



Depression and loneliness may predict work inefficiency among professionally active adults

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Abstract

Purpose Both depression and loneliness have been recognized as major public health issues, yet investigation into their role among young and middle-aged, professionally active persons is still required. The aim of the present study was to evaluate whether depression and loneliness may independently predict inefficiency at work among professionally active adults.

Methods This is a cross-sectional study on a representative, nationwide sample. 1795 questionnaires were gathered from among professionally active adults from Poland from 1 to 31 July 2018 with a direct pen-and-paper interview. The sample was chosen by means of the stratified random method. The survey included a Patient Health Questionnaire (PHQ-9) to measure depression and questions, devised by the authors, relating to loneliness and inefficiency at work. Regression models were constructed with depression and loneliness as predictors of inefficiency at work, unadjusted and adjusted for selected sociodemographic, health- and work-related factors.

Results In the unadjusted models, both depression and loneliness were independently associated with an increase of work inefficiency and absence from work, with effect sizes being higher for loneliness than for depression. After accounting for the control variables (i.e., sociodemographic, work- and health-related factors), the PHQ-9 score, but not the loneliness score, was associated with an increased probability of frequent thoughts about changing or leaving a job.

Conclusion Depression and loneliness independently predicted occupational functioning and differentially affect its various aspects. Counteracting depression and loneliness among employees should be regarded as a public health priority.

Keywords Work performance · Mood disorders · Social support · Poland

Introduction

Depressive disorders pose a major clinical problem, with a global percentage prevalence of 4.4%, and lifetime morbidity estimated to be from 7 to 12% in men and from 20 to 25% in women (Segal et al. 2013; World Health Organization

2017). The proper diagnosis, prevention and treatment of affective disorders is an issue for national economies, given the cost of i.a., psychiatric treatment, absence from work, early retirement, or inability to work caused by depression (Amos et al. 2018; Jaffe et al. 2019; König et al. 2021). In this context, it should be underlined that the World Health Organization has recently ranked depression as the greatest contributor to disability measures worldwide (World Health Organization 2017).

Depression has been associated with measures of work efficiency-related factors, including self-perceived work ability, absenteeism, sick leave or burnout (Hjarsbech et al. 2011; Godinho et al. 2016; Amiri and Behnezhad 2021). It is noteworthy that a diagnosis of depression may raise the probability of early retirement and, additionally, that retirement in general may contribute to an increase in the severity of depressive symptoms (Segel-Karpas et al. 2018a). Moreover, early retirement, compared to normal retirement, has been reported to cause a greater

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negative effect on health and a greater rise in the severity of depressive symptoms (Calvo et al. 2013). Those results warrant the need for studies on the relationship between work conditions, work ability and their impact on health, having recognized the bidirectional association between depression and inability to work (due to taking pension or early retirement) (Calvo et al. 2013; Segel-Karpas et al. 2018a, b).

Similarly to depression, loneliness is a highly prevalent condition and a major public health issue (Leigh-Hunt et al. 2017; Cacioppo and Cacioppo 2018). It can be defined as a subjective and negative experience resulting from a perceived discrepancy between the existing and desired social relationships of an individual (de Jong Gierveld et al. 2006). It is estimated that in industrialized countries, about a third of people are affected by loneliness, with one person in 12 affected severely (Cacioppo and Cacioppo 2018). Recently, this construct has been of particular interest in the clinical setting as a factor related to psychological burden (Cacioppo et al. 2015). Loneliness has been found to be linked with poor quality of life, severity of depressive symptoms, anxiety, insomnia, and suicide risk (Beutel et al. 2017; Leigh-Hunt et al. 2017; Erzen and Çikrikci 2018; Domènech-Abella et al. 2019; Griffin et al. 2020; Solmi et al. 2020; Shaw et al. 2021). The negative impact of loneliness on mental health has been underlined in the context of the novel coronavirus disease 2019 (COVID-19) outbreak and social isolation that followed (Palgi et al. 2020; Morina et al. 2021). The significance of loneliness and its correlates has been investigated mainly among older adults and patients suffering from chronic illnesses (both mental and somatic) (Świtaj et al. 2018; Heidari Gorji et al. 2019; Sipowicz et al. 2021). However, less is known about loneliness as a predictor of psychological and occupational burden among professionally active and younger adults. Loneliness has been found to be associated with involuntary retirement and to moderate the relationship between depressive symptoms and retirement (Segel-Karpas et al. 2018b; Shin et al. 2020). Furthermore, loneliness has been demonstrated to be predictive of future work disability onset among nondisabled, working older adults, with depression acting as a partial mediator in this relationship (Morris 2020). Nonetheless, investigation into role of loneliness among young and middle-aged, professionally active persons is still required, the issue having been raised by previous studies (Richard et al. 2017; Beutel et al. 2017). A scarce number of the bespoke studies have included both loneliness and depression to predict work efficiently (Morris 2020).

