





# Effects of the Mental Health Law on Peruvian Primary Care Physicians: A Cross-Sectional Study on Knowledge of Major Depressive Disorder

Health Services Insights  
Volume 17: 1–7  
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DOI: 10.1177/11786329241297913



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## ABSTRACT

**OBJECTIVE:** The objective was to evaluate the level of knowledge of primary care physicians in Lambayeque, Peru, regarding the diagnosis and treatment of Major Depressive Disorder.

**METHODS:** A cross-sectional analytical study was conducted among 106 primary care physicians in Lambayeque, Peru. Data were collected using a validated questionnaire assessing Major Depressive Disorder diagnosis and treatment knowledge. Physicians' knowledge levels were categorized as inadequate, adequate, or excellent. Poisson regression models were employed to identify factors associated with adequate knowledge.

**RESULTS:** The response rate was 81.21%. Only 36.79% of physicians demonstrated adequate knowledge, with none achieving excellent knowledge. The median score was 6 (IQR: 5–7). Mental health training, which may reflect the new law's implementation, was significantly associated with higher knowledge levels (PR: 2.42, 95% CI: 1.02 to 5.10). Other factors were not significantly associated with knowledge levels.

**CONCLUSIONS:** The proportion of primary care physicians with adequate Major Depressive Disorder knowledge has doubled since 2014, indicating a positive effect of the mental health law. However, to increase this number, continuous professional development programs are needed.

**KEYWORDS:** Major depressive disorder, medical education, primary care, knowledge, needs assessment

**RECEIVED:** August 4, 2024. **ACCEPTED:** October 20, 2024.

**TYPE:** Original Research

**FUNDING:** The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was self-funded.

**DECLARATION OF CONFLICTING INTERESTS:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Introduction

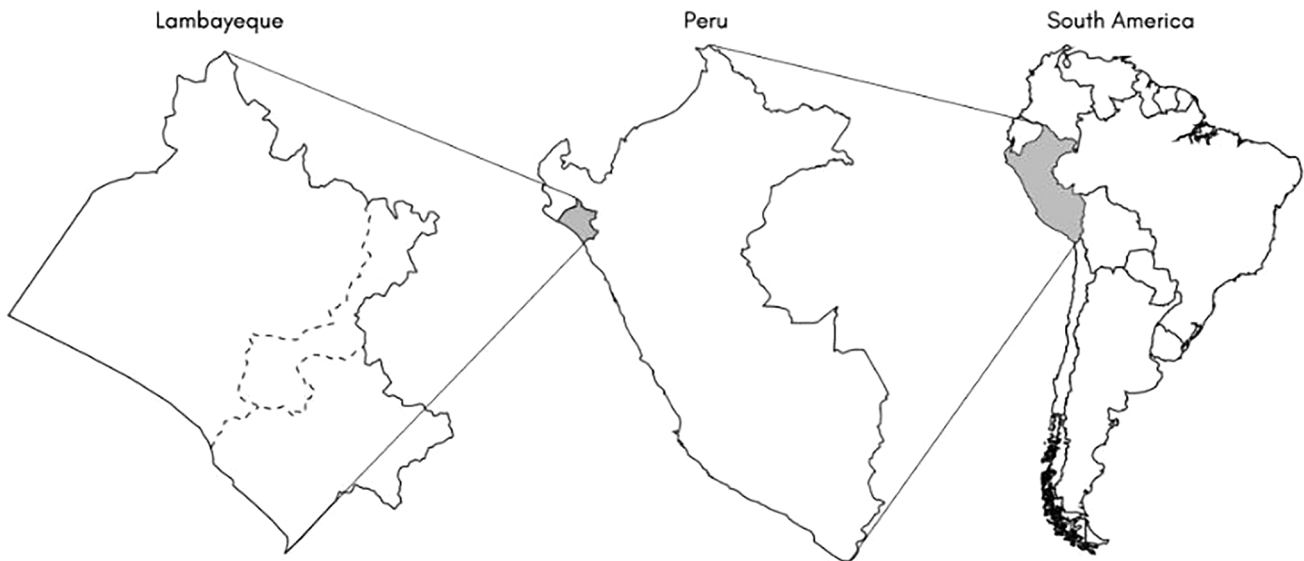
Major Depressive Disorder (MDD) represents a global challenge. Characterized by debilitating symptoms such as anhedonia, cognitive impairment, and suicidal ideation, MDD substantially impairs individuals' quality of life and psychosocial functioning.<sup>1</sup> It not only affects approximately 10% of the world's population<sup>1,2</sup> but accounts for nearly 2% of disability-adjusted life years, diminishes quality of life, and imposes

