

Designing a Cognitive-Behavioral Counseling Program Based on the Stress Inoculation Training Model to Reduce Psychological Stress among Civilian Pilots

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ABSTRACT

Psychological stress among civilian pilots is a major occupational factor associated with their mental health, given the distinctive characteristics of their working environment. In the Algerian context, an exploratory study (Tliba & Amamra, 2023) involving a sample of 230 Air Algérie pilots identified a moderate level of psychological stress, with statistically significant differences according to marital status and years of service. Nevertheless, a review of the accessible literature indicates a limited number of documented cognitive-behavioral counseling programs specifically designed for civilian pilots in the Arab context.

This paper aimed to design a cognitive-behavioral counseling program for civilian pilots based on the Stress Inoculation Training (SIT) model and informed by counseling needs identified in the field. The paper adopted a systematic account of the counseling program design process. The needs analysis drew on the triangulation of three interrelated sources: (1) the findings of a previous exploratory study (Tliba & Amamra, 2023); (2) a review of sources of psychological stress among pilots (Tliba & Amamra, 2026) and the specialized literature; and (3) semi-structured interviews with six pilots, with the sample size determined by the saturation criterion. The SIT model served as the theoretical framework for organizing the program components into its three phases: conceptualization, skills acquisition, and application.

Triangulation identified seven principal domains of counseling need. On this basis, a group counseling program comprising eight sessions, each lasting 45–60 minutes, was designed and organized into three phases consistent with the SIT model. The program design underwent scholarly review by a panel of specialist experts, who endorsed its content validity and the consistency between its objectives and techniques. The program also incorporated a systematic follow-up assessment three months after the sessions ended, using the same measurement instrument, to examine the maintenance of acquired skills and prevent relapse.

Within the limits of what could be established from the literature reviewed, this paper presents a cognitive-behavioral counseling program for civilian pilots in the Arab context, grounded in their field-identified counseling needs and documented in accordance with the TIDieR framework. The principal limitations include the small interview sample (six pilots) and reliance on digital delivery.

Keywords: psychological stress; civilian pilots; cognitive-behavioral counseling; Stress Inoculation Training (SIT); counseling program design; TIDieR framework.

1. GENERAL RESEARCH FRAMEWORK

1.1. Introduction

Civil aviation is among the most sensitive and complex occupations in modern employment sectors, given the complexity of the aviation environment and the substantial responsibilities involved in operating advanced technology and upholding the foundations of aviation safety. Despite major technological advances and improvements in aircraft technical safety standards, the human factor remains the principal and decisive determinant of aviation safety. The aviation literature indicates that most aviation accidents and errors are associated with disruptions in cognitive and emotional functioning resulting from inadequate stress management, accumulated fatigue, and mental exhaustion among flight crew members (Cullen et al., 2021; Goldschmidt & Kandra, 2022).

Specialized field studies show that pilots face an interrelated set of occupational, organizational, and physiological stressors, including:

- Variable and irregular flight schedules and disruptions to circadian rhythms and sleep (Venus & Grosse Holtforth, 2021; Greder et al., 2022).
- Continuous assessments and stringent periodic examinations that may threaten their professional fitness (Cullen et al., 2021; Goldschmidt & Kandra, 2022).
- Social isolation arising from travel and continual changes in crew composition (Demerouti et al., 2019).

In the Algerian context, Tliba and Amamra (2023) identified a moderate level of psychological stress among a sample of pilots, with significant differences attributable to marital status and years of experience. Their study of sources of stress (Tliba & Amamra, 2026) further showed that occupational, organizational, and social dimensions constitute the primary sources of this stress.

Despite these indicators, the literature reviewed suggests that psychological counseling interventions for pilots within work and training settings have received limited attention compared with medical and technical aspects, fatigue, and risk management (Demerouti et al., 2019; Cullen et al., 2021). Accordingly, the central question facing contemporary psychological research is no longer “Do pilots experience psychological stress?”—a matter established through field evidence—but rather: “How can a methodologically documented counseling program be designed that draws on cognitive-behavioral theory and fully addresses the stringent occupational characteristics of pilots?”

Within the accessible Arabic-language literature reviewed, documented cognitive-behavioral counseling programs specifically designed for civilian pilots appear to be limited. This highlights the need to develop interventions grounded in the needs of this group and the distinctive features of its occupational context.

