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Working Memory, Attention and Planning and its relationship with Coping among Males with HIV/AIDS in Manipur

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ABSTRACT

The present study attempts to examine the relationship of neuropsychological function and coping strategies used by males with HIV/AIDS in Manipur. Study had been done on 100 males who were HIV/AIDS positive and who were within age range of 20 to 50 years using NIMHANS Neuropsychological Battery and Coping Check List. The present study reveals that there is no relationship of coping strategies with working memory and attention in males with HIV/AIDS. However, the result of this study has shown that emotion focused coping enhanced performance and coping with social support hinders performance to plan and anticipate results of their actions to achieve a predetermined goal.

Keywords: working memory, attention, planning, coping

INTRODUCTION

HIV-associated dementia (HAD) is the most severe form of HIV-associated neurocognitive disorders (HAND), which typically occurred in severely and prolonged immunosuppressed patients when antiretrovirals were not available. Onset is insidious and the clinical syndrome results from subcortical dementia (Becker et al., 1995). The main symptoms include neurocognitive impairment such as decreases in psychomotor speed, attention and concentration, memory and learning information processing or executive (Dawes et al.,2009). There may also be motor slowing, lack of coordination or tremor that may progress to disabling weakness, spasticity, extrapyramidal movement disorders and paraparesis (Navia et al., 1986). In addition there may be behavioural affects such as apathy and irritability. The earliest psychological impact of being diagnosed with HIV can be understood within the framework of Kübler-Ross cycle of grief involving denial, anger, bargaining, depression and acceptance. However, the most important additional aspect in HIV/AIDS is the social stigma. Soon after becoming aware of one's seropositive status, the HIV infected patient often has to work through life changes including relationships, family, employment, finances etc. Disclosure of seropositivity can be a stressful decision. If the individual feels the need to disclose and the outcome of disclosure is positive, this can be associated with better quality of life (Chandra et al., 2003). Quality of life in the early asymptomatic stage of illness is usually better than early symptomatic or AIDS stage with impact on both physical and psychological domains. Quality of life can be influenced by educational status and income as well (Wig et al., 2006). When symptomatic a range of factors such as physical health, employment and social and biological function can impact upon quality of life (Kohli et al., 2005). Tarakeshwar *et al.*, (2007), studied 50 adults with HIV with regards to their beliefs that helped manage the illness and found that all 50 believed God to be a benevolent force. The spiritual practices were described as enabling them to face their troubles with less fear and greater confidence. In most low and middle-income countries only a minority of the population have access to HAART, and a significant proportion of patients end up without active treatment.

COPING:

Coping is defined as a process by which an individual manages the ever-changing environment (McFarland GE & McFarland EA, 1993) Coping is defined as the things people

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do to master, tolerate, and minimize life strains or demands. Coping is "a constantly changing process involving cognitive and behavioral efforts deployed to manage specific external and or internal demands that are appraised as stressful" (Lazarus & Folkman, 1991). Coping may be seen as actions taken by persons directed at confronting demands, solving problems, and/or altering and managing stressors (McCubbin et al., 1996).

In psychology, coping is expending conscious effort to solve personal and interpersonal problems, and seeking to master, minimize or tolerate stress or conflict (Cummings et al., 1991). The effectiveness of the coping efforts depends on the type of stress and/or conflict, the particular individual, and the circumstances. Psychological coping mechanisms are commonly termed coping strategies or coping skills. Subconscious or non conscious strategies (e.g. defense mechanisms) are generally excluded. The term coping generally refers to adaptive or constructive coping strategies, i.e. the strategies reduce stress levels. However, some coping strategies can be considered maladaptive, i.e. stress levels increase. Maladaptive coping can thus be described, in effect, as non-coping. Furthermore, the term coping generally refers to reactive coping, i.e. the coping response follows the stressor. This contrasts with proactive coping, in which a coping response aims to head off a future stressor. Coping responses are partly controlled by personality (habitual traits), but also partly by the social environment, particularly the nature of the stressful environment (Carver Charles & Connor-Smith, 2010).