Thus, the aim of the present study was to evaluate whether depression and loneliness may predict perceived inefficiency at work, independently of selected sociodemographic, health- and work-related factors, among professionally active adults.

Materials and methods

Study design and sample

This is a cross-sectional study on a representative, nationwide sample. The study was conducted from 1 to 31 July 2018 by means of a direct pen-and-paper interview.

The target population (an equivalent to the inclusion criterion) was professionally active adults aged 30–60 years old. The exclusion criteria were: unemployment, lack of informed consent, diagnosis of major neurocognitive disorder, serious and unstable disease (e.g., cardiac or pulmonary). The sample was chosen by means of the stratified random method. The population was proportionally divided into four independent layers (i.e., employment sector, sex, age and province). The sample distribution aimed to meet the distribution of employment sector in accordance with data of Statistics Poland (the Main Statistics Office). After granting a consent from interviewees, twelve trained interviewers performed the face-to-face interviews and completed the questionnaires based on the respondents' answers. The respondents had an opportunity to ask questions. The interviewers verified the completion of each questionnaire. The target sample size was set at 1500, yet a total of 1795 interviews were gathered to reduce the possibility of statistical error. The response rate was 62%, i.e., more than a third of the randomly selected persons refused to participate. The estimated minimum number of interviews was reached in each defined subgroup (by the employment sector, sex, age and province). The final sample comprised 960 men (53%) and 835 women (47%), with mean age of 43.7 ± 9.3 . The detailed characteristics of the studied sample can be found in Supplementary Table 1.

Tools of the study

The variables were operationalized as a self-reported survey, containing both recognized questionnaires and questions devised by the authors.

Six items were constructed to assess different aspect of inefficiency at work, i.e., absence from work during the year preceding the study, sense of physical inefficiency at work, sense of mental inefficiency at work, presence of frequent thoughts about changing or leaving a job, sense of inefficiency at work due to illness or injury, and two-year likelihood of becoming inefficient at work. Likert-type scales of answers were prepared for each item (shown in detail and proposed scoring in Supplementary Table 2). Higher scores mean greater inefficiency at work, higher absence from work and more frequent thoughts about

changing job. Theoretical validity was assessed by the researchers and through factorial analysis (see below).

Loneliness was assessed with a single-item question, namely “How often do you feel lonely?” (originally in Polish: “Jak często ma Pani/Pan poczucie osamotnienia w swoim życiu?”). A five-step Likert-type range of answers was prepared, from “never” to “almost all the time”. The respondent could reach a score of loneliness ranging from 1 to 5 (the higher the score, the greater the sense of loneliness).

The Patient Health Questionnaire (PHQ-9) was utilized to assess the severity of depressive symptoms. The Polish version of the scale is distributed by Pfizer Inc. and is available at <http://www.phqscreeners.com>. The Polish version of the questionnaire was prepared by Tomaszewski et al. (2011). The scale comprises nine items, each scored from 0 to 3. An increase in the score indicates an increase in the severity of depressive symptoms. Cronbach’s α value for the Polish version of the PHQ-9 was 0.70.

In the adjusted models, the following variables were controlled for:

- sociodemographic factors: sex, age, marital status (single, married, divorced/separated, widowed), place of residence (rural area, town with below 5 k inhabitants, town with between 5 and 50 k inhabitants, city with between 50 and 200 k inhabitants or city with over 200 k inhabitants), education level (primary, secondary, vocational, full-higher or incomplete-higher), perceived economic status (very good, good, mediocre or bad);
- work-related factors: type of job (desk job, executive job/manager, manual labor with shift work at night, manual labor only daytime, remote work with commuting, other), work sector (mining, production, construction, trade, public administration, education and science, health care, service sector, agriculture and forestry, other), exposure to difficult working conditions (high physical exertion, work in a physically uncomfortable position, inadequate temperature, noise, chemical substances, dust), number of working hours per week;
- health-related factors: morbidities (heart disease, kidney disease, diabetes mellitus, arterial hypertension, endocrine disorder, orthopedic disorder, neoplasm, mental disorder), smoking tobacco (non-smoker, active smoker, smoked in the past), frequency of alcohol intake, serious life events in past 12 months (death of a partner, divorce, separation, death of a relative, serious illness or injury, imprisonment, loss of job, serious illness or injury of a relative/partner, change of job).