significant costs on patients and their caregivers.<sup>2,3</sup> Hence, accurate diagnosis and treatment are paramount in improving the lives of those afflicted with MDD.

Despite its substantial impact worldwide, MDD remains underdiagnosed, particularly in developing countries.<sup>4</sup> This diagnostic deficit leads to suboptimal treatment, resulting in reduced quality of life, increased years of life lost, and elevated mortality rates.<sup>5</sup> While multiple factors contribute to



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**Figure 1.** Geographical location of the Lambayeque region on the northern coast of Peru.

inadequate diagnosis and treatment, the major cause appears to be a lack of qualified mental health professionals.

Research indicates that general practitioners (GPs) often lack the necessary competencies to recognize, diagnose, or treat mental illnesses such as MDD effectively.<sup>6</sup> This competency gap, alongside other factors, has catalyzed the development of mental health policies worldwide, underscoring the importance of comprehensive mental health training.<sup>7</sup> However, while developed countries have made strides in this direction, only one-third of countries in regions like South America have established mental health policies.<sup>8</sup>

Peru, a nation of approximately 34 million inhabitants with a 6% prevalence of depression symptoms,<sup>9</sup> stands out as one of the South American countries that has implemented a mental health policy. Since 2012, Peru has undergone significant changes in its mental health policies,<sup>10</sup> culminating in the approval of Law N° 30947 in 2019, which mandated mental health training for healthcare professionals.<sup>11</sup> While this represents an advancement in Peruvian healthcare, there is an absence of studies reporting the effects of this law.

Before the deployment of this law, a 2014 study revealed that merely 20% of GPs possessed adequate knowledge regarding the diagnosis and treatment of MDD.<sup>12</sup> This pre-policy baseline, coupled with the considerable burden of MDD in Peru, presents a unique opportunity to gather indirect evidence on the impact of mental health policy on human resource competencies, a gap that has not been studied previously in the literature.

In light of these major gaps, this study aims to evaluate the current knowledge level of primary care physicians in Lambayeque, Peru, regarding the diagnosis and treatment of MDD. Furthermore, it seeks to identify factors associated with this knowledge and compare the proportion of physicians demonstrating adequate knowledge to the benchmark established in

the 2014 study. This research contributes to understanding MDD management in Peru and provides valuable insights into the effectiveness of mental health policy implementation in developing countries.

## Methods

### *Study design and setting*

A cross-sectional analytical study was conducted in the Lambayeque region of Peru, located in the northwestern part of the country (Figure 1). According to the Demographic and Family Health Survey 2023, Lambayeque has a population of approximately 1,350,663, accounting for 4.09% of the total Peruvian population. The population comprises 51.23% males, with 60.25% of the population aged between 15 and 60 years old and 12.55% over 60 years old.<sup>13</sup> The age-standardized prevalence of depressive symptoms in Lambayeque is 0.40%, which is lower than the national prevalence of 2.3% reported in Peru in 2018.<sup>9</sup>

This study was conducted and reported in accordance with the guidelines of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.<sup>14</sup>

### *Population and sampling*

The study population consisted of physicians from 36 primary healthcare facilities in Lambayeque, selected through a census that prioritized those with a community mental health center in their jurisdiction (Appendix 1).<sup>15</sup> To be eligible for this study, physicians had to be working at the selected facilities, be general practitioners or family doctors, and consent to participate. Physicians who did not agree to participate or those with missing data were excluded.

