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THE SUBTLE STORM: A CLINICAL NEUROPSYCHOLOGY STUDY OF EXECUTIVE FUNCTION DEVELOPMENT IN WOMEN WITH ADHD

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Abstract: Attention Deficit Hyperactivity Disorder (ADHD) is a neuropsychiatric condition that commonly affects adults, especially females, leading to a wide range of problems linked to executive dysfunctions and everyday tasks performance. The purpose of this study was to evaluate executive functions, explore patterns of executive dysfunctions, and investigate their association with daily activities, educational achievements, occupation, and psychosocial health. This cross-sectional quantitative study involved 120 women aged between 18 and 45 years who were clinically diagnosed with ADHD. In addition to clinical evaluation of executive dysfunctions, measures of attention, working memory, cognitive flexibility, inhibitory control, and functional outcomes were used for data collection. Results indicated pronounced deficits in all categories of executive functions, with the most pronounced executive dysfunction being characterized by inhibitory control and working memory. The majority of the participants demonstrated executive dysfunctions at the moderate or severe levels, with this being significantly associated with poor daily functioning, lack of achievement in education and work, and psychosocial problems. Correlations showed strong negative associations between executive dysfunction and all functional categories examined. These findings suggest the considerable impact of ADHD on the lives of affected women with respect to their neuropsychological functioning and overall well-being.

Keywords: Attention Deficit Hyperactivity Disorder (ADHD), Executive Functions, Women, Neuropsychology, Working Memory, Cognitive Flexibility, Inhibitory Control, Psychosocial Well-being.

1. INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is a neuropsychiatric condition that involves a continuous pattern of inattentive, impulsive, and hyperactive behavior that impacts everyday activities and developmental processes [1]. Traditionally, ADHD has been considered a condition of childhood that affects males more frequently. However, current studies show that many women are likely to develop ADHD symptoms persistently into their adult lives [2]. This condition is often under-diagnosed or misdiagnosed in women due to the fact that their symptoms tend to be less pronounced and may manifest mainly through the impairment of attention, regulation of emotions, and cognitive processes.

Executive functions are a type of higher-order cognitive process responsible for planning and organization skills, behavioural regulation, attention management, problem solving, and adaptation to changes [3]. The executive functions encompass such capabilities as attentional control, working memory, cognitive flexibility, and inhibitory control – all of which are likely to be disturbed in individuals suffering from ADHD [4]. Impairments related to executive dysfunction make completing tasks, maintaining relations, emotional regulation, and reaching personal and occupational objectives extremely difficult for

an individual diagnosed with ADHD. In females with this disorder, executive dysfunction often results in difficulties with time management, decision-making, emotional regulation, and paying sustained attention [5].

The present research is designed to examine executive function disturbances in females with ADHD [6]. Utilizing a clinical neuropsychological perspective, this study analyzes various aspects of executive dysfunction in terms of their impact on daily activity, learning, and well-being of an individual with ADHD [7]. Concentrating on women with this disorder, this research is aimed at investigating particular executive deficits associated with ADHD and enhancing understanding of the peculiarities of the disorder.

1.1. Background of the Study

Attention Deficit Hyperactivity Disorder (ADHD) is a disorder of the brain and nervous system that interferes with an individual's ability to regulate their attention, inhibit impulses, and function effectively in terms of executive control processes [8]. ADHD has been widely studied in children but there are far fewer studies of the condition in adult women. Adult women who have ADHD are less likely to demonstrate obvious symptoms than men. The four core executive functions – attention, working memory, cognitive flexibility, and inhibitory control – play an important role in accomplishing daily tasks and goal setting [9]. It is vital to understand the development and disruption of these functions in women with ADHD.

1.2. Problem Statement

Even though awareness about ADHD has been on the rise, executive function disorders in women continue to go unexplored. Women with ADHD suffer from ongoing issues with attention, self-control, decision making, and mental flexibility that may impact adversely their ability to learn at school, succeed in their profession, handle routine tasks, and even their social wellbeing. The specific nature and level of executive function impairments in women with ADHD have not been explored thoroughly enough. Hence, there is a necessity to conduct a clinical neuropsychological study of executive function development in women with ADHD.

1.3. Research Objectives

The research objectives of the study are:

- To evaluate the development of executive functioning in women suffering from ADHD (e.g. attention span, working memory capacity, cognitive flexibility, inhibitory control).
- To investigate the neuropsychological features and the pattern of executive dysfunctions in women diagnosed with ADHD.
- To assess the effect of executive dysfunction on functional performance, educational achievement, and psychosocial functioning in women diagnosed with ADHD.

