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Cost-Effectiveness of a Web-Based Mindfulness Intervention for Healthcare Professionals in a stepped-wedge Cluster Randomized Trial

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Abstract

Digital mental health interventions may provide scalable support for healthcare professionals, but evidence on their economic value remains limited. We conducted an economic evaluation of MINDxYOU, a self-guided web-based psychological intervention, alongside a stepped-wedge cluster randomized trial. Analyses were conducted primarily from a societal perspective and included 214 participants. Remission increased from 14.5% before intervention to 27.0% after intervention (P=.004), with an incremental cost-effectiveness ratio of €283.20 per additional remission. The observed cost was €15.36 per 1-point improvement in perceived stress, while stepped-wedge model estimates were €32.78 and €19.23 in intention-to-treat and per-protocol analyses, respectively. Accumulated quality-adjusted life years were 0.0676 higher after intervention, yielding an observed-period incremental cost-utility ratio of €544.22 per quality-adjusted life year. These findings suggest potential economic value of scalable digital psychological support for healthcare professionals.

Keywords: eHealth; stress; healthcare professionals; occupational mental health; web-based intervention; economic evaluation; cost-effectiveness; cost-utility; QALYs; stepped-wedge trial

Introduction

Sustained occupational stress and mental health problems are particularly prevalent among healthcare professionals [1–3]. In Spain, estimates suggest that approximately 24% of physicians experience significant levels of work-related stress [4–7], constituting a major public health concern. This burden affects not only the well-being of healthcare workers but also the quality of care provided [8], healthcare system functioning, productivity [9], job satisfaction [10], and patient safety [11]. Health professionals' mental health difficulties were further exacerbated by the COVID-19 pandemic, which substantially increased both the emotional burden and workload demands in this population [12–14]. Recent studies highlight the high prevalence of burnout, anxiety, and depression among healthcare professionals during and after the pandemic, underlining the urgent need for effective preventive strategies [15,16].

Effective interventions may therefore provide benefits not only at the individual level but also at organizational and healthcare system levels, potentially reducing societal and healthcare costs.

However, access to traditional face-to-face psychological interventions remains limited by barriers such as time constraints, resource limitations, and concerns about confidentiality [17,18]. In this context, self-guided digital interventions have emerged as a scalable and accessible approach to supporting mental health. Among these, mindfulness-based and other third wave cognitive behavioral therapy (CBT) have shown effectiveness in reducing psychological distress and perceived stress, including among healthcare professionals [19–21]. MINDxYOU was developed within this context as a web-based, self-guided intervention aimed at reducing perceived stress and improving emotional well-being among healthcare professionals, drawing on third-wave cognitive-behavioral approaches previously validated [4]. Its effectiveness has been evaluated in a stepped-wedge cluster randomized controlled trial, which demonstrated improvements across several mental health outcomes [5]. Additional secondary analyses have explored potential mechanisms of change and factors linked to treatment response [22,23].

For digital interventions to be implemented at scale within public healthcare systems, evidence of clinical effectiveness needs to be complemented by evidence of economic value. Economic evaluations, particularly cost-utility analyses, allow the assessment of the relationship between resources invested and health outcomes, including quality-adjusted life years (QALYs), and provide essential information for decision-making in health policy [24]. Previous economic

evaluations of digital mental health interventions have reported favorable findings in some settings [25,26], including interventions targeting workplace stress [27,28]. However, the evidence remains limited and heterogeneous. Similarly, although some mindfulness-based and third wave CBT interventions have reported favorable economic results, current evidence is insufficient to draw firm conclusions about their cost-effectiveness [29,30]. To our knowledge, no economic evaluation has specifically examined a digital mindfulness or third wave CBT intervention aimed at reducing stress among healthcare professionals.

We therefore evaluated the cost-effectiveness and cost-utility of MINDxYOU, a self guided web-based psychological intervention for healthcare professionals, alongside a stepped-wedge cluster randomized trial. The study examined whether the intervention provides economic value from a societal perspective using perceived stress outcomes and QALYs, with additional analyses assessing uncertainty and the influence of indirect costs.

Results

Participant characteristics and costs

The sociodemographic characteristics of the sample (n=214) were as follows: the mean age was 46.46 years (SD=10.86), and 84.1% of participants were women (n=180). Most participants had a university degree (86.0%; n=184). Regarding the professional category, 42.4% were physicians (n=89), followed by nursing staff, who represented 39.0% of the sample, including nurses (n=61) and nursing assistants (n=21). Descriptive monthly costs are presented in Table 1. Mean total costs per participant were €24.35 in the pre-intervention period and €28.71 in the post-intervention period, with psychologist visits, diagnostic tests, and sick leave representing the main cost drivers.

Table 1. Mean per-participant monthly costs (€ per person-month) in the pre- and post-intervention periods.