Ethical considerations

Ethical approval was obtained from the Bioethical Committee of the Institute of Psychiatry and Neurology, Warsaw, Poland.

All participants provided their informed consent. Data were collected and checked for completeness by the trained interviewers and then anonymized.

Statistical analysis

The statistical analysis was conducted in STATISTICA 13 with Medical Add-on (Dell, USA). Due to the large sample size and random sampling, the central limit theorem was applied. The normality of distribution of the continuous variables was verified by means of visual assessment of the histograms and the Shapiro–Wilk W test.

In the first level on analysis, an attempt to reduce the number of dimensions (the bespoke 6 created items considering work-related inefficiency) was made by means of factorial analysis. The number of respondents was sufficient for the purposes of the factorial analysis. The Kaiser–Meyer–Olkin measure and Bartlett’s test were used to assess whether data were fit for the detection of a structure. Indices with a common variance of at least 0.6 were considered as a significant association. Internal consistency was assessed with Cronbach’s α .

In the second level of analysis, linear and logistic regression models were constructed, depending on the type of predicted variable (respectively, quantitative and qualitative).

In the case of the linear regression models, sigma-restricted coding was used to represent the effects for categorical predictor variables. An analysis of residuals was performed to assess the validity of assumptions of normality, homoscedasticity and independence between observations (with the Durbin–Watson test). Tolerance indices were analyzed to track possible multicollinearities—a lack of significant collinearity was adopted for a tolerance index greater than 0.1.

For the logistic regression model, the Hoshmer–Lemeshow test was performed to evaluate the goodness of fit. The results are presented as odds ratios with 95% confidence intervals.

Effect sizes, in statistical terms, were assessed in several ways: for a linear regression model as a whole (coefficient of determination R^2), for each parameter in the model (standardized β parameter), and for each variable as factor loading in factorial analysis. Those quotients may be interpreted in terms of Cohen’s thresholds for small (0.1), moderate (0.3) and strong effect sizes (0.5). The predictive value of the whole model was verified by means of tenfold cross-validation. The level of significance was adopted for $\alpha = 0.05$.

Results

Reduction of the dimensions—factorial analysis

In the first option of the exploratory factorial analysis, all six work inefficiency-related items were included (Table 1).

All six items formed one factor, explaining 47% of variance. Low factorial loading was observed in case of items one and four. In subsequent factorial analyses, those items were excluded. This resulted in an improvement in both the amount of explained variance (from 47 to 63%) and the value of Cronbach's α (from 0.75 to 0.79).

Based on this analysis, the scale was reduced to three dimensions:

- work inefficiency (items two, three, five and six),
- absence from work (item one),
- and frequent thoughts about changing or leaving a job (item four).

Prediction of work inefficiency score—linear regression models

In the univariate models, unadjusted for control variables, an increase in both depression (PHQ-9) and loneliness scores was associated with a rise in work inefficiency score. Both the coefficient of determination (R^2) and effect sizes (standardized β parameter values) were higher for loneliness than for depression in predicting inefficiency at work score (Table 2).

In an unadjusted model including both the PHQ-9 and loneliness as predictors, R^2 was similar to that in the model including loneliness alone. R^2 and β for loneliness were similar, while the effect size of the PHQ-9 score decreased compared to the respective parameters in univariate models (Table 2).

In the model adjusted for sociodemographic, health- and work-related factors, both the PHQ-9 and loneliness scores

Table 1 Summary of factorial analyses of the work efficiency-related items of the survey completed by the group of professionally active adults studied

No. of item	Item name	Option 1	Option 2	Option 3
1	Absence from work (number of days within past year)	– 0.512	– 0.532	Item not included
2	Physical inefficiency at work	– 0.812	– 0.819	– 0.827
3	Mental inefficiency at work	– 0.760	– 0.766	– 0.785
4	Frequent thoughts about changing or leaving a job	– 0.358	Item not included	Item not included
5	Inefficiency at work due to illness or injury	– 0.815	– 0.819	– 0.822
6	Two-year likelihood of becoming inefficient at work	– 0.723	– 0.717	– 0.741
Variance explained		46.9%	54.5%	63.2%
Cronbach's α		0.750	0.767	0.790

