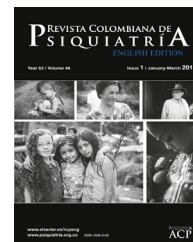




REVISTA COLOMBIANA DE PSIQUIATRÍA

www.elsevier.es/rcp



Original article

Association between daily working hours and depressive symptoms in resident physicians in Peru[☆]



Carlos Alva-Díaz^{a,b,c,g,*}, Wendy Nieto-Gutiérrez^{d,g}, Alvaro Taype-Rondan^{e,g}, Raúl Timaná-Ruiz^{f,g}, Percy Herrera-Añazco^{h,i,g}, David Jumba-Armas^{f,g}, Seimer Escobedo-Palza^{j,e}, Consejo Nacional de Residencia Médico (CONAREME)

^a Servicio de Neurología, Departamento de Medicina, Hospital Daniel Alcides Carrión, Callao, Peru

^b Universidad Científica del Sur, Facultad de Ciencias de la Salud, Lima, Peru

^c Red de Eficacia Clínica y Sanitaria, Lima, Peru

^d Facultad de Medicina Humana, Universidad de San Martín de Porres, Lima, Peru

^e Unidad de Investigación para la Generación y Síntesis de Evidencias en Salud, Universidad San Ignacio de Loyola, Lima, Peru

^f Instituto de Evaluación de Tecnologías en Salud en Investigación, EsSalud, Lima, Peru

^g CRONICAS Centro de Excelencia en Enfermedades Crónicas, Universidad Peruana Cayetano Heredia, Lima, Peru

^h Hospital Nacional Dos de Mayo, Lima, Peru

ⁱ Universidad San Ignacio de Loyola, Lima, Peru

^j Sociedad Peruana de Administración en Salud, Lima, Peru

ARTICLE INFO

Article history:

Received 19 June 2018

Accepted 8 March 2019

Available online 20 February 2021

Keywords:

Medical education

Depression

Mental health

Working day

Working conditions

ABSTRACT

Introduction: Resident physicians who work more hours a day are prone to suffer mental health problems such as depression, a subject that has been little studied. In this regard, the aim of this study was to determine the prevalence of depressive symptoms and to evaluate the association between the number of daily working hours and depressive symptoms in Peruvian residents.

Methods: Analytical cross-sectional study that used the database of the National Survey for Resident Physicians-2016, a voluntary survey issued virtually by the National Council of Medical Residency of Peru to physicians who were undertaking their residency in Peru. The presence of depressive symptoms was considered as having obtained a score ≥ 3 with the Patient Health Questionnaire-2 scale. The number of hours worked each day was collected through a direct question. To assess the association of interest, prevalence ratios (PR) and their 95% confidence intervals (95% CI) were calculated using crude and adjusted Poisson regressions with robust variance.

DOI of original article: <https://doi.org/10.1016/j.rcp.2019.03.007>.

[☆] Please cite this article as: Alva-Díaz C, Nieto-Gutiérrez W, Taype-Rondan A, Timaná-Ruiz R, Herrera-Añazco P, Jumba-Armas D, et al. Asociación entre horas laboradas diariamente y presencia de síntomas depresivos en médicos residentes de Perú. Rev Colomb Psiquiat. 2021;50:22–28.

* Corresponding author.

E-mail address: carlos.alexander.alva@gmail.com (C. Alva-Díaz).

<https://doi.org/10.1016/j.rcpeng.2019.03.011>

2530-3120/© 2019 Asociación Colombiana de Psiquiatría. Published by Elsevier España, S.L.U. All rights reserved.

Results: The responses of 953 residents (41.3% women, mean age: 32.5 years) were evaluated, 14.6% of which presented depressive symptoms. In the adjusted analysis, it was found that the prevalence of depressive symptoms increased for each additional hour worked (PR = 1.11; 95% CI, 1.04–1.17).

Conclusions: One in seven residents had depressive symptoms. For every extra daily working hour, the frequency of depressive symptoms increased by 11%.

© 2019 Asociación Colombiana de Psiquiatría. Published by Elsevier España, S.L.U. All rights reserved.