1.2. Research Problem

The research problem addressed in this article concerns the limited available Arabic-language psychological literature on the design and documentation of counseling interventions for civilian pilots, particularly needs-based cognitive-behavioral interventions. It can be summarized in three fundamental gaps:

1. A gap in needs identification: Traditional counseling programs commonly rely on single sources or abstract theoretical accounts to develop sessions, rather than employing a source-triangulation strategy that integrates quantitative field-survey data from 230 pilots (Tliba & Amamra, 2023), a review of the dimensions of stress sources (Tliba & Amamra, 2026), and qualitative analysis of interviews with six pilots to achieve methodological saturation.
2. A gap in scientific documentation and generalizability: Counseling programs for high-risk sectors are rarely designed and documented using internationally recognized methodological frameworks such as TIDieR (Hoffmann et al., 2014). This impedes the assessment of intervention components, replication, and generalization to comparable settings.
3. A gap in tailoring and occupational suitability: There is a lack of flexible counseling program designs that overcome pilots’ distinctive logistical constraints, such as the inability to assemble physically at the same time because of travel schedules, through flexible remote digital delivery. Such programs should also formulate specific techniques to develop “psychological antibodies” in accordance with Donald Meichenbaum’s Stress

Inoculation Training (SIT) model (Meichenbaum, 1985, 1995), across its three phases: conceptualization, skills acquisition, and application.

Accordingly, the research problem is expressed in the following central question:

How can a cognitive-behavioral counseling program based on Meichenbaum's Stress Inoculation Training (SIT) model be designed to reduce psychological stress among civilian pilots?

The following subsidiary questions arise from this central question:

4. What specific domains of counseling need among civilian pilots are identified through the triangulation of quantitative, qualitative, and literature-based data sources?
5. To what extent is the content of the proposed counseling program valid from the perspective of the expert reviewers?

1.3. Significance of the Paper

The significance of this paper lies in its documented methodological contribution to designing a counseling program for civilian pilots based on their actual field-identified needs. It also offers a replicable methodological model through TIDieR-based documentation and the use of SIT as a preventive theoretical framework.

The paper offers a practical contribution to airlines and psychology practitioners by providing a "roadmap" for developing effective counseling interventions that contribute to improving pilots' mental health and, consequently, enhancing aviation safety.

2. THEORETICAL AND METHODOLOGICAL FRAMEWORK

2.1. Meichenbaum's Stress Inoculation Training (SIT) Model as a Theoretical Framework

The Stress Inoculation Training (SIT) model, developed by Donald Meichenbaum (1985, 1992, 1995), is one of the leading preventive cognitive-behavioral frameworks in contemporary cognitive-behavioral theory. It rests on the premise that psychological stress does not arise as a direct, unmediated response to stressful situations and circumstances themselves; rather, it results from individuals' subjective cognitive appraisal of those situations, accompanied by internal dialogue and an appraisal of their available coping resources (Lazarus & Folkman, 1984; Meichenbaum, 1992, 1995).

The underlying philosophy of SIT draws on the biological metaphor of "vaccination" or "medical inoculation." This approach is presented as surpassing traditional therapeutic programs by functioning as a preventive intervention. The model involves exposing individuals to mild, controlled doses of stress in a safe environment to build "psychological antibodies" and equip them with flexible coping skills. These skills enable them to control physiological and emotional arousal and modify negative responses before they intensify (Meichenbaum, 1985, 1992; Zhiqiang et al., 2022).

SIT provides a methodological structure for developing and designing intervention programs through three main phases that are integrated and dynamically interrelated (Meichenbaum, 1992, 1995):

6. Conceptualization phase: This conceptual and educational phase aims to facilitate cognitive reframing and increase individuals' awareness of the nature of psychological stress and its cognitive, physical, and behavioral mechanisms. The initial sessions help participants understand the reciprocal relationship between automatic thoughts and emotional and physical responses and identify distorted thinking patterns and maladaptive cognitive structures, such as magnification, overgeneralization, and catastrophizing. This prepares the ground for a counseling relationship based on guided discovery, direct collaboration, and the specification of operational intervention objectives (Meichenbaum, 1985, 1995).
7. Skills acquisition phase: During this phase, participants acquire an integrated set of adaptive cognitive, behavioral, and physiological skills for coping with psychological stress. These skills are classified as follows:
 - Cognitive skills: These include cognitive restructuring and self-talk regulation through identifying negative self-statements that deplete concentration and replacing them with encouraging instructional statements (Meichenbaum, 1992).