Factorial loadings, variance explained and Cronbach's α in three variants are presented

Table 2 Results of consecutive linear regression models predicting inefficiency at work, with depression and loneliness as predictors, in the studied sample of professionally active adults

	B	B 95% CI	B	t	p
Depression as a predictor, unadjusted; $R^2=0.093$, $F=184.041$, $df=1$, $p<0.001$					
PHQ-9 score	0.489	0.418 0.559	0.305	13.566	<0.001
Loneliness as predictor, unadjusted; $R^2=0.158$, $F=337.607$, $df=1$, $p<0.001$					
Loneliness score	1.100	0.983 1.218	0.398	18.374	<0.001
Depression and loneliness as predictors, unadjusted; $R^2=0.191$, $F=212.158$, $df=2$, $p<0.001$					
Loneliness score	0.921	0.798 1.043	0.333	14.765	<0.001
PHQ-9 score	0.309	0.238 0.380	0.193	8.551	<0.001
Depression and loneliness as predictors, adjusted*; $R^2=0.396$, $F=20.009$, $df=62$, $p<0.001$					
Loneliness score	0.544	0.425 0.663	0.197	8.968	<0.001
PHQ-9 score	0.173	0.105 0.241	0.108	4.989	<0.001

PHQ-9 Patient Health Questionnaire, R^2 coefficient of determination, F statistics in F Fisher–Snedecor test, df degrees of freedom, p probability in the test, B unstandardized parameter, CI confidence interval, β standardized parameter (size of effect), t statistics in t test

*Adjusted for: sociodemographic factors (sex, age, marital status, place of residence, education level, economic status), work-related factors (type of job, employment sector, difficult working conditions, working hours/week), health-related factors (morbidities, smoking tobacco, frequency of alcohol intake, serious life events in past 12 months)

remained significantly associated with the inefficiency at work score, yet their effect sizes were lower compared to unadjusted models (Table 2).

Prediction of absence from work score—linear regression models

In the univariate, unadjusted models, an increase in the PHQ-9 and loneliness scores was associated with a higher absence from work score. Coefficient of determination (R^2) and standardized β parameter values were slightly higher for loneliness than for the PHQ-9 in predicting absence from work score (Table 3).

In an unadjusted model including both the PHQ-9 and loneliness scores as predictors, both factors were significantly associated with absence from work score. R^2 of the model was similar to the one in the model with loneliness score alone as a predictor (Table 3).

In the model adjusted for sociodemographic, health- and work-related factors, both a rise in the PHQ-9 score and a rise in the loneliness score were significantly associated with a rise in the absence from work score, yet the sizes of their effect were lower compared to unadjusted models (Table 3).

Prediction of frequent thoughts about changing or leaving a job—logistic regression model

In the univariate, unadjusted models, a rise in the PHQ-9 score and a rise in loneliness score were associated with an increased probability of reporting frequent thoughts about changing jobs. Similar effects were seen in the bivariate (including PHQ-9 and loneliness), unadjusted model. The odds ratios (OR) for depression and loneliness were similar,

yet the effect of the PHQ-9 may be considered stronger due to the greater range of possible scores a respondent can achieve, compared to the loneliness score range. This discrepancy is further confirmed in the adjusted model—the PHQ-9 score, but not the loneliness score, was found to be significantly associated with an increased probability of presentation of frequent thoughts about changing or leaving a job (Table 4).

Discussion

The association between depression and inefficiency at work appears to be well-established and was confirmed in the present study. The clinical manifestation of affective disorder is related to poor functional outcome and thus low work ability, particularly if symptoms like low energy, susceptibility to fatigue, lack of motivation or executive dysfunction (due to complaints of memory and attention disturbances) are more pronounced (Zack et al. 2020; Warren et al. 2021). This association may be independent of job characteristics, which was also seen in the current study as the constructed models were adjusted for a series of work-related factors (Zack et al. 2020; Päivärinne et al. 2021). In a recent meta-analysis, depressive symptoms have been shown to increase the risk of sick leave, with the effect being more pronounced for men (Amiri and Behnezhad 2021). Depressive symptoms may increase upon retiring, as distinct from increasing the probability of early retirement (Segel-Karpas et al. 2018a). A clinical diagnosis of treatment-resistant depression has been associated with a three-fold increased risk of premature workforce exit, with an average of six years of work lost (Bang Madsen et al. 2020).