Asociación entre horas laboradas diariamente y presencia de síntomas depresivos en médicos residentes de Perú

R E S U M E N

Palabras clave:

Educación médica

Depresión

Salud mental

Jornada de trabajo

Condiciones de trabajo

Introducción: Los médicos residentes que laboran más horas diarias son propensos a sufrir problemas de salud mental como la depresión, tema que se ha estudiado poco. Por ello, el presente estudio tiene por objetivos determinar la prevalencia de los síntomas depresivos y evaluar la asociación entre el número de horas diarias laboradas y la presencia de síntomas depresivos en residentes del Perú.

Métodos: Estudio transversal analítico que usó la base de datos de la Encuesta Nacional para Médicos Residentes-2016, una encuesta voluntaria realizada virtualmente por el Consejo Nacional de Residentado Médico de Perú a médicos que realizaban su residencia en este país. Se consideró presencia de síntomas depresivos una puntuación ≥ 3 con la escala *Patient Health Questionnaire-2*. Las horas laboradas diariamente se tomaron mediante una pregunta directa. Para evaluar la asociación de interés, se calcularon razones de prevalencia (RP) y sus intervalos de confianza del 95% (IC95%) usando regresiones de Poisson brutas y ajustadas con varianza robusta.

Resultados: Se evaluaron las respuestas de 953 residentes (el 41,3% mujeres; media de edad, 32,5 años), de los que el 14,6% tenía síntomas depresivos. En el análisis ajustado, se encontró que la prevalencia de síntomas depresivos aumentaba por cada hora laborada adicional (RP = 1,11; IC95%, 1,04–1,17).

Conclusiones: Uno de cada 7 residentes presentó síntomas depresivos. Por cada hora laborada diariamente extra, la frecuencia de síntomas depresivos aumentó un 11%.

© 2019 Asociación Colombiana de Psiquiatría. Publicado por Elsevier España, S.L.U. Todos los derechos reservados.

Introduction

Due to their working and academic conditions, resident physicians may be particularly exposed to suffering mental health problems such as depression.^{1–4} In fact, a recent meta-analysis of 54 studies estimated a prevalence of depression or depressive symptoms in residents of 28.8%, although the results were highly heterogeneous.⁵ Depression in this population not only affects the lives of residents,⁶ it also has a negative impact on the quality of care they give to their patients, in addition to creating a greater risk of committing medical errors such as incorrect drug prescriptions.^{7,8}

The residency stage for a specialist physician in training often demands many dedicated hours, meaning they have a higher workload and less time available for leisure, relaxation, seeking help and even sleep. All of this could affect the mental health of resident physicians.⁹ Nevertheless, previous reviews have found mixed results in terms of the impact of reducing the number of hours worked to under 80 hours per week in the

United States (as recommended by the Accreditation Council for Graduate Medical Education [ACGME])⁸ on well-being or burnout among residents.¹⁰ Because of these mixed results, the Flexibility in Duty Hour Requirements for Surgical Training (FIRST) study¹¹ is now underway in the United States. This is a pragmatic trial that seeks to assess whether the policy change on the number of hours of service of general surgery residency programmes affects variables relating to medical education and residents' well-being.

Moreover, few studies have looked at the association between the number of hours worked and symptoms of depression. One study conducted in 13 hospitals in the United States found a positive association between the number of hours worked and depression,⁴ while three studies that evaluated residents in surgery,² internal medicine,¹² and different specialties¹³ in the United States before and after implementing the ACGME hours limit did not find a significant reduction in the presence of depressive symptoms.

Latin America is a region characterised by low incomes for healthcare personnel,¹⁴ as well as a shortage of healthcare professionals and shortages of materials in its healthcare establishments.¹⁵ This could pose an additional risk for the mental health of resident physicians, in particular those who are exposed to these working conditions for a greater number of hours per week. However, few studies have assessed the prevalence of depressive symptoms in residents in Latin America,¹⁶⁻²¹ and no studies were found that looked at the association between hours worked and the presence of depressive symptoms in this region.

This study therefore aims to determine the prevalence of depressive symptoms and assess the association between the number of hours worked and depressive symptoms in residents in Peru.

