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EDITORIAL'S DESK



Dr. Bharani S Sogali,
Editor, APTI Women's Forum Newsletter

Dear All,

A warm welcome to all the members to the third issue of women's forum newsletter, 2019. We have very interesting article in this edition from Dr.G.Y.Narmada, on **Women Empowerment in India**, Dr. Purnima Ashok on **How to address malnutrition problems in women: An overview**, Mrs. Sapna Gore, on **Autoimmune diseases-Female Dominance**. We are thankful to all the authors for their great contribution. Apart from these, we have industry updates, pole to pole, events and research grants information. Any suggestions and contributions, please share to editor.aptiwomenforumbulletin@gmail.com. Have a great reading.

INVITED ARTICLE



How to Address Malnutrition Problems in Women: An Overview

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Every third women of reproductive age in India are under nourished, with a body mass index (BMI) of less than 18.5 kg/m². It is well known that an undernourished mother inevitably gives birth to an undernourished baby, perpetuating an intergenerational cycle of under nutrition.

Why has malnutrition been so high among women in India? The reasons are multiple and complex. Seemingly, the discriminatory practices associated with the rigid social norms and the excessive demands made on the time and energy of women join hands with the usual determinants in blighting women's nutrition. However, one of the usual determinants, namely poverty, seems equally important: not only is poverty one of the basic causes of malnutrition, but also malnutrition is considered to be both an outcome and a manifestation. If so, then, the higher rates of economic growth during the past 10 years or more coupled with a reasonable reduction in poverty, especially between 1999-2000 and 2004-05, would normally imply a decline in women's malnutrition.

Undernourished girls have a greater likelihood of becoming undernourished mothers who in turn have a greater chance of giving birth to low birth weight babies, perpetuating an intergenerational cycle.

This cycle can be compounded further in young mothers, especially adolescent girls who begin childbearing before they have grown and developed enough. When mothers take only short intervals between pregnancies and have many children, this can exacerbate nutrition deficits, which are then passed on to their children.

Accelerating efforts to improve maternal nutrition is a challenging task, a few can be pointed out:

While it is globally acknowledged that focusing on the first 1000 days of a child's life – from conception to two years of age – is a critical window of opportunity to address child stunting.

However, till date, the focus of nutrition programs for Indian children has largely been post-birth, with child and feeding-centered interventions. It is known that 50 per cent of the growth failure that gets accrued by two years of child age occurs in the womb owing to poor nutrition of their mother both during pregnancy and before pregnancy.

There is sufficient knowledge base that fetal stunting is largely caused by inadequate nutrition of the mother before conception and in the first trimester.

The major reason for stagnant levels of undernutrition among Indian children is because of a failure to take adequate nutrition by mothers.

Given this, women's nutrition – before, during and after pregnancy – has now been included as a special focus area in UNICEF India's nutrition programming. The organization now aims to give added focus to universalize the coverage of five essential nutrition interventions for women which have been arrived at based on global and national consensus.

UNICEF India, one of the organizations concerned with health issues has also been at the forefront of strengthening coverage of existing nutrition interventions for women in flagships through policy, advocacy and system strengthening strategies.

The five Essential Nutrition Interventions for Mothers has been underlined by UNICEF:

Arrived at through national and global consensus

1. Improving the quantity and nutrient level of food consumed in the household

Ensuring:

- Access to generalized household food ration through public distribution system (PDS)
- Access to supplementary foods under the integrated child development services scheme
- Access to knowledge to improve the local diet, production and household behaviors through nutrition and health education.

2. Preventing micronutrient deficiencies and anaemia.

By providing:

- Folic Acid Supplementation and de worming during pregnancy
- Pre and peri-conceptual folic acid supplementation
- Universal access to iodized salt
- Malaria prevention and treatment in malaria-endemic areas
- Access to knowledge and support to stop use of tobacco products during pregnancy
- Maternal calcium supplementation.
- Maternal vitamin A supplementation

3. Increasing women's access to basic nutrition and health services.

By providing:

- Early registration of pregnancy
- Quality of antenatal natal checkup, with emphasis on pregnancy weight gain monitoring screening and special care of at-risk mothers.