Table 3 Results of consecutive linear regression models predicting absence at work, with depression and loneliness as predictors, in the sample of professionally active adults studied

	<i>B</i>	<i>B</i> 95% <i>CI</i>	β	<i>T</i>	<i>p</i>
Depression as predictor, unadjusted; $R^2=0.021$, $F=39.946$, $df=1$, $p<0.001$					
PHQ-9 score	0.090	0.062 0.118	0.148	6.320	<0.001
Loneliness as predictor, unadjusted; $R^2=0.036$, $F=68.375$, $df=1$, $p<0.001$					
Loneliness score	0.202	0.154 0.250	0.192	8.269	<0.001
Depression and loneliness as predictors, unadjusted; $R^2=0.043$, $F=41.746$, $df=2$, $p<0.001$					
Loneliness score	0.169	0.118 0.219	0.160	6.528	<0.001
PHQ-9 score	0.057	0.028 0.087	0.094	3.821	<0.001
Depression and loneliness as predictors, adjusted*; $R^2=0.146$, $F=5.960$, $df=62$, $p<0.001$					
Loneliness score	0.106	0.052 0.160	0.101	3.851	<0.001
PHQ-9 score	0.044	0.014 0.075	0.073	2.831	0.005

PHQ-9 Patient Health Questionnaire, R^2 coefficient of determination, F statistics in F Fisher–Snedecor test, df degrees of freedom, p probability in the test, B unstandardized parameter, CI confidence interval, β standardized parameter (size of effect), t statistics in t test

*Adjusted for: sociodemographic factors (sex, age, marital status, place of residence, education level, economic status), work-related factors (type of job, employment sector, difficult working conditions, working hours/week), health-related factors (morbidities, smoking tobacco, frequency of alcohol intake, serious life events in past 12 months)

Table 4 Results of consecutive logistic regression models predicting probability of reporting frequent thoughts about changing or leaving a job, with depression and loneliness as predictors, in the sample of professionally active adults studied

	OR	OR 95% CI	Wald	<i>p</i>
Depression as predictor, unadjusted; HL = 2.138, <i>p</i> = 0.768				
PHQ-9 score	1.338	1.254 1.427	77.315	< 0.001
Loneliness as predictor, unadjusted; HL = 4.424, <i>p</i> = 0.109				
Loneliness	1.407	1.249 1.586	31.331	< 0.001
Depression and loneliness as predictors, unadjusted; HL = 5.720, <i>p</i> = 0.573				
Loneliness	1.192	1.047 1.357	7.093	0.008
PHQ-9 score	1.293	1.207 1.386	52.972	< 0.001
Depression and loneliness as predictors, adjusted*; HL = 10.707, <i>p</i> = 0.219				
Loneliness	0.979	0.836 1.146	0.070	0.791
PHQ-9 score	1.202	1.107 1.305	19.230	< 0.001

PHQ-9 Patient Health Questionnaire, *HL* statistics in Hosmer–Lemeshow test, *OR* odds ratio, *CI* confidence interval, *Wald* Wald statistics, *p* probability in the respective test, *R*² coefficient of determination, *F* statistics in F Fisher–Snedecor test, *df* degrees of freedom, *p* probability in the test, *B* unstandardized parameter, *CI* confidence interval, *β* standardized parameter (size of effect), *t* statistics in *t* test

*Adjusted for: sociodemographic factors (sex, age, marital status, place of residence, education level, economic status), work-related factors (type of job, employment sector, difficult working conditions, working hours/week), health-related factors (morbidities, smoking tobacco, frequency of alcohol intake, serious life events in past 12 months)

Much less is known about the role of loneliness in work-related efficiency, although a certain amount of research on the relationship between loneliness or social support and occupational burnout has been published, with a recent emphasis of the COVID-19 outbreak impact (Marilaf Caro et al. 2017; George-Levi et al. 2020; Dodoo et al. 2021; Thimmapuram et al. 2021). Yet it should be underlined that those studies included only jobs requiring regular interaction with people seeking help, but not general professional activity, which has been done in hereby research.

