offered to people with severe mental illness. *Journal of Mental Health, 18*(1), 38-50.

Corbiere, M., Lecomte, T., Reinharz, D., Kirsh, B., Goering, P., Menear, M., . . . Goldner, E. M. (2017). Predictors of Acquisition of Competitive Employment for People Enrolled in Supported Employment Programs. *J Nerv Ment Dis, 205*(4), 275-282. doi:10.1097/NMD.0000000000000612

Corbière, M., Villotti, P., Dewa, C., Sultan-Taïeb, H., Fraccaroli, F., Zaniboni, S., . . . Lecomte, T. (2018 accepted). Work accommodations in Canadian social firms: Supervisors and workers' perspectives. *Canadian Journal of Community Mental Health*.

Corbière, M., Villotti, P., Lecomte, T., Bond, G. R., Lesage, A., & Goldner, E. M. (2014). Work accommodations and natural supports for maintaining employment. *Psychiatric rehabilitation journal, 37*(2), 90-98. doi:10.1037/prj0000033

Derogatis, L., & Melisaratos, N. (1983). The brief symptom inventory: an introductory report. *Psychological medicine, 13*(3), 595-605. doi:10.1017/S0033291700048017

Dewa, C., Hoch, J., Corbière, M., Villotti, P., Trojanowski, L., Sultan-Taïeb, H., . . . Fraccaroli, F. (2018). A Comparison of Healthcare Use and Costs for Workers with Psychiatric Disabilities Employed in Social Enterprises Versus Those Who

Are Not Employed and Seeking Work. *Community Mental Health Journal, 49*(5). doi:10.1007/s10597-018-0281-5

Diehr, P., Yanez, D., Ash, A., Hornbrook, M., & Lin, D. Y. (1999). Methods for analyzing health care utilization and costs. *Annu Rev Public Health, 20*, 125-144. doi:10.1146/annurev.publhealth.20.1.125

Drummond, M., Sculpher, M., Claxton, K., Stoddart, G. L., & Torrance, G. (2015). *Methods for the economic evaluation of health care programmes* (4th ed.). Oxford: Oxford University Press.

Garon, J.-D., Paquet, A., & Simard, M. (2017). *Analyse économique des subventions aux entreprises adaptées du Québec*. Retrieved from

Gewurtz, R., Tompa, E., Lysaght, R., Kirsh, B., Moll, S., Rueda, S., . . . Padkapayeva, K. (2018). *A Clear Business Case for Hiring Aspiring Workers: Findings from a research project that looked at the costs and benefits of recruiting and retaining people living with mental illness*. Retrieved from Ottawa, ON: www.mentalhealthcommission.ca

Hoe, M., & Brekke, J. S. (2008). Cross-Ethnic Measurement Invariance of the Brief Symptom Inventory for Individuals with Severe and Persistent Mental Illness. *Social Work Research, 32*(2), 71-78. doi:10.1093/swr/32.2.71

Knapp, M., Patel, A., Curran, C., Latimer, E., Catty, J., Becker, T., . . . Burns, T. (2013). Supported employment: cost-effectiveness across six European sites. *World*

psychiatry : official journal of the World Psychiatric Association (WPA), 12(1), 60-68. doi:10.1002/wps.20017

Lanctot, N., Bergeron-Brossard, P., Sanquirgo, N., & Corbière, M. (2013). Causal attributions of job loss among people with psychiatric disabilities. *Psychiatr Rehabil J, 36*(3), 146-152. doi:10.1037/prj0000002

Lanctôt, N., Corbière, M., & Durand, M.-J. (2012). Job tenure and quality of work life of people with psychiatric disabilities working in social enterprises. *Journal of Vocational Rehabilitation, 37*(1), 39-48.

Li, C. Y., & Sung, F. C. (1999). A review of the healthy worker effect in occupational epidemiology. *Occupational Medicine, 49*(4), 225-229. doi:10.1093/occmed/49.4.225

Marwaha, S., Johnson, S., Bebbington, P., Stafford, M., Angermeyer, M. C., Brugha, T., . . . Toumi, M. (2007). Rates and correlates of employment in people with schizophrenia in the UK, France and Germany. *The British journal of psychiatry : the journal of mental science, 191*, 30.