Material and methods

Study design

This is an analytical cross-sectional study. A secondary analysis was carried out of the Encuesta Nacional para Médicos Residentes 2016 [National Survey for Resident physicians 2016] (ENMERE-2016), conducted by the Comité Nacional del Residentado Médico del Perú [National Committee on the Medical Residency in Peru] (CONAREME). The methodology has been published in detail previously.²²

Study population, sample and selection criteria

The study population was made up of physicians pursuing a residency at any university in Peru during June 2016. For convenience, the sample included the residents who had taken part in the ENMERE-2016 survey. Those who did not provide information on the outcome or exposure of interest were excluded.

Background

Physicians who wish to pursue a residency in Peru must apply for a place offered by any CONAREME-accredited university. Their admission will depend on a series of scores, including that obtained in a knowledge exam. For the year 2016, seven universities in Lima and sixteen in other cities in Peru were certified to offer medical residency programmes.²³

Physicians who enrol in a residency programme choose the facility or hospital where they will work for the majority of their residency. These facilities are managed by the National Ministry of Health (MINSA), regional governments, the Ministry of Labour (Medical Social Security [EsSalud]), armed forces and police healthcare systems, or private entities.

Procedures

The survey used in ENMERE-2016 was designed by CONAREME based on consultations with medical residents, consultations with specialists and researchers in medical education, and previous studies. This survey was evaluated by focus groups of medical residents and experts in medical education, to

ensure that it would be understood by participants and that the most relevant subjects linked to the problems of the Peruvian residency were addressed.

During June 2016, this survey was made available virtually to all residents in Peru through the official CONAREME website.²³ CONAREME invited all residents in Peru to take part in the survey through emails, announcements on the official CONAREME Facebook page and in Peruvian periodicals.

The survey was voluntary. To access the survey, residents had to enter their identity document number and agree to voluntary participation. An email address was made available for survey-takers to ask any questions about the survey. The results were stored in the database on CONAREME's server.

For this analysis, permission to access the database, excluding participants' names and identity documents, was sought from CONAREME.

Outcome: depressive symptoms

The presence of depressive symptoms was assessed using the Patient Health Questionnaire-2 (PHQ-2) scale,²⁴ taking into account the modifications proposed by Calderón et al.²⁵ for the questions in Peru. This scale includes two questions that ask about depressive symptoms over the last two weeks. Presence of depressive symptoms is defined as having obtained a score on this scale ≥ 3 , which is used as a cut-off point due to its high sensitivity and specificity for the diagnosis of major depressive disorder based on previous studies.^{26,27}

Exposure: number of hours worked per day

The number of hours worked per day was collected using the open question: "In the last month, on average, how many hours a day were you required to remain at your post in a normal day, not counting on-call shifts?", which was evaluated quantitatively.

Other variables

Other variables available in the database, which were evaluated as potential confounders based on the literature consulted and the authors' opinions, were: age, sex (male or female), marital status (single or married/cohabiting), city in Peru where the university through which the residency took place is located (Lima or provincial), institution to which the hospital facility where the residency took place belongs (MINSA, EsSalud or other), year of residency (first year, second year, or third year and beyond) and specialty pursued (medical, surgical or other). The specialty was categorised as "medical" if it related to preventive, diagnostic or therapeutic activities, "surgical" if it was related to surgical procedures, and "other" which brought together responses related to diagnostic support, management and other areas not included in the above categories.

Other areas assessed were satisfaction with the teaching received during the residency (satisfied or unsatisfied), whether at any time during the residency the resident suffered violence of any type (physical violence, sexual assault, verbal abuse or threats), average number of on-call shifts in the last month, including days and nights (0 or <5, 5-10, or

>10), and time released from night on-call shifts (9:00 a.m. or earlier, 9:00 a.m. to 2:00 p.m., or later than 2:00 p.m.).

Statistical methods

The results were analysed using the STATA v.14.0 program. Mean $\pm$ standard deviation and absolute and relative frequencies were used for the descriptive results.

The evaluate the factors associated with the presence of depressive symptoms, unadjusted and adjusted Poisson regression analyses with robust variance were used to calculate prevalence ratios (PR) and their 95% confidence intervals (95% CI), with a p value <0.05 considered significant. The adjusted model included variables that obtained $p < 0.20$ in the unadjusted models.

