

# Profile of workers receiving disability benefits for depressive conditions in south Santa Catarina, Brazil

Perfil de trabalhadores depressivos com incapacidade para o trabalho no sul de Santa Catarina

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**ABSTRACT | Introduction:** In recent years, mental disorders have remained the third leading cause of sick-pay benefits due to incapacity for work in Brazil. **Objectives:** To assess the profile and outcomes of workers receiving sick pay for depression through the Criciúma unit of the Brazilian National Social Security Institute (Instituto Nacional do Seguro Social, INSS). **Methods:** The study was carried out using data obtained from the Electronic System Portal of the INSS Citizen Information Service of Criciúma, state of Santa Catarina. A total of 343 individuals were selected over a 1-year period. We then analyzed all new benefits granted over a 6-year period. **Results:** Mild depressive episode was the disorder that prompted the most disability benefits. The mean age was 42 years, with a predominance of female beneficiaries. Overall, 56% of beneficiaries were granted at least one new disability benefit. Mental health disorders were among the leading causes. The duration of new benefits was significantly longer. **Conclusions:** The typical profile is that of a 42-year-old woman, gainfully employed, earning one to two times the minimum wage, with low educational attainment, who is deemed unfit for work due to a mild depressive episode. Older age was a risk factor for being awarded a new benefit. Benefits classified as due to a more serious condition and those awarded subsequent to the first benefit had a longer duration. Given the relevance of depression to occupational health, we hope that the findings of the present study will contribute to the literature and encourage new research in the field.

**Keywords |** disability benefit; sick leave; depression.

**RESUMO | Introdução:** Nos últimos anos, os transtornos mentais se mantiveram como a terceira maior causa de concessão de benefícios auxílio-doença por incapacidade de trabalho no Brasil. **Objetivos:** Avaliar o perfil dos beneficiários em auxílio-doença por depressão e o desfecho perante a unidade do Instituto Nacional do Seguro Social de Criciúma. **Métodos:** O estudo foi realizado a partir de dados do portal do Sistema Eletrônico do Serviço de Informação ao Cidadão, da Gerência do Instituto Nacional do Seguro Social de Criciúma/Santa Catarina. Foram selecionados 343 indivíduos no período de 1 ano. Após, houve análise das novas concessões dos benefícios pelo período de 6 anos. **Resultados:** O episódio depressivo leve foi o transtorno que mais gerou benefícios por incapacidade. A idade média foi de 42 anos, com predominância do sexo feminino. Receberam pelo menos um novo benefício por incapacidade 56% dos beneficiários. Entre as principais causas, estavam os transtornos mentais. A duração dos novos benefícios foi significativamente maior. **Conclusões:** O perfil típico é de mulher, com 42 anos, empregada, com renda de um a dois salários-mínimos, baixo grau de instrução, que se afasta do trabalho por episódio depressivo leve. A idade mais elevada foi fator de risco para recebimento de novo benefício. Os benefícios qualificados como de maior gravidade e os posteriores ao primeiro tiveram duração maior. Diante da relevância da depressão na saúde do trabalhador, espera-se que o estudo contribua através do conhecimento gerado e estimule novas pesquisas na área.

**Palavras-chave |** seguro por incapacidade; afastamento; depressão.

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## INTRODUCTION

According to global estimates released by the World Health Organization (WHO), mental health conditions account for 12% of all diseases.<sup>1</sup> Among mental disorders, depression is most prevalent, affecting 322 million people worldwide, or 4.4% of the global population.<sup>2</sup>

Depression is characterized by an unmotivated or reactive state of sadness, with slow thinking, feelings of guilt, low self-esteem, pessimism, and ideas of ruin and death.<sup>3</sup> It mainly affects women, predominantly around 40 years of age, unemployed, and with other comorbid conditions.<sup>4</sup> The rate of recovery from depressive disorder remains low, with only 37% of individuals achieving remission after 6 months of treatment.<sup>5</sup>

WHO estimates that depression is the second leading cause of work days lost in 2020, and will become the leading cause of functional disability by 2030.<sup>6</sup> This disorder is already one of the main causes of disability, absenteeism, and decreased or lost productivity, resulting in increased utilization of health care resources.<sup>7</sup>