While we initially aimed to survey all 149 general primary care physicians in the jurisdiction as a census approach, we also

calculated the minimum required sample size using OpenEpi software to adhere to best practices.<sup>16</sup> This calculation determined that we needed at least 94 responses to accurately estimate the prevalence of GPs with adequate knowledge, assuming a prevalence of 20% with a 5% margin of error.<sup>12</sup> We added a 10% buffer to account for potential non-responses, bringing our target sample size to 103 GPs.

### Procedures

Physicians were enrolled in the study following ethical approval and necessary permissions from health center authorities. Data were collected by the authors, who received a 90-minute virtual training session followed by an in-person practical session by the principal investigator. This training covered questionnaire administration, participant interaction techniques for clarifying doubts, and the process for obtaining informed consent.

Data collection occurred in person at selected clinics during November and December 2023, during times of lower patient activity to facilitate physician availability. The estimated time to complete the survey was 10 to 15 minutes.

Collected data were entered into an Excel database using a double-entry protocol to ensure accuracy. This process included cross-verification of the data by two team members, allowing for the correction of discrepancies and ensuring data integrity for subsequent analysis.

### Instruments and variables

The first page of the printed survey provided to participants included the informed consent request detailing the research and their contribution by completing the survey.

The subsequent validated questionnaire, developed by Rios-Flores et al.,<sup>17</sup> was used to assess primary care physicians' knowledge of major depression (Supplementary Material). This is the same instrument used in the 2014 study by Leonardo-Olivera et al.,<sup>12</sup> allowing for direct comparison between the two studies. The dependent variable was the level of knowledge about major depression among primary care physicians. This instrument consists of 14 multiple-choice questions, with one best answer, seven focused on diagnosis and seven on management. The total questionnaire score ranges from 0 to 14, with MDD knowledge classified into three categories based on the scores: inadequate (less than 6 points), adequate (7-10 points), and excellent (11-14 points). The reliability of each item of this questionnaire has been reported to be superior to 0.5, and the difficulty index ranges from 0.15 to 0.85, which makes this questionnaire valid for its use.<sup>17</sup>

Other measured variables included gender (male or female), type of medical school (private or public), level of training (family physician or general practitioner), years of practice (junior or senior physician, divided by having <10 and

>10 years of practice), and mental health training (whether they received any mental health training after graduation, considered as a dichotomous variable, yes or no).

### Data analysis

Descriptive and inferential statistics were applied to analyze the data. Absolute numbers and frequencies represented categorical variables, while numerical variables were evaluated using central tendency or dispersion measures based on their distribution. The Mann-Whitney *U* test was used to identify differences in MDD knowledge scores between subgroups for inferential analysis. Additionally, crude and adjusted Poisson regression models were constructed with MDD knowledge scores as the outcome. For the adjusted model, potential confounding factors were identified by analyzing causal diagrams. For this, the score was transformed into inadequate and adequate knowledge, taking a cut-off score of 7. Lastly, a bootstrap of 25,000 samples was performed based on the pass rate to assess the robustness of our findings. All data analyses were conducted in Rstudio version 4.1.2 (R Foundation for Statistical Computing, Vienna, Austria).

