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REVIEW ARTICLE

AUTO-IMMUNE DISEASES AND THEIR PSYCHOSOCIAL RISK FACTORS: A REVIEW

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ABSTRACT

Auto-immune disease (AD) is caused by the immune system getting confused and wrongly attacking the body's good cell. The present study examined the psycho-social risk factors in AD, on the basis of review of different studies related to the AD. All about 100 related studies were reviewed. Most of the studies of AD were in medical back ground. About 30-35 studies dealt with the psycho-social risk factors responsible for triggering AD. The review has been focused on 6 AD, became prevalence of the 6 AD is high in Chhattisgarh state, though not reported in documentation. The review of these studies suggested that the important psycho-social risk factors are stress, emotional affects, emotional or physical stress and socio-cultural factors for various AD.

INTRODUCTION

Auto immune diseases (AD) are caused by the immune system getting confused and wrongly attacking the body's good cells. Autoimmunity refers to a breakdown in the immune system's ability to maintain self-tolerance, resulting in an immune response directed against self-components of the body. The etiology of auto-immune diseases is multifactorial, including genetic, environmental, hormonal and immunological factors. Physical and psychological stresses have been suggested in the development of auto-immune disease. The risk factors which are reported in the studies are psychological stress especially emotional stress which in turn lead to immune deregulation, which ultimately alters amplification of cytokine production. Autoimmune diseases, affect at least 5% of the population, which might be prevented by avoiding those environmental factors that trigger the disease (primary prevention).

Auto immune disease is caused by an auto immune response i.e., by an immune response directed to something in the body of the patient. Auto immune disease can affect virtually every site in the body including the endocrine system, connective tissue, gastro intestinal tract, heart, skin and kidneys. Auto-immune diseases result from a combination of genetic, immunologic, hormonal and environmental factors. It is noted that genetic predispositions accounts for about half of the risks of developing auto immune disease. The environment is other factor which triggers the process. Two thirds of those affected are women. ADs can generally be divided into two types: a) organ-specific, where the immune response is directed towards a target antigen that is specific to a single organ or gland, and b) systemic, which involves a response directed across a broad array of organs and tissues.

Objectives

The main objective of the present paper is to examine the psychosocial risk factors of AD, reported in the earlier researches.

METHOD

Auto-immune disease related studies published and available on different electronic sources published in peer reviewed journals from 1980 to 2014 were reviewed. The AD have been an major source of concern in health area specially in Chhattisgarh . There for it was felt that the empirical researches focusing the psycho-social context should be searched. in this

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context from 1980 to 2014 about 100 studies were reported electronically vis. International journal of human genetics, Science directs, Pub-med, Annual reviews, Jstor, Elsevier.

Inclusion And Exclusion Criteria

studies related to psychosocial factors as risk factors of AD have been included. Studies reporting association of gene, medical, psycho-social, cultural factors have also been included studies related to AD. Exclusively of medical back ground have not been included in the review. Auto-immune disease (AD) has been studied from many angles viz. etiology, management. Most of the information is based on the review articles about AD. Stojanovich & Marisevljevich (2008) in review article on AD reported that physical and psychological stress have role in development of AD. They drew conclusion on the basis of many animals and human studies which demonstrated the effect of all types of stressors (not specific) on immune system. Uncommon emotional stress was observed prior to onset of AD. Psychological stress is the trigger factor in AD. Jump (2005), investigated that psychological factors and autoimmune disease. The study was using in cluster analysis approaches and 393 participants were involved. Result of the study suggests that personality, psychological and social support is stronger determinants of response to autoimmune disease.

Dube, *et al* (2009), studied Childhood stress and auto immune disease, finding of the study childhood traumatic stress experiences to be the risk factors in developing auto immune disease in an adult. Boscarino (2004), reported that veterans who experienced PTSD are more likely to suffer from a host of auto immune disease including stress, Rheumatoid arthritis, Multiple sclerosis and Graves' disease. The study found that while 54 men had PTSD, more than double that number had PTSD coupled with another psychiatric disorder such as schizophrenia, depression, paranoia or hysteria, indicating that Vietnam veterans often suffer from multiple mental illnesses.