2. REVIEW OF LITERATURE

Orm et al. (2023) carried out a ten-year-longitudinal study to explore the connection between childhood executive functions and ADHD symptoms and their role as predictors of subsequent psychopathology among emerging adults with and without ADHD [10]. According to the research findings, childhood executive functioning deficits and increased ADHD symptom levels predicted emotional and behavioral disorders in adulthood. The study brought into light the consequences of having impaired executive functioning and ADHD symptoms in childhood for one's psychological health in later life.

Pievsky and McGrath (2018) conducted extensive reviews of multiple meta-analyses in an attempt to explore the neurocognitive features of individuals diagnosed with ADHD [11]. The results showed that there were consistent deficits in executive functions in people with ADHD, such as working memory problems, difficulties with attention regulation, response inhibition and control, and cognitive flexibility. Despite the fact that all these deficiencies can be found among those diagnosed with ADHD, they vary from person to person. The conducted analysis proved the importance of the neurocognitive deficits in ADHD.

Roselló et al. (2020) evaluated executive functioning, ADHD-related behavior, and functional impairment among persistent ADHD, remitted ADHD, and non-ADHD adults [12]. Results suggested that persistent ADHD adults had much more pronounced deficiencies of executive functioning and impairments than those with remitted ADHD and without ADHD. The study found that there was a clear connection between executive dysfunction and impairment in various areas such as academics, job performance, and social interactions. This group of researchers showed that persistent ADHD symptoms continue to impair people's lives, emphasizing the importance of treatment aimed at executive dysfunction.

Stibbe et al. (2020) studied gender differences in adult ADHD through the use of tests for cognitive functioning in a test called "Test of Attentional Performance." The study determined that both males and females with ADHD suffer from impaired attention and executive functioning skills; however, there are some cognitive functions that differ between genders [13]. There is a clear pattern of attention and executive functions of females which indicates that ADHD may be experienced differently among adult females.

Sullivan-Baca and Ellison (2025) Investigated the neuropsychological dimensions of women with emphasis on cognitive, emotional, and behavioural processes at different stages of their lives [14]. The study noted that the neuropsychological makeup of women is affected by biological, hormonal, and psychosocial variables that may influence executive processing, memory, attention, and emotion regulation abilities. The researchers stressed the importance of gender-specific approaches in neuropsychology to gain insights into the cognitive wellbeing of women.

Wong et al. (2023) examined the efficacy of play therapy on executive functions of children diagnosed with attention deficit hyperactivity disorder [15]. It was found that there were notable gains in all areas of executive functioning such as attention regulation, working memory, inhibition control, and cognitive flexibility after the intervention. The findings show that specific psychological treatment can improve executive functions in individuals with ADHD. The authors argue that interventions at an early age can contribute significantly to cognitive development and improvement in performance.

3. RESEARCH METHODOLOGY

The present research employs a quantitative cross-sectional approach in investigating the development of executive function among women suffering from ADHD. The data for the study is obtained from 120 clinically diagnosed females employing standardized neuropsychological assessments and questionnaires. Statistical analyses are performed on the collected data to identify deficits in executive function as well as determine their effect on the participants' functional behavior, academic achievement, and overall well-being.

3.1. Research Design

The present study makes use of a quantitative cross-sectional design in exploring the process of development of executive function in females with attention deficit hyperactivity disorder. This involves making use of the neuropsychological clinical approach for evaluation of cognition and executive dysfunction within participants.

3.2. Study Population and Sample

The target population is comprised of women ages 18 to 45 years old, clinically diagnosed as ADHD patients by trained psychiatrists. A purposeful sampling procedure is employed in selecting subjects from psychiatric hospitals, centers for neuropsychology, and other mental health facilities. The research sample size includes 120 women with ADHD.

3.3. Data Collection Instruments

The data are obtained by employing standardized tests and structured questionnaires for neuropsychological assessment. The assessment of executive function is made through attention, working memory, cognitive flexibility, and inhibition test scores. Additionally, the administration of a questionnaire on daily activities and academic, work, and psychosocial functioning is done.

3.4. Data Collection Procedure

The participants are briefed regarding the aim of the study, and their consent is taken before involvement in the experiment. Neurocognitive evaluation is performed individually by an expert at a

specialized facility. These questionnaires can be done both on paper and online. All personal data of the participants is treated confidentially and only for academic purposes.