In Brazil, the National Social Security Institute (Instituto Nacional do Seguro Social, INSS) is a public organization that provides social security services to society at large. Its mandate is the recognition of the rights of all citizens covered by the General Social Security Regimen, which currently number approximately 50 million persons, of whom more than 33 million were on benefits as of 2017.<sup>8</sup> According to Law No. 8,213, sick pay is a right of all covered employees who are unable to work for more than 15 consecutive days or, in the case of other covered citizens, from the date on which their incapacity for work began onward, as long as they remain unfit.<sup>9</sup>

In recent years, mental health disorders were the third leading cause of sick-pay benefits due to incapacity for work in Brazil, thus representing a high source of public expenditure.<sup>10,11</sup> In the United States, such spending accounted for 83 billion in 2010<sup>12</sup> while, in Europe, mental illness currently accounts for 1% of the gross domestic product, which makes these conditions the costliest disorders on the continent.<sup>13</sup>

Within this context, the present article aimed to evaluate the profile of beneficiaries receiving sick leave due to a depressive episode or recurrent depressive disorder covered by the INSS within the macro-region

of Criciúma, state of Santa Catarina, Brazil, as well as to analyze the recurrence of absenteeism from work among said recipients.

## METHODS

### ETHICAL CONSIDERATIONS

This cross-sectional study was approved by the Research Ethics Committee of Universidade do Extremo Sul Catarinense (protocol no. 2400209). Data collection began after approval by the aforementioned committee, in accordance with Brazilian National Health Council Resolution No. 466/2012, which regulates research involving human subjects. The INSS authorized the primary investigator to access the data of interest (protocol no. 35344.000196/2018-63).

### STUDY DESIGN

This was an observational, retrospective, quantitative study involving secondary data collection.

### STUDY SETTING

The study was carried out using data obtained from the Electronic System Portal of the INSS Citizen Information Service (protocol no. 37400.005825/2017-74) for the Criciúma Executive Management unit of the INSS, as well as through the Unified Benefits Information System. This unit is headquartered in the central region of Criciúma, Santa Catarina, and covers 24 municipalities in the southern region of the state.

### STUDY SAMPLE

The survey was carried out with 343 workers covered by the Criciúma unit who had been granted sick-pay benefits for a depressive episode or recurrent depressive disorder from October 1, 2010, to September 30, 2011. The minimum sample size was calculated, considering the maximum tolerable error as 5%, given a sample size of 323 individuals.

### INCLUSION CRITERIA

We included those individuals covered by Social Security who had been granted sick-pay benefits for a diagnosis of depressive episode or recurrent depressive

disorder (International Classification of Diseases, 10th edition [ICD-10] codes F32, F32.0, F32.1, F32.2, F32.3, F32.8, F32.9, F33, F33.0, F33.1, F33.2, F33.3, F33.4, F33.8, and F33.9) in the period October 1, 2010, through September 30, 2011.

## EXCLUSION CRITERIA

Repeated benefits during the initial sample period were excluded.

## DATA COLLECTION INSTRUMENT

The study was carried out using data obtained from the Electronic System Portal of the INSS Citizen Information Service (protocol no. 37400.005825/2017-74) for the Criciúma Executive Management unit of the INSS. Data collected from this system included sex, age, education, salary range, employment status, duration of benefit, number of benefits, any retirement pensions, and ICD code.

## LOGISTICS

We first analyzed profile of benefit recipients from October 1, 2010, to September 30, 2011. Then, we conducted a follow-up analysis of these benefit recipients until September 30, 2017, checking for new benefits; which illness or condition led to this new disability benefit; and the duration of benefits granted in the intervening period.

## STATISTICAL ANALYSIS

The collected data were tabulated and analyzed in IBM® SPSS Version 21.0. Quantitative variables were described as mean and standard deviation or median and interquartile range, as well as minimum and maximum values. Qualitative variables were expressed as absolute and relative frequencies.

Inferential analyses were performed with a significance level of  $\alpha = 0.05$  and, therefore, 95% confidence. The Kolmogorov-Smirnov test was applied to verify the normality of distribution of quantitative variables. Levene's test was used to investigate the homogeneity of variances.

