

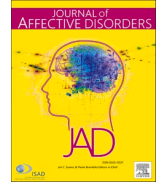


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Short communication

Workplace discrimination and onset of depressive disorders in the Danish workforce: A prospective study

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ABSTRACT

Objectives: Experiences of discrimination at work are a long-standing problem, but research on its mental health effect is sparse. The purpose of this study was to examine the prospective association between workplace discrimination and onset of depressive disorders among Danish workers.

Methods: The prospective cohort study comprised 2157 workers, all free of depressive disorders at baseline. Using logistic regression models, we estimated the association between workplace discrimination at baseline and depressive disorders at 6-months follow-up, adjusted for demographics, health behaviors, job group, educational attainment and other psychosocial working conditions.

Results: At baseline, 103 participants (4.8 %) reported workplace discrimination during the previous 12 months. Among the 103 exposed participants and the remaining 2054 unexposed participants, onset of depressive disorders during follow-up occurred in 16 (15.5 %) and 88 (4.3 %) participants, respectively. After adjustment for all covariates, the odds ratio was 2.73 (95 % confidence interval: 1.38–5.40) comparing exposed to unexposed participants.

Limitations: All measures were self-reported, entailing risk of common methods bias, and we also cannot rule out selection bias.

Conclusions: Exposure to workplace discrimination is a risk factor for onset of depressive disorders. Eliminating or reducing workplace discrimination may contribute to the prevention of depressive disorders in working populations.

1. Introduction

Discrimination is defined as differential treatment of individuals due to actual or perceived membership in particular groups (Williams et al., 1994), such as sex, age, ethnicity, religion, health or sexual orientation.

Although evidence indicates that experiences of discrimination can severely affect mental health (Vargas et al., 2020), only few studies have examined the mental health-related consequences of discrimination in the workplace. These studies found that workers reporting workplace discrimination had lower levels of psychological well-being than workers not reporting discrimination (Hammond et al., 2010; Kim et al., 2022; Lee et al., 2016; Marchiondo et al., 2019; Schütte et al., 2014). Most of these studies, however, were based on cross-sectional designs, severely limiting the possibility for causal inference and rendering the

studies vulnerable to common methods biases and inflated effect estimates (Podsakoff et al., 2003). To the best of our knowledge, only one study has prospectively investigated the association between workplace discrimination and mental health (Marchiondo et al., 2019). This study found that perceived age discrimination at work predicted elevated depressive symptoms over time. However, the study from Marchiondo et al. (2019) examined changes in depressive symptoms but not onset of depressive disorders and, therefore, the present study contributes with new knowledge by analyzing the prospective association between workplace discrimination and onset of depressive disorders.

2. Methods

The study is based on a prospective cohort study (Clausen et al.,

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2019). The baseline questionnaire was distributed in the spring of 2015 to 8958 employees in Denmark. The study population was stratified in 14 job groups representing a variety of positions in the Danish labor market. Procedures for sampling and questionnaire interviews are described in detail elsewhere (Clausen et al., 2019).

Of the 8958 invited individuals, 4340 responded (48.4 %). Six months after baseline, we sent follow-up questionnaires to respondents from the baseline study and obtained response from 2540 (58.5 %). We excluded 194 respondents with missing values on key study variables and 189 respondents with indications of prevalent depressive disorders at baseline (MDI-score ≥ 21 ; see next section), yielding a study sample of 2157 employees.

An analysis of non-response showed that women and older individuals were significantly more likely to participate in the baseline study than men and younger individuals. An analysis of dropout from baseline to follow-up showed no statistically significant differences when comparing baseline levels of workplace discrimination and MDI-scores for participants and non-participants at follow-up (Online supplementary Table 1).

2.1. Workplace discrimination

To assess workplace discrimination, we asked participants this question from the Danish Psychosocial Work Environment Questionnaire (DPQ) (Clausen et al., 2019): *Have you within the last 12 months experienced discrimination or been treated poorly in your workplace due to e. g. your sex, age, ethnicity, religion, health or sexual orientation?* Response options were: (1) Yes, daily or almost daily, (2) yes, weekly, (3) yes, monthly, (4) yes, now and then, and (5) no, never. For the analyses, we collapsed these response options into two categories: (1) *exposed* (daily or almost daily, weekly, monthly, and now and then), and (2) *not exposed* (never).

