

RESEARCH ARTICLE

Psychosocial work stressors, high family responsibilities, and psychological distress among women: A 5-year prospective study

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Funding information

CDC-NIOSH, Grant/Award Number: R01 OH007647-02; Canadian Institute of Health Research (CIHR), Grant/Award Number: GIR-91062

Abstract

Background: Psychological distress is a strong and independent predictor of major depression. Assuming multiple roles (such as being both a mother and an employee) under stressful conditions may lead to psychological distress. This study evaluated, for the first time, the longitudinal effect of the simultaneous exposure to psychosocial work stressors and high family responsibilities on women's psychological distress.

Methods: Women were assessed at baseline (N = 1307) and at 3- and 5-year follow-ups. Psychosocial work stressors of the demand-control and effort-reward imbalance models were measured with validated questionnaires. Family responsibilities were also self-reported and referred to the number of children and their age(s) as well as housework and childcare. Psychological distress was measured with the validated Psychiatric Symptoms Index questionnaire. Prevalence ratios (PR) of psychological distress were modeled with log-binomial regressions.

Results: Having high family responsibilities did not increase women's prevalence of psychological distress. However, being exposed to either job strain or effort-reward imbalance led to a higher prevalence of psychological distress at the 3- and 5-year follow-ups (PR of 1.25-1.62). Being simultaneous exposed to these psychosocial work stressors and high family responsibilities also increased the prevalence of psychological distress (PR of 1.44-1.87), but no interactions were observed between stressors and responsibilities.

Conclusions: In this 5-year prospective study, simultaneous exposure to psychosocial work stressors and high family responsibilities increased the prevalence of psychological distress among women. Work stressors were, however, driving most of the effect, which reinforces their importance as modifiable risk factors of women's mental health problems.

KEYWORDS

effort-reward imbalance, family responsibilities, job strain, mental health, psychological distress

1 | INTRODUCTION

Depression is the leading cause of disability worldwide.¹ Alarming statistics show that it accounts for as much as 4.3% of the global burden of disease.² Women are approximately twice as likely as men to be diagnosed with depression.³⁻⁵ Psychological distress is a strong and independent predictor of depression,^{6,7} affecting more than 25% of women in industrialized countries.^{5,8} The ongoing Mental Health Action Plan of the World Health Organization highlights the importance and urgency of improving the primary prevention of mental health problems.² This action plan also emphasizes the growing concern of overwork and stress, especially regarding its effect on women's mental health.

An increasing number of prospective studies have linked psychosocial work stressors to the development of mental health problems.⁹⁻¹⁴ The most supported and recognized theoretical models to measure psychosocial work stressors are the demand-control¹⁵ and effort-reward imbalance models.¹⁶ The two-dimensional demand-control model suggests that workers simultaneously experiencing high psychological demands and low job control, known as *job strain*, are more likely to develop stress-related health problems.¹⁵ Job strain may act as a threat to personal autonomy, thereby triggering a harmful stress response mechanism. For its part, the effort-reward imbalance model proposes that workers are in a state of detrimental imbalance when high efforts at work are accompanied by low reward.¹⁷ This imbalance has been found to be particularly stressful as it violates core expectations about reciprocity and adequate exchange in a crucial area of social life.¹⁷ Psychosocial work stressors from both theoretical models are important and actionable prevention targets, as they are modifiable and have been shown to be highly prevalent in various working populations.^{5,18} Women tend to be more frequently exposed to these stressors than men, with prevalences generally around 30% compared to 20%.^{5,18}

Women also tend to be more involved than men in family responsibilities; these can be another potential source of psychosocial stress. When both spouses work, Canadian and American women spend about twice as many hours per week on family responsibilities compared to men (mean of 30 compared to 17 hours for both countries).^{19,20} These responsibilities are generally defined by a combination of indicators such as the number of children under 18 years of age and childcare and domestic chores (most often including housework, shopping, and meal preparation).²¹⁻²⁸ An adverse association between family responsibilities and psychological distress have been observed in the majority of previous studies (ie, four out of six).^{24,29-33} However, this entire body of evidence is cross-sectional.

