

Work and home stress: associations with anxiety and depression symptoms

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Background	In the evolving work environment of global competition, the associations between work and home stress and psychological well-being are not well understood.
Aims	To examine the impact of psychosocial stress at work and at home on anxiety and depression.
Methods	In medically healthy employed men and women (aged 30–60), serial regression analyses were used to determine the independent association of psychosocial stress at work and at home with depression symptoms, measured using the Beck Depression Inventory-II (BDI-II), and anxiety symptoms, measured using the Spielberger Trait Anxiety Inventory (STAI). Psychosocial stress at work was measured using the Job Content Questionnaire to assess job psychological demands, job control, job social support and job insecurity. Psychosocial stress at home was assessed by 12 questions including stress at home, personal problems, family demands and feelings about home life.
Results	Serial regression analyses in 129 subjects revealed that job insecurity and home stress were most strongly associated with depression and anxiety symptoms. Job insecurity accounted for 9% of the variation both in BDI-II scores and in STAI scores. Home stress accounted for 13 and 17% of the variation in BDI-II scores and STAI scores, respectively. In addition, job social support was significantly and independently associated with STAI scores but not BDI-II scores.
Conclusions	Work and home stress were associated with anxiety and depression symptoms in both men and women. Both work and home stress should be considered in studies evaluating anxiety and depression in working populations.
Key words	Anxiety; depression; job stress; psychosocial stress.

Introduction

The 12 month prevalence of major depressive disorder and generalized anxiety disorder in the US adult population is 6.7 and 3.1%, respectively [1]. The high prevalence of depression and anxiety disorders imposes an enormous societal burden. For example, lost productivity due to depression in US workers is estimated to be in excess of \$31 billion per year [2].

Job stress is one factor that contributes to psychological distress among the working population [3]. Previous cohort studies have confirmed the association between job stress and impaired psychological well-being [4]. With increased internationalization and global competition and the industrial shift from manufacturing toward service industries, work-related psychological stressors have changed dramatically [5]. These changes may increase the contribution of

such job characteristics as job insecurity to psychological distress [6]. Under conditions of high work stress, stress associated with home life is also often increased. Therefore, there has been a growing interest in the combined effects of work and home stress [7–10]. This study was designed to explore the association of psychosocial aspects of the work and home environments with two aspects of psychological well-being, anxiety and depression. We also conducted exploratory analyses to examine the potential moderating effects of gender on the relationship between job and home stress and psychological well-being.

Methods

This cross-sectional study was part of a larger investigation examining the health consequences of night-time

blood pressure dipping [11]. This report describes the findings of secondary analyses of work and home stress and their association with symptoms of anxiety and depression.

Participants were recruited by newspaper advertisements and by posting study brochures in hypertension clinics and primary healthcare premises in the Piedmont region of NC, USA. Volunteers were eligible to participate if they were aged between 30 and 60 and were currently employed. They were excluded if they had a body mass index (BMI) $>35\text{ kg/m}^2$, were on antihypertensive medications or reported a history of drug abuse in the previous 12 months, diabetes mellitus or coronary heart disease. Data were collected in two steps. Firstly, all volunteers gave a health history and had a physical screening examination. They then completed a battery of questionnaires that assessed psychosocial factors related to stress at work and at home and self-reported symptoms of depression and anxiety.

The Job Content Questionnaire, derived from the demand-control model [12], was used to measure psychosocial aspects of the work environment. This 49-item scale yields measures of job psychological demands, job control (or decision latitude), job-related social support and job insecurity. Job demands were measured by five items, including working fast, working hard, excessive work, time constraints and conflicting demands. Job control was defined as the sum of two subscales given equal weight: skill discretion measured by six items (learning new things, creativity requirement, skill development, skill requirement, task variety and repetition) and decision authority measured by three items (freedom to make decisions, choice of ways to perform work and influence over job requirements). Social support consisted of supervisor support (five items) and co-worker support (two items). Job insecurity was measured by three items. All questions were scored on a 1–4 Likert scale and scores for job demands and control ranged from 12 to 48. Job demands refer to the aggregate psychological (not physical) stressors at work, whereas control refers to the extent to which the individual has control over job-related decision making. Job stress was determined by the ratio of job psychological demands divided by job control [13]. A ratio >1.0 was used to indicate high job strain, and a ratio ≤ 1.0 low job strain.