2.2. Onset of a depressive disorder

We measured prevalence (at baseline) and incidence (at follow-up) of depressive disorders using the *Major Depression Inventory* (MDI) (Bech et al., 2001; Olsen et al., 2003; Rugulies et al., 2012). A detailed description of the MDI has been published elsewhere (Bech et al., 2001). Briefly, the MDI consists of 12 items assessing the presence of depressive symptoms during the last two weeks on a scale ranging from 0 (the symptom has not been present at all) to 5 (the symptom has been present all of the time). The MDI sum score ranges from 0 to 50 points, as for two pairs of items only the higher score is considered. A clinical validation study of the MDI had previously shown that an MDI-score ≥ 21 indicates the presence of a depressive disorder (Bech et al., 2015). Consequently, we used this cut-off point for defining the presence of depressive disorders in our study.

2.3. Covariates

Since workers' mental health may also be influenced by other factors in the psychosocial work environment than discrimination (such as job demands, control, and social support) (Theorell et al., 2015), we adjusted the analyses for the following measures from the DPQ (Clausen et al., 2019): *Quantitative demands* (four items; sample item: *How often is it the case that you do not have time to complete all your work tasks?*; Cronbach's α : 0.84), *Influence at work* (four items; sample item: *Is it possible for you to make important decisions about your work?*; Cronbach's α : 0.87), *Social support from colleagues* (four items; sample item: *Can you talk to your colleagues about it if you experience difficulties at work?*; Cronbach's α : 0.82), and *Leadership quality* (four items; sample item: *Is your immediate supervisor good at motivating the employees?*; Cronbach's α : 0.91). Data on age, sex and job group were retrieved from national registers. We collected data on cohabitation and educational attainment in the study questionnaire.

2.4. Statistical analysis

Using logistic regression analysis, we calculated odds ratios (OR) and 95 % confidence intervals (95 % CI) to estimate the association between workplace discrimination reported at baseline and risk of onset of depressive disorders at follow-up. We calculated crude estimates and adjusted for covariates in three models (see Table 1). In model 1, we adjusted associations for age (as a continuous variable), sex, job group, and educational attainment. In model 2, we additionally adjusted for smoking, cohabitation with partner, and cohabitation with children, and in model 3, we additionally adjusted for psychosocial working conditions (quantitative demands, influence at work, social support from colleagues, and leadership quality). To assess the robustness of the estimates, we conducted a sensitivity analysis, where we excluded respondents with a baseline MDI-score ≥ 15 , i.e. baseline scores that were close to the cut-off point for defining a depressive disorder (MDI-score ≥ 21).

Data were analyzed using the LOGISTIC procedure in SAS 9.4 (SAS Inc., Cary, US).

3. Results

Table 1 shows descriptive statistics for the main study variables. The baseline population consisted of 53 % men and 47 % women. The mean age was 48 years (SD = 11.0). Exposure to workplace discrimination was reported by 103 participants (4.8 %) and was more often reported among women (6.0 %) than among men (3.7 %). We did not observe obvious differences in the prevalence of self-reported discrimination across age groups, educational level, or job groups. Table 1 also shows that participants reporting workplace discrimination reported higher quantitative demands, lower influence at work, and poorer relations to colleagues and managers than participants who did not report workplace discrimination.

Of the 2157 participants, 103 had a new depressive disorder at follow-up (4.8 %). Table 2 shows the estimates for the association between workplace discrimination and risk of onset of depressive disorders. The cumulative incidence rates of depressive disorders were 15.5 % and 4.3 % among exposed and non-exposed workers, respectively. In the crude analysis and in Models 1 and 2, odds ratios for incident depressive disorders were about 4, when comparing respondents reporting workplace discrimination at baseline with the unexposed reference group. After additionally adjusting for other psychosocial working conditions in Model 3, the odds ratio attenuated to 2.73 (95 % CI: 1.38–5.40).

When we excluded participants with a baseline MDI-score ≥ 15 points in a sensitivity analysis, the association between workplace discrimination and onset of depressive disorders became stronger (Online supplementary Table 2, Model 3: OR: 4.53; 95 % CI: 1.91–10.76).

