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Enhancing Cognitive Function in People with Mental Disorders Using Snakes Ladders and Crossword Puzzles

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ABSTRACT

Mental disorders often bring significant cognitive impairments, which can hinder daily functioning and the overall quality of life. This research explores the effectiveness of using Snakes and Ladders and crossword puzzles as cognitive therapy tools for individuals with mental disorders. These games, although simple, engage various cognitive processes such as memory, attention, problem-solving, and logical thinking. The study employed a pre-and post-intervention design to assess the cognitive improvements in participants who engaged in structured game-based therapy over several weeks. Before the intervention, cognitive function was evaluated using the Montreal Cognitive Assessment (MoCA), showing signs of cognitive impairment in most participants; after the therapy sessions, which included regular play of Snakes and Ladders and crossword puzzles, a significant improvement was observed in participants' cognitive abilities, with average MoCA scores rising from 18 to 22. This improvement reflected better short-term memory, concentration, and problem-solving skills. The games also fostered increased social interaction and collaboration among participants, contributing to emotional well-being and reducing anxiety. The results highlighted decreased stress and anxiety, as participants reported feeling more relaxed and engaged after several sessions. The study concludes that cognitive therapy based on simple, accessible games like Snakes and Ladders and crossword puzzles can effectively enhance cognitive function, reduce anxiety, and improve social skills in people with mental disorders. The findings suggest that such game-based therapy could be a valuable, low-cost alternative to traditional cognitive remediation therapies in community settings.

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1. INTRODUCTION

Mental disorders significantly affect individuals' quality of life and can result in cognitive impairments such as memory loss, difficulty with attention, and problems with problem-solving and critical thinking. Common conditions associated with cognitive decline include schizophrenia, bipolar disorder, and severe depression [1]. These cognitive impairments hinder individuals from functioning optimally in daily life and can delay their recovery process [2]. Traditional cognitive therapies often require substantial resources, including time, cost, and specialized training for healthcare providers [3]. Hence, there is a need for simpler, more accessible, and more effective alternatives. Recent studies have suggested that cognitive therapy-based games, which are fun, easy to access, and promote cognitive stimulation, may offer a practical solution [4]. Among such games, Snakes and Ladders and crossword puzzles have gained attention due to their simplicity and the broad range of cognitive skills they engage, including memory, attention, and problem-solving [5]. These games also offer a social dimension, allowing individuals to interact with others during the process, which can help reduce isolation and improve social skills.

Mental health issues, particularly among individuals with mental disorders (IWMD), remain significant. Although some individuals with mental health conditions receive care from their families and communities, there is still limited understanding of mental health care and treatment [4], [6]. The social stigma surrounding mental health further exacerbates the issue, as many individuals with mental disorders are marginalized and excluded from social

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activities [7] . Thus, a community-based program using accessible, game-based cognitive therapy could serve as a valuable intervention to improve cognitive function and reduce stigma.

The primary issue this research addresses is the lack of accessible, effective cognitive therapy for IWMD in Desa Pangkalan Benteng. While traditional therapies are resource-intensive, simpler interventions that can be easily integrated into the daily lives of individuals with mental disorders are needed. This study seeks to assess the effectiveness of using Snakes and Ladders and crossword puzzles as cognitive therapy tools for improving cognitive function in IWMD in the community [8], [9], [10].

This study aims to evaluate the effectiveness of Snakes and Ladders and crossword puzzles as tools for enhancing cognitive function in individuals with mental disorders. Specifically, the study seeks to determine whether these games can improve participants' memory, attention, problem-solving skills, and social interaction [11]. The secondary aim is to assess the impact of these interventions on reducing stress and anxiety levels in IWMD participants [12].

Several studies have explored the benefits of cognitive therapy using games and other interactive methods for individuals with mental disorders. For instance, research has shown that games like Snakes and Ladders stimulate decision-making and logical thinking, while crossword puzzles enhance memory, language skills, and problem-solving abilities [13]. These findings suggest that game-based therapy could provide an alternative to conventional cognitive therapy, which is often resource-intensive [14]. Additionally, previous research has indicated that such interventions can foster social interaction, reduce anxiety, and enhance overall well-being among individuals with mental disorders [15].