- Physiological and behavioral skills: These involve teaching muscle relaxation and deep diaphragmatic breathing techniques to control excessive physiological arousal, together with problem-solving and decision-making skills through observation, generating alternatives, and selecting the most appropriate decision (Meichenbaum, 1985, 1992).
- Organizational and social skills: These include time management, prioritization, and mobilizing social support networks to reduce the negative effects of isolation and facilitate adaptation to stressful environments (Meichenbaum, 1995).
- 8. Application phase: This phase focuses on testing acquired skills and transferring them from the theoretical framework to sustained, automatic performance in real-life situations. Graded exposure, mental imagery, and guided imagery techniques are used. Participants mentally rehearse simulated stressful scenarios and apply self-talk, relaxation, and problem-solving skills to regulate emotions, thereby strengthening self-efficacy and preventing future relapse (Meichenbaum, 1992, 1995; Zhiqiang et al., 2022).

These three phases work together to foster cognitive and emotional stability in participants, enabling effective coping under varying conditions of increasing stress (Meichenbaum, 1995; Zhiqiang et al., 2022).

SIT is an appropriate theoretical framework for this counseling program because of two fundamental characteristics:

- First, its proactive nature: SIT does not wait for stress symptoms to emerge; instead, it provides individuals in advance with the knowledge and skills needed to understand stressors and regulate emotional responses before their effects intensify.
- Second, the integration of its components: SIT combines cognitive, physiological, behavioral, and social skills, thereby strengthening effective coping across diverse stressful situations (Meichenbaum, 1995).

3. PROGRAM DESIGN METHODOLOGY

3.1. Methodology for Triangulating Counseling Needs

To ensure the development of a rigorous counseling program aligned with challenges encountered in the field, a strategy integrating three interrelated sources was adopted:

9. Quantitative survey source: The findings of the exploratory study by Tliba and Amamra (2023), involving 230 Air Algérie pilots, were utilized. The study identified a moderate level of psychological stress (mean = 74.004), with statistically significant differences attributable to marital status and years of professional experience.
10. Review of the literature and specialized studies: The study of sources of stress among pilots (Tliba & Amamra, 2026), together with international research in aviation medicine and psychology (Demerouti et al., 2019; Cullen et al., 2021; Venus & Grosse Holtforth, 2021; Greder et al., 2022), was used to identify organizational, occupational, and physiological dimensions of stress.
11. Qualitative semi-structured interviews: Qualitative interviews were conducted with six civilian pilots. The sample size was determined using the methodological saturation criterion, when no new information emerged. Interview content was examined through thematic content analysis, involving transcription, coding, and classification into categories representing domains of need.
12. Triangulation of these three sources contributed to identifying seven principal domains of counseling need:
 - The concept of psychological stress and its mechanisms.
 - Self-talk and cognitive restructuring.
 - Muscle relaxation and breathing techniques.
 - Problem-solving and decision-making skills.
 - Time management and prioritization.
 - Social support and assistance.
 - General coping strategies.

The three sources converged in identifying some domains, such as time management and self-talk, whereas each source uniquely contributed other domains. This strengthens the validity and comprehensiveness of the identified needs (Hoffmann et al., 2014).

3.2. Findings of Counseling Needs Triangulation and the Seven Domains

Integrating the three sources yielded seven central domains that provide the starting point for developing the counseling sessions. The following table illustrates this methodological integration.

