

EXECUTIVE FUNCTION AND EMOTION REGULATION IN PATIENT WITH SCHIZOPHRENIA

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ABSTRACT

*The executive function (EF) is a part of the frontal lobe of the brain. It is a set of capabilities, which permit individuals to implore voluntary control of their behavioral responses. These functions enable human beings to develop and carry out plans, makeup analogies, obey social rules, solve problems, adapt to unexpected circumstances, do many tasks simultaneously, and locate episodes in time and place. On the other hand, Emotion regulation refers to the processes by which a person influences which emotions he has, when he has them, and how he experiences and expresses them (Gross, 1998). Emotion regulation involves changes in “emotion dynamics” or the latency, rise time, magnitude, duration, and offset of responses in behavioral, experiential, or physiological domains (Thompson, 1991).***Objective:***To investigate the relationship between the executive function and emotional regulation in patients with schizophrenia.***Methods:***Present study is the cross-sectional correlation design. The subjects in the study included 40 adult patients out of which 20 female patients and 20 male patients having a diagnosis of schizophrenia according to the criteria of ICD10 were selected by purposive sampling. The information was collected by neuropsychological testing and psychological testing.***Results:***In this study, results revealed that cognitive reappraisal is positively correlated with the number of categories completed on WCST and word scores on the Stroop color-word test.***Conclusion:***schizophrenia is a chronic illness, patients with schizophrenia have a lack of the ability to regulate their emotions. Emotional dysregulation is present at experiential, processing, and expressing levels, exacerbating distress and social dysfunction experienced. On the other hand, patients have difficulty carrying plans, makeup analogies, and solve problems.***Keywords:***Executive Functions, Emotional Regulation, and Schizophrenia.*

INTRODUCTION

Schizophrenia is a chronic psychiatric disorder characterized by major disturbances in thought, perception, emotion, and behavior. A recent study suggests 1% of the global adult population worldwide is suffering from this disabling disease^[1]. Individuals with schizophrenia show a lack of ability to regulate their emotions, this emotion dysregulation is present at experiential, processing, and expressive levels, exacerbating the distress and social dysfunction experienced by the patients^[2]. There is a body of evidence suggesting emotional dysregulation as a core feature of schizophrenia^{[3], [4]}. Emotion regulation refers to the conscious or unconscious process by which the emotional experience is manipulated and the following expression of these emotions^[5]. The strategy by which persons regulate their emotions influences how they experience their emotions and is also indicative of their well-being as well as how well they function at an interpersonal level^[6]. There are two types of emotional regulation strategies, we can draw a distinction between **antecedent-focused** and **response-focused** emotion regulation strategies. Antecedent-focused strategies modify the emotion generation process in an early stage, before the actual response has taken place. Response-focused strategies, on the other hand, modulate the emotional response in a later stage, once the emotional response has been generated^[5]. Some studies suggesting that patients with schizophrenia used suppression strategies more frequently than reappraisal strategies^[7]. Schizophrenia patients show impairments in emotional and cognitive processing^{[8], [9], [10], [11]}. The elevations in negative emotionality in Schizophrenia may reflect an underlying emotion regulation abnormality. The Schizophrenic patients showed an increased late positive potential (LPP) to negatively described unpleasant images compared with neutral images^[12]. Patients with schizophrenia have also difficulty maintaining goal-oriented behavior, planning, shows deficits in conceptualization, cognitive flexibility, ability to solve a complex problem, and working memory^[13]. These functions are the component of executive functions. The executive functions are a set of abilities, which allows individuals to implore voluntary control of their behavioral responses. These functions enable human beings to develop and carry out plans, make up analogies, obey social rules, solve problems, adapt to unexpected circumstances, do many tasks simultaneously, and locate episodes in time and place. Executive Functioning includes divided attention and sustained attention, working memory, set-shifting, flexibility, planning, and the regulation of goal-directed behavior. Patient with schizophrenia

shows deficits in executive functioning and have difficulty to regulate their emotions ^[14]. Poor insight in schizophrenia may be partially related to executive dysfunction ^[15]. The first episode of schizophrenia has demonstrated mild to moderate impairments in executive function tests ^[16,17]. According to dual-pathway model, the executive functions can be divided into two types such as cold executive functions and hot executive functions. The traditional executive functions or cold executive functions, such as attention, working memory, planning, and inhibition, and hot executive functions which are related to neuropsychological processes such as emotion and motivation^[18].

METHOD

A cross-sectional single group design study was conducted from the inpatient department and outpatient department of the Institute of Mental health and Hospital, Agra. 40 patients were selected through purposive sampling, diagnosis of schizophrenia have been made by a consultant psychiatrist by following ICD-10 criteria. The relevant ethical and scientific permission was taken from the respective committee of the institute.

Inclusion criteria:

1. Patients diagnosed with schizophrenia according to ICD-10 Diagnostic Criteria
2. Male and female patients have been selected within the age range of 20 years to 50 years.
3. Minimal education of the patient is 5th standards.
4. The Patient who willing to give informed consent has been selected.