Category	Pre-intervention (before MindxYou) (n=214), mean (SD)	95% CI	Post-intervention (after MindxYou) (n=214), mean (SD)	95% CI
Intervention	0	N/A	2.53	N/A

Direct Costs				
General practitioner visits	1.90 (10.3)	0.69–3.38	1.48 (7.17)	0.63–2.45
Psychologist visits	9.27 (27.48)	5.92–13.25	6.41 (24.55)	3.48–9.96
Psychiatrist visits	0.86 (4.36)	0.31–1.50	1.05 (5.53)	0.38–1.90
Nurse visits	1.19 (14.87)	0.00–3.56	0	0.00–0.00
Other specialist visits	2.19 (10.48)	0.96–3.82	1.09 (9.79)	0.15–2.60
Diagnostic tests	4.39 (29.71)	1.17–9.06	1.2 (8.33)	0.33–2.48
Medication	1.81 (8.7)	0.86–3.20	1.85 (6.85)	1.05–2.90
Indirect Costs				
Sick leave	2.76 (28.48)	0.00–6.94	13.22 (102.28)	1.91–29.65
Total Cost	24.35 (70.62)	15.74–34.70	28.71 (117.26)	15.29–46.94

Note. *Costs are expressed as euros per person-month. Estimates are based on participants with sufficient CSRI data for cost estimation. CI = confidence interval; N/A = not applicable. Unit costs for healthcare visits were based on the 2024 (BOJA240605) official public tariffs of the Andalusian Health Service, including psychologist, psychiatrist, general practitioner, nurse, and other specialist consultations. Details of the intervention cost are provided in the supplementary material.*

For the cost-effectiveness analyses, mean observation time was 3.29 months (SD 1.53) in the pre-intervention period and 4.22 months (SD 1.65) in the post-intervention period. Table 2 summarizes the base-case cost-effectiveness and cost-utility results, including accumulated costs, effectiveness or utility outcomes, incremental differences, and the corresponding ICERs and ICURs.

Table 2. Accumulated costs and economic outcomes during the observed pre- and post-intervention periods.

Analysis	Period	Mean cost, € (95% CI)	Effectiveness/utility (95% CI)	Incremental ratio
ICER (PSS Remission)	Pre-intervention	67.51 (44.32/94.91)	0.15 (0.10/0.20)	—
	Post-intervention	102.91 (59.99/155.53)	0.27 (0.21/0.34)	—
	Incremental	35.40(−12.62/91.83)	0.13 (0.04/0.21)	283.2 (−113.78/1261.87)
ICER (PSS improvement)	Pre-intervention	67.51 (44.32/94.91)	−0.42 (−1.22/0.41)	—
	Post-intervention	102.91 (59.99/155.53)	−2.72 (−3.61/−1.84)	—
	Incremental	35.40 (−13.31/ 92.77)	2.31 (0.83/3.83)	15.36 (−5.95/ 59.93)
Observed-period ICUR (QALYs)	Pre-intervention	66.98 (44.46/94.41)	0.24 (0.23/ 0.26)	—
	Post-intervention	103.74 (58.96/158.43)	0.31 (0.29/ 0.33)	—

	Incremental	36.77 (−13.15/94.37)	0.07 (0.04/0.10)	544.22 (−200.76/1547.25)

Accumulated costs, effectiveness or utility outcomes, incremental differences, and incremental ratios for remission, PSS improvement, and QALYs. Costs are expressed in euros. Effectiveness is expressed as remission probability or improvement in PSS score, and utility as QALYs. Confidence intervals were estimated using non-parametric bootstrapping.

Cost-effectiveness based on remission

Remission increased from 14.5% in the pre-intervention period to 27.0% in the post-intervention period, corresponding to an absolute increase of 12.5 percentage points (McNemar χ^2=8.12, P=.004).

Mean accumulated costs increased from €67.51 in the pre-intervention period to €102.91 in the post-intervention period, resulting in an incremental cost of €35.40. Combined with the incremental remission difference of 0.125, this yielded an ICER of €283.20 per additional remission.

Bootstrap analyses showed 95% percentile intervals ranging from −€12.62 to €91.83 for incremental costs and from 0.04 to 0.21 for incremental remission, with a corresponding ICER interval of −€113.78 to €1261.87 per additional remission. Most bootstrap replications were located in the northeast quadrant (91.08%), indicating greater effectiveness at higher cost, while 8.68% were located in the southeast quadrant, indicating greater effectiveness at lower cost. The corresponding cost-effectiveness plane and acceptability curve are shown in Figure 1.

Cost-effectiveness based on PSS improvement

In the observed pre–post analysis, the incremental improvement in PSS was 2.31 points. Based on an incremental accumulated cost of €35.40, the resulting ICER was €15.36 per 1-point improvement in PSS.

When effectiveness was estimated using the stepped-wedge mixed-effects model, the corresponding ICERs were €32.78 per 1-point reduction in PSS in the intention-to-treat analysis and €19.23 per 1-point reduction in the per-protocol analysis.