A 12-item self-report scale designed to measure home stress was used for the first time in this study. Each item was scored on a 0–2 Likert scale: 0 (not at all), 1 (somewhat) and 2 (very much). This questionnaire has high internal consistency, reliability (Cronbach's α 0.82) and construct validity. Exploratory factor analysis showed four factors related to home stress, including self-perceived stress at home, personal problems, family demands and feelings about home life. The 12-item factor loadings ranged from 0.61 to 0.88. Self-perceived stress at home included four items (feeling stress at home, the degree of

disliking home life, difficulties getting along with people at home and feeling of stability of home life). Personal problems included three items (thinking about personal problems, effect of personal problems on sleeping and effect of personal problems on work). Family demands included three items (effect of home life on work, ability to deal with home responsibilities and family demands). Feelings about home life included two items (confidence of dealing with home problems and family atmosphere).

Depressive symptoms were assessed by the Beck Depression Inventory-II (BDI-II), which is a 21-item self-report scale [14]. It has been shown to be both a reliable and valid measure of the severity of depressive symptoms. BDI-II depressive symptoms scores range from 0 to 63. Symptoms of anxiety were assessed by the Spielberger Trait Anxiety Inventory (STAI). The STAI is a 20-item self-report measure of trait anxiety (how the individual generally feels), with scores ranging from 20 to 80 [15].

Participants' demographic information was collected through self-report questionnaires and included age, gender, marital status, ethnicity, occupation, work schedule, work time, educational level, recent annual personal income, number of children in family, smoking status and alcohol consumption.

BDI-II and STAI scores were trimmed at the 95th percentile in order to reduce excessive influence of outliers. Student's *t*-tests and Chi-square tests were used to compare characteristics between subgroups defined by gender or by ethnicity. Correlations were assessed between BDI-II scores and STAI scores and psychological factors at work and at home. Interactions between job psychosocial characteristics and home stressors were evaluated by regression models. Five-step sequential regression models were developed to explore the potential explanatory role of psychological factors at work and at home in relation to BDI-II scores and STAI scores, the independent variables of interest, while controlling for participants' demographics (age, income, gender and ethnicity). In the first step, demographic variables (age, income, gender and ethnicity) were entered; in the second step, job demands and job control (job strain) were entered; thirdly, job support was added, then job insecurity, and finally home stress was entered into the model. Data were analysed using SAS 9.2 (SAS Institute, Cary, NC, USA) with significance set at $P < 0.05$.

The institutional review board at Duke University Medical Center approved the study. All study participants provided written informed consent prior to their participation.

Results

The final sample consisted of 129 eligible participants with occupations ranging from blue collar to

professional. Demographic characteristics of participants are shown in [Table 1](#). The proportion of African Americans was greater among women than men (57% versus 33%, $P < 0.05$). The characteristics among subgroups defined by ethnicity indicated that, compared with white participants, African American participants were younger (43.6, standard deviation [SD] = 7.6) versus 46.9 years (SD = 9.1, $P < 0.05$), included fewer men (46% versus 70%, $P < 0.05$), had fewer years of education (14.7, SD = 2.2) versus 16.3 years (SD = 2.2, $P < 0.01$) and were less likely to be married (40% versus 71%, $P < 0.01$). No significant ethnic or gender differences were found for BMI, income, number of children, job demands, job control, job support, job insecurity and home stress. BDI-II scores and STAI scores were similar for men and women, as well as for African American and white subjects.

Correlation analyses between perceived depression and anxiety symptoms and psychological factors

at work and at home are shown in [Tables 2](#) and [3](#). Job insecurity and home stress were positively correlated with both BDI-II scores and STAI scores for both men and women. Job support was negatively correlated with both BDI-II and STAI scores. For men, however, job demands and job stress were positively correlated with BDI-II and STAI scores. Among both African Americans and white participants, job insecurity and home stress were positively correlated with BDI-II scores and STAI scores. However, job demands and job stress were correlated with BDI-II scores among white subjects but not among African Americans. Job support was negatively correlated with STAI scores among African Americans.

Serial regression analyses were used to examine whether psychological factors at work and at home might account for variation in BDI-II and STAI scores after controlling for age, income, gender and ethnicity. Results of the five-step regression models are presented in [Table 4](#) (BDI-II) and [Table 5](#) (STAI). There were no significant

Table 1. Demographic characteristics of participants ($N = 129$) by gender and ethnicity