The result also showed that 17 to 19 percent of those with PTSD had an auto immune disease. Veterans with PTSD and a secondary mental illness diagnosis had the highest values of auto immune disease. They were three times more likely to develop auto immune disorder in Vietnam. Elenker and Chwidsus (1999) suggested that stress may have both systematic and local effects that affect immune system in different ways. There are specific auto immune conditions thought to be influenced by stress, including common conditions such as Psoriasis, RA, Graves disease and Multiple Sclerosis. Prevalence of various AD here been reported by the review in presented in table no.1

Table 1 Shows Prevalence Rate of Various Autoimmune Diseases

S.N	Autoimmune Disease	Prevalence Rate		Male/Female Ratio#	Source/ References
		World*	India**		
1.	Psoriasis	1.3%	0.44- 2.8%	M=F	*#National psoriasis foundation **Dogra(2010)
2.	Rheumatoid arthritis	0.6-1.3%	0.75%	1:3 (M<F)	*#WHO **Malviya(1993)
3.	Graves's disease	100-200/Million /Year (UK) 30/ Million./Year (USA)	0.03%	1:7.8% (M<F)	*SaiChing Jim Yeung **Duraiswamy (2010)
4.	Multiple sclerosis	2.3 Million	8/Million /Year	1:2.3-3.5 (M<F)	*National MS society **Pandit L(2014) #Ahlgren C(2011)
5.	Diabetes type- 1	5-10% or 11-22 Million	10.0/ Million/ Year	M=F (Under age15) M>F (Over all age)	*Soltesz G(2007) **OindrilaRaha (2009) #Diabctologia ,Gale EA(2001)
6.	SLE	20-150/Million	14-60/ Million	1:9 (M<F)	*Lawrence RC(1998) **Malviya AN (1993) #Blank M(2009)

Source-US department of health and human services.

Note – Data of autoimmune disease in Chhattisgarh state (India) are not available. AD - Autoimmune disease; .MS-Multiple sclerosis; SLE – Systemic lupus erythematosus. .UK– United kingdom; USA – United states of America; *- Source and references of diseases (world). **- Source and references of diseases (India) .# - Source and references of diseases (male/female ratio).

The present review examines auto immune disorder that is associated with excessive immune system activity and inflammation. Autoimmune diseases (AD) are characterized by chronic inflammation in which the rate of tissue damage exceeds the ability of the body to repair the damage. There is wide variability across ADs in the tissues that are attacked and specific symptoms caused. Although an understanding of the mechanisms responsible for maintaining tolerance exists, the specific factors contributing to the pathogenesis of AD remain largely unknown (Parham, 2000). It is generally accepted that the cause of any given AD is multifactorial and that environmental and genetic factors play a role in susceptibility of autoimmune diseases. They are relatively common, affecting 2% to 3% of the population of developed countries (Parham, 2000) and 5% to 7% of adults in Europe and North America (Tizard, 1995).

Psoriasis

psoriasis researches in this area of AD have focused on the prevalence rate, psycho-social factor viz.-stress. Psoriasis is a diseases of the skin associated with development of pinkish or reddish plaque covered by white or silvery scales lesions which are typically located around the elbows, forearms, knee, cleft of buttocks and the scalp. The plaques tend to worsen and then remit over time, sometimes in response to psychological and environmental factors. Microscopic examination of these plaques shows dilated blood vessels surrounded by white blood cells.

T lymphocytes and their products are believed to mediate this autoimmune disorder, and treatments that block cytokines produced by T lymphocytes (cyclosporine) improve the disease (Valdimarsson *et al*., 1997). Streptococcal bacterial infections of the skin have sometimes been associated with psoriatic

lesions and therefore may have something to do with the development of lymphocytes that attack both these bacteria and normal components of the skin (Rassmusen, 2000). Studies have reported that psychological factors and stress are associated with the onset of skin symptoms in patients with psoriasis (Abadie *et al*., 1994; Gasten *et al*., 1991, Gupta *et al*. 1996 &Hamme *et al*., 1996. Sing *et al* (1999) reported that stress cause skin mast cell de-granulation which worsens disease activity in psoriasis.