Publications considering the role of depression and loneliness together in their relationship with sick leave, work ability, and burnout are scarce. Also, it is a common approach to consider loneliness as one of the symptoms of depression instead of giving depression and loneliness a consideration as separate phenomena. However, a review of studies regarding the relationship between loneliness and depression has shown that these two, although closely related, are distinct constructs (Heinrich and Gullone 2006; Cacioppo and Hawkey 2009). Dodoo et al. (2021) found a significant increase in the probability of loneliness for high indices of emotional exhaustion, depersonalization, and a high level of perceived fatigue among family doctors. In that study, however, depression was considered as a risk factor of

loneliness. Loneliness appeared to be the most pronounced depressive symptom under heavy work duress among professional medical personnel at the beginning of the COVID-19 outbreak (Sunjaya et al. 2021).

Interestingly, based on the factorial analysis we conducted, thinking frequently about changing jobs appears to be rather weakly associated with inefficiency at work and with recent absence from work. Frequent thoughts about changing jobs may indicate a more proactive and adaptive approach, given the current job is considered unsatisfying, as long as they result in an actual change of a job (Lent and Brown 2013). A sense of inefficiency at work may be related to a depletion of inner resources and thus an inability to utilize goal-oriented coping behaviors (Zijlstra et al. 2014). However, those claims require further verification in future studies. A potential role of loneliness should be considered as a factor particularly contributing to inefficiency at work, since in the currently presented, adjusted multivariate model loneliness was associated with inefficiency at work and absence from work, but not the probability of frequent thoughts about changing jobs (with depression being associated with all three work-related facets). However, the topic requires further investigation.

Practical implications

The current study confirms that depression and loneliness may be considered as targets of tailored therapeutic programs fostering a return to work and work efficiency. Such an approach can already be seen in previously published results and protocols of clinical studies (Poulsen et al. 2017; Petersson et al. 2018; Alvarez et al. 2020). Short-term and long-term psychodynamic psychotherapy and psychoanalysis have been shown to improve depressive symptoms, work ability and functional outcome in a five-year follow-up among professionally active adults (Knekt et al. 2011). In a systematic review, it was found that both clinical care and work-directed psychological interventions may result in the reduction of the severity of depression and absence of sickness (Nieuwenhuijsen et al. 2020). It is worth noting that even simple interventions may prove effective. For example, the monitoring of depressive symptoms with self-report instruments in the primary care setting on a monthly basis may increase work ability and sense of social support in a three-month follow-up (Petersson et al. 2018).

As for loneliness-reduction interventions, four main strategies can be distinguished: improving social skills, enhancing social support, increasing opportunities for social contact, and addressing maladaptive social cognition. The results of the meta-analysis by Masi et al., (2011) indicate that addressing biased social cognition is the most promising of these (Masi et al. 2011). Recent evidence suggests also that the introduction of daily meditation in a four-week

period may have reduced the sense of loneliness among physicians and advanced practice providers during COVID-19 outbreak (Thimmapuram et al. 2021).

Limitations

Certain shortcomings of the study should be outlined. It should be noted that only self-report measures were used. In the case of depressive symptoms and their functional outcome (e.g., ability to work), simple psychological tests cannot replace a careful clinical assessment. However the PHQ-9, chosen for the study to evaluate depression, is a widely-recognized and highly-valued tool commonly used in clinical practice and scientific research. Furthermore, loneliness was assessed with just one item. There is some evidence though that single-item loneliness measures may produce results in line with those obtained using more comprehensive and validated instruments (Michalska Da Rocha et al. 2018). As regards the indicators of work efficiency—the assessment was performed with questions devised by the authors and it may be considered that the items were not given a full, psychometric evaluation of their validity and reliability. Yet, those issues were partially addressed within this study. The cross-sectional design may also raise concerns. Both loneliness and depression were assessed as predictors of inefficiency at work, absence from work and having frequent thoughts about changing jobs, but only in statistical terms. Further verification of our results is required in a study with a prospective design. Finally, we cannot rule out the possibility that some unmeasured variables, e.g., burnout, may have influenced the results achieved.

Conclusion

Depression and loneliness independently predict occupational functioning and differentially affect its various aspects. Our findings may contribute to a better understanding of the roles of depression and loneliness in impairing work efficiency among professionally active adults. Counteracting depression and loneliness among employees should be regarded as a public health priority.

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statistical analysis and interpreted the data. ŁM, PŚ and HSJ prepared the manuscript. All authors have approved the final article. The database used to support the findings of this study may be released upon application to the corresponding author. The authors would like to express their gratitude to Marta Robson for providing language assistance.

Declarations

Conflict of interest The authors have no conflicts of interest to report.

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