4. Improving access to water and sanitation education and facilities:

- By providing sanitation and hygiene education, including menstrual hygiene.

5. Empowering women to prevent pregnancies too early, too often and too close together:

- By Ensuring marriage at/after legal age of 18 through awareness and ensuring a girl completes secondary education.
- By preventing maternal depletion by delaying first pregnancy and repeated pregnancies through family planning, reproductive health information, incentives and services.

Maternity entitlement

- Promoting community support system for women, skill development, economic empowerment
- Ensuring marriage at/after legal age of 18 through awareness and ensuring a girl completes secondary education and cash transfer
- Methods to prevent maternal depletion through family planning, reproductive health information, cash transfers, and services
- Community support system for women to support decision making, confidence building, skill development and economic empowerment.

More recently, it has also generated research evidence on the barriers and opportunities that exist to universalizing the coverage and quality of the five interventions. Importantly, given the linkages of women's nutrition with poverty alleviation, women's empowerment and food security, two innovations are underway.

Firstly, a partnership has been established with the "Aaajevika" programme of the India government's National Rural Livelihood Mission to test whether women's nutrition initiatives can be mainstreamed through women's empowerment platforms under "Aaajevika".

Secondly, UNICEF in Andhra Pradesh and Telengana is technically supporting the state government to implement the One Full Meal Scheme. The programme aims to improve the nutrient intake of pregnant women and breastfeeding mothers, and reduce the prevalence and severity of maternal anaemia.

In Andhra Pradesh and Telangana, 5100 women federations, supported by Aajeevika and UNICEF, partner with State Governments to provide 895,000 pregnant and lactating mothers nutritious meals daily through 'ONE FULL MEAL' scheme, located in villages where undernutrition rates are high.

One Full Meal entitles pregnant women and breastfeeding

mothers to receive a free nutritious meal every day between 11am and 2pm at the village Anganwadi centre, 25 days a month. More than 5,100 federations of women's self-help groups have been engaged to support the implementation of the scheme. Each ICDS project gives a quarterly grant to the federations that are involved in the implementation of the programme.

At the policy level, UNICEF has been the lead agency supporting the Ministry of Health and Family Welfare to develop the country's maternal calcium and deworming guidelines.

Malnutrition and Anaemia rates are high among children:

- 38.4% of children under age three are stunted, that is too short for their age and 46% are underweight that is too thin for their age. Both indicators have slightly improved from 1998-99.

Wasting, defined as an abnormally low weight for the child's height affects 19% of children under age three with a slight deterioration from 1998-99.

- Overall, girls and boys are about equally likely to be undernourished. Under-nutrition is higher in rural areas and is strongly correlated with the level of maternal education showing a two-fold difference between non-educated mothers and 10-year and above educated mothers. This may be linked to a stark difference in access to a nutritious diet and complementary feeding at 6-9 months.

- Most children under age three are anemic (79.2%). The prevalence is slightly higher in rural areas and among non-educated mothers. High prevalence of anaemia may be linked to poor variety of diet, poor hygienic conditions and limited access to iron supplementation.

Improvements Needed in Infant and Child Feeding and Micronutrient Intake:

- While breastfeeding is nearly universal in India, less than half of children (46%) are fed only breast milk for the first 6 months, as recommended. Exclusive breastfeeding is slightly higher among the non-educated mothers and in rural areas. Work conditions and access to breast milk substitutes may impact the feeding pattern among urban and better educated mothers.
- Only 23.4% of children are breastfed within one hour

of birth and the prevalence is significantly lower among the non-educated mothers and in rural areas. However, there has been an overall improvement from 9.5% in 1992-93 and 16% in 1998-99.

- Only 55.8% of children aged 6-9 months receive solid or semisolid food and breast milk. Although the percentage is significantly lower among non-educated mothers and in rural areas, the prevalence in urban areas and among well-educated mothers is still less than 70% making complementary feeding a high-priority to be addressed.