Table 1. Results of Triangulating the Sources of the Seven Counseling Needs

Domain No.	Domain of counseling need	Quantitative source (Tliba & Amamra, 2023)	Literature and study of stress sources (Tliba & Amamra, 2026)	Qualitative interviews (n = 6)
1	Awareness of stress and its mechanisms	Moderate stress levels (74.004)	Cognitive appraisal and physiological responses	Limited precise understanding of the effect of psychological stress on cognitive alertness
2	Cognitive restructuring and self-talk	Significant differences by experience (new pilots)	Thinking errors and catastrophizing during emergencies	Predominance of negative self-talk during assessments
3	Physiological regulation and relaxation	Physical strain responses and prolonged fatigue	Circadian disruption and flight-related tension	Need for rapid tools to control arousal
4	Problem-solving and decision-making	Stress associated with aeronautical decision-making	Operational stressors and sudden weather changes	Cognitive confusion when tasks compete for attention
5	Time management and work-schedule organization	Significant differences by marital status	Variable flight schedules and sleep disruption	Difficulty reconciling aviation demands with family life
6	Social support and assistance	Organizational and social stressors	Social isolation resulting from extended travel	Feelings of social disconnection and limited family communication
7	Comprehensive coping and relapse prevention	Need to maintain acquired skills	Ongoing practice and skills for maintaining fitness	Concerns about returning to previous stress levels

3.3. Program Design and Structure in Accordance with the TIDieR Framework

The counseling program was designed and its practical components standardized according to the TIDieR framework (Hoffmann et al., 2014) to ensure methodological rigor, replicability, and generalizability.

Table 2. Documentation of the Counseling Program According to the TIDieR Framework

Item (according to TIDieR)	Description
1. Intervention name and rationale	A group cognitive-behavioral counseling program for civilian pilots, based on Meichenbaum's SIT model, to reduce psychological stress.
1. Operational objectives	Enable pilots to: (1) understand stress; (2) manage self-talk; (3) practice relaxation; (4) build social support; (5) organize time; (6) solve problems; and (7) prevent relapse.
1. Materials and tools	Educational leaflets, relaxation videos, a homework workbook, session evaluation forms, and a psychological stress scale.
1. Mode of delivery	Interactive remote group sessions via WhatsApp.
1. Dose and frequency	Eight sessions, one session per week, lasting 45–60 minutes each.
1. Setting	A digital environment (WhatsApp).
1. Intervention provider	The researcher: a doctoral student in clinical psychology trained in the SIT model.
1. Tailoring	Consideration of pilots' circumstances: travel schedules, night flights, and social isolation.
1. Modifications	Simplifying homework, adding a relaxation demonstration video, and revising session order based on reviewers' feedback.
1. Assessment methods	Session evaluation forms, pre-intervention assessment, post-intervention assessment, and follow-up assessment using the psychological stress scale.
1. Adherence	Monitoring homework, recording attendance, and reminding participants of session times.
1. Follow-up	A follow-up assessment three months after the program ends, using the same instrument with the experimental group. It aims to examine the maintenance of acquired skills and prevent relapse, in accordance with the third phase of Meichenbaum's SIT model.

3.4. Systematic Distribution of the Eight Sessions across the SIT Phases

Table 3. Systematic Distribution of the Eight Sessions across the SIT Phases

Phase	Session	Title	Operational objectives	Techniques	Homework	References
Conceptualization	1	The concept of psychological stress	Understand stress, establish rapport, and conduct the pre-assessment	Lecture and discussion	Monitor sources of stress	Meichenbaum (1992)
Skills acquisition	2	Self-talk	Replace negative thoughts	Self-talk and role-play	Monitor internal dialogue	Meichenbaum (1992)

Table 3. Systematic Distribution of the Eight Sessions across the SIT Phases (*continued*)

Phase	Session	Title	Operational objectives	Techniques	Homework	References
	3	Muscle relaxation	Apply breathing and relaxation techniques	Diaphragmatic breathing and progressive relaxation	Practice relaxation daily	Meichenbaum (1985)
	4	Social support	Build an effective support network	Discussion and problem-solving	Contact a supportive person	Demerouti et al. (2019)
	5	Time management	Prioritize and schedule tasks	Scheduling and the Eisenhower matrix	Implement a daily schedule	Venus & Grosse Holtforth (2021)
	6	Problem-solving	Apply the five steps	Brainstorming and situational analysis	Apply skills to a real problem	Meichenbaum (1992)
	7	Mental imagery	Mentally rehearse situations	Guided imagery	Practice imagery daily	Meichenbaum (1995)
Application	8	Coping and application	Transfer skills and conduct the post-assessment	Graded exposure and evaluation	Apply skills in real life	Zhiqiang et al. (2022)
Follow-up	—	Follow-up assessment	Examine maintenance of effects and prevent relapse	Re-administer the Lavenstein (1993) scale	—	Meichenbaum (1995)

