Psychoneuroimmunology is the branch of neuroscience involved with interactions between environmental stimuli, the nervous system and immune system. From the last two decades it has acquired a sound scientific basis due to which it became a centre of researches. The immune system is made up of cells, tissues and organs that connect to each other through the blood stream and lymphatic. The immune system is one of the most complex systems of the body, and its function is to protect the organism from infection. The immune system has prompted research work using reliable methodologies to study relationship between a ‘hard’ scientific field, such as immunology and a ‘soft’ one such as behavioural science. This led to the development of a new science i.e psychoneuroimmunology (PNI). It is a relatively new field of study which investigates interaction between behaviour and immune system, mediated by nervous system.

For quite some years it was assumed that in diseases, immune system plays much important role and psychosocial factors are not/or less important. But today it is increasingly being recognized that psychosocial factors play tremendous role due to this reason.

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PNI is coming up as an emerging field. The latest scientific studies help establishing link between the mind and the immune system. It has gained a new dimension with the growing evidence that psychosocial factors directly affect immune function, and also it has the potential of influencing wide range of disorders, including allergies, infections, autoimmune diseases and even cancer (Daruna & Morgan, 1990).

People involved in PNI research believe that these links (i.e. link between mind, brain and immune system) are solid but evidence buttressing such claims has been hard to come as most researchers, warn against overenthusiastic interpretation of findings nonetheless they view the new field whether it goes by the name of psychoneuroimmunology or simply behavioural medicine as the hottest and most promising area of medical research today.

More or less all diseases affected by psychosocial factors but the best known psychosomatic illnesses are coronary heart disease (CHD), hypertension, ulcers, asthma, skin rashes and chronic headaches (Ader & Cohen, 1993) and these help us in establishing connections among mind, immune system and nervous system. Major focus here is that the body’s immune response can be influenced by stress and other psychosocial factor, can make the body more susceptible to infectious and autoimmune diseases. The body immune response can be trained, modified by the same kind of classical conditioning used in psychological experiments to train dogs (Ader & Cohen, 1993).

Immune function is under significant neuroendocrine and autonomic nervous system (ANS) control because the activities of the ANS and neuroendocrine system fluctuate in relation to behaviour (e.g stress). Song and Leonard, (2000) in their animal studies (e.g rabbit anti-rat), lymphocyte serum (ALS) when injected into rats, induces a transient immuno-suppressant due to lymphocyte cytotoxicity. Saccharin was administered as conditioned stimulus (CS). After 14 days CS and ALS injection,
exposed to saccharin alone cause’s suppression in lymphocyte activity by 35% compared to control animals. In this case, saccharin doesn’t act as an adverse CS and the unconditioned stimulus (UCS) is not toxic. This type of experiment therefore establishes that immunosuppressant is not dependent on the presence of an aversive CS and UCS (Song and Leonard, 2000).

Ader and Cohen in 1975 did a study on rats and reported on the basis of results that those animals who did not receive the immune suppressive UCS had the highest antibody response, whereas those received the UCS on the learning day, on the test day and just prior to immunization, had the lowest response.

Immune responses can be conditioned in humans. A study done by Gauci, Husband, Saxarra and King, (1994) investigated whether conditioning could modulate the allergic response in humans with perennial allergic rhinitis. This finding provided experimental support that allergic responses may in part are influenced by conditioning. Additional evidences in the form of conditioning of a specific cellular immune response to antigen have also been reported (Smith & Daniels, 1983). Malfunction in the immune system is known as autoimmune disease. In this the immune system became unbalanced and react to normal body tissues as they became allergic to itself e.g., AIDS.