- Only 44 percent of breastfeeding children 6-23 months are fed at least the minimum recommended number of times per day (twice a day for children 6-8 months and three times for children 9-23 months) and only 36 percent are given food from at least 3 food groups, as recommended to ensure adequate diversity in their diet.
- Just 25% of children age 6-35 months received vitamin A supplements in the six months before the survey. The Government of India recommends twice yearly vitamin A supplements for children age 6-59 months.

A significant percentage of Women and Men Are Either Too Thin or Too Fat:

- Malnutrition and anaemia are common among Indian adults. Both malnutrition and anaemia have increased among women since 1998-99.
- 33% of married women and 28% of men are too thin, according to the body mass index (BMI), an indicator derived from height and weight measurements. Underweight is most common among the poor, the rural population, adults who have no education and scheduled castes and scheduled tribes.³
- Overweight and obesity, the other side of malnutrition, is a growing problem in India, affecting almost 15% of women and 12% of men. Overweight and obesity are most common in urban areas, in wealthier households, and among older adults, and those with more education.

Anaemia is Widespread:

- 56.2% of women and 24.3% of men suffer from anaemia, and have lower than normal levels of blood hemoglobin. Anaemia has increased in ever-married women from 1998-99. Among pregnant women, anaemia has increased from 50% to almost 58%.

- Only 22.3% of pregnant women consume Iron and Folic Acid supplementation for 90 days and the percentage is less than 10% among the non-educated women compared to 50% among the well-educated. Also the disparity between rural and urban areas is significant (18% and 34.5% respectively).

Many Households are Vulnerable to Iodine Deficiency:

- Iodine deficiency, which can lead to mental retardation, goitre, and complications of pregnancy, is easily prevented by using salt fortified with iodine. Only 51 percent of Indian households use adequately iodized salt.

While government agencies are working with all their might to fight malnutrition, NGOs too are playing a key role in giving lakhs of children the nutrition they deserve. The

problem of malnutrition in India is severe. Work by all stakeholders at various levels to be addressed efficiently, is the need for the day.

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INVITED ARTICLE

Women Empowerment in India



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Women's empowerment is the process in which women elaborate and recreate what it is that they can do, and accomplish in a circumstance that they previously were denied. Empowerment can be defined in many ways, however, when talking about women's empowerment, empowerment means accepting and allowing people (women) who are on the outside of the decision-making process into it. "This puts a strong emphasis on participation in political structures and formal decision-making and, in the economic sphere; on the ability to obtain an income that enables participation in economic decision-making. Empowerment is the process that creates power in individuals over their own lives, society, and in their

communities. People are empowered when they are able to access the opportunities available to them without limitations and restrictions such as in education, profession and lifestyle. Feeling entitled to make your own decisions creates a sense of empowerment. Empowerment includes the action of raising the status of women through education, raising awareness, literacy, and training. Women's empowerment is all about equipping and allowing women to make life-determining decisions through the different problems in society.

Alternatively, it is the process for women to redefine gender roles that allows for them to acquire the ability to choose between known alternatives that have otherwise been

restricted from such ability. There are several principles defining women's empowerment such as, for one to be empowered, they must come from a position of disempowerment. Furthermore, one must acquire empowerment themselves rather than have it given to them by an external party. Other studies have found that empowerment definitions entail people having the capability to make important decisions in their lives while also being able to act on them. Lastly, empowerment and disempowerment is relative to other at a previous time; therefore, empowerment is a process, not a product.

Women's economic empowerment refers to the ability for women to enjoy their right to control and benefit from the resources, assets, income and their own time, as well as the ability to manage risk and improve their economic status and wellbeing. Women's empowerment and achieving gender equality is essential for our society to ensure the **sustainable development** of the country. Many world leaders and scholars have argued that sustainable development is impossible without gender equality and women's empowerment. Sustainable development accepts environmental protection, social and economic development and without women's empowerment, women wouldn't feel equally important to the process of development as men. It is widely believed that, the full participation of both men and women is critical for development. Only acknowledging men's participation will not be beneficial to sustainable development. In the context of women and development, empowerment must include more choices for women to make on their own.