Comparison of means between two groups was performed by Student's *t*-test for independent samples. Comparison of means among more than two groups was performed with the Kruskal-Wallis *H* test, followed by a

*post hoc* Dunn's test when the difference was statistically significant. Comparison of means at two different time points was performed by Wilcoxon's *T*-test.

To test for association between qualitative variables, we used likelihood ratios and Pearson's chi-square test, followed by analysis of residuals when statistical significance was observed.

## RESULTS

### SOCIODEMOGRAPHIC PROFILE

The sociodemographic profile of workers who received INSS sick-pay benefits for a depressive episode or depressive disorder in the Criciúma macro-region from October 1, 2010, to September 30, 2011, is given in Table 1. The mean age was  $42.2 \pm 11.4$  years. There was a female predominance, with women accounting for 75.8% of cases. Regarding educational attainment, 61.5% were illiterate or had an incomplete primary education. As for employment, 60.6% of individuals were employed at the time the benefit was granted, 19.8% were self-employed, and 13.7% were unemployed. In terms of income, most (47.8%) were paid one to two times the minimum wage, and 36.4% received minimum wage or less.

The ICD-10 code F32.0 (mild depressive episode) accounted for the majority of sick-pay benefits granted (31.2%), followed by F33.0 (recurrent depressive disorder, current mild episode) with 16.3%.

The mean duration of the sick-pay benefit granted per episode (or for depressive disorder) in the initial analysis was  $70.2 \pm 35.0$  days, and the median, 62 days. As shown in Table 2, a longer duration of sick-pay benefits was observed in subjects with ICD-10 codes F32.3 (severe depressive episode with psychotic symptoms), F33.1 (recurrent depressive disorder, current episode moderate), and F33.2 (recurrent depressive disorder, current episode severe without psychotic symptoms) as compared to individuals with ICD-10 F32.0 (mild depressive episode). A longer duration of benefits was also found in individuals with ICD-10 codes F33.2 (recurrent depressive disorder, severe current episode without psychotic symptoms) as compared to ICD-10 F32.1 (moderate depressive episode) ( $p = 0.025$ ).

## FOLLOW-UP OF BENEFITS GRANTED

On a follow-up analysis of the same INSS benefit claimants from the macro-region of Criciúma in the period October 1, 2011, to September 30, 2017 (Table 1), we found that 192 claimants (56%) had been granted at least one more disability benefit, resulting in 316 repeat benefits during the period of analysis (Table 3).

The mean age of individuals who did not require new benefits was  $40.1 \pm 11.7$  years, while among those who received new benefits, the mean age was  $43.8 \pm 10.9$  years ( $p = 0.003$ ). Again, female sex predominated in both groups, with women accounting for 74.8% and 76.6% of claimants, respectively. Among those who did not receive a new benefit, 8.3% had a college degree or other higher

**Table 1.** Profile of National Social Security Institute (INSS) beneficiaries who were granted sick pay for a depressive episode or depressive disorder in the Criciúma macro-region, state of Santa Catarina, Brazil, October 1, 2010-September 30, 2011

	Mean $\pm$ SD or n (%) n = 343	Benefit Mean $\pm$ SD or n (%)		P-value
		One n = 151	More than one n = 192	
Age (years)	42.2 $\pm$ 11.4	40.1 $\pm$ 11.7	43.8 $\pm$ 10.9	0.003*
Sex				
Female	260 (75.8)	113 (74.8)	147 (76.6)	0.711 <sup>†</sup>
Male	83 (24.2)	38 (25.2)	45 (23.4)	
Educational attainment				
Illiterate or some primary	110 (61.5)	36 (50.0)	74 (69.2) <sup>‡</sup>	0.034 <sup>§</sup>
Primary or some secondary	32 (17.9)	16 (22.2)	16 (15.0)	
Secondary or some higher	29 (16.2)	14 (19.4)	15 (14.0)	
Higher	8 (4.5)	6 (8.3) <sup>‡</sup>	2 (1.9)	
Not reported	164	79	85	
Type of employment				
Employed	208 (60.6)	94 (62.3)	114 (59.4)	0.629 <sup>§</sup>
Self-employed	68 (19.8)	27 (17.9)	41 (21.4)	
Unemployed	47 (13.7)	20 (13.2)	27 (14.1)	
Special insurance	15 (4.4)	8 (5.3)	7 (3.6)	
Domestic worker	4 (1.2)	1 (0.7)	3 (1.6)	
Optional	1 (0.3)	1 (0.7)	0 (0.0)	
Income (R\$)				
Minimum wage or less	125 (36.4)	56 (37.1)	69 (35.9)	0.102 <sup>§</sup>
One to two times minimum wage	164 (47.8)	72 (47.7)	92 (47.9)	
Two to three times minimum wage	29 (8.5)	12 (7.9)	17 (8.9)	
Three to four times minimum wage	15 (4.4)	8 (5.3)	7 (3.6)	
Four to five times minimum wages	4 (1.2)	3 (2.0)	1 (0.5)	
Five to six times minimum wage	6 (1.7)	0 (0.0)	6 (3.1)	