The association of interest was also represented graphically using restricted cubic splines with five knots obtained by default, as other authors have proposed.²⁸

Ethical aspects

This secondary analysis was reviewed by the ethics committee of Hospital San Bartolomé [San Bartolomé Hospital], Lima, Peru. There were no variables that might allow the residents to be identified.

Results

General data

In June 2016, there were 7,393 physicians pursuing their residency in Peru according to the CONAREME database. Of these, 1,163 (15.7%) visited the virtual platform for the survey and answered at least the first question, but only 953 (12.9%) answered all PHQ-2 questions on working and were therefore included in this study's analysis.

Of the subjects included, the mean age was 32.5 ± 5.4 ; 394 (41.3%) were women, 367 (38.5%) were married or cohabiting, 616 (64.6%) were pursuing their residency through a university in Lima, 621 (65.2%) were doing so in a MINSA hospital, 397 (41.7%) were in their first years and 468 (49.1%) were pursuing a medical residency. In addition, 497 (52.2%) felt satisfied with the teaching at their hospital facility, 400 (47.4%) had been on 5–10 on-call shifts in the last month, 305 (37.5%) were released from on-call shifts between 9:00 a.m. and 2:00 p.m. and 394 (48.5%) after 2:00 p.m. (Table 1).

According to the PHQ-2, 139 (14.6%) presented depressive symptoms, defined by a score ≥ 3 . The mean hours worked per day were 9.9 ± 2.4 .

Hours worked per day associated with depressive symptoms

In the unadjusted model, it was found that, for each additional hours worked, the prevalence of depressive symptoms saw a significant increase (PR = 1.12; 95% CI 1.06–1.18). The same was also observed when adjusting for other co-variables (PR = 1.11; 95% CI 1.04–1.17) (Table 2). The graphical representation of this association shows that the prevalence of depressive symp-

Table 1 – Description of the population studied.

Variables	
Time worked (hours/day)	9.9 $\pm$ 2.4
[0,1–2]Age	
20–29 years	336 (35.3)
30–34 years	354 (37.2)
35–54 years	263 (27.6)
[0,1–2]Gender	
Male	559 (58.7)
Women	394 (41.3)
[0,1–2]Marital status	
Single	586 (61.5)
Married or cohabiting	367 (38.5)
[0,1–2]University	
Lima	616 (64.6)
Provincial	337 (35.4)
[0,1–2]Institution	
MINSA	621 (65.2)
EsSalud	260 (27.3)
Other	72 (7.6)
[0,1–2]Specialty	
Medical	468 (49.1)
Surgical	339 (35.6)
Other	146 (15.3)
[0,1–2]Year of residency	
First year	397 (41.7)
Second year	247 (25.9)
Third year or beyond	309 (32.4)
Satisfaction with teaching	497 (52.2)
Suffered violence	706 (74.1)
[0,1–2]Number of on-call shifts in the last month	
None or fewer than 5	368 (43.6)
5–10	400 (47.4)
More than 10	76 (9.0)
[0,1–2]Time released from on-call shift	
9:00 a.m. or earlier	114 (14.0)
Between 9:00 a.m. and 2:00 p.m.	305 (37.5)
Later than 2:00 p.m.	394 (48.5)
Values are expressed as or mean $\pm$ standard deviation or n (%).	

toms was relatively constant among those working between six and nine hours per day, but that there was a marked linear association among those working nine or more hours per day (Fig. 1).

Other associated factors

The adjusted model revealed a significant association between the presence of depressive symptoms and being in the second (PR = 1.51; 95% CI 1.07–2.14) or third year of a residency (PR = 0.59; 95% CI 0.35–1.00), feeling satisfied with the teaching at a hospital facility (PR = 0.65; 95% CI 0.47–0.91), having suffered violence during the residency (PR = 2.19; 95% CI 1.27–3.77) and being released from on-call shifts between 9:00 a.m. and 2:00 p.m. (PR = 2.12; 95% CI 1.04–4.32) (Table 2).

Table 2 – Factors associated with depressive symptoms.