Economic empowerment increases women's agency, access to formal government programs, mobility outside the home, economic independence, and purchasing power. Policy makers are suggested to support job training to aid in entrance in the formal markets. One recommendation is to provide more formal education opportunities for women that would allow for higher bargaining power in the home. They would have more access to higher wages outside the home; and as a result, make it easier for women to get a job in the market.

Strengthening women's access to property inheritance and land rights is another method used to economically empower women. This would allow them better means of asset accumulation, capital, and bargaining power needed to address gender inequalities. Often, women in developing and underdeveloped countries are legally restricted from

their land on the sole basis of gender. Having a right to their land gives women a sort of bargaining power that they wouldn't normally have; in turn, they gain more opportunities for economic independence and formal financial institutions.

Economic and occupational empowerment it implies a better quality of material life through sustainable livelihoods owned and managed by women. It means reducing their financial dependence on their male counterparts by making them a significant part of the human resource.

Another popular methodology for women's economic empowerment also includes microcredit. Microfinance institutions aim to empower women in their community by giving them access to loans that have low interest rates without the requirement of collateral. More specifically, they (microfinance institutions) aim to give microcredit to women who want to be entrepreneurs. The success and efficiency of microcredit and microloans is controversial and constantly debated. Some critics claim that microcredit alone doesn't guarantee women have control over the way the loan is used. Microfinance institutions don't address cultural barriers that allow men to still control household finances; as a result, microcredit may simply be transferred to the husband. Microcredit doesn't relieve women of household obligations, and even if women have credit, they don't have the time to be as active in the market as men.

The Internet as a tool of empowerment

The growing access of the web in the late 20th century has allowed women to empower themselves by using various tools on the Internet. With the introduction of the World Wide Web, women have begun to use social networking sites like Face book and Twitter for online activism. Through online activism, women are able to empower themselves by organizing campaigns and voicing their opinions for equality rights without feeling oppressed by members of society. For example, on May 29, 2013, an online campaign started by 100 female advocates forced the leading social networking website, Face book, to take down various pages that spread hatred about women.

In recent years, blogging has also become a powerful tool for the educational empowerment of women. According to a study done by the University of California, Los Angeles, medical patients who read and write about their disease are often in a much happier mood and more knowledgeable than those who do not. By reading others' experiences, patients

can better educate themselves and apply strategies that their fellow bloggers suggest. With the easy accessibility and affordability of e-learning (electronic learning), women can now study from the comfort of their homes. By empowering themselves educationally through new technologies like e-learning, women are also learning new skills that will come in handy in today's advancing globalized world.

Legal Women Empowerment It suggests the provision of an effective legal structure which is supportive of women empowerment. It means addressing the gaps between what the law prescribes and what actually occurs.

Current Scenario on Women Empowerment -. Based on the ideas championed by our founding fathers for women empowerment, many social, economic and political provisions were incorporated in the Indian Constitution. Women in India now participate in areas such as education, sports, politics, media, art and culture, service sector and science and technology. But due to the deep-rooted patriarchal mentality in the Indian society, women are still victimized, humiliated, tortured and exploited. Even after almost seven decades of Independence, women are still subjected to discrimination in the social, economic and educational field.

Major landmark steps taken for women empowerment.- Provisions made under the Constitution of India such as: Right to equality under Article 14 of the Indian Constitution guarantees to all Indian women equality before law; Equal pay for equal work under Article 39(d), guards the economic rights of women by guaranteeing equal pay for equal work; and Maternity Relief under Article 42, allows provisions to be made by the state for securing just and humane condition of work and maternity relief for women.