3.4.1. Phase One: Conceptualization (Session 1)

This session aims to establish the counseling relationship and a shared knowledge base between the researcher and participants regarding the nature of psychological stress. It begins with introductions and an explanation of the program objectives and confidentiality rules, followed by an interactive lecture on the concept of psychological stress and its cognitive, physiological, and behavioral mechanisms. The session concludes with the pre-intervention assessment using the Lavenstein (1993) scale and distribution of the first homework leaflet, which asks participants to monitor their personal sources of stress during the week.

3.4.2. Phase Two: Skills Acquisition (Sessions 2–7)

This phase forms the backbone of the program, equipping participants with an integrated set of cognitive, physiological, behavioral, and social skills. Each session follows a standardized structure: (1) review the previous homework; (2) introduce the new skill; (3) practice the skill; and (4) assign new homework. The skills are distributed as follows:

- Session 2 (Self-talk): Participants identify their negative self-statements and practice replacing them with positive instructional statements (Meichenbaum, 1992).
- Session 3 (Muscle relaxation): Participants receive training in deep diaphragmatic breathing and progressive muscle relaxation, supported by a demonstration video for daily practice (Meichenbaum, 1985).
- Session 4 (Social support): Participants discuss forms of family and professional support and develop a personal support-network map (Demerouti et al., 2019).
- Session 5 (Time management): Participants are trained to prioritize using the Eisenhower matrix and to schedule daily tasks (Venus & Grosse Holtforth, 2021).
- Session 6 (Problem-solving): Participants apply the five problem-solving steps to critical work situations (Meichenbaum, 1992).
- Session 7 (Mental imagery): Participants use guided imagery to evoke stressful cockpit situations and mentally rehearse coping with them (Meichenbaum, 1995).

3.4.3. Phase Three: Application and Generalization (Session 8)

This session concludes the program and transfers the skills to the professional context. It includes:

13. Emotional ventilation, during which participants express suppressed feelings.
14. A comprehensive review of all acquired strategies.
15. Application of exposure skills in simulated scenarios.
16. Administration of the post-intervention assessment.
17. Evaluation of program effectiveness through a final evaluation form (Zhiqiang et al., 2022).

3.4.4. Follow-up Assessment (an Additional Methodological Procedure)

To examine the maintenance of effects and prevent relapse, the program incorporated a systematic follow-up assessment three months after the eighth session and the post-intervention assessment. The same instrument is administered to the experimental group, in accordance with the generalization and maintenance requirements of the third phase of SIT (Meichenbaum, 1995). This assessment aims to compare follow-up scores with post-intervention scores to determine whether the effects persist or to identify relapse.

3.5. Establishing Content Validity through Expert Review

3.5.1. Purpose of the Review

Before implementation of the intervention, the counseling program underwent methodological quality-control procedures to assess its content validity, ensure the consistency of its components with its objectives, and establish its suitability for the distinctive characteristics of the target group, namely civilian pilots. This procedure is considered mandatory in counseling program design to ensure that the content meets academic and professional standards (Hoffmann et al., 2014).

3.5.2. Expert Review Panel

The complete program manual—including (1) operational objectives, (2) cognitive and behavioral techniques, (3) the eight-session outline, (4) scientific leaflets, and (5) the homework workbook—was submitted to a panel of five expert reviewers ($m = 5$), all higher-education professors specializing in psychology at different Algerian universities.

3.5.3. Review Instrument

The reviewers were asked to evaluate the program content using a questionnaire developed specifically for this purpose. It comprised three main dimensions and 21 evaluation items ($n = 21$):

18. Validity of operational objectives: Their clarity, measurability, and consistency with the program's overall objectives (seven items).
19. Appropriateness of cognitive and behavioral techniques: Their suitability for the nature of pilots' stressors and their working environment (seven items).
20. Clarity of wording and organization: Linguistic precision, session sequencing, and the quality of supplementary materials (seven items).

The reviewers used a three-point Likert scale to rate each questionnaire item: appropriate = 3; appropriate with modification = 2; and inappropriate = 1.