Previous studies suggested that assuming multiple roles under adverse conditions may induce physiological and psychological stress that favors the development of mental health problems.³⁴ Therefore, having a stressful job while performing high family responsibilities could be harmful. Only one previous study evaluated whether a simultaneous exposure to adverse psychosocial work stressors and family responsibilities was deleterious to workers' mental health.³⁵ This study suggested that having at least one child under¹⁸ amplifies

the association between psychosocial work stressors (job strain and low social support) and depressive symptoms (OR = 2.90; 95% CI: 1.7-4.2).³⁵ While this study was a pioneer, it had major limitations due to the use of a cross-sectional design, the evaluation of psychosocial work factors from only one theoretical model (demand-control only), and the examination of family responsibilities using a single item. Given that working-age women have the highest risk of developing mental health problems and are the most exposed to psychosocial work stressors and high family responsibilities,^{3-5,36,37} strengthening knowledge of this topic is an important step toward improving the primary prevention of mental health problems.

The current 5-year study aims to evaluate, for the first time, the prospective effect of simultaneous exposure to psychosocial work stressors and high family responsibilities on the prevalence of psychological distress among women. It overcomes the limitations of the only previous study on his subject by using (a) a prospective design, (b) psychosocial work stressors from both the demand-control and effort-reward imbalance models, and (c) a range of family responsibilities.

2 | MATERIALS AND METHODS

2.1 | Population and study design

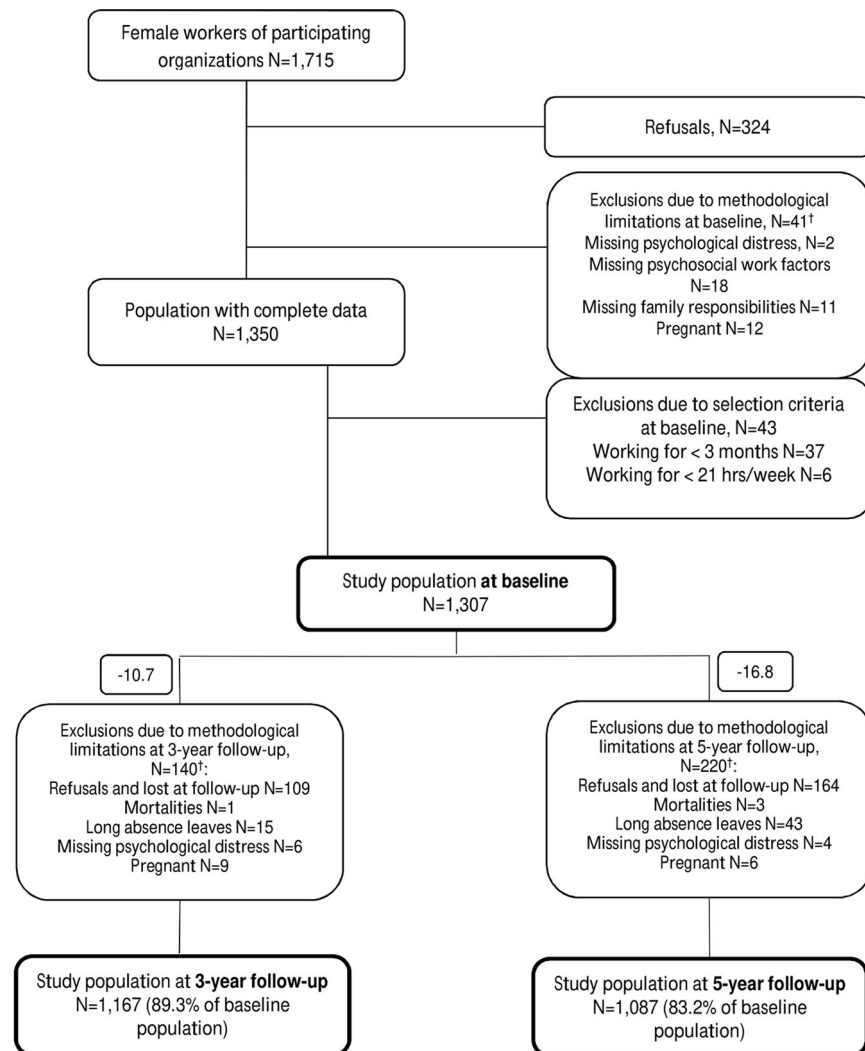
All women (N = 1715) employed in three public insurance companies were invited to participate to this prospective cohort study. They were white-collar workers whose main activities involved organizing and providing insurance services to the general population. Data was collected at baseline (2000-04), 3 years later (2004-06), and 5 years later (2006-09) with participation rates of 80.9%, 89.2%, and 83.2%, respectively.