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Acts like the Dowry Prohibition Act, 1961, prohibits the request, payment or acceptance of a dowry. Asking or giving dowry can be punished by imprisonment as well as fine; Protection of Women from Domestic Violence Act, 2005,

provides for a more effective protection of the rights of women who are victims of domestic violence. A breach of this Act is punishable with both fine and imprisonment; Sexual Harassment of Women at Work Place (Prevention, Prohibition, and Redressal) Act, 2013, helps to create a conducive environment at the workplace for women where they are not subjected to any sort of sexual harassment.

Various Government Policies and Schemes.- The Government of India is running various welfare schemes and policies, both at State and Central levels for the empowerment of woman. Some of the major programs and measures include Swadhar (1995), Swayam Siddha (2001), Support to Training and Employment Programme for Women (STEP-2003), Sabla Scheme (2010), National Mission for Empowerment of Women (2010) etc. All such policies and programs focus on social, economic and educational empowerment of women across various age groups.

Education is the most important and indispensable tool for women empowerment. It makes women aware of their rights and responsibilities. Educational achievements of a woman can have ripple effects for the family and across generations. Most of the girls drop out of schools due to the unavailability of separate toilets for them. The recently launched 'Swachh Bharat Mission' focusing on improving sanitation facilities in schools and every rural household by 2019, can prove to be very significant in bringing down the rate of girls dropping out of school.

Women empowerment is not a new concept it is quite a well-known concept around the globe. Women all over the world have been challenging and changing gender inequalities since the beginning of history. These struggles have also been supported by many men who have been outraged at injustice against women and thereupon the consequences for the society. The goal of women empowerment is simply providing strength to them. The strength may be giving political or economic authority or provision of health and nutrition of health and nutrition care or social element in the poverty eradication. Empowerment of women, particularly rural women has become an important issue in the strategies of balanced development with social justice. Economic empowerment results in women's ability to influence or make a right decision, increase self-confidence better status and role in household etc.

Characteristics of women empowerment:

The following are the characteristics of women empowerment.

- Women empowerment is giving power to women. It is making women better off. It enables a greater degree of self-confidence and sense of independence among women.
- Women empowerment is a process of acquiring power for women in order to understand their rights and to perform her responsibilities towards oneself and others in a most effective way. It gives the capacity or power to resist discrimination imposed by the male dominated society.
- Women empowerment enables women to organize themselves increase their self-reliance and it provides greater autonomy.
- Women empowerment means women's control over material assets intellectual resources and ideology. It challenges traditional power equations and relations.
- Women empowerment abolishes all gender base discrimination in all institutions and structures of society. It ensures participation of women in policy and decision-making the process at domestic and public levels.
- Women empowerment means exposing the oppressive powers of existing gender social relations.
- Women empowerment makes women more powerful to face the challenges of life, to overcome to the disabilities, handicaps, and inequalities. It enables women to realize their full identity and powers in all spheres of life.

Empowerment also means equal status to women. It provides greater access to knowledge and resources greater autonomy in decision making greater ability to plan their and freedom from the shackles imposed on them by custom belief and practice.

Women empowerment occurs within sociology, psychological, political cultural, familial and economic spheres and at various levels such as individual, group and community.

Women empowerment is an ongoing dynamic process which enhances women's abilities to change the structure and ideologies that keep them subordinate. Women empowerment is a process of creating awareness and capacity building.

In the process of empowerment women should consider their strengths and weakness opportunities and threats and move forward to unfold their own potential to achieve their goals through self-development. In our country empowering women through enterprise development has become an integral part of our development efforts due to three important advantage entrepreneurs, economic growth and social stability.

The promotional schemes available in the country in order to develop women entrepreneurship are as follows.

- Mahila Nidhi.
- Mahila vikas Nidhi
- Priyadarshini yojana.
- Trade-related entrepreneurship assistance and development (TREAD).
- Special programs conducted by the SIDO (Small Industries Development Organization)
- CWEI (The Consortium of Women Entrepreneurs of India).
- WIT (Women India Trust).
- SWEA (Self-Employed Women Association)
- SHG's (Self-Help Group)
- FTWE (Federation of Women Entrepreneurs)
- Income generating schemes by Department of women and child development.
- KVIC (Khadi Villages Industries Commission)
- DIC (District Industrial Centers)
- Women cell
- Women industries fund schemes.