SD = standard deviation.

\* Levene's test.

<sup>†</sup> Pearson's chi-square test.

<sup>‡</sup> Statistical significance obtained after application of a residual test.

<sup>§</sup> Likelihood ratio test. Student's *t*-test (Kolmogorov-Smirnov).

education, while 69.2% of those who required more than one benefit were illiterate or had only some primary education ( $p = 0.034$ ). Regarding occupational status, most claimants in both groups were employed (62.3 and 59.4%, respectively). An income of one to two times the national minimum wage remained most prevalent (48%),

both in individuals who received one benefit and among those awarded more than one benefit.

Follow-up study of the sample (Table 3) showed that, of the 316 benefits repeated in the 6 years following the initial period of analysis, 43% were related to mental and behavioral disorders (ICD-10 chapter F); 13%, to

**Table 2.** Duration of National Social Security Institute (INSS) sick-pay benefits granted for a depressive episode or depressive disorder in the Criciúma macro-region, state of Santa Catarina, Brazil, October 1, 2010–September 30, 2017, stratified by ICD-10 code

	Duration of benefit (days)				P-value*
	Mean $\pm$ SD	Median (IQR)	Minimum	Maximum	
F32.0	63.6 $\pm$ 36.5 <sup>†</sup>	57.0 (39.5–88.0)	6	192	0.025
F32.1	67.9 $\pm$ 70 <sup>††</sup>	47.0 (42.0–87.5)	5	213	
F32.2	71.0 $\pm$ 4.3 <sup>††§</sup>	66.0 (52.0–86.0)	5	161	
F32.3	83.0 $\pm$ 8.7 <sup>†§</sup>	79.0 (59.0–101.0)	52	142	
F33.0	69.9 $\pm$ 38.5 <sup>†§</sup>	62.5 (42.5–92.5)	5	180	
F33.1	75.5 $\pm$ 5.1 <sup>†§</sup>	64.5 (51.0–99.0)	41	137	
F33.2	78.9 $\pm$ 4.8 <sup>§</sup>	80.0 (54.0–97.0)	5	166	
F33.3	78.0 $\pm$ 9.0 <sup>††§</sup>	69.0 (53.0–95.5)	46	140	

IQR = interquartile range; ICD-10 = International Classification of Diseases, 10th edition;

SD = standard deviation; F32.0 = mild depressive episode; F32.1 = moderate depressive episode; F32.2 = severe depressive episode without psychotic symptoms;

F32.3 = severe depressive episode with psychotic symptoms; F33.0 = recurrent depressive disorder, current episode mild; F33.1 = recurrent depressive disorder, current episode moderate; F33.2 = recurrent depressive disorder, current episode severe without psychotic symptoms; F33.3 = recurrent depressive disorder, current episode severe with psychotic symptoms; Md = median.

\*Kruskal-Wallis *H*-test.

††§ Different symbols denote a statistically significant difference (Dunn's *post-hoc* test).