## Results

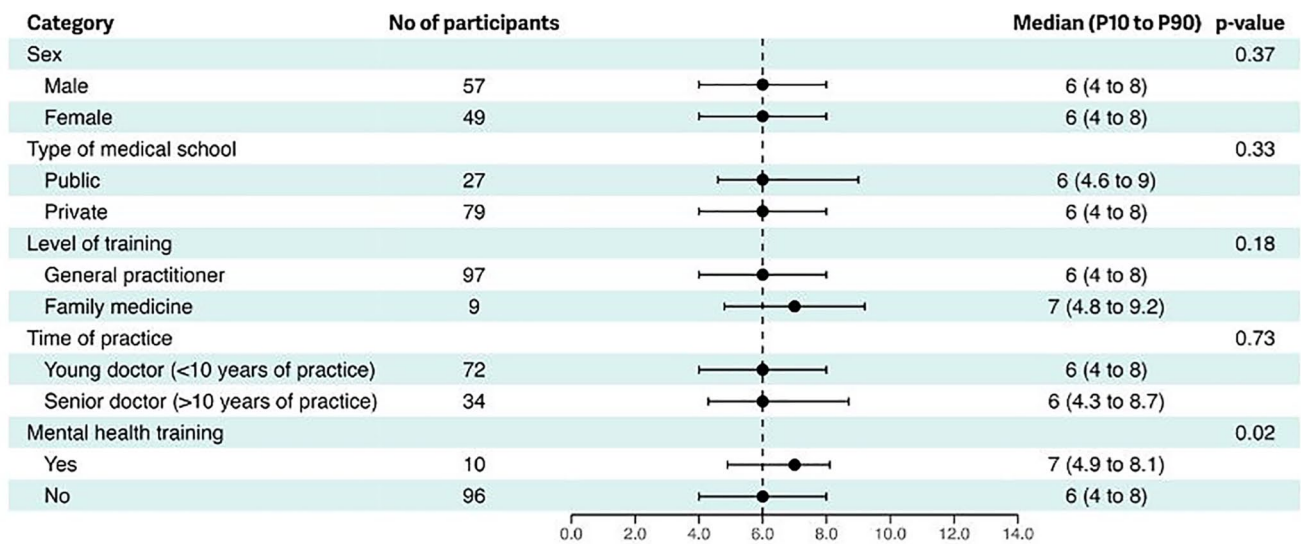
### General findings

The survey had a response rate of 81.21%, with 121 out of 149 invited physicians participating. Due to missing data, only 106 physicians were included in the analysis. The average age was 36.99 years (Standard Deviation [SD]: 8.87), ranging from 23 to 68 years. Approximately 53.77% of the participants were male. Regarding academic background, 74.53% graduated from private medical schools, 91.51% were general practitioners, 7.92% were junior doctors, and 9.43% reported receiving mental health training after graduation.

Regarding knowledge about major depression, approximately four out of ten physicians (36.79%) had adequate knowledge, with a median sample score of 6 (Interquartile Range [IQR]: 5-7). No physician achieved a score classified as excellent knowledge. When evaluated by subgroups, only the group with mental health training showed significant differences in their scores. No differences were found in other subgroups regarding gender, type of medical school, level of training, or years of practice (Figure 2).

### Associated factors with adequate knowledge

In the multivariate analysis, the only factor associated with adequate knowledge was having received mental health training, with a small to moderate effect size (PR: 2.42, 95% CI: 1.02 to 5.10). Other factors were not significantly associated, as shown in Table 1.