Variable	Total ($N = 129$)	Gender		Ethnicity	
		Women ($n = 53$)	Men ($n = 76$)	African American ($n = 52$)	White ($n = 69$)
Age, mean \pm SD	45.4 \pm 8.6	46.2 \pm 8.2	45.0 \pm 8.8	43.6 \pm 7.6	46.9 \pm 9.1*
Male, n (%)	76 (58.9)			24 (46.2)	48 (69.6)*
African American, n (%)	52 (43.0)	28 (57.1)	24 (33.3)*		
Marital status, n (%)	70 (57.9)	25 (51.0)	45 (62.5)	21 (40.4)	49 (71.0)**
Annual personal income (<\$25 000), n (%)	18 (15.8)	10 (22.2)	8 (11.6)	8 (17.0)	10 (14.9)
BMI (kg/m ²), mean \pm SD	28.5 \pm 3.7	28.1 \pm 4.4	28.8 \pm 3.3	29.2 \pm 3.8	28.0 \pm 3.7
Education years, mean \pm SD	15.6 \pm 2.3	15.4 \pm 2.4	15.7 \pm 2.3	14.7 \pm 2.2	16.3 \pm 2.2*
Number of children, mean \pm SD	1.6 \pm 1.5	1.8 \pm 1.3	1.5 \pm 1.6	1.8 \pm 1.6	1.5 \pm 1.4
Job demands, mean \pm SD	30.9 \pm 6.0	31.4 \pm 5.2	30.5 \pm 5.0	31.2 \pm 6.7	30.7 \pm 5.5
Job control, mean \pm SD	36.7 \pm 6.8	36.9 \pm 5.2	36.5 \pm 6.2	35.8 \pm 7.1	37.4 \pm 6.6
Job support, mean \pm SD	11.6 \pm 2.2	11.9 \pm 2.2	11.4 \pm 2.1	11.5 \pm 2.3	11.6 \pm 2.1
Job insecurity, mean \pm SD	6.8 \pm 1.4	6.6 \pm 1.5	6.9 \pm 1.3	6.6 \pm 1.5	6.9 \pm 1.3
Job stress, mean \pm SD	0.9 \pm 0.3	0.9 \pm 0.2	0.9 \pm 0.3	0.9 \pm 0.4	0.8 \pm 0.2
BDI-II scores, mean \pm SD	5.7 \pm 6.5	5.8 \pm 6.3	5.9 \pm 6.7	7.0 \pm 7.6	5.0 \pm 5.3
STAI scores, mean \pm SD	34.9 \pm 9.3	35.4 \pm 9.2	34.2 \pm 9.1	34.7 \pm 9.0	34.7 \pm 9.3
Home stress, mean \pm SD	4.3 \pm 3.8	4.3 \pm 4.2	4.1 \pm 3.2	4.4 \pm 3.9	4.0 \pm 3.4

* $P < 0.05$; ** $P < 0.01$.

Table 2. Correlations, by gender, of work and home stress with anxiety and depression symptoms

Psychological factors at work	Men ($n = 76$)		Women ($n = 53$)	
	BDI-II scores	STAI scores	BDI-II scores	STAI scores
Job demands	0.33**	0.32**	-0.13	-0.04
Job control	-0.09	-0.01	-0.04	-0.07
Job support	-0.18	-0.33**	-0.29*	-0.27
Job insecurity	0.26*	0.30*	0.44**	0.41**
Job stress	0.30*	0.25*	-0.06	0.03
Home stress	0.44**	0.56**	0.57**	0.64**

* $P < 0.05$; ** $P < 0.01$.

Table 3. Correlations, by ethnicity, of work and home stress with anxiety and depression symptoms

Psychological factors at work	African American (<i>n</i> = 52)		White American (<i>n</i> = 69)	
	BDI-II scores	STAI scores	BDI-II scores	STAI scores
Job demands	0.01	0.12	0.25*	0.21
Job control	-0.13	-0.17	0.01	0.09
Job support	-0.30*	-0.40**	-0.16	-0.21
Job insecurity	0.43**	0.44**	0.29*	0.27*
Job stress	0.10	0.20	0.25*	0.15
Home stress	0.46**	0.57**	0.54**	0.62**

P* < 0.05; *P* < 0.01.**Table 4.** Serial regression models evaluating the association of BDI-II scores with work and home environment characteristics