	No depressive symptoms	Depressive symptoms	PR (95% CI)	PRa (95% CI)
<i>Time worked (hours/day)</i>	9.6 ± 2.1	10.4 ± 2.8	1.12 (1.06–1.18)	1.11 (1.04–1.17)
[0,1–5]				
<i>[0,1–5]Age</i>				
20–29 years	275 (81.8)	61 (18.2)	Ref	Ref
30–34 years	305 (86.2)	49 (13.8)	0.76 (0.54–1.08)	0.92 (0.64–1.32)
35–54 years	234 (89.0)	29 (11.0)	0.61 (0.40–0.92)	0.68 (0.43–1.07)
[0,1–5]				
<i>[0,1–5]Gender</i>				
Male	491 (87.8)	68 (12.2)	Ref	Ref
Women	323 (82.0)	71 (18.0)	1.48 (1.09–2.01)	1.34 (0.97–1.87)
[0,1–5]				
<i>[0,1–5]Marital status</i>				
Single	500 (85.3)	86 (14.7)	Ref	
Married or cohabiting	314 (85.6)	53 (14.4)	0.98 (0.72–1.35)	
[0,1–5]				
<i>[0,1–5]University</i>				
Lima	530 (86.0)	86 (14.0)	Ref	
Provincial	284 (84.3)	53 (15.7)	1.13 (0.82–1.54)	
[0,1–5]				
<i>[0,1–5]Institution</i>				
MINSA	517 (83.3)	104 (16.7)	Ref	Ref
EsSalud	233 (89.6)	27 (10.4)	0.62 (0.42–0.92)	0.67 (0.44–1.02)
Other	64 (88.9)	8 (11.1)	0.66 (0.34–1.31)	0.60 (0.26–1.37)
[0,1–5]				
<i>[0,1–5]Specialty</i>				
Medical	397 (84.8)	71 (15.2)	Ref	
Surgical	288 (85.0)	51 (15.0)	0.99 (0.71–1.38)	
Other	129 (88.4)	17 (11.6)	0.77 (0.47–1.26)	
[0,1–5]				
<i>[0,1–5]Year of residency</i>				
First year	336 (84.6)	61 (15.4)	Ref	Ref
Second year	191 (77.3)	56 (22.7)	1.48 (1.06–2.04)	1.51 (1.07–2.14)
Third year or beyond	287 (92.9)	22 (7.1)	0.46 (0.29–0.74)	0.59 (0.35–1.00)
[0,1–5]				
<i>[0,1–5]Satisfaction with teaching</i>				
No	370 (81.1)	86 (18.9)	Ref	Ref
Yes	444 (89.3)	53 (10.7)	0.57 (0.41–0.78)	0.65 (0.47–0.91)
[0,1–5]				
<i>[0,1–5]Violence</i>				
No	229 (92.7)	18 (7.3)	Ref	Ref
Yes	585 (82.9)	121 (17.1)	2.35 (1.46–3.78)	2.19 (1.27–3.77)
[0,1–5]				
<i>[0,1–5]Number of on-call shifts in the last month</i>				
None or fewer than 5	322 (87.5)	46 (12.5)	Ref	
5–10	333 (83.3)	67 (16.8)	1.34 (0.95–1.90)	
More than 10	66 (86.8)	10 (13.2)	1.05 (0.56–1.99)	
[0,1–5]				
<i>[0,1–5]Time released from on-call shift</i>				
9:00 a.m. or earlier	106 (93.0)	8 (7.0)	Ref	Ref
Between 9:00 a.m. and 2:00 p.m.	257 (84.3)	48 (15.7)	2.24 (1.09–4.60)	2.12 (1.04–4.32)
Later than 2:00 p.m.	330 (83.8)	64 (16.2)	2.31 (1.14–4.69)	1.95 (0.97–3.93)

95% CI: 95% confidence interval; PR: prevalence ratio.

Values are expressed as or mean ± standard deviation or n (%).

Discussion

Prevalence of depressive symptoms

Some 14.6% of the residents evaluated presented depressive symptoms, defined as a PHQ-2 ≥ 3 points. Only one previous study was found that used this instrument in resident physicians with a cut-off point of ≥ 3, which reported a 15.1%

prevalence of PHQ-2 ≥ 3 in residents at New York University (United States),²⁹ a similar figure to this study.