4. Discussion

In this prospective cohort study, self-reported exposure to workplace discrimination predicted onset of depressive disorders in a population free of depressive disorders at baseline. The strength of the association between the predictor and the outcome attenuated when we adjusted for psychosocial working conditions, suggesting that factors in the psychosocial work environment may play a role in the association between workplace discrimination and onset of depressive disorders as either instigators, mediators, or moderators – an issue that warrants further research. However, even after adjustment for other psychosocial work environment factors, the estimate for the association between workplace discrimination and onset of depressive disorders remained considerably and statistically significant, both in the main analysis and in the sensitivity analysis, suggesting that workplace discrimination is an important predictor of onset of depressive disorders.

Following the perspective of Semmer et al. (2007), acts of workplace

Table 1
Descriptive statistics for main study variables.^a

	Workplace discrimination at baseline			p
	Yes	No		
Workplace discrimination at baseline (% (n))	4.8 (103)	95.2 (2054)		
Depressive disorders (MDI-score > 21) at follow-up (% (n))	15.5 (16)	4.3 (88)		<0.0001
Sex				0.0109
Female (% (n))	6.0 (61)	94.0 (953)		
Male (% (n))	3.7 (42)	96.3 (1101)		
Age (mean (SD))	48.3 (12.4)	48.3 (11.0)		0.9767
18–34 years (% (n))	5.9 (17)	94.1 (269)		
35–44 years (% (n))	4.1 (18)	95.9 (418)		
45–54 years (% (n))	3.9 (27)	96.2 (674)		
55 years or older (% (n))	5.6 (41)	94.4 (693)		
Psychosocial working conditions ^b				
Quantitative demands (mean (SD))	56.4 (18.1)	49.0 (19.3)		0.0002
Influence at work (mean (SD))	52.3 (22.0)	66.2 (20.3)		<0.0001
Social support from colleagues (mean (SD))	59.8 (20.0)	71.4 (16.8)		<0.0001
Leadership quality (mean (SD))	46.5 (23.5)	58.9 (22.3)		<0.0001
Job group				0.1887
Office workers (% (n))	8.0 (12)	92.0 (139)		
Technical draughtsmen (% (n))	4.0 (7)	96.0 (170)		
Teaching and research staff in universities (% (n))	5.6 (8)	94.4 (135)		
Health care helpers (% (n))	4.7 (5)	95.3 (101)		
Primary school teachers (% (n))	6.0 (11)	94.0 (173)		
Medical doctors (% (n))	5.7 (9)	94.3 (150)		
Mail carriers (% (n))	8.1 (10)	91.9 (113)		
Slaughterhouse workers (% (n))	5.9 (8)	94.1 (127)		
Smith workers (% (n))	– (<5°)	96.8 (119)		
Engineers (construction) (% (n))	2.4 (5)	97.6 (201)		
Sales assistants in shops (% (n))	4.4 (5)	95.6 (108)		
Private bankers (% (n))	5.7 (10)	94.3 (165)		
Business managers (% (n))	– (<5°)	98.9 (177)		
Police officers (% (n))	3.8 (7)	96.2 (176)		
Educational level				0.1914
Low (primary, lower secondary) (% (n))	6.6 (14)	93.4 (197)		
Middle-low (upper and post-secondary) (% (n))	3.4 (17)	96.6 (480)		
Middle-high (first stage tertiary) (% (n))	5.3 (51)	94.7 (905)		
High (second stage tertiary) (% (n))	4.1 (20)	95.9 (465)		
Cohabitation with partner				0.0466
Yes	4.3 (72)	95.8 (1621)		
No	6.6 (27)	93.4 (384)		
Cohabitation with children				0.0338

Table 1 (continued)

	Workplace discrimination at baseline		
	Yes	No	p
Yes	3.8 (39)	96.3 (1000)	
No	5.7 (61)	94.3 (1005)	

^a We excluded respondents with depressive disorders at baseline from the analyses.

^b The four measures of psychosocial working conditions are measured on a scale ranging from 0 to 100, with a score of 100 indicating the highest level of the measured dimension.

^c Results for groups smaller than five persons cannot be reported due to data protection regulations.

discrimination may be considered offenses to the ‘self’ of the targeted individuals. Accordingly, such offenses to the self may have a negative impact on the self-worth of the targeted employees and in cases of extended exposure to acts of workplace discrimination, the exposure may consequently have an adverse impact on the mental health of the targets. Indeed, in discussing their prospective results, [Marchiondo et al. \(2019\)](#) conclude that extended exposure to age discrimination may overwhelm the ability of exposed workers to cope successfully with these exposures, which ultimately may lead to adverse health-related outcomes, such as depressive disorders.