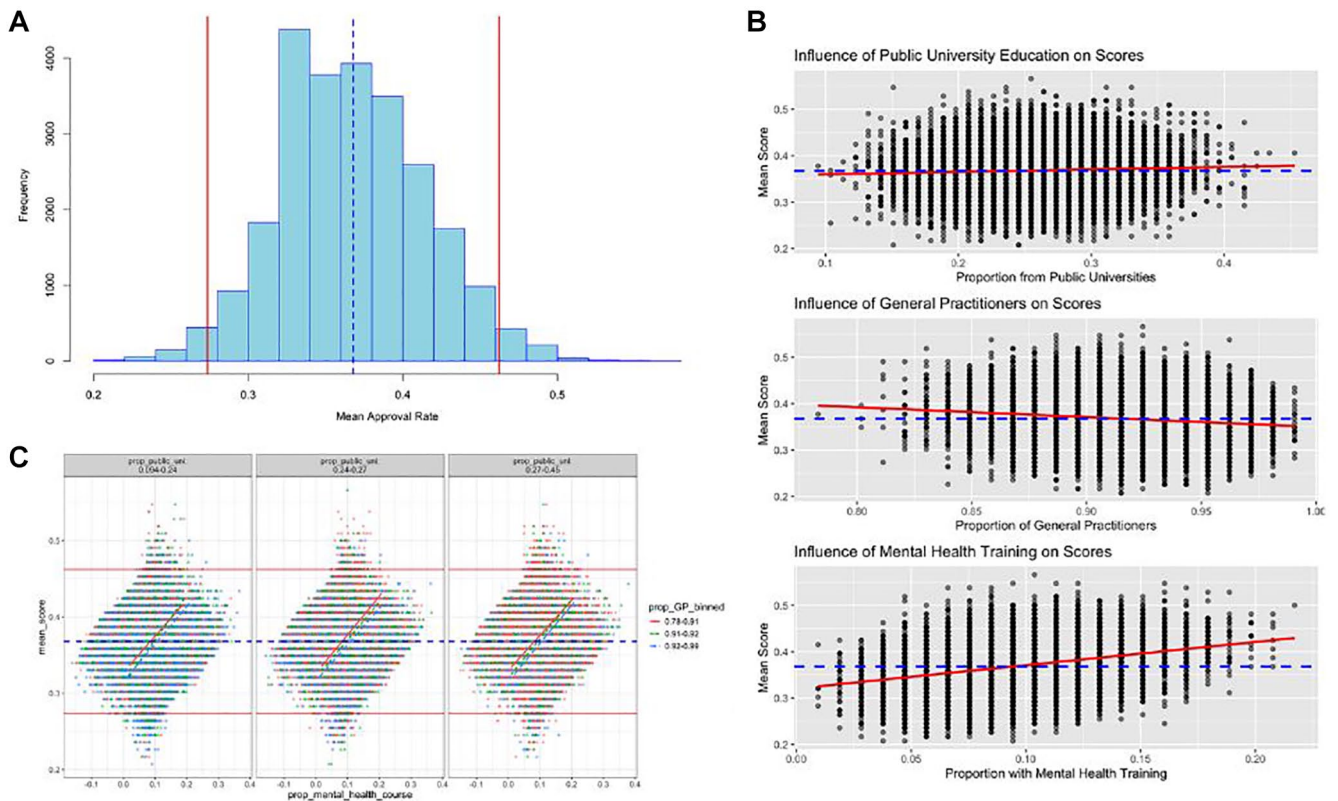
**Figure 2.** Scores across different subgroups ( $n=106$ ).  
Abbreviations: P10, 10th percentile; P90, 90th percentile.  
 $P$ -value for  $U$ -Mann–Whitney test.

**Table 1.** Associated factors with adequate knowledge of major depression ( $n=106$ ).

CHARACTERISTICS	NO OF PARTICIPANTS WITH ADEQUATE KNOWLEDGE/ ALL PARTICIPANTS OF THE SUBGROUP (%)	CRUDE PR (95% CI)	ADJUSTED APR (95% CI) <sup>A</sup>
Overall	39/106 (36.79)	—	—
Sex			
Female	14/49 (28.57)	Ref	Ref
Male	25/57 (43.86)	1.54 (0.81 to 3.03)	1.47 (0.76 to 2.95)
Type of medical school			
Private	28/79 (35.44)	Ref	Ref
Public	11/27 (40.74)	1.15 (0.55 to 2.45)	1.01 (0.45 to 2.06)
Level of training			
Family doctor	5/9 (55.56)	Ref	Ref
General practitioner	34/97 (35.05)	0.63 (0.27 to 1.84)	0.57 (0.18 to 1.95)
Time of practice			
Senior doctor	14/34 (41.18)	Ref	Ref
Young doctor	25/72 (34.72)	0.84 (0.44 to 1.67)	1.20 (0.56 to 2.80)
Mental health training			
No	31/96 (32.29)	Ref	Ref
Yes	8/10 (80.00)	<b>2.48 (1.06 to 5.13)</b>	<b>2.42 (1.02 to 5.10)</b>

Abbreviations: PR, prevalence ratio; CI, confidence interval; Ref, reference. Highlighted values are considered as statistically significant ( $P < 0.05$ ).

<sup>A</sup>Adjusted for sex, type of medical school, level of training, time of practice and mental health training.