At baseline, 1350 women agreed to participate and had complete data (Figure 1). Their jobs encompassed a wide range of white-collar occupations, including office (37.9%), technical (29.7%), and professional (29.1%) workers, and senior management (3.3%). To be included in this study, women had to: (a) work at least 21 hours a week at baseline, (b) work for one of the organizations for more than 3 months at baseline, and (c) not be pregnant at data collection. To examine the longitudinal evolution of mental health according to psychosocial work stressors and family responsibilities, we also restricted our sample to women who participated either at both baseline and the 3-year follow-up (n = 1167) or at baseline and the 5-year follow-up (n = 1087) (Figure 1). The study protocol was reviewed and approved by the appropriate ethical committee. The participants provided their written informed consent before taking part in the study.

2.2 | Data collection and variables

At baseline and both follow-ups, participants completed a self-administered questionnaire on demographic and socioeconomic characteristics, psychological distress, work characteristics, family responsibilities, and social life.

FIGURE 1 Study population



† Some participants were classified simultaneously in two or more selection criteria.

2.3 | Psychological distress at 3- and 5-year follow-ups

Psychological distress was measured with the French-validated short-version of the Psychiatric Symptoms Index questionnaire (14 items).^{38,39} This questionnaire measures the frequency of symptoms of depression, anxiety, aggressive behaviors, and cognitive impairment that occurred in the previous week. Women with scores of 26.19 or greater were considered as prevalent cases. This cut-off point has been used since it has been associated with health professional consultations, hospitalizations for a mental health problem, suicide (thoughts or attempt), and the consumption of psychotropic drugs.³⁸

2.4 | Psychosocial work stressors of the demand-control and effort-reward imbalance models

Psychological demands and job control (measured with nine items each) were evaluated using the validated French version of the

Karasek Job Content Questionnaire.^{40,41} Psychological demands and job control were dichotomized at the median observed in a random sample of all Quebec workers (≥ 24 and ≤ 72 , respectively). Job strain was defined as a combination of high psychological demands and low job control. Job strain was either dichotomized or analyzed in quadrants. When dichotomized, all workers who did not classify as having job strain were considered unexposed. The refined quadrants categorization includes workers having job strain, as well as workers in the active (high demands and high control) and passive (low demands and high control) job situations and unexposed workers (low demands and low control).

Efforts were assessed using four items; two original items of the French version of the Siegrist questionnaire (“having to do overtime” and “in recent years, my job became more demanding”)⁴² and two proxies (“I have enough time to do my job” and “my task is often interrupted before I finish it, so I must come back to it later”) (Cronbach $\alpha = .65$). Reward was evaluated using the validated French version of the Siegrist questionnaire (11 items).⁴³ A ratio of effort/reward greater than one indicated an imbalance.

2.5 | Family responsibilities

Family responsibilities were measured using a questionnaire adapted from Brisson et al.⁴⁴ Family responsibilities referred to the “number of children and their age” and “housework and childcare”.

2.5.1 | Number of children and their age

Hours spent performing family responsibilities is proportional to the number of children and their ages.⁴⁵ Accordingly, younger children were therefore ascribed more weight than older children.⁴⁵ Children in the age categories 0- to 5-, 6- to 11-, 12- to 17-, and 18- to 20-year old were, respectively, weighted 3, 2.5, 2, and 1.5.⁴⁴ The algorithm applied to calculate the score of this index was: $(3 \times \text{number of children aged 0-5 years}) + (2.5 \times \text{number of children aged 6-11 years}) + (2 \times \text{number of children aged 12-17 years}) + (1.5 \times \text{number of children aged 18-20 years})$.⁴⁴

2.5.2 | Housework and childcare

Two tasks were evaluated: meal preparation and cleaning the house interior. Two items were used to measure childcare: who takes care of the children at home and who is responsible for childcare and activities outside the house (doctor, dentist, school, recreational activities, etc). Women indicated whether the task was: (a) primarily performed by themselves, (b) performed with the help of another person (spouse, child, or someone else), (c) primarily performed by another person, or (d) not performed, which respectively gave them a score of 1, 0.5, 0, and 0.

2.5.3 | Family responsibilities

This index represents the product of both “number of children and their age” and “housework and childcare” index scores. The algorithm was: $(\text{number of children and their age} + 1) \times (\text{housework and childcare})$.⁴⁴ The highest tertile indicated a high level of exposure.

2.6 | Simultaneous exposure to psychosocial work stressors and high family responsibilities at baseline

Four exposure categories were created: (a) exposed to both psychosocial work stressors and high family responsibilities (simultaneous exposure), (b) exposed only to psychosocial work stressors (intermediate exposure), (c) exposed only to high family responsibilities (intermediate exposure), and (d) not exposed to either group of factors (reference group).

