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Cognitive Functioning and Emotional Regulation in Older Adults

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ABSTRACT

The present correlational study was aimed at examining the relationship between cognitive functioning (CF) and emotional regulation (ER) to determine the gender differences between them. To explore these dimensions, a sample of 200 community-dwelling Older Adults (M=100, F=100) with an age range of 60+ has been selected using purposive sampling from Lahore district, Punjab. Montreal Cognitive Assessment (MoCA) and Emotional Regulation Questionnaire (ERQ) were used to assess both variables. The data was analyzed using SPSS version 27. The t-test results revealed that there exists gender differences in CF but not evident in ER. The correlational analysis suggested a positive correlation between CF and cognitive reappraisal(CR) and a negative correlation was found between CF and expressive suppression (ES. The findings of the current study can be implicated in the field of Clinical Psychology to establish programs that will help improve mental well-being of aged people by exploring their emotional experiences. Effective emotional regulation strategy which is CR, can enhance CF and resilience in older adults, allowing them to better navigate age-related challenges.

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1. Introduction

Aging is an overall process of gradual and continuous natural change that is being started in middle adulthood. During the time period of middle adulthood, there are numerous changes that starts to occur and lead towards gradual decline of bodily functions either physical or mental (Stefanacci, 2024). Older population is increasing at a faster rate globally. Looking ahead to 2050, the worldwide population of people aged 60 and older is projected to double, reaching 2.1 billion (World Health Organization, 2022, October 1). As the sixth most populous country globally, Pakistan currently has over 8 million older adults (Cassum et al., 2020). This age band is suffering from different problems. These challenge include losing a sense of purpose after retirement, difficulty with performing everyday tasks, finding the proper care and financial insecurities which are speculated to impact their overall well-being (Renan, 2020, August 30). Recognizing and addressing these challenges is crucial for promoting a healthier and more inclusive aging experience (World Health Organization, 2023). An important factor to study in this age bracket involves investigating different strategies older adults use to control their emotions (emotional regulation) and another important factor is to explore their level of cognitive functioning. Emotional regulation is studied in terms of two Emotional Regulation Strategies i.e. Cognitive Reappraisal and Emotional Suppression and cognitive functioning will be studied on the basis of seven cognitive domains that MoCA has analysed.

1.1. Emotional Regulation

Cognitive reappraisal (CR) and expressive suppression (ES) are two common emotional regulation strategies that have been extensively studied by different psychologists and researchers over the time period. CR is defined as an emotional regulation strategy that involves restructuring and reframing the meaning and content of emotion eliciting situations which make the individual able to reinterpret their emotional responses. ES is an emotional regulation strategy in which individuals instead of reframing their emotions inhibit or reduce the ongoing emotion- expressive behaviour (Gross, 1998). It is defined as an emotional regulation strategy that refers to consciously control one's behavioural responses and able to hide emotions while maintaining a neutral facial expressions (Cutuli, 2014).

1.2. Cognitive Functioning

Cognitive functioning, as defined by Dr. Ziad Nasreddine, refers to the different mental processes involved in acquiring, storing, and using information. Cognitive functioning enables individuals to interact effectively with their environment, solve problems, make decisions, and engage in different activities of daily life. There are number of cognitive functioning domains including memory , executive functioning , attention, language, visuospatial abilities, abstract reasoning and orientation to time and space. These are all the domains that MoCA measure in order to evaluate the cognitive functioning in older adults (Wood et al., 2020).

1.3. Relationship among Emotional Regulation and Cognitive Functioning

Emotional regulation and cognitive functioning are associated with each other in the light of previous literature. A study results signifies that Emotion Regulation strategies impact the executive functioning in older adults (Brothers et al., 2022). These will lead to conclusion that a relationship between emotion regulation and cognitive functioning exist but this notion is not consistent in every culture, so detailed investigation is required to explore the dynamics.