**Table 3.** Diseases prompting new disability benefits (October 1, 2011–September 30, 2017) to individuals who had already claimed benefits for a depressive episode or depressive disorder during the initial period of analysis

ICD-10 chapter	Benefit n (%) n = 316
F - Mental and behavioural disorders	136 (43.0)
F32.x	39 (28.7)
F33.x	54 (39.7)
Other F	43 (31.6)
M - Diseases of the musculoskeletal system and connective tissue	42 (13.0)
S - Injury, poisoning and certain other consequences of external causes	20 (6.0)
I - Diseases of the circulatory system	15 (5.0)
Other	63 (21.0)
Unknown	40 (12.0)

ICD-10 = International Classification of Diseases, 10th edition; unknown = benefits awarded by court order, with no information on illness or condition; F32.x = depressive episodes and subdivisions thereof; F33.x = recurrent depressive disorders and subdivisions thereof.

musculoskeletal and connective tissue diseases (ICD-10 M); in 12%, no disease could be identified, probably because the benefit was awarded as the result of a decision by the courts; 6% were awarded a benefit due to external causes (ICD-10 S); and 5%, due to diseases of the circulatory system (ICD-10 I). Among the 136 new benefits for mental and behavioral disorders, 93 (68.4%) were due to a depressive episode or disorder.

Analysis showed that, among individuals who were awarded two consecutive benefits ( $n = 165$ ), the median duration of the second benefit was longer than that of the first benefit ( $p < 0.001$ ). Namely, the median durations in this study were 59 days for the first benefit and 67 days for the second.

During the period of analysis, seven individuals retired from work permanently due to a depressive episode or disorder. The majority were female (71.4%), with a mean age of  $56.7 \pm 6.7$  years, illiterate or with only some primary education (85.7%) and earning minimum wage or less (71.4%).

## DISCUSSION

According to the Brazilian Ministry of Health, depression affects 17% of workers at the height of their working life (between the ages of 25 and 40) and is a major cause of incapacity for work.<sup>7</sup> In the present study, the mean age of claimants receiving their first disability benefit for depression was 42 years. This is consistent with a previous analysis of individuals granted INSS benefits due to mental health disorders, in which the predominant age group was <40 years.<sup>10</sup> On follow-up analysis, the mean age of individuals who did not receive new benefits was 40 years, while that of claimants who received additional benefits was 44 years. This difference was statistically significant, consolidating the finding previously reported in the literature that age is a risk factor for incapacity for work.<sup>14,15</sup>

In the present study, 75.8% of individuals receiving a first benefit for depression were women. An analysis of INSS benefits awarded for mental disorders in 2015 in São Paulo also reported predominance of female claimants (68.7%).<sup>10</sup> In the follow-up analysis of our sample, a similar predominance was found among individuals who

did not need further benefits (74.8%), as well as among those who received additional benefits (76.6%). A female predominance was also observed in a national analysis of absenteeism from work among the working class in the private sector, as well as in a study of public servants from the state of Santa Catarina.<sup>15</sup> These data may be explained by higher prevalence of depression and chronic diseases, which account for the majority of sick leave, among women.<sup>16</sup> Another hypothesis is the greater vulnerability of women to psychosocial, physiological and environmental factors.<sup>7,17</sup>

More than half (62%) of the claimants in the present study who received their first disability benefit for depression were illiterate or had not completed primary school. Similar results were obtained in a study carried out in different Brazilian cities, in which mental disorders were more prevalent among people with low educational attainment.<sup>18</sup> These data diverge from results found among U.S. workers with depressive disorder,<sup>11</sup> only 12.6% of whom had not finished high school. Only 36% of Brazilian workers employed in the formal sector have 11 to 14 years of schooling.<sup>14</sup> Presumably, this would be reflected in an increased risk of absenteeism due to depression among individuals with low educational level in Brazil. However, such divergences can be better explained by the lack of more frequent updates of information regarding educational level in the INSS database.