These schemes can financially help the women but she has to take her own decision! Step out motivate each other and let the stars work for you! And of course, our government who is coming up with various schemes to make women socially and economically strong.

This is all about women empowerment a topic which really needs to be known to all the people out there. It is not about just handful but for the 586.47 million which is nearly 48.5% of women in the country.

INVITED ARTICLE

Autoimmune diseases - Female dominance



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Autoimmune Disorder – Body against its own

Autoimmune Disorders are one of the most important non-communicable diseases and there are more than 80 autoimmune diseases affecting approximately 100 million people worldwide. Information about these disorders is more from developed countries than from developing and under-developed countries. In India, the field of rheumatology is emerging and data on the different autoimmune disorders is lacking. According to many epidemiological studies conducted in developing countries they are an important cause of mortality. Overall the prevalence of autoimmune disorders is estimated to be approximately 10% and pharmacotherapeutic success is attained in only for few of the autoimmune disorders.¹

Common Autoimmune Disorders in Women

Although each autoimmune disease has its own symptoms, hallmark symptoms are fatigue, dizziness, and low-grade fever. Symptoms of autoimmune disorders are gradual in onset, few patients will have mild symptoms, they can be severe at others. Remission is seeing in many cases intermittently between flares that are the sudden and severe in onset. Table 1 briefs some of the common autoimmune disorders in women.²

Our Immune System

Our immune system is divided into 2 parts:

- The innate immune system: First line of defence, ready to go immune cells
- The adaptive immune system: Is activated by the innate immune system, needs time to respond (hours to days),

and has memory.

Innate Immune System:

The main components of the innate immune system are

1. Physical epithelial barriers
2. Phagocytic leukocytes
3. Dendritic cells
4. A special type of lymphocyte called a natural killer (NK) cell, and
5. Circulating plasma proteins.

The adaptive Immune System

The second line of defense against non-self-pathogens is called adaptive immune response. Adaptive immunity is also referred to as acquired immunity or specific immunity and is only found in vertebrates. The adaptive immune response is specific to the pathogen presented. As represented in Figure 1., the components of adaptive immune system include B-cells which produce antibodies (classified into IgM, IgD, IgG, IgA, and IgE) and T-cells which are further divided into Cytotoxic T-cells (CD8+) and Helper T-cells (CD4+).

The components of T-helper cells -TH1, TH2 and TH17 turn on appropriately and then the immune response turns off when the job is done. In this state the regulator cells are working properly, and TH1 and TH2 are in balance, neither one dominant.

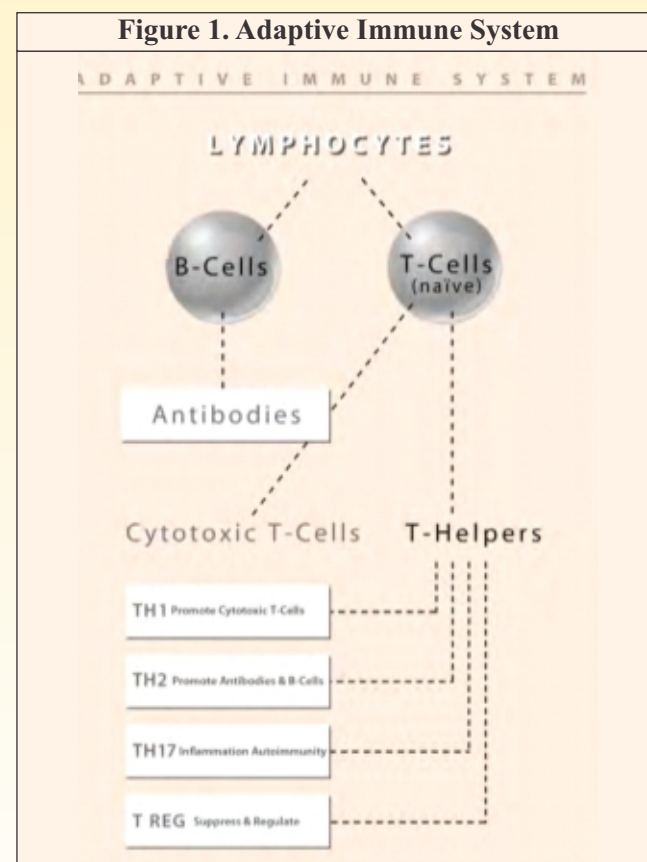
In normal situations they are perfectly in balance by knowing the difference between self and non-self. But when