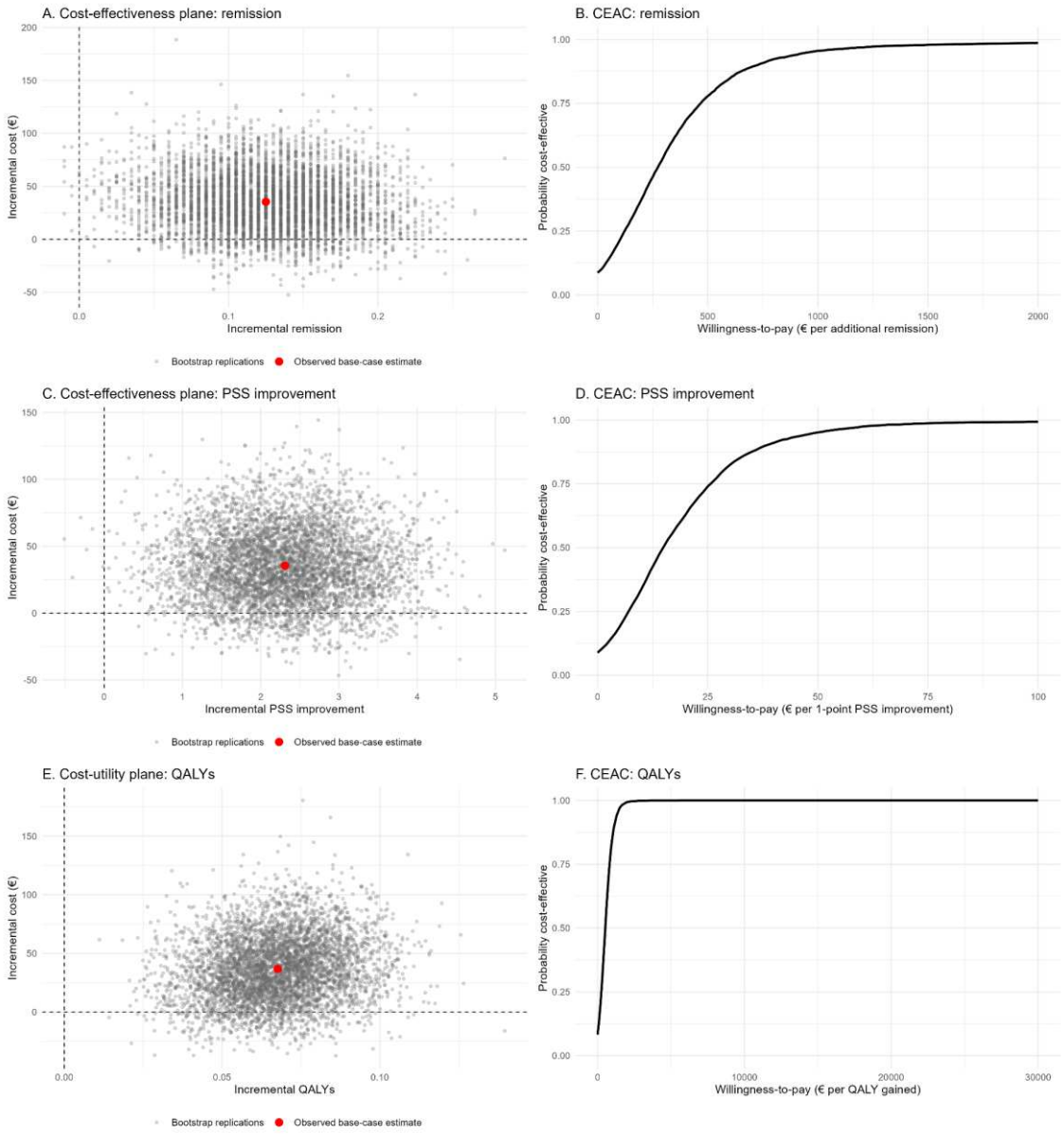
For the observed pre–post analysis, bootstrap intervals ranged from −€13.31 to €92.77 for incremental costs and from 0.83 to 3.83 points for PSS improvement. The corresponding ICER interval ranged from −€5.95 to €59.93 per 1-point improvement in PSS. The cost-effectiveness plane and acceptability curve for the observed analysis are presented in Figure 1.

Cost-utility analysis based on QALYs

Mean accumulated costs in the cost-utility sample increased from €66.98 in the pre-intervention period to €103.74 in the post-intervention period, yielding an incremental cost of €36.77. Accumulated QALYs over the observed periods were 0.24 in the pre-intervention period and 0.31 in the post-intervention period, corresponding to a difference of 0.07 QALYs. The resulting observed-period ICUR was €544.22 per QALY gained.