3.5. Variables of the Study

The independent variable will be ADHD diagnosis in women. Dependent variables, on the other hand, will include executive function skills, attention skills, working memory capacity, cognitive flexibility, inhibition skills, functioning, school performance, and psychosocial functioning.

3.6. Data Analysis

These data are then subjected to statistical analysis using appropriate statistical software. Various descriptive statistics, which include frequency, percentage, mean, and standard deviation, are employed to provide summaries on the participant demographics and executive functioning measures. In addition, inferential statistical techniques like correlation analysis, t-test, and regression analysis will be employed in this study.

3.7. Ethical Considerations

Ethical standards are strictly adhered to in the study. Participation is entirely voluntary, and one can withdraw from participation at any time without suffering any consequences. Confidentiality and anonymity are guaranteed, and informed consent will be sought from all the participants.

4. RESULTS AND DISCUSSION

This section discusses the analysis and interpretation of data gathered from 120 women who have been diagnosed with ADHD. The findings of the study are presented according to the goals set out at the outset, and they include demographics, executive functions scores, level of executive dysfunction, attention difficulties, working memory/cognitive flexibility performance, functional consequences, and the link between executive dysfunction and life domains. Through these findings, important information is obtained about the neuropsychological profile of women with ADHD.

4.1. Demographic Characteristics of Participants

Age distribution pattern of the study participants is presented in this section. This section explains the demography of the sample composition. Tables and figures in this section help in understanding the age-related attributes of the women suffering from ADHD who have been included in this research. Table 1 and Figure 1 show the age-wise distribution of the 120 female participants included in this research study. Age categories of the participants are as follows: 18-25 years, 26-35 years, and 36-45 years.

Table 1: Age Distribution of Participants (N = 120)

Age Group (Years)	Frequency	Percentage (%)
18–25	35	29.2
26–35	48	40.0
36–45	37	30.8
Total	**120**	**100.0**

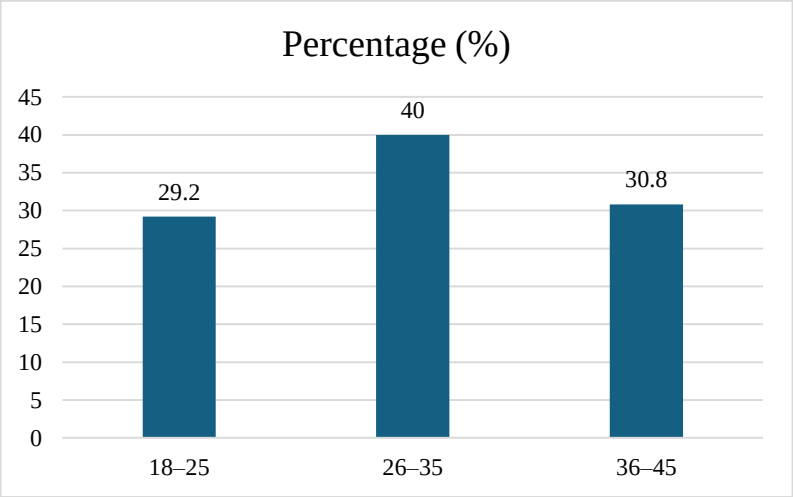

Figure 1: Graphical Representation of Percentage in Age Distribution of Participants

According to the results, the highest number of participants was from the age group of 26-35 years, and there were 48 (40.0%) in this category. The second most common age group is that of 36-45 years with 37 (30.8%) participants. On the other hand, the age group of 18-25 years contained 35 (29.2%) participants. According to the results, women who have reached their middle adulthood made up the highest number of participants in this study.

4.2. Executive Function Performance

This segment discusses the performance of women with ADHD in important executive functioning areas such as attention, working memory, cognitive flexibility, and inhibition. This is a brief analysis of cognitive weaknesses and strengths of the participants. In the table below, Table 2, and the figure below, Figure 2, we can see the mean and standard deviation values for the major executive function's areas assessed among women with ADHD. The executive functioning domains evaluated included attention, working memory, cognitive flexibility, and inhibition.

