

Preliminary Evidence from a Psychoeducational Webinar to Support Work Resilience among Mining Employees in Geographically Remote Areas

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ABSTRACT

Employees working in geographically remote mining areas face substantial psychological challenges related to complex job demands, limited social interaction, and isolation. In this context, work resilience represents an important psychological resource. This pilot study explored the feasibility of delivering a brief positive psychology-based psychoeducational webinar and examined preliminary patterns in self-reported work resilience. A quasi-experimental one-group pre-test-post-test design was applied. Although 40 employees attended the webinar, analyses were conducted using complete paired data from 20 participants. Work resilience was assessed using an exploratory dichotomous self-report questionnaire administered before and after the intervention. Descriptive analyses indicated an overall upward shift in post-test scores, with individual variability. A Wilcoxon signed-rank test suggested a statistically significant difference between measurement occasions ($p = 0.040$). Given the exploratory design and absence of a control group, findings are interpreted cautiously and do not imply intervention effectiveness. Overall, the results provide preliminary descriptive evidence supporting the feasibility of webinar-based psychoeducational delivery in geographically remote industrial settings.

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1. INTRODUCTION

Within this context, work resilience becomes a crucial psychological resource for employees working under remote and demanding conditions. Work resilience refers to an individual's capacity to adapt, recover, and maintain effective functioning when facing work-related stressors in challenging work environments. [1], [2]. For employees working in geographically remote mining sites, the importance of work resilience is further intensified by high job demands, physical isolation, rotating shift schedules, limited social interaction, and restricted access to organizational mental health services, all of which increase vulnerability to psychological strain [3], [4].

The development of digital technology has opened opportunities for implementing more accessible and scalable online mental health interventions in the workplace [5]. Digital programs designed to support employee mental health have been reported as feasible intervention models in modern workplaces [6], [7]. Over the past decade, various digital interventions in organizational settings, such as self-help platforms, mobile applications, and online psychoeducational modules, have increasingly been explored, particularly in flexible and remote work contexts [8]. Among these approaches, psychoeducational webinars represent a structured form of digital intervention that provides information related to stress management and adaptive coping strategies and may support psychological resources, especially in geographically and socially isolated work settings [9], [10]. However, existing evidence on digital psychological interventions remains mixed and context-dependent, highlighting the importance of examining feasibility within specific occupational settings rather than assuming generalizability across different work contexts [11], [12].

In the present study, the psychoeducational webinar format was selected in response to organizational and operational constraints at the mining job site. Company management approved the intervention to be conducted online with a limited duration, taking into account employees' work schedules and operational demands. Participation was further restricted to designated

employee representatives stationed at the job site, resulting in a limited number of participants. Accordingly, the intervention was intentionally designed as a brief, feasibility-oriented psychoeducational webinar aimed at introducing core concepts related to work resilience rather than demonstrating definitive intervention outcomes. Although research on work resilience and digital mental health interventions continues to expand globally, empirical studies focusing on mining employees in geographically remote Indonesian settings remain limited [13]. Existing research has predominantly examined office-based or knowledge-worker populations, leaving a gap in evidence regarding the feasibility of brief, organization-approved psychoeducational webinars implemented in remote industrial contexts under real-world operational constraints [14], [15]

Therefore, the novelty of the present study lies in its feasibility-oriented examination of the implementation of a brief, organization-approved psychoeducational webinar within geographically remote mining job-site contexts. Accordingly, this pilot study focuses on describing intervention delivery among mining employees rather than evaluating effectiveness or causal outcomes.