Winchell & Watts (1988), Zachariae *et al* (1996) studies have found that a variety of relaxation therapies in stress reduce the severity of disease activity in psoriasis, possibly because of their effect of reducing sympathetic nervous system activity. Animal studies indicate that acute psychological stress can cause skin mast cell degranulation, which worsens disease activity in psoriasis; mast cell degranulation is dependent on several neuropeptides, including corticotrophin releasing hormone, neurotensin, and substance P (Singh *et al* 1999).

Rheumatoid Arthritis

RA researches in this area of AD have focused on the prevalence rate, psycho-social factor viz.- emotional affects and stress. RA is an auto immune disorder associated with pain and inflammation of tissue surrounding the small joints of the hands, wrists, feet and as the disease progresses it involves larger joints. Prevalence rate of RA is very high. The symptoms are severe pain, limitations of movements and crippling deformities.

Geenen and Colleagues (1996) compared sympathetic nervous system responses to a mental challenge stress tasks, in a sample of rheumatoid arthritis patients with those of control subjects without RA. They found that subjects with RA had lowest sympathetic activation. Donmez, Pamuk, Umit & Top (2012), evaluated in autoimmune rheumatoid arthritis disease is associated in major symptoms in fibromyalgia patients and the association between their anxiety, depression and somatisation. The study conducted in 232 fibromyalgia patients, 78 is systematic lupus erithematosus patients and 70 healthy control participants were participated. The finding of the study indicates that anxiety, depression and somatization are positively associated in disease severity.

Rang (1998) There are studies which report that interpersonal stresses predict increases in disease activity in patients with RA. Arango& Cano (1998), Zautra *et al*., (1997, 1999) investigated that interpersonal stressors predict increase in disease activity in rheumatoid arthritis problem. Zautra *et al*. (1997) examined the effects of changes in interpersonal stress on disease activity in 41 women. Measures of everyday stressful events were collected weekly for 12 weeks and related to disease activity. Participants who had experienced increased interpersonal stress showed elevations in DR+CD3 cells, sIL-2R, clinicians rating of disease, and self-reported joint tenderness.

Potter and Zautra (1997) may help explain why certain stressful events are associated with a decrease in disease activity in rheumatoid arthritis, whereas other stressful events are associated with increased inflammation and symptoms. These investigators followed a 53 year old woman with rheumatoid arthritis for a 12-week period, during which she experienced two unexpected family deaths and also encountered a number of small events associated with negative effect. Investigators found a large decrease in disease symptoms and signs immediately. However following the two major losses (family members) negative affect and small events were related to a worsening of disease status. These observations were confirmed in an analysis of 25 other subjects with this arthritis, which suggests that major life events and small life events have opposite effects on disease activity.

Stewart *et al* (1994) reported that the presence or absence of rheumatoid factor may determine whether the onset or course of rheumatoid arthritis is stress related. Smyth *et al* (1999) examined that stressful experiences might affect disease symptoms in patients with rheumatoid arthritis. The controls were asked to write about an emotionally neutral topic; subjects wrote for 20 minutes on 3 consecutive days a week and outcomes were assessed at 2 weeks, 2 months and 4 months after writing. Symptom improvement among rheumatoid arthritis patients did occur, but not until the 4 month assessment. This study confirmed the positive effects that emotional disclosure (even when disclosure occurs only in the form of writing) may have on disease activity.

Kelly *et al* (1997) found that psychological interventions designed to reduced in stress level produce a small but significant improvement in clinical activity among patients with RA disease. Antonovsky (1979) reported that psychological factors may also influence the effect that the disease has on physical functioning. There is evidence that a "sense of coherence" may be a mediator between actual disability level and degree of handicap perceived by rheumatoid arthritis patients.