Psychosocial work stressors of the demand-control model and of the effort-reward imbalance models were evaluated separately. Exploratory analyses were also performed to evaluate the effect of simultaneous exposures to psychosocial work stressors and (a) having children (yes/no), (b) the number of children and their age, and (c) housework and childcare.

2.7 | Covariates

Covariates included well-known and suspected risk factors of mental health problems: (a) Demographic characteristics: age (continuous), education (secondary school or less, college, university), and marital status (single/divorced/widower or married/civil union), (b) Clinical risk factors: overweight (body mass index [BMI] ≥ 25 ; BMI = weight [kg]/height [m²]), menopause (yes/no, available at 3- and 5-year follow-ups), and menopausal hormone therapy (yes/no, available at 3- and 5-year follow-ups), and (c) Lifestyle risk factors: smoking (≥ 1 cigarette/day), alcohol consumption (≥ 6 consumptions/week), and sedentary behaviors (≤ 1 time/week). The occurrence of one or more individual stressful life event(s) during the past 12 months was also evaluated (eg, losing one's job, being sick, divorce or death of a spouse, and financial difficulties).

At the 3- and 5-year follow-ups, repeated measures were used to take into account potential changes over time (except for age, education, and family history of CVD [cardiovascular disease]).

2.8 | Statistical analyses

Log-binomial regression was used to model the 3- and 5-year effects of baseline exposures to psychosocial work stressors and high family responsibilities on the prevalence of psychological distress. All covariates were included in the adjusted models, as no collinearity was present between these variables. To verify the presence of additive statistical interaction between work stressors and family responsibilities, relative excess risks due to interaction (RERI) and their 95% confidence intervals were calculated from the adjusted models.⁴⁶ Multiplicative interaction terms and their *P* values were also calculated. To evaluate the potential modifying effect of age (< 45 - vs ≥ 45 -year old),⁴⁷ stratified analyses were also performed and multiplicative interaction terms were calculated. The same subjects were followed over time, as it could lower confusion⁴⁸ and reduce measurement variability.⁴⁹

Several complementary analyses were performed to examine the results' robustness. First, complementary analyses evaluating the potential introduction of selection bias due to nonparticipation (refusals or lost at follow-up) or exclusions were performed. At baseline, 3- and 5-year follow-ups, few differences between participants and nonparticipants were observed for either exposures or the outcome (not shown but available upon request). Second, analyses in which no adjustment was performed for potentially intermediate factors, such as overweight, smoking, excessive alcohol consumption, and leisure time activity, were also performed to evaluate an eventual over-adjustment. These analyses led to almost identical estimates (not shown but available upon request). Third, analyses adjusting for baseline values of psychological distress were computed. After adjusting for baseline values, estimates were considerably lowered. While associations remained in the same direction, those related to job strain exposure were no longer statistically significant, as depicted in Table S1. This is in line with the potential horse-racing effects,⁵⁰ suggesting that adjusting for

baseline values cancels an ongoing effect at baseline. This also suggests that the effects observed persisted over time but did not increase.

P values were calculated with a partial *F* test. The level of statistical significance was set at 0.05. All analyses were performed with SAS 9.4 software.

3 | RESULTS

Table 1 summarizes the participants' baseline characteristics. A majority of the participating women were aged below 45 years (57.6%), married or in a civil union (67.9%), and former smokers (52.9%). Participants were almost equally distributed between education levels (secondary or less, college, and university). A minority was overweight (30.9%), sedentary (18.8%), or excessively consumed alcohol (18.7%). Over one in three women (37.9%) had high psychological distress.

Table 2 presents adjusted prevalence ratios (PRs) of psychological distress according to the subscales and the total index of family responsibilities. At the 3-year follow-up, the PR of psychological distress was significantly higher among women with high family responsibilities (1.27 [95% CI: 1.02-1.59]), compared to unexposed women. The effect was no longer significant at the 5-year follow-up.