Bootstrap intervals ranged from -€13.15 to €94.37 for incremental costs and from 0.0354 to 0.0994 for incremental QALYs. The corresponding ICUR interval ranged from −€200.76 to €1547.25 per QALY gained. The cost-utility plane and acceptability curve are presented in Figure 1

Figure 1. Cost-effectiveness and cost-utility planes and acceptability curves.



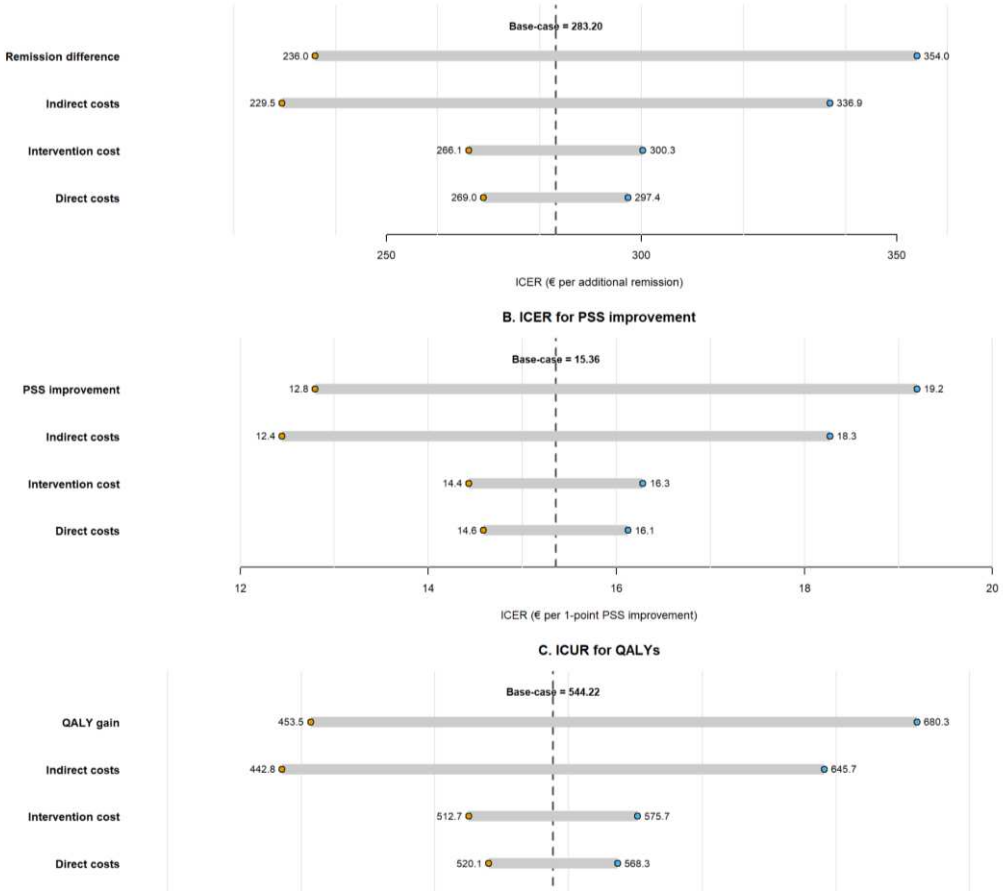
Cost-effectiveness planes and cost-effectiveness acceptability curves based on 5000 bootstrap replications, including the intervention cost in the post-intervention period. Panels A and B show the analysis for remission, panels C and D show the analysis for PSS improvement, and panels E and F show the cost-utility analysis based on QALYs. CEAC = cost-effectiveness acceptability curve; PSS = Perceived Stress Scale; QALY = quality-adjusted life year.

Sensitivity analyses

When indirect costs were excluded while retaining the intervention cost, incremental costs were substantially reduced. For remission, the incremental cost was €1.82, resulting in an ICER of €14.54 per additional remission. The bootstrap interval for the remission ICER ranged from -€232.40 to €402.17. For PSS improvement, the incremental cost was also €1.82, resulting in an

ICER of €0.79 per 1-point improvement in the observed pre-post analysis. The bootstrap interval for the observed PSS ICER ranged from -€11.92 to €19.80. Using the adjusted intervention effects from the stepped-wedge mixed-effects model, the corresponding ICERs were €1.69 per 1-point reduction in PSS for the intention-to-treat analysis and €0.99 per 1-point reduction in PSS for the per-protocol analysis. For the cost-utility analysis, the incremental cost was €2.50, resulting in an observed-period ICUR of €36.98 per QALY gained. The bootstrap interval for the ICUR ranged from -€454.41 to €490.45. The one-way sensitivity analyses are presented in Figure 2. Across the remission, PSS improvement, and QALY analyses, variation in the effectiveness outcomes and indirect costs produced the largest changes in the ICER and ICUR estimates, whereas changes in intervention and direct healthcare costs had a comparatively smaller influence.

Figure 2. One-way sensitivity analyses of cost-effectiveness and cost-utility outcomes.