1.4. Purpose of Study

To determine the relationship between CF and ER strategies (CR, ES) in older adults. This research has majorly targeted older adults as this age group is a neglected part of our society. To counter this outgroup bias towards older adults, they have been selected as sample. It is important to note that while numerous international studies have examined how ER impacts CF in this population, there is a dearth of research specifically focused on Pakistani population. Most available studies originate from Western or East Asian contexts, where family structures, social interactions, and cultural norms regarding emotional expression differ significantly from those in Pakistan. In Pakistani culture, older adults typically reside within close-knit family units, where emotions tend to be managed privately rather than expressed openly. These cultural factors, along with traditional gender roles and limited mental health awareness, likely influence the ways older adults regulate their emotions and how this regulation affects their cognitive performance. Further it was also aimed at determining the ER strategy that has a positive impact on CF in older adults. The results can guide healthcare professionals in development interventions for teaching ER strategy which have a positive impact on CF.

1.5. Hypotheses

- There would be gender differences in cognitive functioning.
- There would be gender differences in emotional regulation.
- Cognitive functioning would have a negative correlation with expressive suppression.
- Cognitive functioning would have positive correlation with cognitive reappraisal.

2. Theoretical Framework

The Cattell–Horn–Carroll (CHC) theory is one of the most significant models explaining the structure of human intelligence. According to this framework, intelligence encompasses two major components: fluid intelligence (Gf) and crystallized intelligence (Gc). Fluid intelligence refers to the capacity to think logically, solve innovative problems, process information quickly, and adapt to unfamiliar situations. Fluid intelligence is a biologically based skill that tends to deteriorate with age as a result of changes in condensed processing speed and brain efficiency. The accumulation of information, language proficiency, and life experiences acquired via education and cultural exposure, on the other hand, is reflected in crystallized intelligence. Because it is mostly dependent on long-term learning and cultural context, this capacity usually stays constant or even increases throughout adulthood. Since many cognitive processes,

including executive functioning, working memory, and attentional control, rely on elements of fluid intelligence, CHC theory highlights how these abilities interact to influence cognitive functioning in later life. The idea that an older adult's ability to carry out cognitively demanding tasks, such as those necessary for emotion regulation, may be impacted by decreases in fluid cognitive capacities is directly supported by this theoretical perspective.

Gross's Process Model of Emotion Regulation describes how individuals manage, modify, or sustain their emotional responses through various strategies. Two widely studied strategies are CR, which involves reframing a situation to alter its emotional impact, and ES, which consists in obstructing outward emotional expressions. Both strategies rely on cognitive resources, including working memory, attentional shifting, and processing speed, all of which are closely linked to fluid intelligence. CR is particularly demanding, rendering it more susceptible to age-related cognitive decline. By combining these two theories, we have a better understanding of the interactions between emotion regulation and cognitive functioning in older adults. From the theory we can anticipate that improved cognitive performance will be linked to increased usage of cognitive reappraisal and decreased reliance on expressive suppression since emotion regulation techniques depend on on the cognitive resources described in the CHC hypothesis.

3. Literature Review

A review of relevant literature was conducted to establish the theoretical and empirical foundation of the study and to identify gaps in existing knowledge regarding cognitive functioning and emotion regulation in older adults (Brothers et al., 2022) studied the habitual and recent use of cognitive reappraisal and expressive suppression among 201 older adults. They explored that recent use of both strategies predicted executive functioning (EF) accuracy more strongly than habitual patterns. This suggests that emotion regulation draws immediate cognitive resources, a point relevant to the present study's focus on cognitive functioning. The relationship between EF and emotion regulation was also investigated by King Johnson et al. (2023). They discovered that reappraisal was positively correlated with shifting ability, particularly in situations where social support was strong. Reliance on expressive suppression was also lessened by social connections. They discovered no connections between additional EF components and emotion regulation, in contrast to Brothers et al. (2022), pointing to inconsistencies in the literature and emphasizing the need for more investigation.