**Acquired Immune Deficiency Syndrome (AIDS)**

Coincidentally, AIDS appeared in distant and various areas of the Earth during the second half of the 20th century. In modern era, AIDS has become the focus of many developing countries as it is spreading fast and has taken the shape of an epidemic. The World Health Organization (WHO) has estimated long back that 47 million people all over the world will be infected with HIV (Humun Immune Virus) by the year 2000 (Song and Leonard, 2000) and the prediction was established. Currently there are over half a million cases of AIDS in the USA and over 90% of
the diagnosed cases may result in premature death (Song and Leonard, 2000). There is disagreement over how many people are currently living with HIV in India. UNAIDS (the United Nations agency that co-ordinates global efforts to fight HIV) estimates that there were 5.7 million people in India living with HIV by the end of 2005, suggesting that India has a higher number of people living with HIV than any other country in the world. On the other hand, NACO has established an estimate of 5.2 million people, which indicates that there are less infected people in India than in South Africa. The virus spread to an uninfected person only through contact of his or her body fluids with those of an infected persons, \((i.e.,\) HIV infected pregnant women give birth to an infected child) generally either through unsafe sexual practices or when intravenous drug users share needles the likelihood of infection increases if the person has wounds or inflammation from other sexually transmitted diseases such as syphilis, herpes, chalmydia (Peterman, 1990). An individual infected with HIV, take same period for the development of AIDS and this period is known as incubation period. It is shorter in infants and adults, 10 years (approximately) in younger adults and varies even from 20 to 40 years of age. The major symptoms of AIDS are loss of weight, chronic diarrhea and prolonged fever etc. Minor symptoms are persistent cough for more than a month, history of Herpes Zoster etc. AIDS is the end stage of HIV infection. A number of opportunistic infections occurs at this time. Due to the damage of the immune system many diseases like T.B, cancer etc. takes on the person and he/she may even die due to uncontrollable infection. The factors which determine the progression of AIDS disease include viral strain, genes, co-infection with other pathogenic organism (Zorilla \textit{et. al}, 1996) and health maintenance habits \((e.g.\) diet, excercise). However, extreme variability has been noted in (Cole & Kemeny, 1997) the course of HIV disease.
In AIDS, defense, homeostasis, and surveillance all three main functions of the immune system become deficient. Specific infectious agents found in the weakening of the defense functions, a unique opportunity to grow and generating a variety of opportunistic infections. The deficiency in the homeostasis functions is responsible for the diversity of metabolic diseases in AIDS patients. The deficiency of the surveillance functions, together with the presence of specific carcinogenic agents, and other factors involved in the carcinogenesis process is responsible for the occurrence of neoplasias. Obviously, the simultaneous appearance of life-threatening infectious, metabolic, and neoplasias diseases depends besides the type and dose of the immunological stressors and on the physiological status of the individual, given by many variables such as age, gender, personality, nutrition, pregnancy, lactation, detoxification status, responsiveness of tissues, and genetics. All other bodily systems are also suffering the consequences of the exposure to stressors. Today our immune system is being challenged by the worldwide increment in immunological stressor agents of chemical, physical, biological, mental, and nutritional origin. However, the diversity and intensity of these risks or etiologic factors for AIDS vary from person to person, from one group at risk to another, from country to country, and from continent to continent. This is the principal reason why the frequency of AIDS is not homogeneous in all places and countries. AIDS will rise, if immunological stressors continue to increase in number and strength and if they spread to new social groups, as will probably happen. Obviously, this is influenced by the diversity, quality and quantity of the stressors, route of exposure, duration and dose, as well as by individual and group susceptibilities. In the diagnostic analysis of AIDS, the etiologic factors should be searched and graded for each individual, group of people, country, and group of countries. Light, moderate, or severe acquired immunodeficiency is a consequence of immunogenic and immunotoxic degenerative effects upon immune
cells and immune metabolic reactions from multiple, repeated, and chronic exposures to immunological stressors.

**Pathophysiology of HIV Infection**

HIV is human immunodeficiency virus. It is a retrovirus and its two strains have been clearly identified *i.e.*, HIV-I, HIV-II. HIV-II appears to be less pathogenic than HIV-I. HIV is attached to the target cell through a specific glycoprotein (gp. 120) on the CD4 protein located on the T cells. After attachment, viral envelop fuses with the cell membrane and enters the host cell. Information is then transferred from viral RNA to DNA of host cell through the process of reverse transcription (Song and Leonard, 2000). After that the virus can remain in a fairly dormant state for several years. This phase is known as latent or asymptomatic phase. The decline in the proportion of CD4+ cells infected with HIV increases dramatically with progression of disease. The number of CD4 lymphocyte count in AIDS people is less than 200 (Song & Leonard, 2000) and suggests that shifting of CD4+ from Th1 cells to Th2 cells. It appears that increased expression of CD126 may directly or indirectly contribute to immune dysfunction and to AIDS pathogenesis in HIV infected people. Secondly, it has also been suggested that failure of homeostasis is also important feature of HIV-I infection and it is independent of CD4+ and CD8+ subsets. Monocytes, phagocytes and macrophages also get infected with HIV. Monocytes may act as a reservoir or transport the virus throughout the body including brain (Song & Leonard, 2000).