Tornado diagrams showing the impact of ±20% variation in key cost and outcome parameters on the ICER for remission, the ICER for PSS improvement, and the ICUR for QALYs. The dashed vertical line represents the base-case estimate including the intervention cost. Wider bars indicate parameters with greater influence on the economic results.

Discussion

The present study evaluated the cost-effectiveness and cost-utility of the MINDxYOU web-based intervention for healthcare professionals using data from a stepped-wedge cluster randomized trial. Overall, the findings suggest that improvements in perceived stress were achieved at relatively modest incremental costs. Cost-effectiveness estimates were also consistent when intervention effects were derived from the stepped-wedge mixed-effects model, while the cost-utility analysis suggested potential economic value over the observed study periods. These findings add economic evidence to the growing literature on scalable digital interventions for occupational mental health.

From a cost-effectiveness perspective, the intervention was associated with a significant increase in remission rates and meaningful improvements in perceived stress. The estimated ICERs indicated that these clinical improvements were achieved at relatively low incremental costs. Similar conclusions were obtained when PSS effectiveness was estimated using the adjusted intervention effects from the stepped-wedge mixed-effects model, supporting the robustness of the cost-effectiveness findings across analytical approaches. These results align with previous research showing that internet-based psychological interventions can be cost-effective for stress-related and common mental disorders [24,31], and further extend this evidence by focusing specifically on healthcare professionals.

Regarding cost-utility, accumulated QALYs were 0.0676 higher in the post-intervention period, resulting in an observed-period ICUR of €544.22 per QALY gained. Although this estimate is numerically well below commonly used willingness-to-pay thresholds [32], its interpretation should take into account the different duration of the pre- and post-intervention observation periods. The cost-utility findings therefore provide additional evidence of the potential economic value of the intervention, while the cost-effectiveness analyses based on remission and PSS improvement offer a more direct assessment of changes in clinical outcomes. Sensitivity analyses further supported the economic findings. When indirect costs were excluded while retaining the intervention cost, incremental costs were substantially reduced across all analyses. This pattern indicates that indirect costs, particularly sickness absence, were an important driver of the economic results, whereas intervention and direct healthcare costs had a comparatively smaller influence. These findings corroborate previous economic evaluations of digital mental health interventions in which indirect costs substantially influenced cost-effectiveness estimates [24,31].

More broadly, previous research suggests that mindfulness-based interventions may offer good value for money across different populations. A systematic review of economic evaluations reported generally favorable cost-effectiveness profiles, although with considerable heterogeneity across studies [30], and randomized controlled trials have similarly reported favorable economic outcomes for mindfulness-based approaches in both clinical and non-clinical populations [33,34]. However, most of this evidence concerns face-to-face or therapist-guided interventions rather than fully digital, largely self-guided programs. The present study therefore extends the available evidence by providing an economic evaluation of a web-based third-wave CBT intervention specifically developed for healthcare professionals. The findings are also consistent with evidence from digital psychological interventions more broadly [35]. Beyond

clinical effectiveness and economic outcomes, the potential integration of interventions such as MINDxYOU into real-world healthcare and occupational settings is particularly relevant. Digital programs offer advantages in terms of scalability, flexibility, and reduced reliance on specialized human resources, which may facilitate their implementation within public healthcare systems and occupational health programs. These characteristics may be especially relevant for healthcare professionals, who experience high levels of occupational stress and may face barriers to accessing traditional psychological support. Recent evidence highlights the growing role of digital interventions in workplace mental health and their potential to improve both individual and organizational outcomes [36,37].

Nevertheless, the effectiveness and sustainability of these interventions may depend on implementation context, organizational support, and integration into existing care pathways [37]. Future research should therefore examine not only clinical and economic outcomes but also implementation strategies across different delivery settings, particularly in real-world healthcare systems.

Several limitations should be considered when interpreting these findings. First, the economic analyses relied on outcome-specific complete-case samples, resulting in partially different analytical samples across cost, cost-effectiveness, and cost-utility analyses, which may have reduced comparability and precision. Second, because control observations systematically preceded intervention observations in the stepped-wedge design, cost comparisons may have been influenced by calendar-time effects, particularly for highly variable sickness-absence costs. Accordingly, changes in indirect costs cannot be attributed directly to the intervention.

Third, the pre- and post-intervention periods differed in mean duration, and accumulated costs and QALYs were therefore estimated over unequal observation periods. This is particularly relevant when interpreting the ICUR, as part of the difference in accumulated QALYs may reflect observation time rather than the intervention alone. Finally, although uncertainty was explored using non-parametric bootstrapping, intervals around some economic estimates were relatively wide, particularly for the remission-based ICER, and point estimates should therefore be interpreted alongside their uncertainty.

The MINDxYOU intervention was associated with meaningful improvements in perceived stress at relatively modest incremental costs among healthcare professionals. Observed-period cost-utility estimates also suggested potential economic value. Together, these findings provide economic evidence supporting further evaluation and implementation of scalable digital

psychological interventions for occupational mental health, while highlighting the importance of considering indirect costs and observation time when interpreting their economic value.