Tuicomepee et al. (2018) investigated emotion regulation and successful aging among Thai older adults. Cognitive reappraisal emerged as the strongest predictor of successful aging. Although the study did not directly measure CF, the findings support the idea that emotion regulation plays a significant role in overall well-being, making it relevant for studies focusing on cognitive health. Opitz et al. (2014) found that fluid cognitive ability, particularly processing speed, associated strongly with reappraisal success in both younger and older adults. These results also supported the theoretical notion that emotion regulation rely on cognitive resources, aligning with CHC. Demographic differences was also seen in cognitive functioning. Engedal et al. (2021) reported that men scored higher than women on MoCA assessments in an Italian sample. This highlights the influence of demographics on cognitive scores and the importance of considering contextual factors when interpreting cognitive functioning among older adults. While international studies provide strong evidence linking cognitive functioning and emotion regulation, very limited research exists from Pakistan. Most studies originate from Western or East Asian settings, where family structures, emotional norms, and aging expectations differ significantly from Pakistani culture. In Pakistan, older adults commonly live in extended family systems where emotional expression is influenced by collectivistic standards, social expectations, and limited mental health awareness. These cultural elements may form how older adults regulate their emotions and how such regulation relates to their cognitive functioning. Taken together, previous research shows that emotion regulation is closely tied to cognitive resources, yet findings are inconsistent across studies and unexplored in Pakistani contexts. This gap justifies the present investigation into the association between cognitive functioning and emotion regulation among older adults in Pakistan.

3.1. Clinical and Social Significance of Study

The age bracket of older adults was considered to study the link between the two variables of Emotional Regulation and Cognitive Functioning as the cognitive decline is very significant during this period. From a clinical perspective, this knowledge can guide healthcare

professionals in development of interventions that target cognitive decline and promote the well-being. From a social perspective, this can counter the stereotype of ageism and foster inclusivity. A society that values the nuanced insights and contributions of older adults can be developed by taking in consideration the emotional experiences of older adults. Through this we can help create a more inclusive and empathetic environment for previously isolated age groups. Furthermore, encouraging social connectedness among this population can also help in better cognitive performance and emotional well-being.

4. Methodology

This section provides information on the research approach used in this study.

4.1. Research Design

The study variables' relationship was investigated using a correlational research approach. It had been chosen to investigate the interaction of research variables in the target population.

4.2. Sample and Sampling Strategy

Target population was community-dwelling older individuals aged 60 and above from the Lahore district. Lahore was selected as the site for this study due to its concentration of old age homes, which accommodate older adults from a variety of cities. This characteristic allows the older adult population in Lahore to serve as a representative sample of older adults across Pakistan. Furthermore, the city attracts residents from multiple regions, enhancing the generalizability of the sample to the broader Pakistani population. A total of 200 people were chosen, with 100 men and 100 women. A purposive sampling strategy (non-probability technique) was used to choose participants based on predetermined inclusion and exclusion criteria. This strategy provide us determined criteria which aligned with our study objectives and helped us target population which was required as a sample. It is cost and time efficient, allowing us to reach a population that was not easily assessible (Etikan, 2016). While having its advantages, the disadvantage was that this strategy limit the generalizability of the results on broader population (Baltar & Brunet, 2012).

4.3. Inclusion Criteria

- Older adults (male and female) aged 60 years or above residing in the community (non-institutionalized).
- Older adults who were married and had children.

4.4. Exclusion Criteria

- Older adults suffering from chronic physical ailment (Dementia) and diagnosed with psychological disorders (e.g., depression, PTSD, or generalized anxiety disorder).
- Older adults who experienced the loss of a loved one (spouse, sibling, or child) within the past six months.

4.5. Operational Definition of Study Variables

4.5.1. Cognitive Functioning

It was described as number of mental processes that involved in acquiring, storing and using the acquired information. These processes includes several cognitive aspects such as memory, perception, language, attention, problem-solving, reasoning and decision-making. These helped individuals to interact with their environment effectively, solving problems, making decisions and engaging in a number of daily life activities (Nasreddine et al., 2005).

4.5.2. Emotional Regulation

"Emotional regulation is the internal and transactional processes through which individuals consciously or unconsciously modulate one or more components of emotion, by modifying either their own experience, behavioural expression, or the emotion-eliciting situation" (Gross, 2002; Gross & John, 2003).

4.5.3. Cognitive Reappraisal

It is defined as an emotional regulation strategy that involves restructuring and reframing the meaning and content of emotion eliciting situations which make the individual able to reinterpret their emotional responses (Gross, 1998).

4.5.4. Expressive Suppression

An emotional regulation strategy in which individuals instead of reframing their emotions inhibit or reduce the ongoing emotion- expressive behavior (Gross, 1998).

4.6. Instruments

4.6.1. Demographic Sheet

This sheet was used to capture basic demographic information such age, gender, education level, and marital status. The document helped assess eligibility based on the inclusion and exclusion criteria.