TABLE 1 Baseline characteristics of study participants (n = 1307)

	N (%)
Prevalence of psychological distress	496 (37.9)
Age, y	
<45	754 (57.7)
≥45	553 (42.3)
Completed education	
University	470 (36.0)
College ^a or equivalent	398 (30.5)
High school or less	439 (33.5)
Marital status	
Single/divorced/widower	420 (32.1)
Married/civil union	887 (67.9)
Smoker status ^b	
Non-smoker	616 (47.1)
Ex-smoker	432 (33.1)
Smoker	259 (19.8)
Overweight ^c	
BMI <25	903 (69.1)
BMI ≥25	404 (30.9)
Sedentary behaviors ^d	
0 time/wk	1074 (82.2)
≤1 time/wk	233 (17.8)
Alcohol consumption	
<6 consumptions/wk	1063 (81.3)
≥6 consumptions/wk	244 (18.7)

^aCollege in the province of Quebec is generally either a 2-year pre-university program or a 3-year technical school program after the successful completion of high school or equivalent.

^bOccasional or regular smokers were included.

^cHad BMI (body mass index) greater than or equal to 25 kg/m².

^dPerformed leisure physical activity one time or less a week.

Table 3 presents adjusted PRs of psychological distress according to either job strain or effort-reward imbalance. Compared to women with no job strain, women exposed to job strain (dichotomized or in quadrants) had higher PRs of psychological distress than women unexposed at 3- and 5-year follow-ups, ranging from 1.33 to 1.59. Among women exposed to effort-reward imbalance, higher PRs of psychological distress were also observed at 3-year (1.65 [95% CI: 1.42-1.91]) and 5-year follow-ups (1.51 [95% CI: 1.27-1.80]).

Table 4 presents adjusted PRs of psychological distress according to single and combined exposures to psychosocial work stressors and high family responsibilities. Women only exposed to high family responsibilities did not have a higher prevalence of psychological distress. However, women who were solely exposed to job strain or effort-reward imbalance had higher prevalences of psychological distress at the 3- and 5-year follow-ups, with PR ranging between 1.25 and 1.62. The combined exposure to job strain or effort-reward imbalance and high family responsibilities also led to higher prevalences of psychological distress (PR of 1.44 to 1.87), but no significant additive or multiplicative interactions were observed between work stressors and family responsibilities (Table 5).

Age modified the effects observed at the last follow-up. Women who were 45 years or older in age at baseline and who were exposed to both psychosocial work factors and high family responsibilities did not have a significantly higher prevalence of psychological distress at the 5-year follow-up, while an adverse effect was present in younger women (Tables S2 and S3).

In exploratory analyses, similar patterns were observed for the simultaneous exposure to job strain or effort-reward imbalance and either (a) having one child or more, (b) the number of children and their age, or (c) high housework and childcare (Tables S4 and S5).

4 | DISCUSSION

Psychological distress is an early-stage mental health problem that affects more than one in four working women in industrialized countries^{5,8} and that is strongly associated with the incidence of future depression.^{6,7} Considering the colossal human and economic burden of depression,^{51,52} prevention strategies targeting such early symptoms are urgently needed, as stated by the World Health Organization.² The current 5-year study aimed at addressing this important knowledge gap as it was the first to examine whether combinations of precise stressors from work and family responsibilities were prospectively linked to an increased prevalence of psychological distress. Women who simultaneously had a stressful job (defined by job strain and effort-reward imbalance at work) and who assumed high family responsibilities had a 44% to 87% increased prevalence ratio of psychological distress. However, work stressors were driving most of the adverse effects, as detailed in the next paragraph.

In the current study, the simultaneous effects of psychosocial work stressors and high family responsibilities on psychological distress were not significantly higher than the individual effects of

TABLE 2 Adjusted^a prevalence ratios (PR) of psychological distress (95% confidence interval [95% CI]) at 3- and 5-year follow-ups according to family responsibilities dimensions^b assessed at baseline

	At 3-year		At 5-year	
	N	PR (95% CI)	N	PR (95% CI)
<i>Subscales of family responsibilities</i>				
A: Children				
No	373	1.00	339	1.00
Yes	794	1.17 (0.99-1.39)	748	1.16 (0.96-1.41)
B: Number of children and their age				
Low	542	1.00	493	1.00
Intermediate	196	1.23 (1.00-1.52)	184	0.90 (0.69-1.16)
High	429	1.16 (0.97-1.38)	410	1.13 (0.93-1.38)
C: Housework and childcare				
Low	316	1.00	286	1.00
Intermediate	360	1.18 (0.95-1.47)	335	0.98 (0.78-1.24)
High	491	1.31 (1.08-1.60)	466	0.95 (0.76-1.18)
<i>Total responsibilities (subscales B+C)^c</i>				
Family responsibilities ^d				
No	780	1.00	720	1.00
Yes	387	1.08 (0.92-1.28)	367	1.07 (0.89-1.28)
Family responsibilities tertiles				
Low	278	1.00	252	1.00
Intermediate	502	1.27 (1.04-1.57)	468	0.98 (0.77-1.23)
High	387	1.27 (1.02-1.59)	367	1.05 (0.82-1.34)

^aAdjusted for all covariates, namely: education, age, marital status, body mass index, alcohol consumption, smoking, leisure physical activity, stressful events, social support outside work, at 3- and 5-year follow-ups, and menopause and menopausal hormone therapy. Categorizations used are provided in the "covariates" subsection of the methodology.