The nonstop exposure of immunological stressors and the patient is medicated with anti-infective, anti tumoral, and anti-retroviral therapies a greater stage of immunodeficiency comes, with an increment in metabolic alterations and nutritional needs. This brings the patient into a stage of severe malnutrition and generalized metabolic disturbances, with an increasing hazard of death. The reactivity on the tests for HIV, that occurs beginning
in the earlier stages of the natural history of AIDS, \( \frac{3}{4} \) stages without clinical manifestations, \( \frac{1}{4} \) may be part of the stress response of the individual to multiple, repeated and chronic exposure to immunological stressor or oxidizing agents (Song and Leonard, 2000). The capabilities and possibilities of the immune system are neither infallible nor infinite, they have limits. AIDS is the maximum state of deterioration that the human immune system can reach. If the pathogenic process of AIDS is not stopped, it will kill the person. This clearly shows that AIDS is a fatal and incurable disease. Therefore, it requires efforts to reduce its spreading. There is no vaccine against HIV virus and there is a remote possibility to have one in the near feature.

Immunological stressors, also known as “co-factors”, are the real risk, etiologic or causal factors for AIDS. Multiple, repeated, and chronic exposure to immunological stressors of chemical, physical, biological, mental, and nutritional origin are the risk factors for reacting positively on the tests for HIV and for developing AIDS2. Immunological stressors can weaken the immune system, predisposing the individual to AIDS i.e., stressors can constitute predisposing factors. In a person with a debilitated immune system the exposure to more immunological stressors can determine the beginning of the disease i.e., starting factors. And in a person already sick, the continuation of exposures to stressors keeps or worsens the sickness status \( \frac{3}{4} \) keeping/worsening factors \( \frac{1}{4} \) which eventually brings death2. The primary predisposing factors for AIDS in developed countries are chemical in origin, such as recreational drugs (cocaine, heroine, marijuana, alkyl nitrites, amphetamines etc.), the chemicals polluting the air, water, and soil, the chemicals used in food preservation, and pharmaceutical medications. Secondary predisposing factors are biological stressors such as semen through anal intercourses and blood and derivatives in hemophiliacs and other patients treated with transfusions2. Mental stressors are the third group of factors that can weaken the immune system. Anxiety, depression, and
periods of panic, secondary to social conditions such as prostitution, drug-addiction, the knowledge of being “HIV-positive”, hemophilia, homophobia, AIDS-phobia, lack of hope for a better life, are the main mental stressors. The physical pollutants such as noise, electromagnetic fields, along with ionizing and non-ionizing radiations constitute the fourth group of predisposing factors. The excess of fats as well as diets lacking in certain nutritional needs may constitute a fifth group of AIDS predisposing factors in developed countries.

The most important risk factor for AIDS in developed countries is the new epidemic of drugs abuse (Duesberg & Rasnick, 1998). The more common etiologic factors that permit AIDS to start (starting factors) are again the recreational drugs. Pharmacological medicines such as AZT and other chemicals from environmental pollution can also often be the switch which starts AIDS. The immunodepressive effects of semen, blood and derivatives can also act as starting factors. Certain infections such as viral hepatitis, herpes simplex, herpes zoster, syphilis, and gonorrhea can act as starting factors in people with already weakened immune systems. The same can happen with an acute crisis of anxiety, depression or panic in debilitated individuals. The mere fact of knowing oneself to be “HIV-positive” is a strong immunological stressor. A specific nutritional deficiency a mental stressor and, less frequently, a chemical such as alcohol or a physical stressor can be the one that switches on the disease (Duesberg & Rasnick, 1998).