4.6.2. Emotional Regulation Questionnaire (ERQ)

The ERQ, created by James J. Gross and John J. Oliver in 1999, was used to assess emotional regulation across two dimensions: cognitive reappraisal and expressive suppression. The reliability coefficient of the tool ranges between 0.70 and 0.85, showing strong internal consistency. Urdu version of this questionnaire was translated by Sadia Bano Abbasi and Syeda Farhana Kazmi in year 2022. Tool was found to be highly reliable with psychometric properties indicating α = 0.8.

4.6.3. Montreal Cognitive Assessment (MoCA)

MoCA was developed by Dr. Ziad Nasreddine in 1996. This tool was considered as one of the most used cognitive screening instrument. It's used to measure cognitive functioning of individuals on parameters including memory, visuospatial tasks, language and other areas. Minimum time required to complete 30 items of MoCA is 10-12 minutes. Cut-off score of 26 indicated that individual has cognitive impairment. This tool was translated in Urdu language (Habib, 2015) and was used in Urdu for this study to facilitate research participants. Tool's psychometric properties are established and is considered as highly reliable and valid tool to screen out potential cognitive impairments. It has good Cronbach's alpha value (α = 0.79), and a high inter-rater reliability (ICC = 0.96).

4.7. Procedure

Study topic was finalised after extensive reviews and meeting regarding its importance, practicality and effectiveness. After finalization of topic, next step was to develop a data collection form for which permissions were taken from respective authors of the tools. This form consisted of Demographic Performa, MoCA, and ERQ to collect data from study participants. Purposive sampling serves as a sampling strategy to predetermine the criteria for selection of the study participants. Before conducting actual research study, pilot study was conducted on five older adults to assess technicalities and appropriateness of tools. Main study was done and data was gathered from elderly individuals that belongs to Lahore district. It was ensured that all ethical principles were taken into consideration such as ensuring participant's confidentiality. Information sheet was provided so that participants were aware of study objectives and aims. After data collection, it was entered on SPSS sheet for analysis. Descriptive statistics, such as mean, percentage, and frequency, were calculated. Pearson Product Moment Correlation was run to explore relation between study varaibles. In addition, a t-test was used to determine gender differences among older adults.

5. Results

The use of independent-samples t-tests and Pearson correlations was supported by the assessment of the assumptions pertaining to these analyses, which revealed no violations. Levene's test verified the homogeneity of variances, and distributions were roughly normal as shown by the values of skewness and kurtosis. The participants' demographics are shown in Table 1. The age range of the participants was 60 to 89 years (M = 65.06, SD = 5.57). When it came to education, the largest group (n = 65) had completed matric or intermediate education, followed by those with elementary or middle-level education (n = 54). Participants with master's degrees (n = 19) or graduations (n = 29) made up smaller groupings, whereas 29 were uneducated and 4 reported having additional credentials. In terms of employment, 83 individuals stated that employment was not relevant, 55 were retired, and 61 were actively employed. 145 respondents said their spouse was still alive, and the majority of respondents (n

= 142) lived in joint families. Table 2 presents the descriptive statistics and reliability coefficients for the measures used in the study. Cognitive Functioning (M = 24.96, SD = 3.73, α = .662) served as the primary scale, while Cognitive Reappraisal (M = 29.91, SD = 6.74, α = .652) and Expressive Suppression (M = 19.93, SD = 4.99, α = .528) represented its subscales. All scales demonstrated satisfactory reliability and variability among participants.

Table 3 shows the correlations among the study variables. A non-significant positive correlation was found between cognitive functioning and cognitive reappraisal (r = .067, p > .05), suggesting that older adults with better cognitive functioning tend to use cognitive reappraisal more frequently as an emotion regulation strategy. In contrast, a non-significant negative correlation was observed between cognitive functioning and expressive suppression (r = –.074, p > .05). Furthermore, there were positive correlations between cognitive functioning and both education level (r =.226, p <.01) and the quality of relationship with friends (r =.211, p <.01) and siblings (r =.168, p <.05). Overall, the results indicate that while some correlations were not statistically significant, cognitive functioning generally relates positively to higher education and stronger social relationships.Table 4 presents the mean differences in cognitive functioning and emotion regulation strategies across gender. A significant difference emerged in cognitive functioning between men (M = 25.81, SD = 3.34) and women (M = 24.11, SD = 3.91), t(198) = 3.30, p = .001, indicating that male participants had higher cognitive functioning scores. The effect size was medium (Cohen's d = 0.68). In contrast, gender differences were non-significant for cognitive reappraisal, t(198) = 1.41, p = .160 (M = 30.58, SD = 6.47 for men; M = 29.24, SD = 6.96 for women), and expressive suppression, t(198) = -0.14, p = .888 (M = 19.88, SD = 4.84 for men; M = 19.98, SD = 5.15 for women). These results suggest that while men demonstrated better cognitive functioning, emotion regulation strategies were generally similar across gender.