^bResults in bold: $P < .05$. Results in italic: $.05 \leq P < .10$.

^cThe algorithm was: (number of children and their age + 1) × (housework and childcare). Variable used for calculating the simultaneous exposure to psychosocial work factors and high family responsibilities (Table 4). The "yes" group represents the highest tertile and the "no" group combines the low and intermediate tertiles.

^dVariable used for calculating the simultaneous exposure to psychosocial work factors and high family responsibilities (Table 4). The "yes" group represents the highest tertile and the "no" group combines the low and intermediate tertiles.

psychosocial work stressors (ie, combined compared to single exposures) (Tables 4 and 5). Only one previous cross-sectional study examined the effect of simultaneous exposure to psychosocial work stressors and family responsibilities on workers' mental health. This study evaluated the association between job strain and self-reported depressive symptoms among 431 employees in four extended care facilities in Massachusetts, United States of America. In this previous study, having at least one child less than 18 years of age amplified the association between psychosocial work stressors and depressive symptoms.³⁵ However, consistently with our findings, the combined effect of work and family factors seemed more strongly driven by the work factors. Indeed, the combined effect of job strain and having children on depressive symptoms (OR: 2.9; 95% CI: -0.4 to 6.2) was not substantially higher than the individual effects of job strain (OR: 2.6; 95% CI: 0.5-4.8). An explanation could arise from the fact that being a mother and taking care of family is known to favor

TABLE 3 Adjusted^a prevalence ratios (PR) of psychological distress (95% confidence interval [95% CI]) at 3- and 5-year follow-ups according to job strain or effort-reward imbalance^b assessed at baseline

	At 3-year		At 5-year	
	N	PR (95% CI)	N	PR (95% CI)
High job strain ^c				
No	903	1.00	838	1.00
Yes	264	1.17 (1.00-1.38)	249	1.33 (1.10-1.60)
Job strain quadrants				
Unexposed	157	1.00	153	1.00
Passive	482	1.37 (1.03-1.83)	439	1.05 (0.77-1.44)
Active	264	1.55 (1.15-2.09)	246	1.46 (1.06-2.00)
High strain	264	1.59 (1.18-2.14)	249	1.54 (1.12-2.11)
Effort-reward imbalance ^c				
No	845	1.00	787	1.00
Yes	322	1.65 (1.42-1.91)	300	1.51 (1.27-1.80)

^aAdjusted for all covariates, namely: education, age, marital status, body mass index, alcohol consumption, smoking, leisure physical activity, stressful events, social support outside work, and at 3- and 5-year follow-ups menopause and menopausal hormone therapy. Categorizations used are provided in the "covariates" subsection of the methodology.

^bResults in bold: $P < .05$. Results in italic: $.05 \leq P < .10$.

^cVariables used for calculating the simultaneous exposure to psychosocial work factors and high family responsibilities (Table 4).

psychological well-being by providing satisfaction and self-rewards.^{53,54} Having to deal with a high level of family responsibilities does not systematically imply that a women are exposed to a work-family conflict (eg, when demands from work and family interfere). Simultaneous exposure to psychosocial work stressors and work-family conflict would possibly have exacerbated the adverse effects. A meta-analysis by Amstrad et al⁵⁵ showed a deleterious correlation

TABLE 4 Adjusted^a prevalence ratios (PR) of psychological distress (95% confidence interval [95% CI]) assessed at 3- and 5-year follow-ups according to the simultaneous exposure to high job strain or effort-reward imbalance and high family responsibilities^b assessed at baseline