2. METHOD

The study was not designed to evaluate intervention effectiveness or causal relationships, but to examine the feasibility of delivering a brief psychoeducational webinar and explore preliminary patterns in perceived work resilience among employees working in geographically remote settings. A total of 40 employees attended the psychoeducational webinar. The research procedure was conducted in three stages: an initial assessment (pre-test), implementation of a psychoeducational webinar, and a follow-up assessment (post-test). The study was conducted among employees working at geographically remote job sites located far from urban centers, where work activities are highly dependent on digital communication and access to face-to-face psychological support services is limited. In accordance with company policy, the researchers were not permitted to access the mining job site in person. Therefore, all research activities, including intervention delivery and data collection, were conducted entirely online in coordination with the company's Training Center staff. However,

due to network connectivity limitations at the job site and high operational workload, only 20 participants completed both the pre-test and post-test questionnaires. Consequently, data analysis was conducted using responses from these 20 participants with complete paired data. Participants were recruited using purposive sampling in coordination with company management. Due to operational demands at the job site, the company approved participation of employee representatives only, which limited the number of participants available for data collection.

Prior to data collection, participants received information regarding the study objectives, procedures, voluntary nature of participation, and data confidentiality. Informed consent was obtained electronically when participants agreed to complete the pre-test and post-test questionnaires. Primary data were collected using an online questionnaire developed for exploratory purposes. The questionnaire consisted of dichotomous (Yes/No) items designed to capture preliminary indicators of perceived work resilience. The items were informed by general concepts of work resilience, but were not intended to function as a psychometrically validated measurement scale. The intervention consisted of a single-session psychoeducational webinar delivered synchronously via an online conferencing platform. The session lasted approximately 90 minutes and was facilitated by a Training Center staff member employed by the company. Participant attendance was directly monitored by the Training Center staff throughout the session. Given the small sample size and exploratory study design, data analysis was limited to descriptive statistics and preliminary comparison across time points. All statistical results are interpreted as preliminary patterns rather than evidence of intervention effectiveness or causal impact.

To enhance transparency of the research process, Figure 1 presents the detailed research flow diagram outlining each stage of the study, from the initial identification of organizational issues to the preliminary evaluation of feasibility and participant responses