In fact, changes in immune function and disease susceptibility have been well documented in healthy individuals during times of psychic distress (Ader, Cohen, & Felton, 1995; Miller, Kemeny & Taylor, 1997), and studies over the past 15 years have shown significant correlations between psychosocial variables and HIV progression (Vedhara, & Folkman, 2000). In this section role of psychosocial factors in immunomodulation is discussed.
Psychosocial Factors and Immunomodulation

Stress refers to a real or perceived imbalance between environmental demands required for survival and an individual’s capacity to adapt to these requirements (Lazarus & Folkman, 1984; Chrousos & Gold, 1992). Psychological stress has also been shown to increase susceptibility to viral infection. Subjects exposed to stress showed increase in infection rates from 74% to 90% and clinical colds rose from 27% to 47% (Glaser et al., 2001). In medical students taking exams, psychological stress produced a shift in the cytokine balance toward a Th2 profile. The data showed decreased synthesis of Th1 cytokines, including interferon-γ (IFN-γ), and increased production of Th2 cytokines, including IL-10 (Glaser et al., 2001). In a study from 1982 through 1992, on medical students Glaser et al., (2001) found that the students’ immunity went down every year under the simple stress of the three-day exam period. Test takers had fewer natural killer cells, which fight tumors and viral infections. They almost stopped producing immunity-boosting gamma interferon and infection-fighting T-cells responded only weakly to test-tube stimulation. It is not surprising, as stress does suppress the immune system; latent viruses then have an easier time resurging, since the body cannot defend itself as well (Brosschot, et al., 1994). Lack of social support may cause AIDS to develop more quickly partly because it leaves, those who are HIV-positive less able to cope effectively with stressful life events (Theorell et al., 1995).

Finding shows that stressful life events and HIV have interesting but conflicting relationship. Rabkin, Williams and Remien (1991) studied 124 HIV-positive men and found no association between clinician-rated anxiety and CD4+ lymphocyte counts at study entry and at six-month follow-up. However, Evans, Leserman, Perkin (1995), in a similar cross-sectional study of HIV-positive men, did reported a significant correlation between increased frequency of negative life events over the six months
prior to interview and decreased CD8+ cytotoxic T-cells. Evans et al. (1997) continued with a two-year prospective study and found that not only were severe life stressors predictive of greater declines in some lymphocyte populations [natural killer (NK) cells and CD8+ cytotoxic lymphocytes], but also that such stressors increased the rate of HIV progression to AIDS. Further it was emphasized that these results were significant only in those experiencing severe life stress, not with stresses associated with everyday living. For every severe life stress reported, it was found that the risk of HIV disease progression to AIDS doubled. Leserman, Jackson, and Petitto (1999) followed 82 HIV-positive gay men at six-month intervals for up to 5.5 years, and found that more cumulative life stress and less cumulative social support doubled or tripled the probability of progressing to AIDS.

**Coping Style:** There is growing evidence that one’s coping style may modulate the progression of HIV infection. In a study Byrnes, et al. (1998) found that an increase in pessimism was related to lower NK-cell cytotoxicity in a group of HIV-seropositive black women at risk for cervical cancer. Furthering this hypothesis, Cole, Kemeny, Fahey, Zack, and Nalibaff, (2003) found in a nine-year study that the degree of “closetedness,” or concealment of gay identity, was strongly correlated with more rapid decline of CD4+ lymphocytes, more rapid progression to AIDS diagnosis and more rapid time to AIDS-related mortality. These findings were unrelated to health practices, medical treatment or other demographic differences and suggest a relationship between disease progression, poor coping and the stress of concealing one’s sexual orientation. Examining specific coping styles in a group of 74 gay men diagnosed with AIDS, Reed, Kemeny, and Taylor, (1994) showed that higher measures of “realistic acceptance” of their AIDS diagnosis was a significant predictor of decreased survival time. They point out that, in past, researchers have shown unrealistic optimism to be associated with better psychological adjustment and more active coping styles.
Studies of the converse of this idea have found a “fighting spirit” to be associated with reduced progression to AIDS over a 12-month period (Solano, Costa, and Salvati, 1993). In an examination of the impact of perceived causes of events on HIV progression, Segerstrom, Taylor, and Kemeny, and Fahey, (1998) reported that the tendency to attribute negative events to the self was predictive of faster CD4+ lymphocyte decline over the 18-month study period.