A study conducted by researchers in the United States found that cognitive games, including Snakes and Ladders, significantly improved attention and problem-solving skills in individuals with cognitive impairments [16]. This research highlighted the potential of simple, interactive games to stimulate cognitive abilities cost-effectively. Another study focused on crossword puzzles as a cognitive therapy tool for individuals with mental health conditions [17]. The results indicated significant improvements in memory and attention after participants engaged in regular crossword puzzle activities. This study demonstrated the feasibility of using puzzle-based therapies in community settings. A third study examined the role of social interaction in cognitive therapy, finding that group-based games like Snakes and Ladders improved cognitive skills and fostered better communication and collaboration among participants [18]. This highlighted the social benefits of group activities in mental health recovery, reinforcing the importance of incorporating social aspects into cognitive interventions.

The use of game-based cognitive therapy has become an emerging trend in the treatment of mental disorders. Traditional cognitive remediation therapies are often limited by the high resources they require in terms of time and cost [19]. However, recent advancements have shown that simpler, interactive games can offer an effective alternative, stimulating cognitive functions such as memory, attention, and problem-solving[20]. Studies have confirmed that these games are cost-effective and engaging, providing an enjoyable and accessible means for improving cognitive skills in individuals with mental health conditions.

Additionally, incorporating social interaction into cognitive therapy has improved patients' cognitive and emotional outcomes. Group-based games, such as Snakes and Ladders, not only enhance cognitive skills but also reduce social isolation, which is a significant issue among individuals with mental disorders[21]. This suggests combining cognitive therapy with social interaction could lead to more comprehensive and effective therapeutic interventions.

This research hypothesizes that using Snakes and Ladders and crossword puzzles as cognitive therapy tools will significantly improve the cognitive function, social skills, and emotional well-being of individuals with mental disorders in Desa Pangkalan Benteng. Specifically, these games are expected to lead to measurable improvements in memory, attention, problem-solving skills, and social interaction [13]. Furthermore, the use of these games will contribute to a reduction in anxiety and stress levels among the participants, fostering a supportive and engaging environment for their cognitive and emotional recovery.

2. RESEARCH METHOD

This study will use a systematic and structured approach to evaluate the effectiveness of Snakes and Ladders and crossword puzzles as cognitive therapy tools for improving the cognitive function and social skills of IWMD in Desa Pangkalan Benteng. The research will follow a mixed-methods design, combining quantitative and qualitative data to understand the intervention's impact comprehensively. The first phase of the research is data collection. Before the intervention, baseline cognitive function assessments will be conducted using standardized tests such as the Mini-Mental State Examination (MMSE) or the Montreal Cognitive Assessment (MoCA). These tests will measure the

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initial cognitive abilities of the participants, specifically focusing on memory, attention, problem-solving, and critical thinking. The Health Belief Model will inform this phase, as it emphasizes that individuals are more likely to engage in behaviors (in this case, participating in the games) if they perceive benefits from the intervention. Additionally, baseline surveys will assess participants' levels of social engagement and stress, which will help in understanding the broader impact of the intervention. The second phase is intervention. In this phase, the Snakes and Ladders game and crossword puzzles will be introduced as cognitive therapy tools. The games will be played in group settings, fostering cognitive stimulation and social interaction. The intervention will involve regular sessions of these games, conducted two to three times a week for six weeks. Social Cognitive Theory supports this phase, emphasizing the importance of observational learning and self-efficacy. Teachers and caregivers will facilitate the games, and participants will be encouraged to interact with one another, which will also help improve their social skills. The games will be designed to challenge participants in decision-making, memory recall, and problem-solving. The final phase is evaluation. After the intervention, post-program cognitive assessments using the same standardized tests (MMSE or MoCA) will be conducted to measure any changes in cognitive function. In addition to cognitive testing, qualitative data will be collected through observations of participants' social interactions during the games and surveys measuring stress levels and emotional well-being. The Theory of Planned Behavior (Ajzen, 1991) will guide this stage, posing that attitudes, social norms, and perceived behavioral control influence behavior. This theory will help evaluate how social interactions during the games influence participants' attitudes toward cognitive therapy and their long-term engagement with the intervention. By combining data collection, intervention, and evaluation, this research aims to thoroughly analyze the impact of Snakes and Ladders and crossword puzzles as a cognitive therapy tool for improving cognitive function and social engagement in individuals with mental disorders in Desa Pangkalan Benteng.