3.5.4. Calculating Agreement and Concordance among Reviewers

To ensure the accuracy of the review results, Kendall's coefficient of concordance (Kendall's W) was used instead of raw percentage agreement or individual kappa coefficients. Kendall's coefficient is an appropriate nonparametric statistical measure of the consistency and concordance of ranked evaluations from a panel of more than two reviewers ($m = 5$) using explicitly ordinal data (Kendall & Babington Smith, 1939; Siegel & Castellan, 1988).

The coefficient W is calculated using the following statistical equation:

$$W = 12 \sum_{i=1}^n (R_i - \bar{R})^2 / [m^2(n^3 - n)]$$

Where:

- W : Kendall's coefficient of concordance.

- R_i : The sum of ranks assigned to item i across all reviewers.
- $\bar{R}$: The mean rank sum, calculated as $\bar{R} = m(n + 1)/2$.
- m : The number of reviewers ($m = 5$).
- n : The number of evaluation items ($n = 21$).

3.5.5. Statistical Results of the Expert Review

Statistical analysis of the evaluation data yielded the Kendall's concordance coefficients shown below.

Table 4. Kendall's Coefficients of Concordance and Raw Agreement Percentages

Dimension	Number of items (n)	Kendall's W	Raw agreement	Statistical significance
Validity of operational objectives	7	0.64	85.7%	$p < 0.01$
Appropriateness of cognitive and behavioral techniques	7	0.56	71.4%	$p < 0.05$
Clarity of wording and organization	7	0.60	78.6%	$p < 0.01$
Overall	21	0.60	78.6%	$p < 0.01$

The overall Kendall's coefficient of concordance ($W = 0.60$) indicates a moderate degree of agreement, at the upper end of the moderate range, among the five experts regarding the validity of the counseling program's content, objectives, and techniques. The chi-square value was $\chi^2 = 60.0$, with 20 degrees of freedom ($df = 20$) and a significance level of $p < 0.01$. This confirms that the concordance was statistically significant and not attributable to random chance (Siegel & Castellan, 1988). Raw agreement reached 78.6%, a high percentage that strengthens confidence in content validity.

The "validity of operational objectives" dimension recorded the highest concordance ($W = 0.64$), reflecting the clarity and measurability of the operational objectives and their consistency with the overall program objectives. The "appropriateness of cognitive and behavioral techniques" dimension recorded the lowest concordance ($W = 0.56$), reflecting differing reviewer views concerning the suitability of certain techniques, such as mental imagery, for the specific operational conditions of the aviation environment.

The difference between Kendall's coefficient (0.60) and raw agreement (78.6%) is attributed to the mathematically conservative nature of Kendall's coefficient, which relies on precise differences in rating ranks across reviewers, whereas raw agreement reflects apparent concordance in responses. This indicates substantive agreement on item validity, alongside slight variation in the prioritization of certain techniques.

Methodological note: The Landis and Koch (1977) classification was originally developed to interpret Cohen's kappa, not Kendall's coefficient of concordance. Although some applied literature uses this classification as an operational framework for interpreting W because of the similarity in numerical values, the present study interpreted W primarily in relation to statistical significance and raw agreement percentages, thereby avoiding methodological conflation of the two coefficients.

3.5.6. Recommended Modifications

Based on the panel's evaluations and detailed comments, the following modifications were incorporated into the final program:

21. Adaptation of counseling techniques: Mental imagery techniques were supported with practical examples and simulated scenarios drawn directly from the cockpit environment, emergency situations, and periodic assessments.
22. Facilitation of self-directed application: The language of homework assignments and training workbooks was simplified to accommodate the free time available during flights.
23. Enhancement of digital delivery: A demonstration video explaining muscle relaxation and diaphragmatic breathing was added to support correct self-directed remote practice.

24. Logical sequencing of sessions: The session sequence was revised so that the time-management session followed the relaxation and physiological-regulation session, ensuring progression from physical-emotional skills to organizational skills.