**Figure 3.** Bootstrapping of 25,000 samples to evaluate factors influencing Physician's Knowledge of MDD. For Figures a and c, the red lines represent the 95% confidence interval, while the blue dashed line represents the proportion of physicians with adequate knowledge in the original sample. For Figure b, the blue dashed line represents the proportion of physicians with adequate knowledge in the original sample, and the red line represents the regression line.

*Robustness of findings*

Figure 3 illustrates the results of bootstrapping with 25,000 samples. Figure 3a shows that for these samples, the mean proportion of physicians with adequate knowledge of MDD is 36.80% (95% CI: 27.35% to 46.22%), consistent with our initial findings. Interestingly, out of the 25,000 samples, only 89 (0.36%) had a ratio of physicians with adequate knowledge equal to or greater than 50%.

We conducted additional analyses to investigate this subgroup further, as shown in Figures 3b and c. The subgroup analysis (3b) and adjusted analysis (3c) revealed that as the proportion of physicians with mental health training increased, the proportion of physicians with adequate knowledge of MDD also increased. Conversely, a decrease in the proportion of general practitioners was associated with a higher proportion of physicians with adequate MDD knowledge.

Therefore, in the scenarios where 1 out of 2 physicians had adequate knowledge of MDD, the proportion of physicians with mental health training and those who were family medicine doctors was the highest.

**Discussion**

*Summary of findings*

This study assessed the level of knowledge regarding the diagnosis and treatment of MDD among 106 primary care

physicians in Lambayeque and explored the associated factors. Our main findings were as follows: (1) None of the physicians had an excellent level of knowledge about MDD; (2) 4 in 10 (36.79%) physicians showed adequate knowledge of MDD, which represents an increment of 100% when compared to the 2014 Study, and (3) To make sure that at least half of the physicians have adequate knowledge of MDD, it is essential to prioritize mental health and specialized training for physicians.

*Interpretation of findings*

Our study revealed that approximately 37% of Peruvian primary care physicians demonstrated adequate knowledge of MDD, an increase from the 20% reported by Leonardo-Olivera et al.<sup>12</sup> This improvement likely reflects the initiatives undertaken by the Peruvian Ministry of Health, notably the implementation of the Mental Health Law No. 30947 in 2019,<sup>11</sup> which mandates mental health training in undergraduate curricula and emphasizes enhancing mental health competencies among healthcare professionals. Additionally, efforts by previous researchers to assess mental health training and implement interventions may have contributed to this positive change.<sup>18,19</sup>

Despite advancements, the proportion of Peruvian physicians with adequate knowledge remains low, which is consistent with findings from other Latin American countries. In Chile, a study by Acuña et al.<sup>20</sup> revealed that primary care physicians scored below 50% on tests assessing theoretical

knowledge and clinical skills for diagnosing and treating depression. Similarly, in Colombia, an evaluation of primary care physicians demonstrated limited knowledge of depressive disorders, with an average score of 26.3 out of 50, reflecting significant gaps in key areas such as diagnosis and treatment.<sup>21</sup> In contrast, studies from countries outside of Latin America report that at least 50% of primary care physicians have adequate knowledge of MDD, indicating better preparation in these regions.<sup>22-24</sup> This indicates that while Peru has made strides, there is still a gap compared to global standards.

It is noteworthy that the reported prevalence of MDD in Lambayeque is 0.40%,<sup>9</sup> significantly lower than the global estimate of approximately 10%.<sup>1,2</sup> This low reported prevalence may be partly due to underdiagnosis, potentially stemming from insufficient knowledge and awareness of MDD among primary care physicians. Underdiagnosis leads to fewer identified cases, resulting in less clinical exposure and reduced emphasis on MDD during medical training and practice. While our study focuses on assessing knowledge levels rather than prevalence, acknowledging the potential for underdiagnosis is important for understanding the challenges in improving mental health education and the overall management of MDD in the region.