Hundreds of coping strategies have been identified. Classification of these strategies into a broader architecture has not yet been agreed upon. Common distinctions are often made between various contrasting strategies, for example: problem-focused versus emotion-focused; engagement versus disengagement; cognitive versus behavioral. The psychology textbook by Weiten & Lloyd (2008) identifies three broad types of coping strategies.

- Appraisal-focused: Directed towards challenging one's own assumptions, adaptive cognitive
- Problem-focused: Directed towards reducing or eliminating a stressor, adaptive behavioral
- Emotion-focused: Directed towards changing one's own emotional reaction

Appraisal-focused strategies occur when the person modifies the way they think, for example: employing denial, or distancing oneself from the problem. People may alter the way they think about a problem by altering their goals and values, such as by seeing the humor in a situation: "some have suggested that humor may play a greater role as a stress moderator among women than men" (Worell, 2001).

People using problem-focused strategies try to deal with the cause of their problem. They do this by finding out information on the problem and learning new skills to manage the problem. Problem-focused coping targets the causes of stress in practical ways which tackles the problem or stressful situation that is causing stress, consequently directly removing/reducing the stress. It aimed at changing or eliminating the source of the stress. The three problem-focused coping strategies identified by Lazarus & Folkman (1985) are taking control, information seeking, and evaluating the pros and cons.

- Taking Control – this response involves changing the relationship between yourself and the source of stress. Examples: escaping from the stress or removing the stress.
- Information Seeking – the most rational action. This involves the individual trying to understand the situation (e.g. using the internet) and putting into place cognitive strategies to avoid it in future. Information seeking is a cognitive response to stress.

Evaluating the Pros and cons of Different Options for Dealing with the Stressor:

In general problem-focused coping is best, as it removes the stressor, so deals with the root cause of the problem, providing a long term solution.

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However, it is not always best, or possible to use problem-focused strategies. For example, when someone dies, problem-focused strategies may not be very helpful for the bereaved. Dealing with the feeling of loss requires emotion-focused coping.

Problem focused approached will not work in any situation where it is beyond the individual's control to remove the source of stress. They work best when the person can control the source of stress (e.g. exams, work based stressors etc.).

It is not a productive method for all individuals. For example, not all people are able to take control of a situation. People with low self esteem typically use emotion focused coping strategies.

Emotion-focused strategies involve releasing pent-up emotions, distracting oneself, managing hostile feelings, meditating or using systematic relaxation procedures. Emotion-focused coping "is oriented toward managing the emotions that accompany the perception of stress" (Brannon & Jess, 2009). The five emotion-focused coping strategies identified by Folkman and Lazarus are disclaiming, escape-avoidance, accepting responsibility or blame, exercising self-control, and positive reappraisal. Emotion-focused coping is a mechanism to alleviate distress by minimizing, reducing, or preventing, the emotional components of a stressor. This mechanism can be applied through a variety of ways, such as seeking social support, reappraising the stressor in a positive light, accepting responsibility, using avoidance, exercising self-control, and distancing (Carver, 2011). The focus of this coping mechanism is to change the meaning of the stressor or transfer attention away from it. For example, reappraising tries to find a more positive meaning of the cause of the stress in order to reduce the emotional component of the stressor. Avoidance of the emotional distress will distract from the negative feelings associated with the stressor. Emotion-focused coping is well suited for stressors that seem uncontrollable (ex. a terminal illness diagnosis, or the loss of a loved one). For example, when an individual's spouse is diagnosed with a terminal illness, the healthy partner cannot change the diagnosis. In this case, the most effective way to manage the stress is for the healthy partner to change his or her perspective or appraisal of the stressor. It is more effective to effect change in the partner's emotional reaction to the diagnosis than it is to focus on changing or denying the diagnosis, although denial, too, is an emotion-focused means of coping (Laureate Education, 2012). Some mechanisms of emotion focused coping, such as distancing or avoidance, can have alleviating outcomes for a short period of time; however they can be detrimental when used over an extended period. Positive emotion-focused mechanisms, such as seeking social support, and positive re-appraisal, are associated with beneficial outcomes (Ben-Zur, 2009). Emotion-focused coping would not be effective when an individual is chronically late making their mortgage payment, although they have enough money to make the payment. In this case, changing one's emotional response to needing to make a payment in a timely manner will not help change the problem. Problem solving may be more appropriate since the stressor, (making late payments) is changeable.

