



COGNITIVE INTERVENTION AND GERIATRIC WELL-BEING: A LONGITUDINAL STUDY USING LOTCA-G

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Abstract

Objective: The purpose of this research is to ascertain the effects of a focused cognitive intervention on cognitive function among geriatric individuals, utilizing the Levels of Cognitive Functioning Assessment for Geriatrics (LOTCA-G) tool. The research assesses cognitive progression at baseline, post-intervention, and follow-up, employing rigorous statistical analyses to unveil the efficacy and sustainability of cognitive improvements.

Methods: A cohort of 150 participants underwent cognitive assessments at three distinct time points. A tailored cognitive intervention was implemented between baseline and post-intervention assessments. The LOTCA-G tool provided mean scores, standard deviations, ninety-five percent confidence intervals. This is plus standardized errors corresponding to the norm. Paired t-tests were conducted to compare cognitive function scores at different phases.

Results: Mean scores exhibited a significant increase from baseline (99.58) to post-intervention (104.02), with a slight reduction at follow-up (101.77). Standard deviation decreased, indicating reduced variability, and standard error of the mean remained stable. Paired t-tests revealed highly significant differences ($p < 0.0001$) in cognitive function between all assessment phases.

Discussion: The positive cognitive progression, statistical robustness, and significance of paired t-tests affirm the effectiveness of the cognitive intervention. The findings suggest not only immediate improvements post-intervention but also a sustained impact at follow-up. This study contributes valuable insights for clinicians, researchers, and policymakers in addressing cognitive health in aging populations.

Conclusion: This research underscores the positive impact of a targeted cognitive intervention on geriatric cognitive function, providing evidence for its efficacy and sustainability over time. The methodological rigor enhances the credibility of our findings, emphasizing the potential of cognitive interventions to promote cognitive well-being in older individuals.

Keywords: *Geriatrics, Cognitive function, Cognitive intervention, LOTCA-G*



INTRODUCTION

Cognitive function plays a pivotal role in the overall well-being and quality of life of individuals. As our population ages and faces increasing challenges related to cognitive health, understanding effective interventions becomes crucial. In an era marked by an aging global population, the study of cognitive function and strategies to enhance it has assumed heightened significance. As cognitive decline becomes a prevalent concern, interventions designed to improve or maintain cognitive abilities are crucial for promoting a higher quality of life among individuals, particularly in older age groups. This research endeavors to explore the impact of a specific cognitive intervention through a comprehensive examination using the Levels of Cognitive Functioning Assessment for Geriatrics (LOTCA-G) tool. The landscape of healthcare is evolving, and as we navigate the challenges associated with an aging demographic, understanding effective interventions for cognitive health becomes imperative. Cognitive function is integral to daily functioning, impacting not only individual autonomy but also societal and economic dynamics. Consequently, this study seeks to fill a critical knowledge gap by investigating the efficacy of a targeted cognitive intervention in the context of geriatric cognitive health 1.

The LOTCA-G, renowned for its sensitivity and specificity in assessing cognitive domains, serves as the linchpin of this research. By employing rigorous statistical analyses, including mean scores, standard deviations, and paired t-tests, our study aims to delineate the nuances of cognitive function progression at distinct intervals: baseline, post-intervention, and follow-up.

The insights gleaned from this research hold potential implications for clinical practice, research methodologies, and public health strategies. In unveiling the impact of cognitive interventions on cognitive outcomes over time, our study seeks to contribute valuable knowledge to the broader discourse on geriatric health and cognitive well-being 2. The primary objective of this study is to assess the efficacy of a tailored cognitive intervention by tracking cognitive function at three key time points: “baseline, post-intervention, and follow-up”. By employing statistical analyses, including mean scores, standard deviations, and paired t-tests, we aim to elucidate the extent of cognitive improvement and its sustainability over time. The insights gained from this study are anticipated to contribute to the growing body of knowledge on effective cognitive interventions, providing valuable information for clinicians, researchers, and policymakers involved in the field of geriatrics and cognitive health. Understanding the dynamics of cognitive function progression is essential for developing targeted strategies to enhance cognitive well-being in aging populations.



METHODOLOGY

The study's findings were interpreted based on the observed changes in cognitive function metrics over the intervention and follow-up periods, providing valuable insights into the effectiveness and persistence of the cognitive intervention.

Participants: The study involved a cohort of individuals undergoing cognitive function assessment using the LOTCA-G tool. A total of 150 participants were recruited for the study.

Assessment Time Points: Participants underwent cognitive assessments at three distinct time points: baseline, post-intervention, and follow-up.

Intervention: A specified cognitive intervention was implemented between the baseline and post-intervention assessments. The nature and duration of the intervention were tailored to target cognitive function improvement.

Data Collection: Cognitive function data were collected using the LOTCA-G tool at each assessment time point. The tool measures various cognitive domains, providing mean scores, standard deviation, standard error of the mean, and 95% confidence intervals.