6. Discussion

The research was done considering the significance of the older adult population in society. The results of the research indicate positive and negative correlations between variables and gender differences. A detailed discussion was done below. The first hypothesis stated that there will be gender differences in cognitive functioning. After the analysis, this hypothesis is accepted, as significant gender differences in cognitive functioning were found, with men exhibiting higher mental functioning. Prior literature also supports this hypothesis. A study conducted to explore the gender differences in cognitive functioning concluded that men outperform women in visuospatial tasks while women outperform men in verbal tasks (Maitland et al., 2000). Another study aimed to find the sex differences in the scores of MoCA, MMSE, and self-report memory problems in older adults concluded that men had significantly higher scores than women on the items vasoconstriction (copying a cube and clock drawing test) and serial subtraction on MoCA (Engedal et al., 2021). As of 2022, the male literacy rate stands at 70% while the female literacy rate lags at 48% (The Express Tribune, 2023, August 19). This might also be a reason for fewer females on MoCA as compared to men. Engaging in a variety of social interactions outside the home can enhance cognitive functioning. Males are more likely to work in diverse fields that require a range of cognitive skills. Jobs that involve planning, decision-making, and interaction with different people can enhance cognitive abilities. Regular physical activity, often more accessible to males, is linked to better cognitive functioning. They have more freedom to socialize in different settings, participate in group activities, and engage in competitive sports, all of which stimulate cognitive processes.

The second hypothesis stated that the gender differences in emotional regulation are not significant, which is supported by our findings and prior literature. A study conducted to investigate the gender differences in emotional regulation with depression concluded that once the depressive symptoms are controlled, no gender differences were there (Kwon et al., 2013). A review to explore the cross-cultural variation in emotional regulation suggests that culture, instead of gender, sets our preferences for which emotional regulation strategy to use. These results signifies that individuals residing in individualistic cultures use emotional expression while in cultures such as Pakistan (collectivistic culture), emotional suppression was used to regulate emotions. To sum up, culture predicts whether individuals are motivated to express or suppress their emotions (Ramzan & Amjad, 2017). Another reason for the non-significant gender differences is that both men and women accumulate substantial life experience, which enhances their ability to manage emotions effectively over time (Bailly et al., 2023). Cognitive

changes and social support systems play significant roles in equalizing emotional regulation abilities between older men and women. Traditional gender norms tend to become less prominent. Similar levels of emotional regulation may result from older persons having more equitable access to social engagement, emotional expression, and support. Similar changes in daily routines and social responsibilities may occur for both sexes, resulting in similar coping mechanisms for emotions. There are no appreciable gender variations in emotional regulation since men and women go through a comparable adaptation process (Urry & Gross, 2010).

Quality of relationship with siblings and friends are indicators of high level of emotional regulation and well-being in individuals. A research study (Stocker et al., 2020), stated that the quality of sibling relationships older adults have is linked with their well-being. Research also shows that social connections can positively impact cognitive function by providing psychological benefits that help reduce stress, depression, and feelings of loneliness. This effect is closely connected to the functional aspect of social relationships (Kim, 2023). A study concluded that older adults in the commanding-conflicted type of relationship had the lowest cognitive function (Li et al., 2022). Another study concluded that poor social relationships were associated with cognitive decline (Piolatto et al., 2022). Thus, all these studies emphasize the importance of having good-quality relationships for better cognitive functioning. The third hypothesis stated the negative correlation between cognitive functioning and expressive suppression. The statistical analysis showed that there is a non-significant negative correlation between the two variables. The negative correlation is supported by the previous literature, too. In a study conducted in 2022 to investigate the multivariate relationship among expressive suppression, cognitive reappraisal, and executive functioning, it was found that expressive suppression has a deleterious impact on executive functioning (Brothers et al., 2022). There are no significant gender differences found in Cognitive Reappraisal and Expressive Suppression. It appears that both groups employ emotional regulation strategies at similar levels.