Methods

Study design

This economic evaluation was conducted alongside a stepped-wedge cluster randomized trial designed to assess the effectiveness of the MINDxYOU intervention among healthcare professionals. The trial followed a hybrid type 2 effectiveness–implementation design, integrating the evaluation of both clinical effectiveness and implementation outcomes.

Six clusters were randomly allocated to three sequences, which determined the timing of crossover from the control condition to the intervention. All clusters initially remained in the control condition and subsequently transitioned to the intervention in a staggered manner over time, ensuring that all participants were eventually exposed to the intervention. This design allowed for within-participant comparisons between pre- and post-intervention periods.

Participants were assessed repeatedly at baseline and at 8-week intervals throughout the study period, in accordance with the stepped-wedge design. The study followed a closed-cohort design, whereby all participants were recruited before the start of the trial and no new participants were included thereafter. Further details regarding the study design, assessment schedule, and implementation procedures have been described in detail elsewhere [4].

Intervention

MINDxYOU is a self-guided, web-based digital psychological intervention designed to support the mental health of healthcare professionals, delivered through a digital platform structured into eight modules over an 8-week period.

The program is grounded in third-wave CBT, including mindfulness, compassion, and acceptance-based approaches, and is based on previously validated protocols [4,6,38].

The intervention was specifically adapted to the occupational context of healthcare professionals, incorporating psychoeducational content, mindfulness practices, compassion-based exercises, and experiential activities delivered through videos, audio-guided practices, and interactive exercises. The program is accessible via smartphone, tablet, or computer, allowing flexible use adapted to participants' schedules. Participants received brief weekly support via WhatsApp, telephone, or email to promote adherence. Within the stepped-wedge

design, participants initially allocated to the control condition were placed on a waiting list and subsequently received access to the intervention at different time points according to the study sequence. Further details regarding the intervention content and delivery are described in the published study protocol [4].