Schnyder and colleagues (1999) examined the association between disability, handicap and sense of coherence in a sample of 89 subjects with rheumatoid arthritis. Objective measures of illness severity were used to measure disability, whereas judgment of subjects concerning their condition was used as a measure of handicap. Significant correlations were found between sense of coherence and all handicap variables, whereas there was no association between sense of coherence and disability variables. These findings suggest that sense of coherence may mediate between disability and handicap in rheumatoid arthritis patients.

Graves's Disease

GDresearches in this area of AD have focused on the prevalence rate, psycho-social factor viz.- emotional or physical stress. Graves's disease is an autoimmune disorder that affects the thyroid gland. Antibodies are directed at thyroid-stimulating hormone (TSH) receptors located on the gland. These antibodies act like TSH itself, stimulating the thyroid cells to enlarge and produce large quantities of thyroid hormone, resulting in hyperthyroidism. This is one of the most common causes of hyperthyroidism. People with Graves's disease experience symptoms of increased perspiration, heat

intolerance, increased appetite, irritability, thyroid enlargement and sometimes protrusion of eyes. Thyroid hormone production increases are controlled, speeding up the body's metabolism and resulting in the symptoms just noted.

Matos-Santos (2001) examined in the association between stressful life events, and onset of Graves' disease and toxic nodular goiter. A case control design was used and total 93 participants were included, participants divided in three groups each groups 31 participants, groups namely- grave disease, toxic nodular goiter and control group. The study find that grave disease had a highly significant associated in stressful life events compared to toxic nodular and control group.

Chen, et al (2012) investigated that biological, psychological and social factors interact with the mental health status of grave disease and antithyroid drug treatment. The cohort study design was using, total 300 participants were involved in the before and after treatment condition. The study was find that positive coping style, negative events and social support as a protective factor, as predicting cure for the grave disease. Enhancing the positive coping and social support is important to improve mental health in grave disease. Lidz (1955), Bennett & Cambor (1961) reported that the emotional factors were important in the etiology of hyperthyroidism. Harris et al (1992), Kung (1995), Sonono et al (1993), Winsa et al (1991) and Yoshiuchi et al (1998) investigated and reported that increase in negative life events preced and play on important role in Grave's disease.

Rabin (1999) provides two possible explanations for the role that stress plays in Graves's Disease. First, the altered immune system regulation seen in this disorder may result from a genetic defect that alters immune surveillance. This defect might cause the loss of a suppressor T lymphocyte that then allows auto reactive lymphocytes to produce the TSH-like antibodies that stimulate the volpe gland. Second, stress may alter the functioning of the thyroid gland by decreasing TSH production through its effects on the pituitary or hypothalamus. Servatius et al (1994) studies in animals have shown the result that chronic stress is associated with increased weight of the thyroid gland, despite decreased concentrations of TSH and decreased production of thyroid hormone.

Multiple Sclerosis

MSresearches in this area of AD have focused on the prevalence rate, psycho-social factor viz.- physical and emotional stressors. Multiple sclerosis (MS) is a chronic autoimmune disease of the central nervous system characterized by intermittent inflammation of the myelin sheath that covers nerve cell axons in the brain and spinal cord. The damaged areas that result are called plaques. MS produces visual changes and muscle weakness or paralysis in an inconsistent pattern. As the disease worsens, different nerves are affected at different times, producing an exacerbation of current symptoms, as well as new symptoms. Lymphocytes and macrophages release cytokines, proteolytic enzymes and immunoglobulins that cause the inflammatory damage seen in plaques. Although the initiating event for MS is unknown, both genetic and environmental factors are believed to play a role.

Artemiadis, Anagostouli and Alexopoulos (2011), reviewing in stress a risk factors for multiple sclerosis onset of relapsed. The study was conducted in Medline, using English language restriction from 1980 to 2010 total 30 years time period and relevant studies were included. The study was included only observational longitudinal studies. Reviews suggest and marked heterogeneity in environmental stress is related to multiple sclerosis.