McCullagh, P., & Nelder, J. (1983). *Generalized Linear Models*. New York: Chapman & Hall.

MSSS. (2018). *Comptes de la santé du Ministère de la Santé et des Services sociaux 2015-2016 à 2017-2018*. Québec: La Direction des communications du ministère de la Santé et des Services sociaux Retrieved from http://publications.msss.gouv.qc.ca/msss/fichiers/2017/17-614-01F.pdf.

Olesen, S. C., Butterworth, P., Leach, L. S., Kelaher, M., & Pirkis, J. (2013). Mental health affects future employment as job loss affects mental health: findings from a longitudinal population study. *BMC psychiatry, 13*(1), 144. doi:10.1186/1471-244X-13-144

Prause, J., & Dooley, D. (2001). Favourable Employment Status Change and Psychological Depression: A Two-year Follow-up Analysis of the National Longitudinal Survey of Youth. *Applied Psychology*, *50*(2), 282-304. doi:10.1111/1464-0597.00059

Pregibon, D. (1980). Goodness of link tests for generalized linear models. *Applied Statisics, 29*, 15-24.

Roy, M. J., Donaldson, C., Baker, R., & Kerr, S. (2014). The potential of social enterprise to enhance health and well-being: A model and systematic review. *Social Science & Medicine*, *123*(C), 182-193. doi:10.1016/j.socscimed.2014.07.031

Sayah, F. A., Bansback, N., Bryan, S., Ohinmaa, A., Poissant, L., Pullenayegum, E., . . . Johnson, J. A. (2016). Determinants of time trade-off valuations for EQ-5D-5L health states: data from the Canadian EQ-5D-5L valuation study. *Quality of Life Research, 25*(7), 1679-1685. doi:10.1007/s11136-015-1203-4

Suijkerbuijk, Y. B., Schaafsma, F. G., van Mechelen, J., Ojajärvi, A., Corbière, M., & Anema, J. R. (2017). Interventions for obtaining and maintaining employment in adults with severe mental illness, a network meta-analysis (Review). *The Cochrane Library*.

Svanberg, J., Gumley, A., & Wilson, A. (2010). How do social firms contribute to recovery from mental illness? A qualitative study. *Clinical Psychology & Psychotherapy, 17*(6), 482-496. doi:10.1002/cpp.681

Thomas, C., Benzeval, M., & Stansfeld, S. A. (2005). Employment transitions and mental health: an analysis from the British household panel survey. *Journal of epidemiology and community health, 59*(3), 243. doi:10.1136/jech.2004.019778

van Reenen, M., & Janssen, B. (2015). *EQ-5D-5L User Guide, Basic information on how to use the EQ-5D-5L instrument*. Retrieved from Netherlands: https://euroqol.org/wp-content/uploads/2016/09/EQ-5D-5L_UserGuide_2015.pdf

Vasiliadis, H. M., Dionne, P. A., Preville, M., Gentil, L., Berbiche, D., & Latimer, E. (2013). The excess healthcare costs associated with depression and anxiety in elderly living in the community. *Am J Geriatr Psychiatry, 21*(6), 536-548. doi:10.1016/j.jagp.2012.12.016

Villotti, P., Corbière, M., Dewa, C. S., Fraccaroli, F., Sultan-Taieb, H., Zaniboni, S., & Lecomte, T. (2017). A serial mediation model of workplace social support on work productivity: the role of self-stigma and job tenure self-efficacy in people with severe mental disorders. *Disabil Rehabil*, 1-7. doi:10.1080/09638288.2017.1377294

Villotti, P., Corbiere, M., Fossey, E., Fraccaroli, F., Lecomte, T., & Harvey, C. (2017). Work Accommodations and Natural Supports for Employees with Severe Mental

Illness in Social Businesses: An International Comparison. *Community Ment Health J, 53*(7), 864-870. doi:10.1007/s10597-016-0068-5

Villotti, P., Zaniboni, S., & Fraccaroli, F. (2014). Les entreprises à économie sociale en Italie. *L'Encéphale, 40*, S57-S65. doi:https://doi.org/10.1016/j.encep.2014.04.002

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