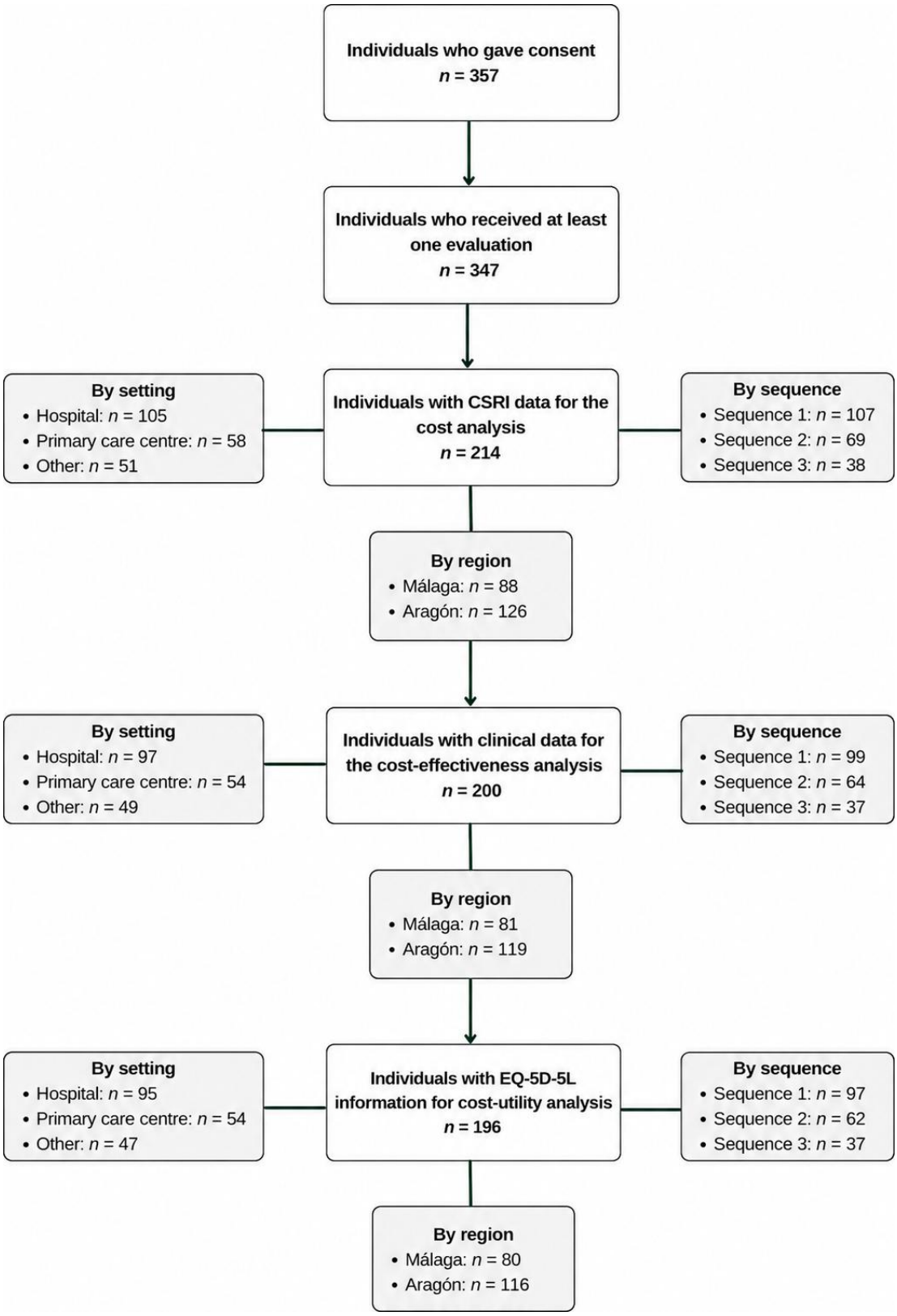
Participants

Eligible participants were active healthcare workers aged between 18 and 70 years, with sufficient Spanish language proficiency and basic digital literacy, who were expected to remain in their professional role for at least six months. Exclusion criteria included the presence of severe mental disorders, active suicidal ideation, or substance abuse problems.

A total of 357 individuals provided informed consent, of whom 347 completed at least one assessment and were included in the analytical sample. For the economic evaluation, 214 participants with available cost-related data were included in the analyses, and among these, 200 participants were included in the cost-effectiveness analyses and 196 in the cost-utility analyses, depending on data availability.

Detailed eligibility criteria and recruitment procedures can be found in the study protocol [4]. The flow of participants and analytic samples is presented in Figure 3.

Figure 3. Flowchart of the analytical samples included in the economic analyses.



Note: *Sequence 1 started the intervention 2 months after the first assessment, Sequence 2 after 4 months, and Sequence 3 after 6 months.*

Measures

Clinical outcomes

The clinical outcome used in the cost-effectiveness analysis was perceived stress, assessed using the 10-item Perceived Stress Scale (PSS-10) [39,40]. In the present economic evaluation, the PSS-10 was used to define both remission and improvement in perceived stress.

Health-related quality of life and healthcare resource use

Health-related quality of life was assessed using the Spanish five-level EuroQol five-dimensional questionnaire (EQ-5D-5L) [41,42] from which utility values were derived to estimate quality-adjusted life years (QALYs) using the area-under-the-curve approach.

Healthcare resource utilization was retrospectively assessed using the Client Service Receipt Inventory (*CSRI)* [43,44], which captured healthcare use and medication consumption during the previous two months.

Detailed information on the full set of clinical measures collected in the MINDxYOU trial is available in the study protocol [4].

Economic evaluation

Cost analysis

Descriptive cost analyses included participants with sufficient CSRI data in both the pre- and post-intervention periods (n=214). Resource-use costs were first standardized as euros per person-month to allow comparison between periods of different duration. For the economic evaluation, these participant-level monthly estimates were multiplied by the length of each individual's observed pre- and post-intervention period, so that ICERs and ICURs were based on accumulated observed-period costs.

Cost-effectiveness (CEA) and cost-utility analysis (CUA)

For the cost-effectiveness analysis, participants with complete data on costs and clinical outcomes were included (n=200). Two effectiveness outcomes were considered: (1) remission based on PSS-10 criteria and (2) improvement in perceived stress measured with the PSS-10. Remission was analyzed using paired binary indicators comparing the pre- and post-intervention

periods and was defined as a PSS-10 score ≤17 together with a reduction of ≥6 points relative to the corresponding reference assessment. The PSS-10 threshold was based on previous studies defining remission or symptom-free status using cut-offs around 17 points [43–45], while the reduction criterion was included to reflect reliable within-person improvement according to the approach proposed by Jacobson and Truax [45].

Continuous effectiveness was defined as improvement in PSS-10 scores, calculated as the pre-intervention minus post-intervention score, with higher values indicating greater improvement. For this outcome, two cost-effectiveness estimates were obtained: one based on the observed pre–post difference in PSS-10 scores and another based on the intervention effect estimated from the stepped-wedge mixed-effects model, thereby incorporating the trial design into the estimation of effectiveness. For the model-based analysis, the observed incremental cost was combined with the adjusted intervention effect to estimate the corresponding incremental cost-effectiveness ratio (ICER).

For the cost-utility analysis, participants with complete data on costs, EQ-5D-5L utilities, and follow-up time were included (n=196). QALYs were estimated using the area-under-the-curve method over the observed pre- and post-intervention periods.

ICERs were calculated as the difference in mean accumulated costs between the post- and pre-intervention periods divided by the corresponding difference in effectiveness. The incremental cost-utility ratio (ICUR) was calculated analogously using accumulated QALYs as the health outcome.