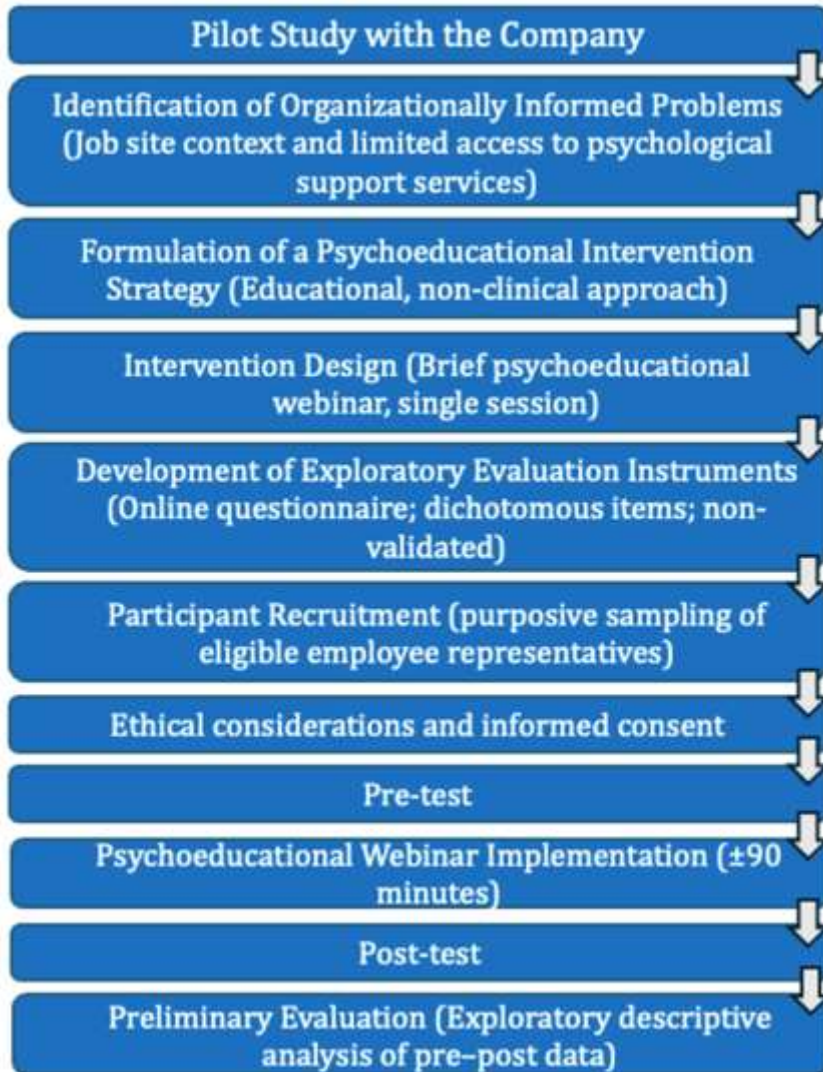


Figure 1. Research flow

3. RESULTS

Table 1. Descriptive statistics of pre-test–post-test work resilience scores

Statistics	Pre-test	Post-test
N	20	20
Missing	0	0
Mean	2.55	3.65
Median	3.00	4.00

Statistics	Pre-test	Post-test
Standard deviation	0.759	0.875
Minimum	1	2
Maximum	3	5
Shapiro–Wilk W	0.62	0.78
Shapiro–Wilk p	<.001	<.001

In direct response to the research question regarding whether participation in the webinar was associated with changes in work resilience, the descriptive results indicate a positive temporal shift in resilience scores from pre-test to post-test. The mean score increased from 2.55 at pre-test to 3.65 at post-test, and the median increased from 3.00 to 4.00. In addition, the minimum and maximum observed scores were higher at post-test (minimum = 2; maximum = 5) compared to pre-test (minimum = 1; maximum = 3), indicating an overall upward redistribution of resilience levels.

The Shapiro–Wilk test indicated non-normal distributions at both measurement occasions ($p < .001$). Because the assumption of normality was not met, a Wilcoxon signed-rank test was conducted. The results indicated a statistically significant difference between pre-test and post-test resilience scores ($p = 0.040$), providing statistical support for the observed change following webinar participation.

To further describe the pattern of change, participants were classified into Low, Moderate, and High resilience categories based on interpretation guidelines commonly applied in studies using the Brief Resilience Scale (BRS) [16], [17].

Table 2. Distribution of Participants Across Resilience Categories

Category	Pre-test	Post-test
Low	3	0
Moderate	17	7
High	0	13

At pre-test, most participants were categorized as Moderate ($n = 17$), with a small number in the Low category ($n = 3$) and no participants in the High category. At post-test, no participants

remained in the Low category; seven participants were classified as Moderate, and thirteen were classified as High.

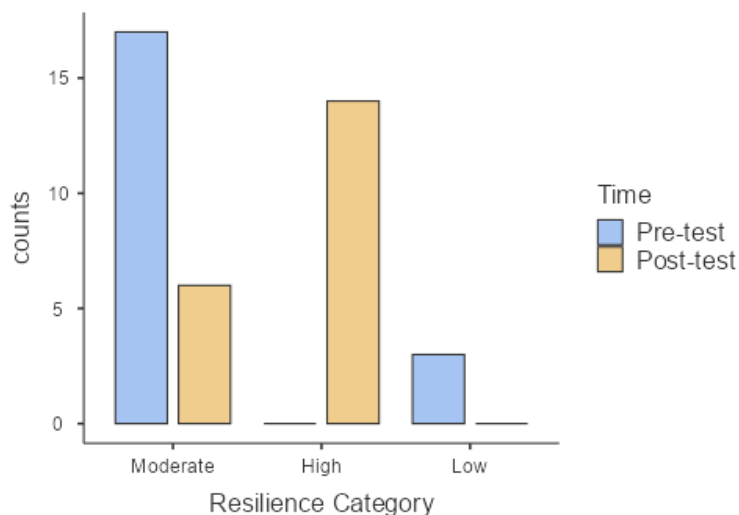


Figure 2. Distribution of resilience categories at pre-test and post-test

Frequency and percentage analyses further clarify this redistribution. At pre-test, 85% of participants were classified as Moderate and 15% as Low, with 0% in the High category. At post-test, 65% of participants were classified as High and 35% as Moderate, with 0% in the Low category. At the individual level, participants generally demonstrated upward movement in resilience category classification from pre-test to post-test, and no participant exhibited a downward shift. Taken together, these findings indicate that participation in the webinar was associated with measurable improvements in work resilience scores and category distribution from pre-test to post-test.