On follow-up analysis of claimants in our sample, among those who did not receive a new benefit, 8.3% had a college degree or other higher education, while 69.2% of those who required more than one benefit were illiterate or had only some primary education ( $p = 0.034$ ). A study of workers in the capital of Finland showed that those with higher education needed less time off work.<sup>19</sup> Studies show that education provides people with a greater understanding of health-related factors, leading to an early search for diagnosis and treatment when they are ill and, consequently, reducing absenteeism.<sup>17,19</sup>

Every year, more than 5 million American adults fail to seek or find employment due to mental illness.<sup>20</sup> A study carried out from 1995 to 2013 in Portugal showed that unemployment is strongly associated with depression.<sup>21</sup> Another study, carried out in 2011 in Greece, suggests that unemployment is in turn a risk factor for this disease.<sup>22</sup> These data contradict the findings of the present study,

since, at the time when disability benefits were granted for depression, most claimants were employed (60.6%) and only 13.7% were unemployed. On follow-up analysis of the subsequent 6-year period, 62.3% of those who did not receive new benefits and 59.4% of those who did were employed; in contrast, only 13.2% and 14.1% were unemployed, respectively. These discrepancies can be explained by the fact that our data were extracted from the INSS database, and thus covered only workers who were currently or had been recently active. Therefore, our findings cannot be extrapolated.

Regarding income, the majority (48%) were paid one to two times the minimum wage and 36% were paid minimum wage or less, corroborating a study carried out in Porto Alegre which included adults with depression and found a higher prevalence of this disease in low-income persons.<sup>23</sup> During the follow-up period, an income of one to two times the national minimum wage remained most prevalent (48% of individuals awarded one or more than one benefit). The odds of developing disease are higher among low-income individuals.<sup>24</sup> It bears stressing that comparison of the findings of the present study, especially in relation to these variables, must be done judiciously due to methodological differences. Some data available in the INSS database, such as educational attainment and salary range, may not reflect the current reality, as they are infrequently updated.

In a study of 396 individuals diagnosed with depressive disorder who were followed for 6 years by the U.S. National Institute of Mental Health, 34% of patients experienced recurrence,<sup>25</sup> demonstrating that the rate of recovery from depressive disorder remains low.<sup>6</sup> However, when analyzing incapacity for work, less than 25% of claimants due to depression in Germany in 2008 needed a new benefit.<sup>17</sup> In the present study, only 17% of claimants required a new benefit due to this condition. This suggests that, although complete recovery from depression is still uncommon, if properly treated, the capacity for work can be restored even before full recovery.<sup>26</sup>

A study carried out in the Netherlands found that the average duration of absence from work due to depressive symptoms was approximately 200 days.<sup>17</sup> Conversely, a study carried out among public servants with mental disorders in the Brazilian state of Tocantins found an average of 44 days of leave.<sup>27</sup> In the present study, the

average duration of the first benefit was 70 days, and the predominant ICD-10 code was F32.0 (mild depressive episode), accounting for 31.2% of cases. The INSS Decision Support Guidelines in Psychiatry for Medical Assessors state that incapacity for work should resolve within approximately 60 days, justifying the average duration of benefits found herein.<sup>26</sup> ICD-10 code F33.0 was the second most prevalent, accounting for 16.3% of cases. In these cases, as the course of the disorder progresses, patients tend to have more frequent episodes that last longer and longer, and the likelihood of recovery progressively decreases as the duration of each episode increases.<sup>26</sup>

In the present study, 56% of claimants needed more than one benefit during the period of analysis. The leading causes were mental disorders (43%), followed by musculoskeletal and connective tissue diseases (13%). Individuals with depression tend to have more chronic diseases and, consequently, need time off work more often.<sup>28</sup> Furthermore, a history of mental health conditions significantly increases the risk of relapse of depressive disorder.<sup>25</sup>

This study showed an increase in the duration of benefits ( $p < 0.001$ ), with the first having a median duration of 59 (43-88) days, while the second had a median duration of 67 (46-124) days. Another study carried out with state civil servants also identified an increase in the average duration of benefits granted. In these individuals, a depressive component may contribute to longer periods of absenteeism due to other comorbidities.<sup>28</sup>

During the present study, seven individuals retired altogether due to a depressive episode or disorder, the majority being female (71%). There was also a female predominance in a study carried out in Finland in which mental disorders, mainly depression, were the main reasons for early retirement.<sup>29</sup> In the present study, the mean age was  $56.7 \pm 6.7$  years.