Table 2: Mean Scores of Executive Function Domains

Executive Function Domain	Mean Score	Standard Deviation
Attention	62.4	10.5
Working Memory	58.7	11.2
Cognitive Flexibility	60.3	9.8
Inhibitory Control	55.8	12.1

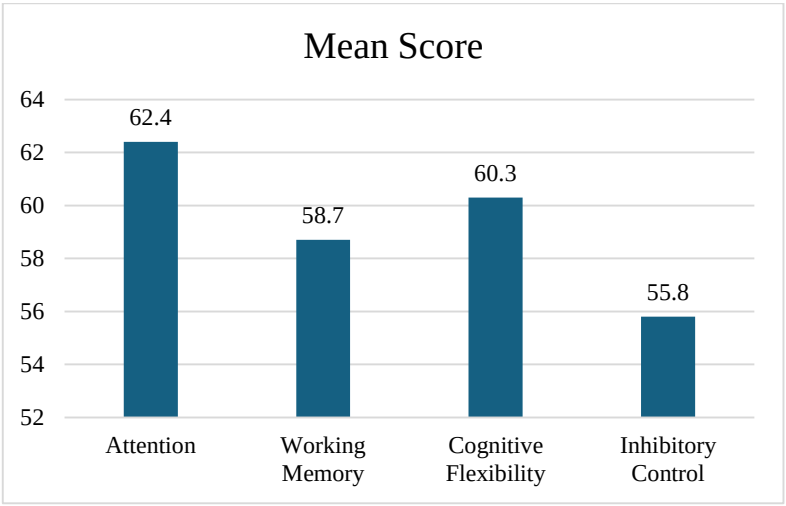

Figure 2: Mean Executive Function Scores

From the results, attention exhibited the highest average (62.4 ± 10.5) compared to cognitive flexibility (60.3 ± 9.8) and working memory (58.7 ± 11.2). Inhibitory control exhibited the lowest average score (55.8 ± 12.1), signifying relatively higher impairment compared to the other areas. The implications of the results indicate that even though impairments were experienced in all categories of executive functions, inhibitory control and working memory posed significant challenges for female ADHD sufferers.

4.3. Severity of Executive Dysfunction

It is attempted to examine the presence of executive dysfunction in women suffering from ADHD through categorizing the participants into mild, moderate, and severe groups. This is important for examining the degree and prevalence of executive dysfunction problems in the target population. Tables 3 and Figure 3 below illustrate the distribution of participants based on the severity of their executive dysfunction. Respondents were classified into three groups which include mild, moderate, and severe executive dysfunction.

Table 3: Severity Levels of Executive Dysfunction

Severity Level	Frequency	Percentage (%)
Mild	22	18.3
Moderate	61	50.8
Severe	37	30.9
Total	**120**	**100.0**

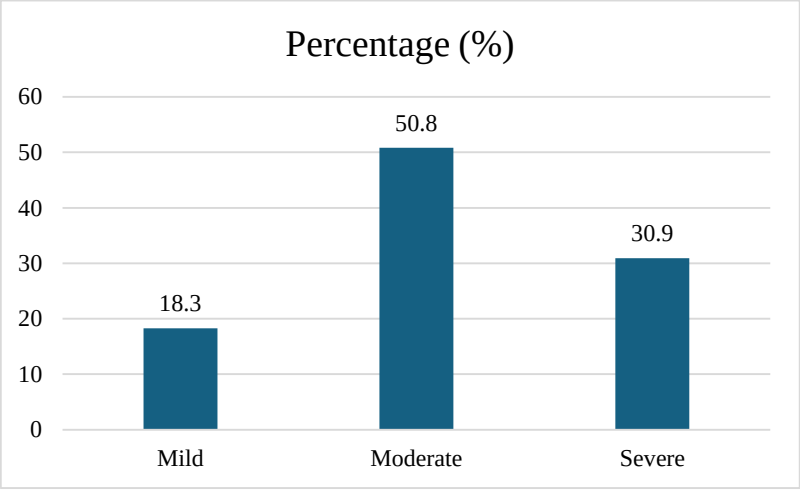

Figure 3: Graphical Representation of Percentage in Severity Levels of Executive Dysfunction

The results show that 61 respondents (50.8%) have moderate executive dysfunction, which is the highest percentage among all categories. The next group consists of 37 individuals (30.9%), who suffered from severe executive dysfunction, while only 22 women (18.3%) showed mild executive dysfunction. The results prove that the vast majority of women suffering from ADHD demonstrate moderate or severe impairment of their executive functions.