It is not that the studies conducted in this area are free from limitations. In fact several limitations have been reported (Cole & Kemeny, 1997). Majority of studies have been conducted among groups consisting primarily of Caucasian, well-educated, homosexual men living in metropolitan locations. However, even within this subgroup, there are variables that might skew study data (e.g., age group, unknown time since HIV infection, access to antiretroviral treatment and so forth). A variety of methodological difficulties deserve mention. HIV/AIDS is an illness with an extraordinarily long latency period, so following patients even for several years may yield no substantive change in disease status. Putative immunologic changes brought about by psychosocial factors tend to be small, necessitating larger samples to reveal significant findings (Cole & Kemeny, 1997). Many psychiatric disorders tend to be recurring, time-limited entities, and our measurement techniques for these typically yield only a cross-sectional glimpse of mental health at a given time. These factors could preclude significant findings in a disease like HIV/AIDS, which has a lengthy asymptomatic phase (Zorilla, McKay, Luborsky & Schmidt, 1996). Moreover, the available studies help establishing link between immunity and coping style and resources. Methodologically sound studies in future may help in delineating the specific role of coping in immunomodulation.

**Personality Traits:** Personality is defined by the emotional and behavioural characteristics or traits that constitute stable and predictable ways that an individual relates to, perceives, and thinks
about the environment and the self (Costa & Widiger, 1994). Individuals vary in the degree to which they possess a given trait and in the way it influences their behaviour. Most personality theories depict individuals along dimensions of extroversion-introversion and stability-instability (Costa & Widiger, 1994).

There has been little empirical investigation of the influence of personality characteristics on HIV risk behaviour, however, Costa and Widiger, (1994) reported on the basis of their clinical observations that of the four temperaments, unstable extroverts were the most prone to engage in HIV risk behaviour. They estimated that in the psychiatric service of the Johns Hopkins AIDS Service (JHAS), about 60% of their patients present with this blend of extroversion and emotional instability. Unstable extroverts were more likely than other personality types to engage in behaviour that places them at risk for HIV infection. They were less likely to plan ahead and carry condoms and more likely to have unprotected vaginal or anal sex. The second most common personality type that they observed, which may represent about 25% of AIDS service patients referred to psychiatry, were that of the stable extrovert. Stable extroverts were also present-oriented and pleasure seeking; however, their emotions were not as intense, as easily provoked, or mercurial. Hence, they were not as strongly driven to achieve pleasure. Their emotional ‘flatness’ may generate a kind of indifference to HIV risk more than a drive to seek pleasure at any cost. Stable extroverts may be at risk because they are too optimistic or sanguine to believe that they will become HIV infected. Introverted personalities appear to be less common among HIV clinic patients. HIV risk for introverts is determined by the dimension of emotional instability-stability. Elsewhere it has been estimated that about 14% of HIV infected psychiatry service patients were with the blend of introversion and instability.

Lucho and Jeri, (2000) did a prospective personality assessment in a group of 612 AIDS patients (306 men and 306
women) living in deprived areas of the city of Lima, using the following procedure: (1) clinical interview; (2) semistructured questionnaire based on the diagnostic criteria of the ICD-10; (3) interviews with the patients’ relatives and friends; (4) behaviour assessment during out and in patient treatments. Patients with dementia and severe neurological complications were excluded. On the basis of results it was concluded that (1) probably due to intermingling of social and constitutional factors personality disturbances were highly prevalent in AIDS patients living in deprived areas of Lima. (2) Personality disorders seem to be a definite risk factor to acquire the HIV infection. (3) Preventive efforts should especially be directed to young healthy people who show personality disorders.