These results are also comparable to those of other studies conducted in resident physicians with different instruments; indeed, a systematic review of 54 studies found a mean prevalence of 28.8%, although estimates varied between 22.4% and 43.7%.⁵ In Peru, a previous study in 84 residents at Hospital Nacional Cayetano Heredia [Cayetano Heredia National Hospital] using the Center for Epidemiological Studies Depression

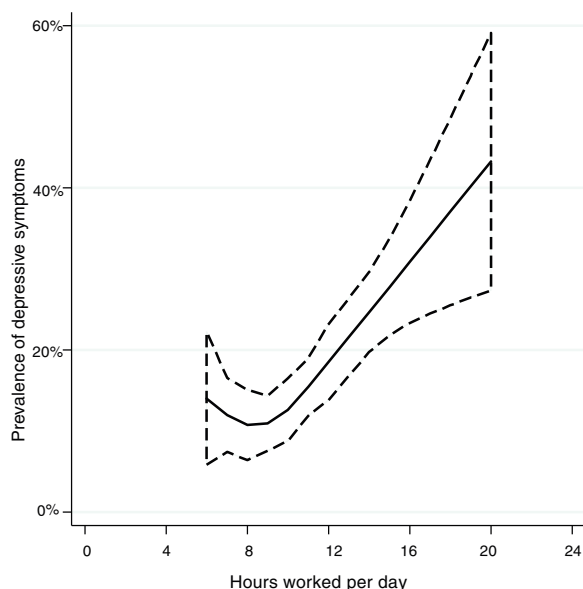


Figure 1 – Restricted cubic splines: hours worked per day and prevalence of depressive symptoms.

Scale found a prevalence of 38.6%.³⁰ Another study conducted in 39 resident physicians at Hospital Daniel Alcides Carrión [Daniel Alcides Carrión Hospital] and using the Hamilton Depression Rating Scale reported a prevalence of 13.3%.³¹ Unfortunately, the lack of uniformity in the instruments used means that an adequate comparison between these results and ours is not possible.

Association between hours worked and depressive symptoms

Our study found an almost linear association between hours worked and the prevalence of depressive symptoms. Although one previous study had also found this association in residents at 13 hospitals in the United States,⁴ various studies that followed residents before and after the implementation of the ACGME hours limit in the United States did not find a significant reduction in the presence of depressive symptoms.^{2,12,13} This could be because the ACGME provisions only achieved a small reduction in working hours of between 0.4 and 3 h per day in the studies analysed.

The association between hours worked and depressive symptoms found in this study highlights the importance of regulating working hours for resident physicians. In this respect, Peruvian legislation up to 2016 established that a resident's workload should not exceed 70 h per week excluding on-call shifts.³² Nevertheless, new regulations published in 2017 reduce this time to 60 h excluding on-call shifts (approximately 8.6 h per day).³³ In spite of this, 68.2% of the population evaluated in this study indicated working 9 h per day or more. There is therefore a need to regularly assess compliance with current legislation for the medical residency programme in Peru, which could be achieved through oversight of facilities where residents work and anonymous surveys.

On the other hand, it is important to implement strategies for the early detection and treatment of cases of depression during the medical residency, such as periodic risk assessments and preventive and therapeutic programmes for resident physicians.³⁴

Other factors found to be associated

Those in the second and third years of their residency presented a higher prevalence of depressive symptoms than first-year residents. This may be explained by a cumulative phenomenon or physical and mental exhaustion.

Dissatisfaction with teaching was associated with the presence of depressive symptoms, possibly because unsatisfactory teaching can cause feelings of pessimism and irritability, or because depression causes problems with academic development, which in turn would cause the teaching to be perceived as unsatisfactory.³⁵ Likewise, suffering violence was associated with presenting depressive symptoms, similarly to descriptions in previous studies.^{36–38}

Limitations and strengths

The study has the following limitations: a) the variable of hours worked per day was self-reported by participants, therefore it is possible that some might have exaggerated the number of hours in the hope that CONAREME might take actions against their hospital facility or reported a lower figure, fearing that actions might be taken against them; b) because the survey was voluntary, it is possible that the response rate might have been lower among those working more hours (as they have less free time) and among those with depressive symptoms (as they may have difficulty performing extracurricular activities like answering surveys), so our sample may under-represent the number of hours worked and the presence of depressive symptoms, and c) the residents who responded to the surveys and were ultimately included differed from those who did not respond, so that residents in surgical specialties, second-year residents and those pursuing residencies in public universities outside of Lima were found to be under-represented, and caution should be exercised with regard to external validity of our results in these groups, as is mentioned in the study report.²²

Nevertheless, this study was able to obtain information from a considerable number of residents, and is one of the few studies in the world to have evaluated the association between hours worked and depressive symptoms in resident physicians.