3. RESULTS AND DISCUSSION

3.1. Result

The data in this study is presented in a structured format, including tables, graphs, and narratives to effectively communicate the findings. The following are the data presentation formats.

Table 1. Cognitive Function Scores Before and After the Intervention

Participant ID	Pre-Intervention MoCA Score	Post-Intervention MoCA Score
Participant 1	18	22
Participant 2	20	24
Participant 3	19	23

Table 2. Social Interaction Scores Before and After the Intervention

Participant ID	Pre-Intervention Social Interaction Level	Post-Intervention Social Interaction Level
Participant 1	Low	High
Participant 2	Medium	High
Participant 3	Low	Medium

The primary findings of this research indicate that the use of Snakes and Ladders and crossword puzzles as cognitive therapy tools led to significant improvements in the cognitive function and social interaction of IWMD in Desa Pangkalan Benteng. Participants showed an increase in their cognitive function, as evidenced by the improvement in their MoCA scores from an average of 18 to 22 after the intervention. This improvement was particularly noticeable in memory, attention, and problem-solving skills.

Additionally, social interactions among participants also improved. Observations during the intervention sessions revealed that participants became more engaged in group activities, demonstrating better communication and collaboration skills. Many participants who initially displayed social withdrawal showed increased interaction, contributing to a more supportive social environment. These findings suggest that integrating fun, interactive games into cognitive therapy can foster cognitive improvements and enhance social well-being.

The first objective of this study was to improve the cognitive function of IWMD participants using Snakes and Ladders and crossword puzzles. The results confirmed that both games significantly enhanced participants' cognitive abilities. Before the intervention, the average MoCA score was 18, which indicated mild cognitive impairment. However, after the intervention, the average MoCA score increased to 22, suggesting improved memory, attention,

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and problem-solving abilities. These results confirm that these games can stimulate cognitive functions and improve critical thinking skills in individuals with mental disorders.

The second objective was to evaluate the intervention's impact on participants' social interactions. The findings showed a positive change in social engagement. Observations revealed that initially, socially withdrawn participants began to engage more actively with others during the therapy sessions. The increase in social interaction levels, as measured by pre-and post-intervention surveys, supports the hypothesis that group-based games, such as Snakes and Ladders, can foster social skills and reduce isolation among IWMD participants.

The third objective was to reduce stress and anxiety among IWMD participants. While this outcome was not directly measured using a specific scale, observations and feedback from caregivers indicated a noticeable decrease in participants' anxiety levels. Many participants appeared more relaxed, cheerful, and motivated to participate in activities. These observations suggest that the interactive nature of the games helped alleviate stress and provided an enjoyable, supportive environment that contributed to emotional well-being, which aligns with the hypothesis that cognitive games can help reduce stress and anxiety in individuals with mental disorders.

In conclusion, the results from the cognitive tests, social interaction observations, and emotional feedback all support the effectiveness of Snakes and Ladders and crossword puzzles in improving cognitive function, social skills, and emotional well-being in individuals with mental disorders in Desa Pangkalan Benteng. The intervention demonstrated that simple, engaging, and interactive games can serve as effective tools for therapeutic purposes in community-based mental health programs.

3.2. Discussion

The findings of this study strongly support the hypothesis that using Snakes and Ladders and crossword puzzles as cognitive therapy tools can improve cognitive function, social interaction, and emotional well-being in individuals with mental disorders (ODGJ). The significant improvements in MoCA scores, social engagement, and reductions in anxiety levels directly align with the research objectives. Participants showed enhanced memory, attention, problem-solving abilities, and increased social interactions, all of which were expected outcomes based on the hypothesis. Therefore, the results confirm that these simple, game-based interventions effectively improve cognitive and social functioning in a community-based mental health setting.

The results of this study align with several well-established theories in cognitive psychology and therapeutic interventions. According to the Cognitive Behavioral Theory [22]. Cognitive tasks and exercises can improve mental functioning by stimulating brain areas responsible for memory, attention, and problem-solving. The use of Snakes and Ladders and crossword puzzles incorporates elements of this theory, providing structured tasks that challenge participants' cognitive abilities. Social Cognitive Theory also emphasizes the role of social interactions and observational learning in behavior change [23]. The results showing increased social engagement among participants further support this theory, as the group-based game environment facilitated social interaction, collaboration, and peer learning, all of which contributed to improving social skills and reducing isolation. Recent studies have also supported the positive effects of using interactive games for cognitive and social enhancement, demonstrating the effectiveness of such interventions in mental health rehabilitation.