Typically, people use a mixture of all three types of coping strategies, and coping skills will usually change over time. All these methods can prove useful, but some claim that those using problem-focused coping strategies will adjust better to life (Taylor, 2006). Problem-focused coping mechanisms may allow an individual greater perceived control over their problem, whereas emotion-focused coping may sometimes lead to a reduction in perceived control (maladaptive coping).

Lazarus "notes the connection between his idea of 'defensive reappraisals' or cognitive coping and Freud's concept of 'ego-defenses', coping strategies thus overlapping with a person's defense mechanisms (Robinson, 2005).

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Coping Strategies of HIV Seropositive:

Along with the broad categorizations mentioned above, hundreds of sub-ordinate coping mechanisms have been identified in the literature (Skinner et al., 2003). For example, spiritual perspective or religious-based practices such as prayer are shown to provide psychological relief from aversive experiences in women living with HIV/AIDS (Morse et al., 2000). Larger effects are noted when this mechanism is reportedly used by women of African decent (Spilka et al., 1997). Seeking Social Support (SSS) is also employed to alleviate physical and emotional distress associated with adverse environmental conditions. This construct may be quantified (a) the source of support (e.g. partner, family, or extended social network). (b) indication of the type of support (e.g., tangible or informational), and (c) perception of the level or quality of support received (Thoits, 1982).

Persons who receive a diagnosis of HIV or AIDS often react with a mixture of emotions, including shock, depression, hopelessness, grief, anger and fear (Fleishman & Vogel, 1994). The complexities of stress have an effect on coping and psychological well-being (Russell & Smith, 1999). The HIV/AIDS epidemic impacts the lives of women in a unique way precipitating the integration of strategies to face a range of stressors within and outside the biological context of the disease. HAART regimens have done much to change the perception of life expectancy (Siegel & Schrimshaw, 2005), however, maladaptive coping contaminant with aversive socioeconomic factors and oscillating immune response increasingly and disparately jeapordize disease adjustment in women (Weiss & Rao, 1999). Psychosocial variables are known to contribute to some of the variability in immune parameters such as CD4 count, viral load, and preservation of natural killer (NK) cells. Specifically, maladaptive responses to stress or one's efficacy in coping with that stress are associated with more rapid progression from HIV to AIDS in both men and women (Antoni, 2003). [252] Finding means to assist PLWH to cope with these numerous and diverse problems have become an increasing concern. This is a significant issue from several perspectives. First, there is a need to reduce psychosocial vulnerability that can result in debilitating behaviors such as drug and alcohol abuse and suicidal ideation. Second, there is evidence that debilitating psychosocial problems have a negative impact on maintaining adherence to complex treatment regimens, which is a threat to the individual's health as well as a serious public health problem (Catz et al., 2000). Third, maladaptive coping is associated with high-risk sexual behavior that escalates the spread of HIV disease. Fourth, there is mounting evidence that high levels of stress may influence disease progression by way of immunological impairment (Robinson et al., 2000).

In a study by Jennifer *et al*., (1997), it has been found that neuropsychological impairment occurs in many persons with AIDS and in a smaller proportion of asymptomatic HIV-1 carriers, but the implications of such impairments in terms of psychosocial functioning are poorly understood. They explored potential differences in coping activity (e.g., cognitive and behavioral efforts to manage, alter, or regulate emotional responses to stressful situations) in a group of 275 medically symptomatic and asymptomatic HIV-positive men stratified on neuropsychological impairment. Regardless of medical symptom status, persons rated as being neuropsychologically impaired in attention/speed of information processing and verbal skills utilized significantly more confrontive coping than did unimpaired subjects. It may be that individuals with difficulty sustaining attention to details or reduced ability to process verbal information resort to impulsive forms of coping because they are less able to assess the precise nature or extent of threat or harm posed by a stressful situation.