The results are in accordance with previous cross-sectional studies ([Hammond et al., 2010](#); [Kim et al., 2022](#); [Lee et al., 2016](#); [Schütte et al., 2014](#)) and one prospective study ([Marchiondo et al., 2019](#)) reporting that exposure to workplace discrimination is associated with lower levels of psychological well-being. To our knowledge, the present study is the first one providing prospective evidence on the association between workplace discrimination and onset of depressive disorders. Accordingly, the present study meets the call for research on the association between discrimination and health ([Williams et al., 2008](#)), and the call for longitudinal studies on the association between discrimination and mental health ([Vargas et al., 2020](#)).

Finally, other studies showed that the *global burden of disease* related to mental health issues is on the rise ([GBD 2019 Mental Disorders Collaborators, 2022](#)). Efforts to reduce the prevalence of depressive disorders may, therefore, take its’ point of departure in combatting work-related acts of offensive behavior in general and acts of workplace discrimination in particular.

4.1. Limitations

It is a weakness of the study that it was not possible to identify the precise type of discrimination that the respondents reported being exposed to (e.g., discrimination due to age, sex, or ethnicity). This limits the possibilities for developing targeted interventions on the basis of the present study and, hence, limits the practical applicability of the study results. It is also a limitation of the study that all variables were based on self-reported measures as this entails risk of common method bias. Further, the use of a self-reported measure of depressive disorders lowers the validity of the outcome measurement, compared to a clinical diagnostic interview. Although we cannot rule out that the observed association between workplace discrimination and onset of depressive disorders may be inflated because of common methods biases ([Podsakoff et al., 2003](#)), it is likely that the prospective design of the study has reduced such biases in the present study. The low response rate in the baseline study and the attrition from baseline to follow-up may constitute a source of selection bias, and the analysis of non-response at baseline showed that women and older individuals were more likely to participate in the baseline study. However, we found no differences between participants and non-participants at follow-up in their baseline-levels of workplace discrimination or MDI-score. Finally, the follow-up

Table 2

Odds ratios (OR) and 95 % confidence intervals (95 % CI) for the association between workplace discrimination at baseline and onset of a depressive disorder during six months follow-up (n = 2157).

	At risk	Cases n/%	Risk of onset of depressive disorder after six months of follow-up								
			Crude model ^a		Model 1 ^b		Model 2 ^c		Model 3 ^d		
			OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI	
Workplace discrimination at baseline	Yes	103	16/15.5	4.11	2.31 to 7.30	3.94	2.13 to 7.30	3.80	1.99 to 7.28	2.73	1.38 to 5.40
	No	2054	88/4.3	1	Reference	1	Reference	1	Reference	1	Reference

^a Crude model: Unadjusted.

^b Model 1: Adjusted for age, sex, job group, and educational attainment.

^c Model 2: Model 1 plus smoking, cohabitation with partner, cohabitation with children.

^d Model 3: Model 2 plus psychosocial working conditions: quantitative demands, influence at work, social support from colleagues, and leadership quality.

period was only six months long, which is short for studying the onset of a depressive disorder. It is possible that most of the new cases at follow-up occurred among participants who had already substantial mental health problems at baseline, raising concerns about inflated estimates. However, when we excluded participants with MDI-scores of 15 to 20 points at baseline, i.e. scores close to the threshold for identifying depressive disorders (MDI \geq 21 points), the association between baseline discrimination and onset of depressive disorders during follow-up did not become weaker but actually stronger. Thus, the association between baseline discrimination and onset of depressive disorders during follow-up was not driven by individuals who were close to a prevalent depressive disorder at baseline.

5. Conclusions

The results of this study indicate that workplace discrimination constitutes a serious stressor with potentially damaging effects on the mental health of exposed individuals. Eliminating or reducing workplace discrimination may contribute to prevent cases of depression in the working population.

CRedit authorship contribution statement

All authors contributed to the design of the study. T. Clausen performed the data analysis and wrote the first draft of the manuscript. All authors have contributed significantly to the preparation of the manuscript and to the interpretation of the results. All authors have approved the final version of the manuscript.

Conflict of interest

The authors have no conflicts of interest to disclose.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jad.2022.09.036>.