	At 3-year		At 5-year	
	N	PR (95% CI)	N	PR (95% CI)
High job strain and high family responsibilities				
No (no)	608	1.00	559	1.00
No (Yes)	295	1.14 (0.94-1.38)	279	1.05 (0.85-1.31)
Yes (no)	172	1.25 (1.03-1.53)	161	1.31 (1.04-1.65)
Yes (yes)	92	1.17 (0.88-1.54)	88	1.44 (1.07-1.92)
Effort-reward imbalance and high family responsibilities				
No (no)	553	1.00	508	1.00
No (Yes)	292	1.06 (0.85-1.32)	279	1.17 (0.93-1.47)
Yes (no)	227	1.60 (1.34-1.92)	212	1.62 (1.31-2.01)
Yes (yes)	95	1.87 (1.49-2.34)	88	1.56 (1.15-2.10)

^aAdjusted for all covariates, namely: education, age, marital status, body mass index, alcohol consumption, smoking, leisure physical activity, stressful events, social support outside work, at 3- and 5-year follow-ups, and menopause and menopausal hormone therapy. Categorizations used are provided in the "covariates" subsection of the methodology.

^bResults in bold: $P < .05$.

TABLE 5 Additive and multiplicative interaction for prevalence ratio (PR) of psychological distress assessed 3- and 5-year follow-ups according to the double exposure to high job strain or effort-reward imbalance and high family responsibilities^a assessed at baseline

	At 3-year			At 5-year		
	PR	RERI ^b (95% CI)	Multiplicative interaction term (P value)	PR	RERI (95% CI)	Multiplicative interaction term (P value)
High job strain and (high family responsibilities)						
Yes (yes)	1.17	-0.20 (-0.49 to 0.09)	0.84 (.18)	1.44	0.08 (-0.41 to 0.58)	1.05 (.43)
Effort-reward imbalance and (high family responsibilities)						
Yes (yes)	1.87	0.24 (-0.45 to 0.93)	1.12 (.42)	1.56	-0.23 (-0.74 to 0.28)	0.82 (.31)

^aResults in bold: $P < .05$.

^bRERI (relative excess risk due to interaction): $RP_{11} - RP_{01} - RP_{10} + 1$. Scores below zero indicate a protective interaction. Scores above zero indicate an adverse interaction.

between work-family conflict and depressive symptoms ($\rho = 0.23$). While the work-family conflict and health literature is expanding, it is still heavily reliant on cross-sectional research designs⁵⁵ and to our knowledge, no previous study examined the interplay between this conflict, psychosocial work stressors, and health. This interplay needs to be assessed to better understand the potential factors that place working women at the highest risk of developing depression. Moreover, it should be noted that in the current study methodological limitations, namely, the dichotomization of our exposures and the use of an incomplete measure of family responsibilities (detailed below as third and fourth limitations), may have contributed to underestimating the combined effect of psychosocial work stressors and high family responsibilities.

The effects of the simultaneous exposures were slightly different according to the combination of psychosocial work stressors examined (ie, job strain or effort-reward imbalance). Prevalence ratios observed were slightly higher for the simultaneous exposure including effort-reward imbalance compared to job strain, especially at the 3-year follow-up (+0.51 and +0.71). Although the two models overlap by measuring workload (the “psychological demands” and “efforts” components), they differ by measuring either job control or reward. Job control refers to task-level characteristics, while reward includes respect and esteem from coworkers along with broader socioeconomic conditions, such as salary, promotion prospects, and job stability. Two previous prospective studies have shown that low job control protected against depression in women.^{5,56} It has been hypothesized that women might tend to favor team spirit, which builds on values such as the reward arising from respect and esteem, over job control.⁵ Supplementary post-hoc analyses allowed us to observe that the combination of low job control and high family responsibilities did not increase the prevalence of psychological distress while the combination of high psychological demands and high family responsibilities did (Table S6). This suggests that psychological demands, that is, the workload, were responsible for most of the adverse effects. Also supporting the stronger adverse effect of effort-reward imbalance, adverse effects were hypothesized to be stronger when one feels that their work stress is attributable to out-of-control conditions.⁵⁷ In our study, salaries and promotion prospects were particularly out of women’s control, as these sources of reward are regulated by strict governmental rules.

The simultaneous exposure to psychosocial work factors and high family responsibilities did not lead to a higher prevalence of psychological distress among older women of our study, that is, women who were 45 years of age or older at baseline (Tables S2 and S3). The attenuation in the effects observed in this age-group could be due to a reduction of the initial distress arising from performing high family responsibilities when children grow.⁵⁸ In other words, the attenuation could be due to a potential reduction in exposure over follow-up, which would have been unnoticed as only baseline exposures were evaluated (nondifferential misclassification bias). It is, however, important to note the very low statistical power available for these sensitivity analyses, as only 11 women had simultaneous exposure.