Bellani, et al., (1993) evaluated psychological assessment and socio-demographic characteristics among health care-workers (HCWs) accidentally exposed to HIV in AIDS units. In this 3 groups (G1, 41 accidentally exposed to HIV, G2, 44 health workers with no accidental exposure, G3, 77 HCW with unknown exposure) of HCWs in AIDS units of 14 large public hospitals in Lombardia (Italy) were compared about: personality traits (The 16 Personality Factor Questionnaire of Cattell), burnout (Maslach Burnout Inventory), anxiety (IPAT ASQ of Krugg), depression (IPAT CDQ of Krugg) and socio-demographic characteristics (sex, age, marital status, occupational group, time worked as HCWs, time worked in AIDS unit). Differences among groups were assessed using analysis of variance (ANOVA). Results revealed that G1, G2 and G3 had significantly higher mean scores than comparisons groups in burnout (emotional exhaustion, depersonalization, personal accomplishment) anxiety, depression and personality factors (I; O; Q1; Q2; Q4). There were no significant differences among groups in socio-demographic characteristics, anxiety, depression, and burnout and personality assessment. This study suggests that personality traits, socio-demographic and psychological characteristics are not important
Personality characteristics and personality disorders reflect relatively stable, lifelong propensities that are difficult to change. This does not mean, however, that HIV risk reduction efforts are necessarily futile. Rather, the knowledge of personality characteristics and their role in HIV risk behaviour and medication adherence, can help the mental health professional to develop more effective, specific treatment strategies. Moreover, HIV infected patients can identify aspects of their personality that might interfere with intentions to practice safer behaviour, may develop strategies for dealing with these situations, with this knowledge and it may help them in reducing high-risk behaviours.

**Optimism:** Optimism which may be part of resilience- is the point of view that good things are likely to happen. Optimists tend to experience life’s difficulties with less distress than do pessimists. Optimism has been associated with immune systems (Cohen et al., 1999; Segerstrom et al., 1998). Naturalistic studies have also found optimists to have lower immune parameters than pessimists when stressors persisted over time (Cohen et al., 1999) or participants experienced goal conflict (Segerstrom, 2001). If stress is associated with decreased immune response then what about the pesimistic style of living and explaining bad events? Researches have explored it and reported (Levy et. al. 1987, Peyyingale, 1985) that pessimistic style of explaining bad events (saying it is my responsibility, it is going to last, it is going to undermine everything makes illness more likely) (Segerstrom et al., 1998). Tensahok, O’Leary and Jenkins (1990) found that optimistic attitude may protect and slow the onset of AIDS. The ability of optimism to boost the immune system may hold benefits for victims of acquired immune deficiency syndrome (AIDS) which ordinarily knocks out the body’s immune system.
In a study, conducted by Somlai, et al. (2000) on 158 women, administered measurements that assessed variables in three domains believed pertinent to HIV sexual risk behaviour: (1) substance use in the past 3 months, (2) acquired immunodeficiency syndrome (AIDS)-specific cognitive and attitudinal factors, including AIDS risk knowledge, condom attitudes, perceived risk for AIDS, behaviour change intentions, and perceived self-efficacy, and (3) life context variables, including self-esteem, fatalism, personal optimism toward the future, and current life satisfaction. It was found that women at highest risk for HIV also most often used a variety of substances and scored lower in self-esteem, held views more characterized by personal fatalism and low optimism concerning the future, and had greater life dissatisfaction than women at lower risk.

In a study cohort of gay men responding to the threat of acquired immunodeficiency syndrome (AIDS), dispositional optimism was associated with less distress, less avoidant coping, positive attitudes as a coping strategy, and fewer AIDS-related concerns. Men who knew they were seropositive for human immunodeficiency virus (HIV) were significantly more optimistic about not developing AIDS than men who knew they were seronegative for HIV. This AIDS-specific optimism was related to higher perceived control over AIDS and to active coping among seropositive men only and to health behaviours in both serostatus groups. There was no relation of optimism to risk-related sexual behaviour. It is concluded that optimism is psychologically adaptive without necessarily compromising health behaviour and useful to distinguish between event-based optimistic expectations and dispositional optimism (Taylor, et al., 1992).