According to the ICD-10 classification, patients with mild depressive episodes are able to perform most activities, and do not normally require time off work.<sup>3</sup> However, this study found a predominance of ICD-10 code F32.0 (mild depressive episode), accounting for 31.2% of benefits, followed by F33.0 (recurrent depressive disorder, current episode mild), with 16.3%. Nevertheless, the INSS Decision Support Guidelines in Psychiatry for Medical Assessors recommend that patients be evaluated for

treatment adherence and effectiveness and their particular occupation taken into account, considering the potential for risk to oneself and to others, as well as possible work-related triggers,<sup>26</sup> which could explain this finding.

In the present study, ICD-10 codes F32.3 (severe depressive episode with psychotic symptoms), F33.1 (recurrent depressive disorder, current episode moderate), and F33.2 (recurrent depressive disorder, current episode severe without psychotic symptoms) were associated with a longer duration of sick-pay benefits as compared to ICD-10 code F32.0 (mild depressive episode). A longer duration of benefits was also found in individuals with ICD-10 codes F33.2 (recurrent depressive disorder, severe current episode without psychotic symptoms) as compared to ICD-10 F32.1 (moderate depressive episode) ( $p = 0.025$ ). Therefore, the granting of disability benefits for depressive disorder must be individualized. Following the guidance given in the INSS Decision Support Guidelines, in cases of a mild to moderate depressive episode, the benefit may be granted with a duration of approximately 60 days, taking into account whether symptoms improve. Conversely, a severe episode (with or without psychotic symptoms) or recurrent depressive disorder may require prolonged or even indefinite time off work.<sup>26</sup>

## CONCLUSIONS

The profile of patients who were granted disability benefits in this study is similar to that reported in the literature in terms of age, sex, education level, salary range, and employment status. The typical profile is that of a 42-year-old woman, gainfully employed, earning one to two times the national minimum wage, with 10 or fewer years of formal schooling, who is deemed unfit for work due to a mild depressive episode (ICD-10 F32.0).

Older age was identified as a risk factor for being awarded a new disability benefit. Disability was recurrent in most benefit claimants. The conditions that most often prompted the award of a new disability benefit were mental disorders – most commonly recurrence of depression – and musculoskeletal disorders.

Notably, most of the disability benefits granted to the study sample were due to “mild” illness. That at least

partially contradicts the ICD-10 definition, which states that patients diagnosed with codes F32.0 or F33.0 “will probably be able to continue with most activities”. As expected, both qualified benefits and benefits granted due to more severe illness, as well as those granted subsequent to a first benefit, lasted longer than those granted for mild or moderate illness.

The INSS has the largest database of demographic and health information on the Brazilian working population. Nonetheless, the profile of workers’ morbidity and mortality in the country is still a relatively little explored area of research. Due to this absence of studies, we are unsure of the extent to which the sample included in the present study is similar to that of populations from other regions of the country, as well as to the Brazilian population as a whole, regarding disability benefits granted for depression.

Regarding individual factors, given the limitation of the variables available in the INSS database, we believe it could be interesting to identify particular occupations or marital statuses that may be associated with absenteeism from work as a result of depressive disorders. The tools used herein are not sufficient to assess the full impact of depression on the occupational health of all workers in the country, especially as they do not evaluate workers in the informal sector, who, despite constituting a vitally important segment for representativeness of Brazilian society, do not contribute toward Social Security and are thus not covered by INSS.<sup>30</sup> In addition, our methods are not appropriate to establish any causal relationship between work and depression. Further studies should follow claimants once they have ceased to receive benefits, aiming to evaluate their productivity and identify risk factors for recurrence.

Given the relevance of depression to occupational health, we hope that the findings of the present study will contribute to the literature and encourage new research in the field, always with the overarching goal of improving workers’ health.

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**Author contributions**

AES: project administration and supervision, study conceptualization, resources/materials, validation, writing - original draft, writing - review & editing. AG: study conceptualization, formal analysis, funding acquisition, investigation (including data collection), resources/materials, presentation, writing - original draft, writing - proofreading and editing. BFOV: study design, formal review, obtaining funding,

investigation (including data collection), resources/materials, visualization, writing - original draft, writing - review & editing. KM: data curation, methodology, software, resources/materials, validation, writing - review & editing. SGC: co-responsible for data curation and visualization. All authors have approved the final version of the manuscript and take responsibility for all aspects of the work.

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