3.5.7. Summary

Following completion of all methodological quality-control procedures—expert review, a statistically significant concordance coefficient of $W = 0.60$ at $p < 0.01$, raw agreement of 78.6%, and incorporation of the recommended modifications—the final counseling program demonstrated an acceptable degree of content validity and acceptable indicators of review reliability. These indicators provide sufficient statistical and methodological support for considering the program ready for field implementation with a sample of Air Algérie civilian pilots. Nevertheless, agreement is acknowledged as moderate, and future studies are advised to address this through a larger panel of reviewers or more detailed review instruments.

4. DISCUSSION

4.1. Interpretation of the Findings

This paper presents a designed and documented counseling program for civilian pilots, grounded in an integrated needs analysis and documented in accordance with the TIDieR framework (Hoffmann et al., 2014). The program's scientific value lies in combining SIT with digital delivery, thereby providing an applied reference for sectors characterized by substantial variability and geographical dispersion, overcoming travel-related barriers and ensuring continuity of psychological support for pilots.

The integrated analysis identified seven principal domains of counseling need: (1) the concept of psychological stress and its mechanisms; (2) self-talk and cognitive restructuring; (3) muscle relaxation and breathing techniques; (4) problem-solving and decision-making skills; (5) time management and prioritization; (6) social support and assistance; and (7) general coping strategies. The three sources converged in identifying some domains, while each source contributed others, thereby strengthening the validity and comprehensiveness of the identified needs.

4.2. Comparison with Previous Literature

This design is consistent with literature indicating that effective preventive interventions in high-risk workplaces should be grounded in a precise needs analysis and tailored to the distinctive characteristics of the target group (Cullen et al., 2021; Greder et al., 2022). It also aligns with Zhiqiang et al. (2022), who emphasized that SIT can be integrated into occupational training programs without compromising technical skills, making it a practical solution suitable for field implementation.

The findings of this design agree with Cullen et al. (2021), who emphasized the importance of tailoring interventions to pilots' specific characteristics, and with Greder et al. (2022), who indicated that occupational stress requires multidimensional interventions addressing cognitive, physiological, and social aspects. The design is also consistent with Zhiqiang et al. (2022), who demonstrated the effectiveness of SIT in enhancing psychological immunity among pilots.

4.3. Scientific Contribution

This paper makes three principal scientific contributions:

25. Theoretical contribution: It presents the first Arab counseling program for civilian pilots based on SIT and specifically tailored to this group's distinctive characteristics.
26. Methodological contribution: It uses source triangulation—quantitative, qualitative, and literature-based—to identify needs and documents the program according to TIDieR to ensure replicability and generalizability.
27. Applied contribution: It provides a “roadmap” for developing effective counseling interventions in high-risk workplaces, with digital flexibility that overcomes travel-related barriers.

5. LIMITATIONS

This research paper is subject to the following limitations:

28. Small qualitative interview sample (six pilots): Although the methodological criterion of data saturation was met, the sample remains statistically small, which may limit generalization of the findings to all pilots.
29. Logistical and technical challenges associated with exclusive reliance on digital delivery: Delivering sessions through WhatsApp may restrict full group interaction or entail technical challenges, such as poor internet connectivity or difficulties monitoring participants.
30. Reliance on a single psychological stress measure: Using only the Lavenstein (1993) scale may not capture all dimensions of psychological stress, suggesting the need to incorporate physiological measures in future studies.

6. CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

This paper presented a counseling program specifically designed for civilian pilots, based on SIT, grounded in the triangulation of field-identified needs, and documented according to TIDieR. The program is the first of its kind in the Arabic-language literature and provides a replicable “roadmap” for developing effective counseling interventions in high-risk workplaces.

6.2. Recommendations

On the basis of the foregoing, the following recommendations are proposed:

31. Adoption of the program by airlines: Integrate the program into pilots’ continuing training as a preventive measure to strengthen mental health and aviation safety.
32. Conducting experimental studies to assess effectiveness: Implement the program with larger samples and assess its effects using a quasi-experimental design with experimental and control groups to confirm its effectiveness.
33. Developing pilot-specific psychological stress measures: Design measures that account for the cultural and occupational characteristics of pilots in the Arab context.
34. Extending the program to other aircraft crew members: Include flight attendants and engineers, who face similar stressors.

6.3. Future Directions

This paper opens several avenues for future research, including:

- Implementing the program with larger samples of pilots across different airlines.
- Developing an interactive digital version of the program as a smart application.

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