Depression studies examining the effect of depression on HIV progression have had variable results. Rabkin, Williams, and Remien, (1991) reported a relationship between clinician-rated depression and increased report of HIV-related symptoms. Burack,
Barrett and Stall (1993) reported findings of a five-year prospective cohort study that showed a significant correlation between depressive symptoms and more rapid decline in CD4+ lymphocyte counts, although not with increased HIV/AIDS-related morbidity or mortality. Conversely, in a similar eight-year study of 1,809 HIV-positive gay men, Lyketsos et al. (1996) found no significant relationship between depression and indicators of HIV disease progression or clinical outcome. Likewise, results from a seven-year prospective cohort study of 402 gay men showed that depression was associated with a greater AIDS-related mortality rate, although no correlation was found for measures of CD4+ lymphocytes (Mayne et al., 1996). In a meta-analytic review, Zorilla et al. (1996) reported non-significant correlation between depressive symptoms and markers of HIV disease progression. There did seem to be a relationship between depression and increased reporting of HIV-related symptoms. Thus the relationship between depression and HIV/AIDS progression need to be further probed, and it will help in understanding its role in immunomodulation.

Social support it refers to the perceived comfort, caring, esteem, or help a person receives from other people or groups (Cobb, 1976; Wallston, Alagna, DeVellis, and DeVellis, 1983). Several studies have outlined the importance of social support for the health and wellbeing. Sarah, Pressman and Sheldon (2005) provided support for the theory that social support may strengthen the immune system. Their subjects got their ‘first-ever’ flu shots at a university health clinic and filled out questionnaires on health behaviour. Subjects carried palm computers beginning two days before their vaccination that “prompted them four times a day to register their momentary sense of loneliness, stress levels and mood. It was found that through both self reported loneliness and social isolation have negative association with immunity yet self-reported loneliness had strong association. Theorell et al. (1995)
in a study found that isolation and less emotional support showed a significantly greater decline in T cells over the course of the study than those who reported feeling more socially connected. It is widely accepted (Theorell et al., 1995) that social isolation is a significant risk factor for several disease entities and that significant interruptions in social relationships can have deleterious effects. With regard to HIV/AIDS, this is exemplified among studies examining the death of an intimate partner, an event generally associated with bereavement and social role disruption. Kemeny and Weiner (1994) studied 39 HIV-positive gay men who had experienced the death of an intimate partner within the previous 13 months. Looking at various markers of HIV progression pre- and post bereavement, they found significant increases in serum neopterin (a product of activated monocytes and a predictor of HIV disease progression) in the bereaved group. This finding was independent of ratings of depression, suggesting a qualitative difference between bereavement and depressive disorders. Another study unexpectedly found that greater self-reports of loneliness were associated with a slower decline in CD4+ lymphocytes over a three-year period, but not associated with time to AIDS diagnosis or AIDS-related death (Miller et al., 1997). Emotional support also boosts immune system, function in AIDS and HIV-positive patients. Similarly, in a study of socially and independently housed rhesus monkeys, Capatinio and Lerche (1990) found that greater social disruption around the time of inoculation with simian immunodeficiency virus correlated with a significantly increased rate of mortality. The rate of mortality also increased after inoculation if the animal was placed in a novel social environment versus individual housing. These findings, although yielding variability, yet suggest that social interactions social and emotional support may play an increasingly important role in understanding HIV disease progression and may modulate the immune system.
Life Style: Life style referred to the general pattern of living of an individual. It involves his/her diet or food habits, exercise, sleeping, smoking, drinking etc. In health psychology two types of life styles or behaviours i.e. health promoting (taking good nutritious diet, exercise etc.) and health endangering (smoking, lack of exercise) are referred to quite extensively. The health promoting behaviours/life style may help an individual in coping with stressors and help in building/ strengthening the immune system. Smoking, taking unbalanced diet etc. on the contrary may have negative effect on the immune system. Suttajit in 2007 reported that the nutritional problems have been shown to be significant and contribute to health and death in HIV/AIDS patients. The role of nutrition and how oxidative stress is involved in the pathogenesis of HIV+ leading to AIDS is reviewed. Studies consistently show that serum antioxidant vitamins and minerals decrease while oxidative stress increases during AIDS progression. The optimization of nutritional status, intervention with foods and supplements, including nutrients and other bio-active food components, are needed to maintain the immune system. Kusaka, Kondou and Morimoto (1992) revealed that people who have healthy lifestyle (e.g getting enough sleep, eating balanced meal etc.) have a strong immune functions than who have less health full life styles. There is no single, optimal eating regimen appropriate for every person living with HIV/AIDS. Instead, HIV positive people should adopt a sensible balanced diet and consult an experienced nutrition specialist for individualized recommendations (Hiqhleyman, 2006).