Statistical analyses

Analyses were conducted using complete cases according to data availability for each economic outcome. Descriptive statistics were used to summarize participant characteristics, resource use, costs, and clinical and utility outcomes. Continuous variables were reported as means and standard deviations, and categorical variables as frequencies and percentages. Cost estimates and incremental economic outcomes were reported with 95% confidence intervals where applicable.

Pre- and post-intervention remission proportions were compared using McNemar's test for paired binary data. For PSS improvement, cost-effectiveness was estimated using both the observed pre–post difference and the adjusted intervention effect derived from the stepped-wedge mixed-effects model. The adjusted intervention effect was estimated using both

intention-to-treat (ITT) and per-protocol (PP) analyses. For the model-based estimate, the observed incremental cost was used as the numerator and the adjusted intervention effect as the denominator. Because lower PSS scores indicate better outcomes, the absolute value of the adjusted PSS reduction was used to express the ICER as the cost per 1-point improvement in PSS.

Uncertainty around the ICERs and ICURs based on observed pre-post differences was assessed using non-parametric bootstrapping with 5000 replications. In each replication, participants were resampled with replacement, and incremental costs and effectiveness or QALYs were recalculated. The resulting cost-effect pairs were plotted on cost-effectiveness and cost-utility planes, and cost-effectiveness acceptability curves (CEACs) were generated to estimate the probability that the intervention was cost-effective across a range of willingness-to-pay thresholds.

Additional sensitivity analyses were conducted to assess the robustness of the findings. First, the economic analyses were repeated excluding indirect costs to reflect a healthcare system perspective. In addition, one-way sensitivity analyses of ±20% were conducted on key cost and outcome parameters, including direct costs, indirect costs, intervention cost, remission, PSS improvement, and QALYs. Results were visualized using tornado diagrams to assess the influence of variation in these parameters on the economic estimates.

Ethics Considerations

The study protocol was approved by the Research Ethics Committee of the Autonomous Community of Aragon and the Provincial Research Ethics Committee of Málaga in July 2022 (PI22/341). All participants provided informed consent before participation. Participant data were handled confidentially and analyzed in accordance with applicable data protection requirements. Participants did not receive financial compensation for participation. The trial was registered at ClinicalTrials.gov (NCT05436717, registered 29 June 2022).

Data availability

The datasets generated and analyzed during the current study are not publicly available because they contain potentially sensitive participant information and their public sharing is restricted to protect participant privacy and confidentiality. De-identified data supporting the findings of this study may be available from the corresponding author

upon reasonable request and subject to applicable ethical and data protection requirements.

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Authors' contributions

GGP: Conceptualization, Methodology, Investigation, Project administration, Writing-original draft, Writing-review & editing. VCA: Investigation, Writing-review & editing. EVM: Methodology, Investigation, Writing-review & editing. JJDH: Writing-review & editing. AMB: Methodology, Investigation, Writing-review & editing. APA: Methodology, Writing-review & editing. SFM: Methodology, Investigation, Writing-review & editing. JGC: Conceptualization, Methodology, Supervision, Writing-review & editing. YLH: Conceptualization, Methodology, Funding acquisition, Supervision, Writing-review & editing. FJS: Methodology, Formal analysis, Writing-review & editing. JHI: Writing-review & editing. JMGC: Writing-review & editing. JGP: Conceptualization, Methodology, Formal analysis, Data curation, Funding acquisition, Supervision, Project administration, Writing-review & editing. All authors reviewed and approved the final version of the manuscript.

Competing interest

The authors declare no financial or non-financial competing interest.

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Figure legends

Figure 1. Cost-effectiveness and cost-utility planes and acceptability curves. Cost-effectiveness planes and cost-effectiveness acceptability curves based on 5000 bootstrap replications, including the intervention cost in the post-intervention period. Panels A and B show the analysis for remission, panels C and D show the analysis for PSS improvement, and panels E and F show the cost-utility analysis based on QALYs. CEAC = cost-effectiveness acceptability curve; PSS = Perceived Stress Scale; QALY = quality-adjusted life year.

Figure 2. One-way sensitivity analyses of cost-effectiveness and cost-utility outcomes. Tornado diagrams showing the impact of ±20% variation in key cost and outcome parameters on the ICER for remission, the ICER for PSS improvement, and the ICUR for QALYs. The dashed vertical line represents the base-case estimate including the intervention cost. Wider bars indicate parameters with greater influence on the economic results.

Figure 3. Participant flow and analytical samples included in the economic evaluation. Sequence 1 started the intervention 2 months after the first assessment, sequence 2 after 4 months, and sequence 3 after 6 months.

En la Figure 3 sí he introducido el pequeño cambio que habíamos comentado: sustituir “Flowchart of the analytical samples included in the economic analyses” por “Participant flow and analytical samples included in the economic evaluation” y eliminar “Note:”. El resto lo mantendría como está.

Supplementary Files

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