References

- Bech, P., Rasmussen, N.A., Olsen, L.R., Noerholm, V., Abildgaard, W., 2001. The sensitivity and specificity of the Major Depression Inventory, using the Present State Examination as the index of diagnostic validity. *J. Affect. Disord.* 66 (2–3), 159–164.
- Bech, P., Timmerby, N., Martiny, K., Lunde, M., Soendergaard, S., 2015. Psychometric evaluation of the Major Depression Inventory (MDI) as depression severity scale using the LEAD (Longitudinal Expert Assessment of All Data) as index of validity. *BMC Psychiatry* 15, 190. <https://doi.org/10.1186/s12888-015-0529-3>.
- Clausen, T., et al., 2019. The Danish Psychosocial Work Environment Questionnaire (DPQ): development, content, reliability and validity. *Scand. J. Work Environ. Health* 45 (4), 356–369. <https://doi.org/10.5271/sjweh.3793>.
- GBD 2019 Mental Disorders Collaborators, 2022. Global, regional, and national burden of 12 mental disorders in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet Psychiatry* 9 (2), 137–150. [https://doi.org/10.1016/s2215-0366\(21\)00395-3](https://doi.org/10.1016/s2215-0366(21)00395-3).
- Hammond, W.P., Gillen, M., Yen, I.H., 2010. Workplace discrimination and depressive symptoms: a study of multi-ethnic hospital employees. *Race Soc. Probl.* 2 (1), 19–30. <https://doi.org/10.1007/s12552-010-9024-0>.
- Kim, S., et al., 2022. Gender discrimination in workplace and depressive symptoms in female employees in South Korea. *J. Affect. Disord.* 306, 269–275. <https://doi.org/10.1016/j.jad.2022.03.050>.
- Lee, B.J., Lamichhane, D.K., Jung, D.Y., Moon, S.H., Kim, S.J., Kim, H.C., 2016. Psychosocial factors and psychological well-being: a study from a nationally representative sample of Korean workers. *Ind. Health* 54 (3), 237–245. <https://doi.org/10.2486/indhealth.2015-0191>.
- Marchiondo, L.A., Gonzales, E., Williams, L.J., 2019. Trajectories of perceived workplace age discrimination and long-term associations with mental, self-rated, and occupational health. *J. Gerontol. B Psychol. Sci. Soc. Sci.* 74 (4), 655–663. <https://doi.org/10.1093/geronb/gbx095>.
- Olsen, L.R., Jensen, D.V., Noerholm, V., Martiny, K., Bech, P., 2003. The internal and external validity of the major depression inventory in measuring severity of depressive states. *Psychol. Med.* 33 (2), 351–356.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88 (5), 879–903.
- Rugulies, R., et al., 2012. Bullying at work and onset of a major depressive episode among Danish female eldercare workers. *Scand. J. Work Environ. Health* 38 (3), 218–227.
- Schütte, S., Chastang, J.F., Malard, L., Parent-Thirion, A., Vermeulen, G., Niedhammer, I., 2014. Psychosocial working conditions and psychological well-being among employees in 34 European countries. *Int. Arch. Occup. Environ. Health* 87 (8), 897–907. <https://doi.org/10.1007/s00420-014-0930-0>.
- Semmer, N., Jacobshagen, N., Meier, L., Elfering, A., 2007. Occupational stress research: the "Stress-as-offense-to-self" perspective. In: Houdmont, J., McIntyre, S. (Eds.), *Occupational Health Psychology*. Nottingham University Press, Nottingham, pp. 43–59.
- Theorell, T., et al., 2015. A systematic review including meta-analysis of work environment and depressive symptoms. *BMC Public Health* 15 (738), 738. <https://doi.org/10.1186/s12889-015-1954-4>.
- Vargas, S.M., Huey, S.J., Miranda, J., 2020. A critical review of current evidence on multiple types of discrimination and mental health. *Am. J. Orthopsychiatry* 90 (3), 374–390. <https://doi.org/10.1037/ort0000441>.
- Williams, D.R., Lavizzo-Mourey, R., Warren, R.C., 1994. The concept of race and health status in America. *Public Health Rep.* 109 (1), 26–41 (Washington, DC: 1974).
- Williams, D.R., Neighbors, H.W., Jackson, J.S., 2008. Racial/ethnic discrimination and health: findings from community studies. *Am. J. Public Health* 98 (9 Suppl), S29–S37. https://doi.org/10.2105/ajph.98.supplement_1.s29.