Independent variables	<i>B</i>	β	<i>P</i> value	95% CI for <i>B</i>
Step 1	Adjusted <i>R</i> ² = 0.11			
Age	-0.18	-0.26	<0.01	-0.31, -0.05
Income	-1.74	-0.16	0.10	-3.83, 0.35
Gender	-0.21	-0.02	0.85	-2.47, 2.04
Ethnicity	-0.44	-0.08	0.45	-1.58, 0.71
Step 2 ^a	Adjusted <i>R</i> ² = 0.12			
Job demands	0.08	0.08	0.42	-0.12, 0.28
Job control	0.01	0.01	0.95	-0.16, 0.17
Step 3 ^a	Adjusted <i>R</i> ² = 0.17			
Job demands	0.08	0.08	0.43	-0.12, 0.27
Job control	0.08	0.10	0.34	-0.09, 0.25
Job support	-0.64	-0.25	0.02	-1.15, -0.12
Step 4 ^a	Adjusted <i>R</i> ² = 0.26			
Job demands	0.02	0.02	0.86	-0.17, 0.20
Job control	0.08	0.10	0.30	-0.08, 0.25
Job support	-0.50	-0.19	0.05	-0.99, -0.01
Job insecurity	1.36	0.32	<0.01	0.57, 2.15
Step 5 ^a	Adjusted <i>R</i> ² = 0.39			
Job demands	-0.03	-0.03	0.75	-0.20, 0.14
Job control	0.06	0.07	0.42	-0.09, 0.21
Job support	-0.25	-0.10	0.29	-0.71, 0.22
Job insecurity	0.96	0.22	0.01	0.22, 1.70
Home stress	0.61	0.40	<0.01	0.34, 0.88

Adjusted *R*², adjusted coefficient of determination; *B*, unstandardized coefficients; β , standardized coefficients, CI, confidence interval.^aThe results of Steps 2–5 were shown after adjustment for age, income, gender and ethnicity.

interactions between job demands, job control and home stress, between job support and home stress or between job insecurity and home stress (data not shown). Age was found to be a significant determinant of BDI-II scores (*P* < 0.01) in the initial model. In Step 2, job demands and job control did not account for additional variance in BDI-II scores. Job support (Step 3) and job insecurity (Step 4) were significant explanatory variables for BDI-II scores when added to the model. The inclusion in Step 5 of home stress further enhanced the explanatory power of the model, with the adjusted *R*² changing from 0.26 in Step 4 to 0.39 in Step 5.

Parallel models were constructed to evaluate factors associated with STAI scores. In Step 1, age and income

were found to be significant determinants of STAI scores. In Step 2, job demands and job control were not found to contribute to explain STAI scores. As with BDI-II scores, job support and job insecurity were significant predictors of STAI scores in Steps 3 and 4, as was the inclusion in Step 5 of home stress, which notably improved the model (adjusted *R*² changing from 0.32 in Step 4 to 0.49 in Step 5).

Discussion

The findings of this study indicate that job insecurity and home stress were related to elevated depression and anxiety symptoms for both men and women, independent of

Table 5. Serial regression models evaluating the association of STAI scores with work and home environment characteristics

Independent variables	<i>B</i>	β	<i>P</i> value	95% CI for <i>B</i>
Step 1	Adjusted $R^2 = 0.10$			
Age	-0.23	-0.25	<0.01	-0.41, -0.05
Income	-3.32	-0.22	<0.05	-6.26, -0.38
Gender	0.74	0.05	NS	-2.43, 3.92
Ethnicity	0.52	0.06	NS	-1.09, 2.13
Step 2 ^a	Adjusted $R^2 = 0.12$			
Job demands	0.19	0.13	NS	-0.09, 0.46
Job control	0.04	0.03	NS	-0.19, 0.26
Step 3 ^a	Adjusted $R^2 = 0.23$			
Job demands	0.18	0.13	NS	-0.08, 0.44
Job control	0.20	0.17	NS	-0.03, 0.43
Job support	-1.31	-0.37	<0.01	-2.01, -0.62
Step 4 ^a	Adjusted $R^2 = 0.32$			
Job demands	0.10	0.07	NS	-0.15, 0.35
Job control	0.20	0.18	NS	-0.02, 0.42
Job support	-1.13	-0.31	<0.01	-1.80, -0.46
Job insecurity	1.82	0.30	<0.01	0.76, 2.89
Step 5 ^a	Adjusted $R^2 = 0.49$			
Job demands	0.03	0.02	NS	-0.19, 0.25
Job control	0.16	0.14	NS	-0.03, 0.35
Job support	-0.73	-0.20	<0.05	-1.32, -0.13
Job insecurity	1.17	0.20	<0.05	0.22, 2.12
Home stress	0.98	0.46	<0.01	0.64, 1.33

Adjusted R^2 , adjusted coefficient of determination; *B*, unstandardized coefficients; β , standardized coefficients; CI, confidence interval.

^aThe results of Steps 2–5 were shown after adjustment for age, income, gender and ethnicity.

ethnicity. At the same time, our results indicate that job support was associated with fewer depression and anxiety symptoms. These observations suggest that stress in both the work and home environments need to be considered jointly in order to identify potential factors contributing to psychological distress.