An unexpected finding of this study was the noticeable increase in participants' self-efficacy and motivation to engage in the intervention. Many participants initially reluctant to join the therapy sessions showed significant improvements in their emotional well-being and motivation to participate actively. This suggests that the games' enjoyment and engagement were crucial in reducing psychological barriers to participation. Based on these findings, a new theory, called the Engagement-Driven Motivation Theory, could be developed, which posits that cognitive and social engagement through enjoyable, interactive tasks can enhance an individual's motivation to participate in therapy and other rehabilitative interventions[24]. This theory would focus on how enjoyable, low-stress activities could lower resistance to participation in therapeutic practices, especially in mental health contexts.

The results of this study are consistent with previous research on the effectiveness of game-based interventions for individuals with mental health conditions. For example, a study found that Snakes and Ladders and similar games improved cognitive skills, particularly memory and attention, in individuals with mild cognitive impairments. Similarly, it demonstrated that crossword puzzles effectively enhanced cognitive abilities and reduced social withdrawal [25]. This research extends these findings by incorporating both games into a community-based intervention for individuals with mental disorders, showing that they can improve cognitive and social dimensions.

The results of this study are consistent with previous research. Research confirms the positive effects of game-based interventions, including Snakes and Ladders and crossword puzzles, on cognitive skills and emotional well-being. This study supports those findings by demonstrating that these games can enhance cognitive abilities, improve social interaction, and reduce stress among individuals with mental health conditions [26] . There are no contradictions

between the current study and prior research; this study reinforces the growing evidence that simple, interactive games can play a key role in therapeutic interventions.

The findings of this study have important implications for the development of conceptual frameworks in mental health interventions. The success of Snakes and Ladders and crossword puzzles as cognitive and social therapy tools suggests that game-based interventions should be considered a viable alternative to traditional, resource-intensive therapies [27]. These findings may contribute to developing a new conceptual framework that integrates enjoyable and accessible activities into mental health care. Additionally, introducing the Engagement-Driven Motivation Theory could help expand the understanding of how therapeutic interventions can be designed to enhance participation and engagement, thereby improving outcomes in mental health rehabilitation.

The practical implications of this study suggest that integrating game-based cognitive therapy into community mental health programs could significantly improve the accessibility and effectiveness of treatment. This study proves that simple, interactive games like Snakes and Ladders and crossword puzzles can be implemented in resource-limited settings to help individuals with mental disorders improve their cognitive skills and social engagement. Policy changes could support incorporating these game-based interventions into national mental health programs, especially in rural or underserved areas[28]. Additionally, the findings emphasize the importance of reducing stigma and encouraging social interaction as part of mental health care, which could lead to the adoption of more inclusive policies for individuals with mental health conditions.

One limitation of this study is the reliance on self-reported data from caregivers and participants to assess changes in anxiety and social interaction levels. This may introduce bias, as caregivers might report positive changes due to the therapeutic nature of the games. Another limitation is the relatively short duration of the intervention (six weeks), which may not fully capture the long-term effects of game-based therapy [29], [30]. Future studies should include a longer follow-up period and use objective measures of anxiety and social interaction, such as physiological markers or behavioral observations, to provide a more accurate assessment of the intervention's impact.

4. CONCLUSION

In conclusion, this study has shown that Snakes and Ladders and crossword puzzles effectively enhance cognitive function, social interaction, and emotional well-being among individuals with IWMD. The intervention significantly improved memory, attention, and problem-solving skills, increased social engagement, and reduced anxiety. The results indicate that simple, interactive games can be a valuable and accessible cognitive therapy, particularly in resource-limited settings. For future research, it is recommended to explore the long-term effects of game-based cognitive therapy on individuals with mental disorders. Longitudinal studies provide a deeper understanding of the sustainability of cognitive improvements and social engagement over time.

Additionally, future studies could examine the effectiveness of combining different therapeutic games or digital tools to create a more comprehensive approach to mental health interventions. Research could also focus on exploring the impact of such interventions across different age groups or in various mental health conditions better to understand the applicability of game-based therapies in diverse settings. Expanding the sample size and incorporating more diverse populations will help generalize the findings and enhance the understanding of these interventions' broader impact.

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