Conclusions

A non-random sample of Peruvian resident physicians was evaluated, finding that 14.6% of the residents surveyed had depressive symptoms. This was directly related to the number of hours worked per day, such that for each additional hour of work per day, the frequency of depressive symptoms increased by 7%.

Conflicts of interest

The authors have no conflicts of interest to declare.

REFERENCES

- Buddeberg-Fischer B, Klaghofer R, Buddeberg C. Stress at work and well-being in junior residents. *Z Psychosom Med Psychother.* 2005;51:163-78.
- Yousuf A, Ishaque S, Qidwai W. Depression and its associated risk factors in medical and surgical post graduate trainees at a teaching hospital: a cross sectional survey from a developing country. *JPMA.* 2011;61:968-73.
- Schneider SE, Phillips WM. Depression and anxiety in medical, surgical, and pediatric interns. *Psychol Rep.* 1993;72 3 Pt 2:1145-6.
- Sen S, Kranzler HR, Krystal JH, et al. A prospective cohort study investigating factors associated with depression during medical internship. *Arch Gen Psychiatry.* 2010;67:557-65.
- Mata DA, Ramos MA, Bansal N, et al. Prevalence of depression and depressive symptoms among resident physicians: a systematic review and meta-analysis. *JAMA.* 2015;314:2373-83.
- Vázquez-Ramírez LA, González-Pedraza Avilés A. Ansiedad, depresión y calidad de vida en un grupo de médicos residentes de la ciudad de México. *Aten Fam.* 2014;21:109-12.
- Fahrenkopf AM, Sectish TC, Barger LK, et al. Rates of medication errors among depressed and burnt out residents: prospective cohort study. *BMJ.* 2008;336:488-91.
- Accreditation Council for Graduate Medical Education. The ACGME 2011 Duty Hour Standard. Chicago: ACGME Task Force on Quality Care and Professionalism; 2011.
- Weiss P, Kryger M, Knauer M. Impact of extended duty hours on medical trainees. *Sleep Health.* 2016;2:309-15.
- Stamp T, Termuhlen P, Miller S, et al. Before and after resident work hour limitations: an objective assessment of the well-being of surgical residents. *Curr Surg.* 2005;62:117-21.
- Bilimoria KY, Chung JW, Hedges LV, et al. Development of the Flexibility in Duty Hour Requirements for Surgical Trainees (FIRST) Trial Protocol: a national cluster-randomized trial of resident duty hour policies. *JAMA Surg.* 2016;151:273-81.
- Sen S, Kranzler HR, Didwania AK, et al. Effects of the 2011 duty hour reforms on interns and their patients: a prospective longitudinal cohort study. *JAMA Intern Med.* 2013;173:657-63.
- Bolster L, Rourke L. The effect of restricting residents' duty hours on patient safety, resident well-being, and resident education: an updated systematic review. *J Grad Med Educ.* 2015;7:349-63.
- Taype-Rondán Á, Luna-Porta L, Mendoza Quispe O. El ingreso económico como incentivo para la migración médica: explorando los números. *Salud Pública México.* 2016;58:337-8.
- Organización Panamericana de la Salud. Redes integradas de servicios de salud: El desafío de los hospitales. Santiago de Chile: OPS; 2011.
- Waldman SV, Diez JC, Arazi HC, Linetzky B, Guinjoan S, Grancelli H. Burnout, perceived stress, and depression among cardiology residents in Argentina. *Acad Psychiatry.* 2009;33:296-301.
- Pereira-Lima K, Loureiro SR. Burnout, anxiety, depression, and social skills in medical residents. *Psychol Health Med.* 2015;20:353-62.
- Pérez Cruz E. Burnout syndrome as a risk factor of depression in medical residents. *Med Interna México.* 2006;22:282-6.