Our findings show that high job stress and high job demands were associated with greater symptoms of anxiety and depression. These results are consistent with previous studies, which found job stress tends to be associated with physical health and psychological health among men, but not women [3,16]. Interestingly, we observed a correlation of job stress with depression and anxiety symptoms among white participants but not African Americans. These findings are consistent with a Baltimore study of residents with full-time jobs, which showed that white Americans are more likely to suffer from dysphoria compared with African Americans [17], possibly reflecting ethnic differences in type of work [18].

Perceived job support, which includes supervisor and co-worker support, is thought to help buffer the negative effects of high strain (high demands and low control) on health [19]. Parkes *et al.* [20] showed that elevated somatic scores were associated with a combination of high strain and low job support, rather than high strain and high job support, in both cross-sectional and longitudinal data. However, social support is also thought to have a direct and independent effect on health. Our

study showed that job support was negatively related to STAI scores after controlling for age, income, gender and ethnicity. The Whitehall II cohort study showed that lack of social support from colleagues and supervisors was associated with increased risk of psychiatric disorders after adjustment for baseline scores of psychiatric disorders assessed by the general health questionnaire [21]. The Whitehall II cohort study also indicated job support was related to lower risk of short spells of absence due to psychiatric illness, after adjustment for baseline psychological distress [22].

In the USA, perceptions of job insecurity increased from 1977 to 2002 among workers, after controlling for unemployment [23]. Persistent perceived job insecurity is a significant predictor of depressive symptoms among the 'Americans Changing Lives' study sample [24]. The association of chronic job insecurity with psychological distress was confirmed in the Whitehall II study. The change >2½ years from insecure to secure employment did not mitigate the increased risk of minor psychiatric morbidity [25]. The results of this study also showed that job insecurity was associated with elevated depressive and anxiety symptoms. However, we found no ethnic difference in perceived job insecurity between African American and white participants, which is not consistent with some previous studies indicating that African Americans tend to perceive more job insecurity than white employees [23,26].

A Canadian National Population Health Survey among 8273 members of the working population showed that chronic life stress and life events were directly related to psychological distress [27]. A Japanese study indicated that work–family conflict accounted for ~10% of the variance in depressive symptoms, after adjusting for demographic factors and work-related factors [10]. Our study also showed that home stress contributed to 13% of the variance in depressive symptoms and 17% of the variance in anxiety symptoms, after adjustment for age, income, gender, ethnicity and psychological factors at work. The contribution of home stress to symptoms of anxiety and depression may reflect work stress spilling over to family and home life among the working population. A meta-analysis showed that employees who were employed longer, had higher job stress and lower job control and job support tended to have more work-related interference with family life [7]. As indicated in this study, job stress ($r = 0.22$) and job insecurity ($r = 0.23$) were positively correlated with home stress, whereas job support ($r = -0.22$) was negatively correlated with home stress. Job insecurity, perhaps reflecting the present rate of high unemployment, has also been found to influence life satisfaction, marital status and family relationships [28].

The cross-sectional design of our study precludes any inferences about cause–effect relationships; depression and anxiety could be a cause or an effect of job and home stress. A limitation of this study is that it is a secondary analysis, with sample selection not specifically designed to address the association of psychological factors at work and at home with anxiety and depression symptoms. The inclusion/exclusion criteria were designed to meet the objectives of a larger investigation examining the health consequences of night-time blood pressure dipping. Therefore, participants in this study included a relatively narrow age range of 30–60 and they were in overall good health. Another limitation of this study is that questionnaires were used to measure both psychological aspects of work and home as well as to assess depression and anxiety symptoms. The items have high face validity and may have been transparent so that response bias may have affected how participants responded to the questionnaires. However, we surveyed a wide range of attitudes and behaviours (relating to physical activity, dietary habits and personal values), which may have helped conceal the intent of this study [29].

In summary, we found that psychological factors at work and at home were significantly and independently associated with greater symptoms of depression and anxiety after controlling for age, income, gender and ethnicity. The association of job support, job insecurity and home stress with depression and anxiety symptoms was significant among both men and women, regardless of ethnicity. Among the working population work stressors may spill over into family life, and home stressors may interfere with work. Both work stress and home

stress should be considered in developing interventions designed to address the potentially adverse effects of job stress on health [30].

Key points

- Job insecurity and home stress were significantly and independently associated with elevated depression and anxiety symptoms.
- The dual effect of psychological factors from work and home on working populations should be considered in intervention projects.
- Effects of anxiety and depression symptoms related to work and home stress on functional outcomes should be included in the future research.

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Conflicts of interest

None declared.

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