Riise (2011), examine the stress is the risk factor of multiple sclerosis, study conducted in two cohort study design, I – Nurses Health Study (n) 1,21,700 from 1976 and the Nurses Health Study II (n) 1,66,671 from 1989. Result has suggested that the stress factor is slightly potential risk factors for multiple sclerosis. Garfield & Lincoln (2012), examine the anxiety is a risk factor for multiple sclerosis. The cohort study design was using in the assessing factors potentially related anxiety questionnaire. The anxious factor was highly associated in the multiple sclerosis. Oroanc (1996) found that MS patients had a low likelihood of having lgE-mediatated diseases, suggesting an increase in the activity of Th1 lymphocytes known to be stimulated by psychological stress.

Stip & Truelle (1994) Stressful life events often involve interpersonal of financial difficulties. MS patients also report significantly more stressful life events in the months prior to the exacerbations of the disease than in sympto free intervals. Schwartz and colleagues (1999) followed 96 healthy controls and 101 MS patients for 6 years, comparing self-reported stressful events and changes in health status between groups. They found a bidirectional relationship between stress and illness, with increased risk of disease progression when reported stressful events were higher and an increased risk of reported stressful events when rate of disease progression was higher.

Nisipeanu and Korczyn (1993) reported fewer exacerbations of MS among those with this condition, and this suggests that intense psychological stress may suppress immune activity responsible for the disease. Ackerman et al (1996, 1998) demonstrated that the immune system of MS patients react normally to acute stress by increases in these cell typesfoundthat immune alterations remain intact in patients who have MS and are exposed to mild psychological stressors.

Diabetes

Diabetes researches in this area of AD have focused on the prevalence rate, psycho-social factor viz.- environmental factors. Kakleas, Kandyla, Karayianni& Karavanaki (2009) studied that diabetes education pro-grammes and health promotion strategies improve symptoms of depression, diabetes knowledge, glycaemic control, self-care and self-efficacy. Kluding (2010),Castillo (2010) noted that education interventions are easy to implement and are likely to have a very positive effect on diabetes knowledge and management.

Systemic Lupus Erythematosus

SLEresearches in this area of AD have focused on the prevalence rate, psycho-social factor viz.-socio-cultural factors.

Systemic lupus erythematosus (SLE) is a prototypical AD in which almost every tissue or organ may be affected. Its diagnosis depends on multisystem involvement and the presence of auto antibodies, which together form the diagnostic criteria for SLE (Tan *et al* 1982). Systemic lupus erythematosus is thus a syndrome, rather than single disease entity, that exhibits considerable variation in disease manifestations between individual patients.

risk for misdiagnosis.In the United States, the most commonly used assessment system for disease activity is the Systemic Lupus Erythematosus Disease Activity Index (SLEDAI; Bombardier, Gladman,Urowitz, Caron, & Chang, 1992), whereas in Europe, it is the British Aisles Lupus Assessment Group (BILAG; Symmons *et al* 1988)system predominates (Wallace & Hahn 2002).

Table 2 shows the Pathophysiology and epidemiology of various Autoimmune diseases

SN	Auto - immune Disease	Age of onset (years)*	Trigger gene**	Risk factor	Risk factor (psycho-socio)	Symptoms	Source/ References
1	Psoriasis	15-35	CARD -14	-streptococcus, koebner -phenomenon -medicine (li+,inderal,cluinidine)	- stress	-red scaly patches on (head, elbow, knee). -itching, pain	*NPF **Dogra (2010)
2	Rheuma -toid arthritis	40-50	-PTPN 22 -PAD 14	-genetic -viral/bacteria -trauma -smoking	-emotional affects -stress	-morning stiffness. -two or more joint swollen. -RA factor +tv.	*WHO **Malviya (1993)
3	Graves's disease	20-40	-HLA 6 chromo. -CTLA 4 band 2a33	-hyper thyroidism -pregnancy -smoking -family history -other AD	-emotional or physical stress	-insomnia. -weight loss. - brittle hair. -bulging eyes. -heat sensitive.	*SaiChing Jim Yeung ** Duraiswamy (2010)
4	Multiple sclerosis	20-30 typical 20-60 women	HLA-DRB1, HLA-B12	-infection -climate -diet -occupational exposures	-physical & emotional stressors	-weakness coordination, balance, speaking, walking. .tremors. -numbness.	*IFMS **Ahlgren C (2011)
5	Diabetes type- 1	juvenile or child -hood onset	IDDM1varient-DRB1-0401	-rubella virus (coxsackie virus). Pyrinuron(chemicals & drugs) -Identical twins	environment- tal factors	-thirsty. -urinating. often-hungry. -weight loss. -blurry eye sight.-itching.	*Soltesz G (2007) **OindrilaRaha(2009) Gale EA (2001)
6	SLE	14-64	-HLA DR3 HLA-A1	-UV exposure -microbial response -drugs -smoking	-socio –cultural factors	-butter fly. rash on nose & cheeks. -mouth sores. -sun sensitive. -chest pain. -weight lose.	*Boddaert J (2004) **Malviya AN(1993)