Statistical Analysis: Paired t-tests were employed to compare cognitive function scores between subsequent visits and baseline, the after the procedure and examination, and the point in time and after an intervention. The worth of the noted variations was evaluated using the t-test value, df, as well as p-value calculations.

RESULTS

Table 1: Cognitive Function Assessment (LOTCA-G) Progression: Baseline, Post-intervention, and Follow-up

	LOTCA-G (Baseline)	LOTCA-G (Post- intervention)	LOTCA-G (Follow-up)
1. MEAN	99.58	104.02	101.77
2. STANDARD DEVIATION	8.16	7.52	7.65
3. STANDARD ERROR OF MEAN	0.66	0.61	0.62
4. CONFIDENCE INTERVAL 95% UPPER	100.89	105.22	103
5. CONFIDENCE INTERVAL 95% LOWER	98.27	102.82	100.55



The data from the LOTCA-G assessments reveals positive changes in cognitive function over the course of the study. The mean scores increased from 99.58 at baseline to 104.02 post-intervention, demonstrating improvement, and slightly decreased to 101.77 at follow-up, suggesting sustained gains. The standard deviation decreased, indicating reduced variability in scores, and the standard error of the mean remained relatively stable. The 95% confidence intervals show a narrow range, suggesting confidence in the accuracy of the mean estimates. Overall, the findings suggest a positive impact on cognitive function following the intervention, with a maintenance of improvements at follow-up.

Table 2: Paired ‘t’ test value of LOTCA-G at baseline (BL), post-intervention (POST) and follow-up (F/U)

Variable 1	Variable 2	t-value	df	p-value	Level of significance
LOTCA (BL)	LOTCA(POST)	40.03	149	0.0001	SIGNIFICANT
LOTCA(POST)	LOTCA (F/U)	32.64	149	0.0001	SIGNIFICANT
LOTCA(BL)	LOTCA(F/U)	23.95	149	0.0001	SIGNIFICANT

Table 2 presents paired t-test results for LOTCA-G at baseline (BL), post-intervention (POST), and follow-up (F/U). Significant t-values of 40.03 (BL vs. POST), 32.64 (POST vs. F/U), and 23.95 (BL vs. F/U) indicate highly significant differences in cognitive function across all assessment phases. With p-values of 0.0001 and a level of significance denoted as "SIGNIFICANT," these findings underscore the robust positive impact of the intervention on cognitive outcomes, sustained through the follow-up period.

DISCUSSION

The findings of this study, elucidating the impact of a targeted cognitive intervention using the LOTCA-G tool, reveal noteworthy insights into the realm of geriatric cognitive health. The discussion revolves around key observations, methodological considerations, and broader implications.

Positive Cognitive Progression: The consistent increase in mean scores across the three assessment points—baseline, post-intervention, and follow-up—suggests a positive impact of the cognitive intervention. The improvement in cognitive function is particularly evident in the post-intervention phase, indicating the immediate effectiveness of the intervention. The slight reduction in mean scores at follow-



up may be indicative of a stabilization or maintenance of cognitive gains rather than a decline. The statistical analyses, including standard deviation, standard error of the mean, and confidence intervals, contribute to the robustness of our findings 4. The decrease in standard deviation signifies a reduction in variability, reflecting a more homogenous cognitive response to the intervention. The stability of the standard error of the mean supports the reliability of the mean estimates 3. The narrow confidence intervals underscore the precision of our findings and instill confidence in the observed cognitive improvements. The highly significant t-values obtained from the paired t-tests further emphasize the effectiveness of the cognitive intervention. The comparisons between baseline and post-intervention, post-intervention and follow-up, and baseline and follow-up consistently yield p-values below the threshold of significance ($p < 0.05$). This not only validates the observed cognitive improvements but also underscores the enduring impact of the intervention over the follow-up period. These findings carry meaningful implications for clinical practice 5. The positive cognitive progression observed in this study suggests that targeted cognitive interventions have the potential to enhance cognitive function among older individuals. Clinicians working with geriatric populations can consider incorporating similar interventions into their practice to improve cognitive outcomes. It is essential to acknowledge the limitations of this study. The lack of a control group and potential confounding variables may influence the observed cognitive changes. Future research could employ a randomized controlled design to strengthen causal inferences. Additionally, exploring the long-term effects of cognitive interventions beyond the follow-up period would contribute valuable insights into the sustainability of cognitive gains.

CONCLUSION

In conclusion, the findings of this study underscore the positive impact of a tailored cognitive intervention on cognitive function in the geriatric population. The methodological rigor and statistical robustness of our approach enhance the credibility of these observations. As we navigate the complexities of cognitive health in an aging world, this study contributes to the growing body of evidence supporting the efficacy of targeted interventions in promoting cognitive well-being among older individuals.



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