Neuropsychological abilities, such as memory, can affect how someone learns, adopts, and ultimately utilizes different coping strategies (Krpan det al., 2007). Coping

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strategies can be conceptually categorized into two types: action-focused (also referred to as active, problem-focused, and positive coping strategies), which includes active coping behaviors targeted at changing the source of a stressor; and emotion-focused (also sometimes referred to as avoidant coping or negative coping), that are used to regulate emotional responses to a stressor (Folkman & Lazarus, 1980). Although emotion-focused and avoidant coping are often used interchangeably, emotion-focused coping, defined as coping aimed at lessening emotional distress, has been adopted as a parent factor to avoidant coping, which is a type of emotion-focused coping expressed by actions that purposefully avoid confronting a stressor with the goal of indirectly reducing emotional distress (Billings & Moos, 1981). Evidence supports a positive association between good neuropsychological functioning and action-focused coping skills as well as between poor neuropsychological functioning and emotion-focused coping skills.

One study found that patients with TBI who developed PTSD were more likely to have adopted an avoidant coping strategy, which positively influenced PTSD symptom severity (Bryant et al., 2000). A similar pattern was also noted by Johnsen et al., (2002), which indicated that the adoption of emotion-focused coping did not improve symptom severity over time, when compared to other coping styles. In a similar vein, PTSD mediates the impact of coping skills on quality of life (Huijts et al., 2012). These studies suggest that it is important to study coping and quality of life in veterans who are at risk for PTSD, TBI, and other neuropsychological impairments that may negatively affect redeployment from the war zone. Veterans are a patient group that frequently present with symptoms of both PTSD and TBI, which are in turn associated with neuropsychological implications that can complicate treatment (Najavits et al., 2012). Although coping skills are already taught as part of evidence-based approaches to treatment for military personnel (Rosen et al., 2004), there is a paucity of literature that examines how different cognitive deficits, such as memory and attention, affect the ability of an individual to adopt and utilize these skills, and subsequently impact on quality of life. However, recent literature supports this relationship in patients with acquired brain injury (Wolters et al., 2015), finding that executive functioning was related to greater use of passive coping.

Method

Sample

The sample of the present study was collected from different drop-in-centre of Manipur located at Imphal. Based on purposive sampling technique, 100 males who were HIV/AIDS positive and were within age range of 20 to 50 years were taken. The subjects with minimum education level of 8th standard were taken. Subjects with any other co-morbid illness were excluded.

Tools

The following tools were used in the present study:

1. **History taking proforma especially designed for present study:**
   Semi-structured proforma scale was administered for collecting socio-demographic and economic data of the subjects which was developed by the researcher for the present study. Subjects were asked to provide details of their age, gender, educational qualification, marital status, religion, and monthly income, duration of HIV tested and duration of starting ART.
2. **Coping Check List (CCL) (**Rao et al.,1989**):**
   The CCL is a comprehensive checklist of coping behaviour and is the first of its kind validated for use in the Indian setting. It comprises 70 items describing a broad range of behavioural, emotional and cognitive responses that may be used to handle stress. Items are scored dichotomously in a yes/no format, the responses indicating presence

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or absence of a particular coping behavior. The various coping strategies covered in the checklist resulted in 7 subscales: 1 for Problem Solving, 5 for Emotion focused coping (denial/blame, distraction positive, distraction negative acceptance and religion / faith) and 1 for social support seeking. A higher score in each domain denotes greater reliance on that specific strategy. The test retest reliability (over 1 month) is 0.74 and the internal consistency is 0.86 as established by the authors.

3. **NIMHANS Neuropsychological Battery (**Rao et al., 2004**):**

The NIMHANS Neurological Battery consists of a series of tests aimed to assess various aspects of cognitive function including motor speed, attention, memory, language, visual-spatial ability and executive functions. The profile of the Neuropsychological assessment will indicate the patient's deficits and adequacies in different area. The factorial validity of this test is 0.4 which indicates the value is high and is suggestive of adequate reliability of the tests.