Beliefs: A sense of control can affect health and well-being in a number of ways. Studies show that people with little sense of control -those who see lives and futures controlled by luck or fate- suffer much greater psychological distress. The relation of cognitive information (perception, belief, emotion) to lymphocytes is taken as evidence that they do indeed alter immunity. Research focusing on the effects of beliefs of susceptibility to AIDS
indicates that adolescents and adults who report high perceived risk for AIDS practice safer sexual behaviours, than those who perceive low risk for contracting AIDS (Gray & Saracino, 1989; Villarruel et al., 1998).

**Psychosocial Intervention**

Recent evidence indicated that there is a direct impact of positive intervention on the immune system of HIV positive people (Cole et al., 2003). Researchers have also demonstrated that physical exercise and psychotherapy can reduce stress and enhance immune function in people infected with AIDS virus (Antoni et al., 1991). Psychological beliefs such as optimism, personal control and a sense of meaning are known to be protective of mental health (Taylor, Kemeny, Reed, Bowen & Gruenwald, 2000). They did a number of studies on HIV positive men and it was found that ability to find meaning in life is less associated with onset of AIDS illness. Many studies give us hope that psychosocial interventions can not only improve our patients’ quality of life, but also improve their physical health. A study of 10 HIV-positive men by Taylor (1995) showed that behavioural stress management over a 20-weeks period significantly slowed the rate of CD4+ lymphocyte decline.

The effect of Exercise training has been studied among several HIV-positive cohorts, revealing numerous psychological benefits including decrease in anxiety and depression and increase in active, positive coping styles. In a review of pertinent literature, LaPerriere et al. (1997) concluded that atypical regimen of aerobic exercise can result in increase in CD4+ lymphocyte counts in all HIV-positive patients, except those with AIDS. However, even among AIDS patients, the CD4+ lymphocyte counts remained stable over an 18-month study (whereas control patients’ levels continued to decline). HIV prevention programs for disadvantaged women require attention not only to AIDS-specific knowledge, attitudes, and skills development but also to broader issues of life context.
that, if unaddressed, may limit women’s ability and motivation to reduce risk for HIV/AIDS (Somlai, et al., 2000).

There is evidence, at least in the case of depression, that HIV-positive individuals respond to antidepressant therapy at rates similar to seronegative controls. The side-effect profiles of these medications also seem to differ minimally based on HIV status (Rabkin et al., 1994). A significant finding about HIV and depression in the meta-analysis by Zorilla et al., (1996) was that depression was associated with increased reporting of HIV physical symptoms, regardless of objective markers of physical disease. Depressed HIV-positive individuals may have a more painful experience of HIV illness, regardless of objective physical signs and markers. Alleviating depression in some cases may also facilitate compliance with medication regimens and medical follow-up, improve self-care, and decrease self-destructive behaviour have all been joined to be associated with diminished morbidity and mortality (Stober et al., 1997).

Finally, it is concluded that psychosocial factors are associated with the onset, progression and even in the treatment of a number of illnesses including HIV/AIDS. However, the strength of the relationship and the exact mechanism how they influence the health/illness of the individual need to be established. The available evidence though meager points towards the role of these factors in strengthening or weakening the immune system in general and in cases of HIV/AIDS in particular. This is an emerging area for research and researchers from medical and behavioural sciences are coming together on a platform to conduct interdisciplinary research which may help us in having a new ray of hope for this deadly disease. However, with more HIV-positive individuals being seen in general psychiatric practice, one should not underestimate the positive effects of comprehensive psychiatric care. Overall, it can be said that psychological factors play a vital role in the progression of AIDS and in its intervention.
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