4. DISCUSSION

This study examined whether participation in a brief webinar-based psychoeducational intervention was associated with changes in work resilience among employees in a geographically remote industrial setting. The results demonstrated a statistically significant increase in resilience scores from pre-test to post-test, accompanied by upward redistribution across resilience

categories. In direct and explicit response to the research question, participation in the webinar was associated with measurable short-term improvement in self-reported work resilience. The Wilcoxon signed-rank test ($p = 0.040$) provided inferential evidence supporting this observed change. Thus, the research question concerning whether webinar participation was associated with changes in work resilience can be answered affirmatively in terms of statistical association, while acknowledging methodological limitations.

4.1 Theme 1: Conceptual Clarification of Work Resilience

To interpret these findings appropriately, it is necessary to clarify how resilience is conceptualized in contemporary psychological literature. Resilience has been described as a stable trait, a dynamic adaptive process, and an outcome following adversity [18], [19]. In organizational contexts, resilience is commonly operationalized as the perceived ability to “bounce back” from stress [20], [21]. However, Britt et al. [22] emphasize that brief self-report measures such as the Brief Resilience Scale primarily capture perceived coping capacity rather than directly observed adaptive recovery across time. This distinction is theoretically important because perceived resilience may fluctuate depending on cognitive appraisal and situational interpretation.

Within this conceptual framework, the increase observed in the present study likely reflects enhanced perceived coping confidence and improved appraisal of workplace stressors following psychoeducational exposure [23], [24]. As Smith et al. [16] argue, resilience measured through the BRS reflects individuals’ beliefs about their recovery capacity rather than objective behavioral indicators. Therefore, the statistically significant change observed here suggests responsiveness at the level of perceived adaptive capacity rather than deep structural transformation of resilience as a dispositional trait. This interpretation aligns with Hartmann et al. [18], who describe resilience as context-sensitive and partially malleable.

4.2 Theme 2: Empirical Alignment with Digital Resilience Literature

Building on this theoretical clarification, the findings can be positioned within the broader digital resilience and workplace eHealth literature. Meta-analytic evidence by Ang et al.

[6] indicates that structured digital resilience interventions are associated with measurable improvements in resilience-related outcomes, particularly when delivered across multiple sessions with guided facilitation and interactive components [25]. Furthermore, a systematic review and meta-analytic evidence by Stratton et al. [26] demonstrates that workplace eHealth interventions can reduce psychological distress and improve mental health outcomes, with effect sizes influenced by intervention duration, engagement level, and program structure [27]. Together, these findings suggest that digital delivery formats are capable of influencing resilience-related and mental health variables, although intervention intensity plays a critical moderating role.

Compared to the multi-session interventions examined by Ang et al. [6] and Stratton et al. [26] the present study evaluated a single-session webinar designed primarily for feasibility and scalability in a remote workforce. The modest yet statistically significant improvement observed here appears proportionate to the limited intervention intensity [28]. Rather than contradicting prior empirical findings, the results extend the literature by demonstrating that even brief psychoeducational exposure can be associated with short-term improvements in perceived resilience within occupational contexts [26]. Accordingly, in direct response to the research question, webinar participation was statistically associated with improved resilience scores, in a pattern that is directionally consistent with established digital intervention research [29], [30].