The tests selected for the present study are:

A) Verbal N-Back Test (I&II) (Smith & Jonides, 1999**):**

This test measures externally guided working memory. In the verbal condition consonants are randomly ordered and spoken aloud. There is 1 back and 2 back task. In the 1 back task the subject responds whenever a consonant is repeated consecutively. In the 2 back task the subject responds whenever a consonant is repeated after an intervening consonant. Hits and errors in each task condition/ combination form the score.

B) Digit Cancellation / Vigilance Test (Lezak, 1995**):**

This test consists of numbers 1 to 9 randomly ordered and placed in rows on a page. There are 30 digits per row and 50 rows on the sheet. The digits are closely packed on the sheet. The same level of mental effort or attention deployment is required over a period of time. The subject has to focus on the target digits i.e.6 and 9 amongst other distracter digits. Inability to sustain and focus attention leads to both increased time to complete the test as well as errors.

C) Tower of London Test (Shallice, 1982):

The test evaluates the subject's ability to plan and anticipate the results of their actions to achieve a predetermined goal. The test consists of two identical wooden boards. Each board is fitted with 3 round pegs of different sizes. The first peg is 18cms in height, the second is 11cms in height and the third is 7cms in height. There are three wooden balls, painted red, green and blue respectively. Each ball has a bore in the middle. The tallest peg can hold 3 balls. The second tallest can hold two balls, while the shortest can hold one ball. Time and number of moves form the score.

Procedure

To proceed with the study, necessary permission was sought from the concerned authorities of different NGO's. They were thoroughly explained about the research programme and the concerned subjects were also informed about the nature of the research study and informed consent is also taken from them to undergo the research. They were also informed that confidentiality will be maintain regarding their HIV status and identification like name will not be appeared in any part of the study. A prepared script was read out providing an overview of the study aims and risks and benefits to each subject approached for participation. After this all the subjects were aksed to sign the informed consent form if they agree to participate in the study. They have the rights to seek clarification and information about the aspect of the research

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work. They have the freedom to refuse answer to any particular question and can withdraw the test at any point of time. Once the consent is obtained, brief history of socio-demographic, socio-economic and other relevant data of each subject was elicited on proforma made for the study. The subjects were instructed beforehand regarding the assessment tool.

RESULTS

Table-1: Correlation of Coping Mechanisms and Verbal N Back Test among Males of Experimental Group

Verbal N back	Dimension of Coping Strategies		
	Problem Focused	Social Support	Emotion Focused
1Back Hit	-0.117	-0.030	-0.110
2Back Hit	0.061	0.196	-0.039
1Back Error	0.194	0.044	0.129
2Back Error	0.046	-0.130	-0.001

The correlation between Verbal N back and coping strategies is shown on the above table and the results reveal no significant relations between the two variables. This reveals that there is no relationship between coping strategies and working memory in males with HIV/AIDS.

Table-2: Correlation of Coping Mechanisms and Digit Vigilance Test among Males of Experimental Group

Digit Vigilance	Dimension of Coping Strategies		
	Problem Focused	Social Support	Emotion Focused
Time Taken	-0.145	-0.036	-0.062
Total Error	-0.035	0.182	0.067

The above table shows no significant correlation between digit vigilance and coping strategies which highlights that coping strategies has no associations with attention for males with HIV/AIDS.