To bridge this gap and achieve a ratio where at least half of physicians have adequate knowledge of MDD, our findings suggest a need to increase mental health training and specialization beyond general practice. This aligns with international research demonstrating that targeted mental health education significantly enhances physicians' competencies.<sup>22</sup> However, specialization requires substantial time and resources, typically involving two to three years of additional training, which may not be feasible for all practitioners.

Therefore, implementing structured and standardized national curricula on MDD could be a more practical and cost-effective approach. Previous successful experiences in rural settings using synchronous (live training sessions) and asynchronous (online modules, recorded lectures) educational materials have shown promise in improving physician knowledge and skills.<sup>25,26</sup> These methods allow for flexible learning opportunities and can be scaled to reach a wider audience of healthcare providers.

### *Implications and future research*

This study has some implications. The most proximal is employing bootstrapping techniques to identify the ideal scenario for Peruvian primary care. This approach can be refined to determine the profile of healthcare workers needed, evaluate the findings' robustness, and be used for further needs assessment studies like this one. Distal implications fall under the realm of Peruvian medical education. The absence of physicians with adequate knowledge and solely 4 in 10 with adequate knowledge represents a call to enhance mental health

training. While there is no evidence of the structure of mental health programs, if we extrapolate findings from other studies, it is possible that the contents are not standardized across them.<sup>27</sup> Moreover, in the absence of a national curriculum of a competency framework for mental health training, the need to standardize training is a major need.

Similarly, some avenues for future research need to be explored. First, previous studies in the Peruvian and worldwide have only evaluated knowledge. While this is important, performance evaluation is needed through objective structured clinical examination or workplace-based assessment. This is due to previous research that found that knowledge correlates little with behavior.<sup>28</sup> Second, there is no synthesis nor cross-national study on the knowledge of MDD worldwide, which represents a significant gap. Third, compared with other studies, all used different items, hindering the comparison. Hence, it also points out the need for a global questionnaire to standardize this assessment. Lastly, we encourage researchers to evaluate periodically the state of depression knowledge in Peruvian primary care workers to provide a portrayal of advanced education in this field.

### *Limitations and strengths*

While this study has several strengths, it is not without limitations. The sample was limited to one region, so the results may not represent the entire country. Additionally, the cross-sectional design of the study prevents establishing causal relationships. Lastly, the exclusive focus on primary care physicians might not reflect the knowledge of other health professionals. Nevertheless, these findings provide an important foundation for future research and improving mental health training.

## **Conclusions**

In conclusion, we found that 4 in 10 Peruvian primary care physicians have adequate knowledge of MDD and that continuous professional development is the only factor associated with high knowledge. This represents an increase of 100% when compared to the study conducted in 2014, which may suggest the positive effect of the Peruvian mental health law.

## **Acknowledgements**

The authors thank the newly graduated doctors from the 34th cohort of the Faculty of Human Medicine at Universidad Nacional Pedro Ruiz Gallo for their contribution to data collection.

## **Author Contributions**

Conceptualization: Javier A. Flores-Cohaila; Data collection: Peter Garcia-Portocarrero, Deysi A. Saldaña-Amaya, Fabricio Herrera-Escobar, Josue Y. Guivar-Cajusol and Henry Ricardo Villarreal-Trujillo; Data analysis: Javier A. Flores-Cohaila and Brayan Miranda-Chavez; Drafting the manuscript: All authors; Writing the final manuscript: All authors; Critical revision of the manuscript: Cesar Copaja-Corzo, Javier A.

Flores- Cohaila and Brayan Miranda-Chavez; Approval of the final version: All authors.

### Ethics Statement


This research was approved by the Research Ethics Committee of the Lambayeque Regional Hospital (Code Inv: 23-084-CIEI), and permission was obtained from the Lambayeque Regional Health Management for its execution (File No. 4805511-0). Participation in the study was voluntary, and all participants signed informed consent beforehand. The authors kept all collected data strictly confidential, and the research was conducted in accordance with the ethical principles of autonomy, beneficence, and justice.


### Data Availability

The data supporting this study's findings are available on reasonable request from the corresponding author.

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### SUPPLEMENTAL MATERIAL

Supplemental material for this article is available online.

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