Source-US department of health and human services; Note – Data of Autoimmune disease in Chhattisgarh state (India) are not available; UV-ultra violate; Chromo.-chromosome; PAD-poly(A)binding protein; HLA- human leucocyte antigen; NPF-national psoriasis foundation; CTLA-cytotoxic T lymphocyte associated; IFMS-international federation of multiple sclerosis; PTPN- protein tyrosine phosphatase non receptor type.

The course of SLE generally involves periods of intense flares and periods of remission (Parham 2000).

Greco, *et al* (2012), investigates the association between depression and vascular disease in systemic lupus erythematosus. A cross-sectional study design was conducted in 2002 to 2005 in 161 women participants with SLE disease positive. Result of the study has suggested that systematic lupus erythematosus and depression is associated in cardiovascular disease. It is evident that gender has a major influence on the likelihood of developing SLE, with a 90% female predominance over males (Rus& Hochberg 2002). The predominance of female SLE patients is not well understood, although hormonal factors are believed to play an important etiological role (Tizard 1995).

Systemic lupus erythematosus is generally diagnosed according to the American College of Rheumatology's revised (Hochberg 1997) criteria for SLE. The criteria include 11 items, 5 of which are composites of one or more abnormalities. In order to meet criteria for a diagnosis of SLE, patients must fulfill at least 4 criteria; however, no single criterion is essential (Wallace & Hahn 2002). Laboratory diagnosis of SLE focuses to a large extent on antinuclear antibodies (Kuby 1991). The absence of a clearly defined diagnostic marker for SLE contributes to the diagnostic challenge and can place patients at

The review on psychosocial risk factors reveals that auto-immune disorders have been studied with regard to various aspects. There is paucity of researches revealing personality association with autoimmune disease risk factors. The Psychosocial issues/have been given less attention. A study revealing personality association and psychosocial issue may be undertaken for the research work. The studies addressing etiological and intervention issues have revealed that the genetic and environmental factors are responsible factors and studies have been conducted on different conditions, like Rheumatoid arthritis, Multiple sclerosis, Diabetes (autoimmune), Thyroiditis (autoimmune), Systemic Lupus Erythematosus, Psoriasis.

Although there is no prevalence studies available with regard to autoimmune disorder in the state of Chhattisgarh, in various clinical settings the number of cases of Psoriasis, Rheumatoid arthritis and Systemic Lupus Erythematosus (SLE) seems to be higher in comparison to other AD. These disorders have been equally reported in significant numbers in urban as well as rural areas.

Whatever the mechanisms that underline this relationship, Psycho-social factors that reduce stress may help prevent or ameliorate the course of disease. There is some evidence that religious practices may alter the course of autoimmune

condition. Better understanding of these risk factors will likely lead to a better understanding of mechanism for the onset of autoimmune diseases. Effective strategies for prevention will require identification of psychosocial triggers before the onset of clinical disease. We have only begun to scratch the surface of how psychosocial factors affect autoimmune disease, making this a fertile ground for future study

Conflicts of interest

There are no conflicts of interest.

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