Exclusion criteria:

1. Major medical illness or neurological illness.
2. Patient with significant co-morbid substance abuse.
3. Patient with a significant co-morbid psychiatric disorder.
4. Any co-morbid psychiatric disorder.

Procedures

This correlational study has been conducted with clearance from the ethical & scientific committee. The patients were selected by matching inclusion and exclusion criteria and informed regarding the study. Informed written consent was taken from each patient. A semi-structured socio-demographic datasheet has been used for gathering information, after that WCST, Stroop

Color-Word Test, and Emotion regulation questionnaire was administered to assess the level of executive function and emotional regulation of patients. The correlation was computed by using SPSS 16.0 version.

RESULT

TABLE 1: SHOWING CORRELATION COEFFICIENT BETWEEN SCORES OF EMOTION REGULATION AND WISCONSIN CARD SORTING TEST

	Cognitive reappraisal	Express suppression	Total scores
Number of trails administered	-.147	-.035	-.090
Total number correct	.150	.003	.094
Total number error	-.208	-.017	-.123
Perseverative response	-.234	-.017	-.144
Perseverative error	-.219	.006	-.123
Non perseverative error	-.022	-.055	-.027
Conceptual level response	.278	.104	.212
Number category complete	.370*	.143	.280
Trail to complete first category	-.040	-.028	-.034
Failure to maintain set	-.032	.009	-.009
Learning to learn	.157	.098	.138
**p<0.01, *p<0.05			

TABLE 2: SHOWING CORRELATION COEFFICIENT BETWEEN EMOTION REGULATION AND STROOP COLOR WORD TEST AND DIGIT SPAN

	Cognitive reappraisal	Express suppression	Total scores
Word score	.339*	.242	.318*
Color score	.191	.192	.211
Color word score	.099	-.010	.057
Predicted color word score	.308	.252	.308

Interference	.072	-.029	0.28
Digit forward	.188	.078	.153
Digit backward	.286	.126	.232
*p<0.05			

DISCUSSION

Schizophrenia is a chronic mental illness. It is a syndrome that includes impairment in cognitive functioning as well as neurological deficits. Patient with schizophrenia shows the difficulty in regulating their emotion and expression as well as shows deficits in executive functioning. The present study suggests broadly that enhanced executive function skills may be associated with greater emotion regulation capabilities. Taken together, these results help to clarify bidirectional associations underlying the relationship between the executive and emotional control. Table: 1 represents the significant positive correlation between ‘cognitive reappraisal’ and ‘number category complete’, on emotion regulation and WCST respectively. This can be explained based on the Process Model of Emotion Regulation by Gross (2001). Gross (2001) introduced two types of strategies antecedent focused strategy and response-focused strategy. In ‘cognitive reappraisal’ and ‘number of category complete’, response focused strategy works. Cognitive reappraisal states to a flexibility regulatory strategy that draws a cognitive control and executive functioning to reframe stimuli or situations within the environment to change their meaning and emotional valance.

Table: 2 shows a significant positive correlation between ‘cognitive reappraisal’ sub-dimensions of emotion regulation with the word score scale of the STROOP test. Language and verbal ability are strongly associated with emotional understanding and regulating (Pope et al., 2012). This finding is also supported by the findings of Roca et al (2014), in which the relationship between executive functioning, and fluid intelligence in schizophrenia was found to be positively correlated as measured by the tests WCST, verbal fluency, and trail making test. Barkley (1997) suggested that inhibitory functions, comprised of many factors including self-regulation of affect, are fundamental for efficient executive functioning. More specifically, the ability to self-regulate or bring about emotional states in order to support goal-directed behaviors requires the incorporation of greater executive functioning. Zelazo and Cunningham and Carlson and Wang (2007) created models that determined that executive function and emotion regulation

demonstrate bi-directional relationships implying that deficits in one area may lead to deficits in the other. Results of the current study support this conceptualization of the relationship between executive functioning and emotion regulation, namely that better skills in one area are associated with better skills in the other. Although our results are limited to the healthy patients who do not display clinically significant executive or emotion control deficits, further research examining the nature of this relationship in clinical populations is warranted.

CONCLUSION

The primary aim of the study was to determine the association in executive functions and emotion regulation in patients with schizophrenia. The result revealed a significant correlation between sub-dimensions of emotion regulation, 'cognitive reappraisal', and sub-dimensions of the WCST and STROOP test. Cognitive reappraisal states of a flexibility regulatory strategy that draws a cognitive control and executive functioning to reframe stimuli or situations within the environment to change their meaning and emotional valence. We can say cognitive reappraisal is the ability to do any work in an emotionally flexible manner. Overall results concluded that the executive functions and emotional regulation are associated with each other. If one is deficient, can be a possibility of it impacts one another.

Implications

Limitations of the Study

- A specific subtype of schizophrenia was not taken in the study.
- The sample size was small.
- The sample of this study has been taken only from IMHH, Agra.
- The duration of illness was ignored.

Suggestions of the Study

- Future studies can be conducted with a specific subtype of schizophrenia.
- In further study, samples will be taken from different places.
- A control group can be taken in future studies.
- The duration of illness should be considered in further study.

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