4.4. Attention Deficit Assessment

The analysis in this section highlights the extent of attention deficits that women with ADHD have by grouping the participants into those having low, moderate, and high attention deficit. This helps determine the extent to which there are attention-related challenges in the study population. The data in Table 4 and Figure 4 below show how the study participants have been grouped based on their attention deficit status. The participants were grouped into low, moderate, and high attention deficits.

Table 4: Levels of Attention Deficits Among Participants

Attention Deficit Level	Frequency	Percentage (%)
Low	18	15.0
Moderate	69	57.5
High	33	27.5
Total	**120**	**100.0**

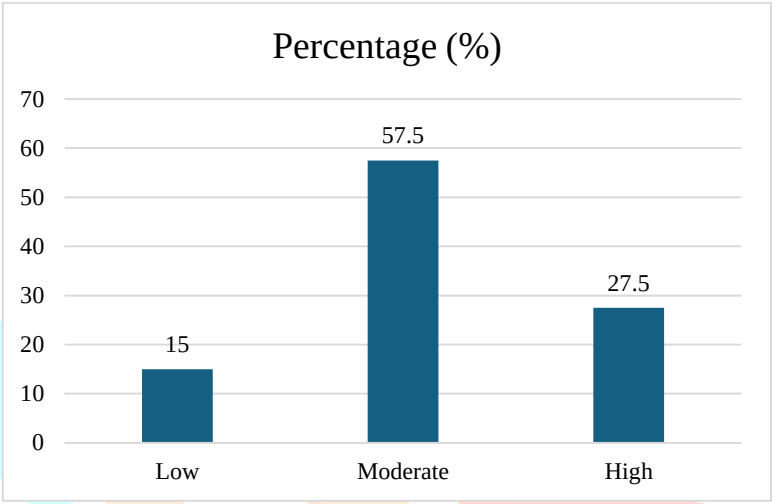

Figure 4: Graphical Representation of Percentage in Levels of Attention Deficits Among Participants

It is evident that 69 individuals (57.5%) had moderate attention deficits, constituting the largest subgroup among those studied. The next subgroup comprised of 33 individuals (27.5%) who had high attention deficits, whereas 18 individuals (15.0%) had low attention deficits. It can be seen that there exists a trend of problems associated with attention among women with ADHD, with most of them having moderate deficits of attention.

4.5. Working Memory and Cognitive Flexibility Performance

This section assesses the performance of the participants with regard to working memory and cognitive flexibility, which are some of the key aspects of executive function. Performance levels in these domains will be compared in order to determine how cognitive processes and cognitive flexibility among women with ADHD are. Table 5 provides an overview of the performance levels of the participants based on working memory and cognitive flexibility domains. These scores are further classified as low, moderate, and high-performance levels, and their frequency and percentages are provided.

Table 5: Working Memory and Cognitive Flexibility Scores

Performance Level	Working Memory n (%)	Cognitive Flexibility n (%)
Low	41 (34.2)	35 (29.2)
Moderate	55 (45.8)	61 (50.8)
High	24 (20.0)	24 (20.0)
Total	**120 (100)**	**120 (100)**

The findings suggest that for working memory, the largest number of subjects was classified under moderate performance (55; 45.8%), followed by low (41; 34.2%) and high (24; 20.0%) performance. Likewise, when considering cognitive flexibility, the biggest proportion was classified under moderate (61; 50.8%) followed by low (35; 29.2%) and high (24; 20.0%) performance. The implications of the

findings are that moderate deficits in working memory and cognitive flexibility occur among females with ADHD.

4.6. Impact on Functional Outcomes

The impact of executive dysfunction on various aspects of life for women who suffer from ADHD will be assessed. The assessment will focus on the way that cognitive dysfunctions affect their everyday functioning, school performances, job effectiveness, and psychological and social well-being. Table 6 shows the average scores along with their respective standard deviations regarding the effect of executive function deficiencies on functional domains in women with ADHD. The domains considered include everyday functioning, school performance, job efficiency, and psychosocial well-being. The score ranges from one to five points, with higher scores indicating the bigger impact of executive dysfunctions.

Table 6: Impact of Executive Function Deficits on Functional Domains

Functional Domain	Mean Score	Standard Deviation
Daily Functioning	3.98	0.72
Academic Performance	4.12	0.68
Occupational Efficiency	3.85	0.76
Psychosocial Well-being	4.25	0.65

(Scale: 1 = Low Impact, 5 = Very High Impact)

The findings reveal that psychosocial well-being achieved the highest mean value (4.25 ± 0.65), followed by academic success (4.12 ± 0.68), everyday functioning (3.98 ± 0.72), and occupational competence (3.85 ± 0.76). These findings reveal the strong effect of EF impairment on various functional areas; however, its strongest effects are seen in relation to psychosocial well-being and academic success, pointing out the difficulties experienced by ADHD females in emotional, social, and educational spheres of life.