Table-3: Correlation of Coping Mechanisms and Tower of London Test among Males of Experimental Group

Tower of London	Dimension of Coping Strategies		
	Problem Focused	Social Support	Emotion Focused
Mean Time for 2 Moves	0.081	0.127	0.173
Mean Moves for 2 Moves	0.031	0.114	0.126
Mean Time for 3 Moves	0.023	0.162	0.169
Mean Moves for 3 Moves	0.028	0.082	0.178
Mean Time for 4 Moves	-0.040	0.012	-0.174
Mean Moves for 4 Moves	-0.153	-0.004	-0.235*
Mean Time for 5 Moves	0.095	0.178	0.050
Mean Moves for 5 Moves	0.106	0.078	-0.051
Number of Problems solve with minimum move for 2 Move	-0.122	-0.108	0.046
Number of Problems solve with minimum move for 3 Move	0.060	-0.227*	-0.008
Number of Problems solve with minimum move for 4 Move	0.087	-0.203*	0.050

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Number of Problems solve with minimum move for 5 Move	-0.041	0.095	0.002
Total number of Problems solve with minimum move	0.022	-0.198*	0.005

* 0.05 levels

The above table shows correlation between Tower of London and Coping Strategies and it reveals significant Negative correlation between Mean move for trial 4 and emotion focussed, number of minimum move in trial 3 and trial 4 and social support and total number of minimum move and social support. The analysis indicates the more emotion focused is used as coping strategies the lesser will be the number of moves and the more social support the lesser is the problem solved with minimum moves. This shows that emotion focused enhanced performance and social support hinders performance to plan and anticipate results of their actions to achieve a predetermined goal.

DISCUSSION

The result of the present study reveals that there is no significant relationship between coping strategies and working memory in males with HIV/AIDS. The result of the present study had also shown no significant relation between digit vigilance and coping strategies which highlights that coping strategies has no relationship with attention for males with HIV/AIDS. Whereas, in a study by Jennifer *et al*., regardless of medical symptom status, persons rated as being neuropsychologically impaired in attention/speed of information processing and verbal skills utilized significantly more confrontive coping than did unimpaired subjects. It may be that individuals with difficulty sustaining attention to details or reduced ability to process verbal information resort to impulsive forms of coping because they are less able to assess the precise nature or extent of threat or harm posed by a stressful situation.

However, the result of the present study further indicates that the more emotion focused is used as coping strategies the lesser will be the number of moves, and the more social support is used as coping strategies the lesser is the problem solved with minimum moves which shows that emotion focused enhanced performance and social support hinders the performance to plan and anticipate results of their actions to achieve a predetermined goal.

Interestingly, the relationship was specific to- plan and anticipate results of their actions to achieve a predetermined goal and not other neuropsychological function. Planning using the Tower of London test (Morris et al., 1993) activates a wide network consisting of the dorsal prefrontal cortex, premotor and parietal cortex and the cerebellum. Lesion studies have shown that the left frontal lesions are associated with deficits of planning (Shallice, 1982). Moreover, the studies have found that the inappropriate organizational strategies associated with poor planning are greater in bilateral prefrontal lesions (Owen et al., 1990). Imaging studies have found that increased activation of the left prefrontal cortex is associated with more efficient planning in terms of longer time to plan and less number of moves. Results have shown that emotioned focussed coping enhanced the functions of planning whereas social support hinders the performance. It is possible that individuals who have difficulty with planning also have difficulties in accessing the use of problem-focused coping skills. These results were similar to a recent study by Wolters et al., (2015), which found TBI patients with self-reported executive functioning difficulties tended to use more passive coping strategies. It had been stated that Emotion-focused coping is well suited for stressors that seem uncontrollable (e.g, a terminal illness diagnosis, or the loss of a loved one). For example, when an individual's spouse is diagnosed with a terminal illness, the healthy partner cannot change the diagnosis. In this case, the most effective way to manage the stress is for

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the healthy partner to change his or her perspective or appraisal of the stressor (Laureate Education., 2012).

Coping skills training has been found to be effective in reducing anxiety and depression in active-duty members who are deploy (Jones., 2008). However, no known study has investigated how neuropsychological deficits impact these coping skills. This present study attempts to examine the relationship of coping strategies with neuropsychological functions and have shown no significant relationship with coping and other neuropsychological functions except for planning, which might be due to inclusion of only males with HIV/AIDS who were on ART in this sample. Some approaches to treatment for males with HIV/AIDS should focus on teaching effective coping skills for better day to day functioning.

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