- Sánchez M, Islas C, Escobar I, Rico L. Symptoms of anxiety and depression in resident physicians at high risk of stress. *Psiquiatr Biol.* 2008;15:147-52.
- Lima KP, Loureiro SR. Asociaciones y comparaciones entre burnout, ansiedad, depresión y habilidades sociales de residentes médicos de diferentes áreas. Sao Paulo: Universidade de Sao Paulo; 2014.
- Cubero DI, Fumis RR, de Sa TH, et al. Burnout in medical oncology fellows: a prospective multicenter cohort study in Brazilian institutions. *J Cancer Educ.* 2016;31:582-7.
- Escobedo-Palza S, Nieto-Gutierrez W, Taype-Rondán A, Timaná-Ruiz R, Alva-Díaz C, Jumpa-Armas D. Características del residentado médico en el Perú: resultados de la primera Encuesta Nacional de Médicos Residentes (ENMERE-2016). *Acta Médica Peruana.* 2017;34:273-82.
- Comité Nacional de Residentado Médico [Internet]. Perú: CONAREME; 2016. Available from: <http://www.conareme.org.pe/web/>. Accessed 25 March 2019.
- Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care.* 2003;41:1284-92.
- Calderón M, Gálvez-Buccollini JA, Cueva G, Ordoñez C, Bromley C, Fiestas F. Validación de la versión peruana del PHQ-9 para el diagnóstico de depresión. *Rev Peru Med Exp Salud Pública.* 2012;29:578-9.
- Arroll B, Goodyear-Smith F, Crengle S, et al. Validation of PHQ-2 and PHQ-9 to screen for major depression in the primary care population. *Ann Fam Med.* 2010;8:348-53.
- Shin J-H, Kim H-C, Jung C-H, et al. The standardization of the Korean version of the Patient Health Questionnaire-2. *J Korea Neuropsychiatr Assoc.* 2013;52:115-21.
- Durrleman S, Simon R. Flexible regression models with cubic splines. *Stat Med.* 1989;8:551-61.
- Mousa OY, Dhamoon MS, Lander S, Dhamoon AS. The MD Blues: under-recognized depression and anxiety in medical trainees. *PLoS One.* 2016;11:e0156554.
- Mariños A, Otero M, Málaga G, Tomateo J. Coexistencia de síndrome de Burnout y síntomas depresivos en médicos residentes: Estudio descriptivo transversal en un hospital nacional de Lima. *Rev Med Herediana.* 2011;22:159-60.
- Villavicencio Castro J. Asociación entre la depresión y el síndrome de Burnout en médicos residentes e internos de medicina en el Hospital Nacional Daniel Alcides Carrión en el año 2015. Lima: Universidad Nacional Mayor de San Marcos; 2016.
- Comité Nacional de Residentado Médico. Reglamento del Sistema Nacional de Residentado Médico: Resolución Suprema N° 002-2006-SA. Lima: CONAREME; 2006.
- El Peruano [Internet]. Perú: SINAREME; 2017 Decreto Supremo que aprueba el Reglamento de la Ley N° 30453, Ley del Sistema Nacional de Residentado Médico (SINAREME). Available from: <https://busquedas.elperuano.pe/normaslegales/decreto-supremo-que-aprueba-el-reglamento-de-la-ley-n-30453-decreto-supremo-n-007-2017-sa-1492036-2/>. Accessed 25 March 2019.
- Bright RP, Krahn L. Depression and suicide among physicians. *Curr Psychiatry.* 2011;10:16.
- National Institute of Mental Health. La depresión: Lo que usted debe saber. Bethesda: NIMH; 2015.
- Resnick HS, Acierio R, Kilpatrick DG. Health impact of interpersonal violence. 2: Medical and mental health outcomes. *Behav Med.* 1997;23:65-78.
- Mullen PE, Romans-Clarkson SE, Walton VA, Herbison GP. Impact of sexual and physical abuse on women's mental health. *Lancet.* 1988;1:841-5.
- Taype-Rondán Á, Lizarraga-Castañeda Z, Mayor-Vega A, Mariños-Claudet A. Percepción de violencia durante el internado de medicina en una universidad peruana. *Rev Peru Med Exp Salud Pública.* 2016;33:382-4.