The fourth hypothesis suggested a positive correlation between cognitive functioning and cognitive reappraisal. The statistical analysis revealed a non-significant negative correlation between the two variables. Older adults with better cognitive functioning tend to utilize cognitive reappraisal more frequently as an emotional regulation strategy, indicating a non-significant positive correlation between cognitive functioning and the use of cognitive reappraisal. Liang et al. (2017), stated that the decline in cognitive control associated with aging may explain why older adults are less likely to employ detached reappraisal for emotion regulation. In many everyday situations, people might not need to engage in reappraisal, so its benefits on cognitive functioning aren't always apparent (Zhou, Wu, & Xu, 2023). Prior research revealed that better performance at shifting tasks is associated with increased use of cognitive reappraisal, while all the other cognitive functioning areas had a non-significant correlation with emotional regulation (King Johnson et al., 2023). The relation between age and cognitive functioning is negative. According to research Murman (2015), the most significant cognitive changes associated with normal aging involve declines in performance on tasks that necessitate rapid information processing and decision-making, encompassing speed of processing, working memory, and executive cognitive function.

Further in light of theoretical perspectives, let’s discuss study variables. CHC theory help differentiates between fluid and crystallized cognitive abilities, highlighting how high-order processes (executive functioning, processing speed) assist carrying out intricate cognitive processes. This perspective provided insight into how cognitive resources are required to enable effective use of reappraisal strategy, as processes including working memory, mental shifting to analyze different perspective in order to preserve possible interpretations. So, in light of this framework, positive correlation between CF and CR is theoretically explained. In contrast, suppression occurs after triggering of emotional response, so it utilize less higher order processes concluding that cognitive resources are not contributing in usage of this strategy. Another point that need to be highlighted was that frequent suppression leads to compromised cognitive efficiency because it created mental load especially in social contexts. So, individuals who suppress face more cognitive deficits in comparison to those who reappraise. And so CHC provides insight that individuals required cognitive resources to enable and effectively use cognitive reappraisal strategy (Flanagan & Dixon, 2014). In light of Process model of Emotional Regulation, it provided strong basis to interpret our study findings. It showcases that reappraisal, an antecedent focused technique, which help individuals reappraise

a situation used initially in emotional process while suppression which is a response-focused strategy used after an emotional response had already been generated. Empirical studies based on process model emphasize how using reappraisal reduce emotional expression without any depletion of cognitive resources while suppression although helped in reduction of behavioral expression, leading to depletion of cognitive assets. Our study results although non-significant aligned with the idea that better cognitive reserves helped enabling adaptive antecedent focused strategies. Negative trend with suppression, on the other hand, makes sense as model predicted that frequent suppression required sustained efforts and heavily deplete individual's cognitive resources. These theoretical insights help us understand why study findings weren't statistically significant despite consistent direction with theoretical perspectives. As gross described, older adults utilized reappraisal when their resources were intact but resort to emotional suppression when it surpass their capacity (Gross, 2002).

7. Conclusion

In conclusion, research study indicated relationship between study variables emphasizing use of reappraisal strategy lead to good cognitive functioning while using suppression cause depletion of cognitive assets. Gender differences were not found in emotional regulation but men scored higher on cognitive functioning than women indicating use of personalized interventions for particular gender needs. This study emphasize importance of using healthy strategies providing empirical evidence to structure interventions in order to help individuals incorporate and learn how to implement healthy emotional regulation strategies to deal with stressors and enhance their cognitive abilities. Community-level programs and personalized interventions should be work on to generate effective solutions for elderly population. Cognitive stimulation incorporating reappraisal will enhance well-being and reserve cognitive resources. Programs such as computerized training, social activation along with CBT or ER workshops will be of great help. On community level, elder care programs should be imposed with emotion-regulation skill training. These findings help mental health professionals to understand older adult's challenges and help establish targeted programs to enhance elderly individuals well-being and quality of life.