4.3 Theme 3: Contextual Relevance in Remote and High-Risk Industrial Settings

Interpretation of these findings must also consider the occupational context in which the intervention was implemented. Remote and high-risk work environments have been associated with elevated psychological strain and reduced access to structured psychosocial resources. Oakman et al. [29] report that remote working arrangements are linked to increased stress and mental health challenges, while Nyaaba et al. [5] highlight psychological distress in industrial and mining populations. Furthermore, research on remote workforce transitions indicates increased psychological challenges in geographically dispersed organizational settings [11], [31].

Within such environments, digital psychoeducation represents a pragmatic and scalable intervention strategy. [32]. The present findings demonstrate that resilience-related perceptions can shift positively even within geographically constrained industrial contexts [33]. This contextual dimension strengthens the applied relevance of the study, as it shows that short-term improvements in perceived resilience are achievable despite structural limitations in access to traditional in-person programming [34], [35]. Accordingly, the research question is not only statistically answered but also contextualized within a setting characterized by elevated occupational stress.

4.4 Theme 4: Methodological Boundaries and Interpretation of Association

Despite the statistically significant findings, methodological considerations are essential for balanced interpretation. The quasi-experimental one-group pre-test-post-test design limits causal inference. Shadish et al. [32] explain, such designs are vulnerable to internal validity threats, including testing effects, regression to the mean, and maturation [36], [37]. Therefore, while the Wilcoxon signed-rank test indicates a statistically significant difference ($p = 0.040$), the findings should be interpreted as evidence of association rather than definitive proof of intervention effectiveness.

However, the convergence of descriptive improvements (increased mean, increased median, and upward redistribution across resilience categories) and inferential significance strengthens confidence that the change reflects structured temporal variation rather than random fluctuation alone. Taken together, the theoretical clarification of resilience [38] Meta-analytic evidence indicates that structured digital resilience interventions are associated with measurable improvements in resilience-related outcomes [6]. Furthermore, systematic reviews of workplace eHealth interventions demonstrate that program duration, engagement level, and structured facilitation significantly influence effect magnitude [26]. contextual relevance in remote industrial settings, and inferential statistical evidence collectively support the conclusion that webinar participation was associated with short-term improvement in perceived work resilience.

4.5 Organizational Implications and Future Directions

Resilience has been empirically linked to work engagement and job satisfaction in organizational research [36]. However, Britt et al. [22] caution against framing resilience solely as an individual responsibility without considering structural and organizational influences. While the present findings suggest short-term perceptual improvement following webinar participation, sustainable workforce resilience likely requires multi-level organizational strategies integrating individual skill development with leadership practices and supportive work design [39], [40].

5. CONCLUSION

The present study provides a preliminary descriptive examination of changes in self-reported work resilience scores following participation in a positive psychology-based psychoeducational webinar among employees working in geographically remote industrial settings. Descriptive and non-parametric analyses indicated an overall upward shift in scores from pre-test to post-test; however, these findings should be interpreted with caution. Given the exploratory one-group pre-test-post-test design, the absence of a control group, the use of an ad hoc dichotomous measurement instrument, and the lack of follow-up assessments, the study does not permit causal conclusions regarding intervention effectiveness or practical impact. Observed score changes may reflect alternative explanations, including testing effects, regression to the mean, or contextual factors unrelated to the webinar. The findings do not establish clinical or practical significance and should not be interpreted as evidence that the intervention improves work resilience or well-being. Rather, the results indicate score variation over a short measurement interval and highlight the feasibility of webinar-based delivery as a data collection and engagement format in remote work contexts. From a theoretical perspective, concepts from positive psychology are used solely to contextualize the observed score patterns, not to explain underlying mechanisms or outcomes. The study did not directly assess emotional regulation, meaning-making, or other proposed psychological processes. Overall, the primary contribution of this study lies in its feasibility-oriented exploration of digital psychoeducational delivery in a geographically constrained industrial setting. Future research should employ controlled

designs, validated multidimensional measures of work resilience and well-being, assessment of psychometric properties, and longitudinal follow-up to determine whether observed score changes represent meaningful, sustained, or intervention-related effects. Until such evidence is available, the present findings should be regarded as preliminary and descriptive rather than confirmatory or prescriptive.

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