4.7. Correlation Between Executive Dysfunction and Functional Outcomes

This segment is concerned with the relationship between executive dysfunction and functional outcomes for females with ADHD. This will assist in analyzing how executive dysfunction contributes to daily functioning, academic performance, occupational efficiency, and psychosocial wellness. Table 7 highlights the results of the correlation between executive dysfunction and functional outcomes, which include daily functioning, academic performance, occupational efficiency, and psychosocial well-being. Correlation coefficients (r) and their corresponding levels of significance have been provided to analyze these relationships.

Table 7: Correlation Analysis

Variables	Correlation Coefficient (r)	Significance
Executive Dysfunction vs Daily Functioning	-0.69	$p < 0.01$
Executive Dysfunction vs Academic Performance	-0.73	$p < 0.01$
Executive Dysfunction vs Occupational Efficiency	-0.65	$p < 0.01$
Executive Dysfunction vs Psychosocial Well-being	-0.77	$p < 0.01$

The results show that there are strong negative correlations between executive dysfunction and the functional domains ($p < 0.01$). The highest negative correlation was obtained from psychosocial well-being ($r = -0.77$), followed by academic performance ($r = -0.73$), daily functioning ($r = -0.69$), and occupational efficiency ($r = -0.65$). This means that the greater the executive dysfunction, the lower the functional level, especially in terms of psychosocial well-being and academic achievement of women who have been diagnosed with ADHD.

4.8. Discussion of Findings

The results obtained in the current research have shed significant light on executive functioning among women with a diagnosis of ADHD. In particular, according to the demographic analysis, the majority of the subjects were aged 26-35 years old, demonstrating the presence of ADHD-related cognitive problems even during adulthood. As for the assessment of executive functions, deficiencies have been found in all of the studied areas, and inhibition and working memory appeared to be the most problematic ones. Moreover, the vast majority of subjects displayed moderate dysfunction, and about one third of them had serious dysfunctions. Finally, according to the attention deficit analysis, the majority of women had problems with their attention. Therefore, one can conclude that executive dysfunction is a key feature of ADHD among women.

The research further showed that deficits in executive functions have a profound effect on many different areas of everyday functioning. Psychosocial wellbeing and academic achievement had the highest impact scores, suggesting that problems related to cognition do not only affect neuropsychological functioning but also influence psychological, social, and academic outcomes. Correlational analysis showed high statistical significance of the negative relationship between executive dysfunction and all assessed domains, especially psychosocial wellbeing and academic achievement. It suggests that the greater the level of executive dysfunction, the worse individual's function in these areas. In general, the findings point out the importance of early intervention aimed at improving executive functions in women with ADHD.

5. CONCLUSION AND RECOMMENDATIONS

The present study has shown that there exist substantial problems with the executive functioning faced by female adults with ADHD, especially in terms of paying attention, retaining information in memory, switching thoughts flexibly, and suppressing distracting thoughts and impulses. The results obtained show that the majority of individuals suffer from significant levels of executive dysfunctions, which are closely related to impaired ability to perform daily routine tasks, academic success, occupational effectiveness, and psychosocial functioning. The study has also found that executive dysfunctions have been affecting different spheres of people's lives, and that those two aspects – psychosocial wellbeing and academics – have been most greatly affected. Strongly negative correlations between executive dysfunction and functional outcome measures were observed, reflecting the high impact of cognitive difficulties on quality of life. In view of this, the study results provide important insight into the need for appropriate screening for executive dysfunction in ADHD females and offer valuable recommendations. Some of the implications suggested by the study are as follows:

- Early detection and intervention strategies must be put into place for identifying executive function weaknesses in females suffering from ADHD so that intervention can take place.
- Cognitive rehabilitation and executive function training programs must be carried out to improve attention, working memory, cognitive flexibility, and inhibition amongst those who suffer from executive dysfunction.
- An infrastructure of educational and professional support needs to be established in order to mitigate the difficulties in academics and work experienced by women with ADHD related to executive dysfunction.
- Counselling services along with psychosocial support services need to be made available to facilitate emotional well-being and other factors of life with ADHD among women.

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