7.1. Limitations of study

- Correlational research design was used due to time constraints, for further deep research other research designs should be utilized such as longitudinal design to understand the patterns over a period of time
- The sample of 200 participants may not fully represent the broader population, particularly those from rural areas.
- The study can only identify correlations, not causality, between emotional regulation and cognitive functioning due to its cross-sectional design.
- The use of self-report tools like the Emotional Regulation Questionnaire (ERQ) may introduce response bias.
- While the ERQ and MoCA are valid, they may not capture all aspects of emotional regulation and cognitive functioning.
- Sample was taken from only Lahore district hence limit the generalizability of the study findings for elderly people of other districts and areas.

7.2. Future Implications

- Geriatric care programs should incorporate emotion regulation training as a core component
- Intervention strategies should account for gender-based variations in cognitive performance
- Future research should employ longitudinal designs to determine cause-effect relationships
- Comparative cross-cultural studies may uncover universal versus culture-specific emotion-cognition dynamics

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Appendix

Table 1: Mean and Standard Deviation of Age (N=200)

Variable	Minimum	Maximum	M	SD
Age of Participant	60	89	65.06	5.573

Note: M = mean; *SD* = standard deviation

Table 2: Frequencies and Percentages

Variables	f	%
Education Level		
Primary/Middle	54	27.0
Matric/Intermediate	65	32.5
Graduation	29	14.5
Masters	19	9.5
Any other	4	2.0
Uneducated	29	14.5
Current Job Status		
Retired	55	27.5
Still working	61	30.5
Not applicable	83	41.5
Family System		
Joint	142	71.0
Nuclear	58	29.0
Spouse		
Alive	145	72.5
Dead	54	27.0

Note: f = frequency; % = percentage. Values represent the distribution of participants across demographic categories.

Table 3: Mean, Standard Deviations, and Cronbach's Alpha for tools

Measures	k	M	SD	α	Range
					Actual
Cognitive Functioning	12	24.96	3.730	.662	13-30
Cognitive Reappraisal	6	29.91	6.739	.652	9-42
Expressive Suppression	4	19.93	4.990	.528	7-28

Note: k = number of items; *M* = mean; *SD* = standard deviation; *α* = Cronbach's alpha.

Table 3: Correlation between Cognitive functioning, Cognitive reappraisal Strategy, and Expressive suppression strategy (strategies of ER)

Variable		1	2	3	4	5	6	7	8	9	10
1.	MoCA	1	.067	-.074	-.275**	.226**	.076	.075	.037	.168*	.211**
2.	Cognitive Reappraisal	.067	1	.425**	-.055	.133	-.127	-.022	-.103	.215**	.041
3.	Expressive Suppression	-0.74	.425**	1	-.069	-.012	-.037	.008	-.001	.096	-.035
4.	Age	-.275**	-.055	-.069	1	-.190	-.001	.028	-.060	.095	-.057
5.	Education Level	.226**	.133	-.012	-.190**	1	.167*	-.218**	.014	.072	.095
6.	Monthly Family Income	.076	-.127	.037	-.001	.167*	1	-.096	.024	-.036	.049
7.	Quality of Relationship with spouse	.075	-.022	.008	.028	-.218**	-.096	1	-.031	.053	.086
8.	Quality of Relationship with Children	.037	-.103	-.001	-.060	.014	.024	-.031	1	-.009	-.071
9.	Quality of Relationship with siblings	.168*	.215**	.096	.095	.072	-.036	.053	-.009	1	.388**
10.	Quality of Relationship with Friends	.211**	.041	-.035	-.057	.095	.049	.086	-.071	.388**	1

Note. r values are presented. p < .05 is indicated with *, and p < .01 is indicated with **.

Table 4: **Independent Sample T-Test comparing gender differences in Cognitive Functioning and Emotional Regulation (N=200)**

Variables	Men (n=100)		Women (n=100)		p	95% CI		Cohen's d
	M	SD	M	SD		Lower	Upper	
Cognitive Functioning	25.81	3.344	24.11	3.91	.001	.6843	2.715	3.6412
Cognitive Reappraisal	30.58	6.468	29.24	6.96	.160	-.534	3.214	6.722
Expressive Suppression	19.88	4.84	19.98	5.15	.888	-1.49	1.29	5.003

Note. M = mean; *SD* = standard deviation; *p* = significance level; CI = confidence interval; Cohen's *d* = effect size.