4.1 | Strengths and limitations

The current study has important strengths, including the use of a 5-year follow-up which allowed the first longitudinal evaluation of the adverse effects of the simultaneous exposure to psychosocial work stressors and high family responsibilities on a mental health outcome. Other important strengths are the evaluation of the psychosocial work stressors from the two most validated and internationally recognized theoretical models, high participation rates at all three time points, the consideration of several potential confounders, and a large sample of women.

Our study also has limitations. First, a common method bias could have been introduced. This bias occurs when the measures of effect are inflated due to the fact that both the exposure and outcome are self-reported and measured simultaneously (107). Women who experience psychological distress could, for example, be more likely to “blame it on” work stress or high family responsibilities, thereby overestimating their exposures. In the current study, the outcomes were measured 3- and 5-years after the exposures, thus minimizing a potential common method bias.^{59,60}

Second, only baseline exposures to psychosocial work stressors and family responsibilities were evaluated. Measuring exposures at a single time point could have led to a considerable misclassification bias (potential underestimation of the true effect) due to changes in exposures over the course of follow-ups. The fact that women kept working within the same white-collar organization nevertheless lower potential changes in their job situation. Third, psychosocial

work stressors and family responsibilities were dichotomized to create the simultaneous exposures categories, which could have led to an underestimation of the true effects. Prevalence ratios of psychological distress tended to be higher (+0.15 to +0.84) when using refined categorizations (Table 2 and 3). Unfortunately, statistical power did not allow the use of finer categories for simultaneous exposure.

Fourth, a potential nondifferential misclassification bias could have been introduced due to an “incomplete” measure of family responsibilities. Previous studies on family responsibilities did not use a standard definition to measure these responsibilities. However, in line with the current study, previous studies generally used items related to the number of children 18 years of age or younger, childcare, and domestic chores.²¹⁻²⁸ More comprehensive measures could have included questions about tasks outside the house (eg, grass mowing and snow clearing), taking care of a person with a loss of autonomy, family budget, car maintenance, and playtime with children. Not accounting for these responsibilities could have led to an underestimation of the burden and might, in turn, have led to an underestimation of the adverse effect.

Women of the current study could take a 1-year paid maternity leave. Also, governmental financial support was offered to those with children of 18 years of age or younger. Therefore, the findings of the current study might mainly be exportable to women of industrialized countries where there are the governmental measures supporting families with children. In countries where no such measures are in place, the stressful exposure to high family responsibilities may be stronger, leading to greater deleterious effects on mental health.

5 | CONCLUSION

In this study, women simultaneously exposed to psychosocial work stressors and high family responsibilities had an increased prevalence of psychological distress over a 5-year period. It is, however, possible that prevention efforts aimed at reducing psychosocial work stressors could be of particular importance to lower women's psychological distress as these stressors contributed to the majority of the adverse effect of simultaneous exposure with family responsibilities in this study. Nevertheless, the interplay between work and family stressors in relation to mental health needs to be studied further as this was only the second study on this topic and the first that used a longitudinal design.

ACKNOWLEDGMENTS

The authors would like to thank the participants and organizations that participated in this study. This study was supported by two grants from the CDC-NIOSH (Grant R01 OH007647-02) and the Canadian Institute of Health Research (CIHR) (Grant GIR-91062). Dr Brisson was a CIHR investigator when this study was conducted. This study was also supported by scholarships from the CIHR, the Fonds de recherche en santé du Québec and the Institut de Recherche Robert-Sauvé en Santé et en Sécurité au travail for Dr Gilbert-Ouimet.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

DISCLOSURE BY AJIM EDITOR OF RECORD

Paul Landsbergis declares that he has no conflict of interest in the review and publication decision regarding this article.

AUTHOR CONTRIBUTIONS

MG-O had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. MG-O and CB conceived and designed the work. MG-O performed the analysis and drafted the manuscript. All authors interpreted the findings and revised the study critically.

ETHICS APPROVAL AND INFORMED CONSENT

This study was approved by the ethical review board of the research center of the CHU de Québec. The participants provided their written informed consent before taking part in the study.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

How to cite this article: Gilbert-Ouimet M, Brisson C, Vézina M. Psychosocial work stressors, high family responsibilities, and psychological distress among women: A 5-year prospective study. *Am J Ind Med*. 2020;63:170-179. <https://doi.org/10.1002/ajim.23070>