| Disease | Symptoms |
|--|--|
| <p>Alopecia areata The immune system attacks hair follicles. Though not debilitating it greatly affects the appearance of a person</p> | <ul style="list-style-type: none"> • Patchy hair loss on the scalp, face, or other areas of body |
| <p>Antiphospholipid antibody syndrome (aPL) is a disorder of the immune system that causes an increased risk of blood clots.</p> | <ul style="list-style-type: none"> • Blood clots in veins or arteries • Multiple miscarriages • Lacy, net-like red rash on the wrists and knees |
| <p>Autoimmune hepatitis The immune system attacks and destroys the liver cells. This can lead to scarring and hardening of the liver, finally leading to liver failure.</p> | <ul style="list-style-type: none"> • Fatigue • Enlarged liver • Yellowing of the skin or eyes • Itchy skin • Joint pain • Stomach pain or upset |
| <p>Celiac disease Gluten intolerance. When people with celiac disease eat foods or use products that have gluten, the immune system responds by damaging the lining of the small intestines.</p> | <ul style="list-style-type: none"> • Abdominal bloating and pain • Diarrhea or constipation • Weight loss or weight gain • Fatigue • Missed menstrual periods • Itchy skin rash • Infertility or miscarriages |
| <p>Diabetes type 1 A chronic illness characterized by the body's inability to produce insulin due to the autoimmune destruction of the beta cells in the pancreas. Although onset frequently occurs in childhood, the disease can also develop in adults.</p> | <ul style="list-style-type: none"> • Increased thirst • Excessive urination • Feeling very hungry or tired • Loss of weight • Having sores that heal slowly • Dry, itchy skin • Tingling of feet • Deterioration of eyesight |
| <p>Graves' disease (overactive thyroid) It is a type of hyperthyroidism that is due to the production of autoantibodies against the TSH receptor on the follicular epithelial cells. These antibodies mimic the effects of TSH and cause overproduction and release of thyroid hormone.</p> | <ul style="list-style-type: none"> • Insomnia • Irritability • Weight loss • Heat sensitivity • Sweating • Fine brittle hair • Muscle weakness • Light menstrual periods • Bulging eyes • Shaky hands • Sometimes there are no symptoms |
| <p>Guillain-Barre syndrome A rare neurological disorder in which the body's immune system mistakenly attacks part of its peripheral nervous system—the network of nerves located outside of the brain and spinal cord. Though GBS can range from a very mild case with brief weakness to nearly devastating paralysis, it can be managed affectively.</p> | <ul style="list-style-type: none"> • Weakness or tingling feeling in the legs that might spread to the upper body • Paralysis in severe cases <p>Symptoms often progress relatively quickly, over a period of days or weeks, and often occur on both sides of the body.</p> |

| | |
|---|--|
| <p>Hashimoto's disease</p> <p>Also known as Hashimoto's thyroiditis is an autoimmune disease in which the thyroid gland is gradually destroyed. Early on there may be no symptoms. Over time the thyroid may enlarge, forming a painless goiter.</p> | <ul style="list-style-type: none"> • Fatigue • Weakness • Weight gain • Sensitivity to cold • Muscle aches and stiff joints • Facial swelling • Constipation |
| <p>Hemolytic anaemia</p> <p>A form of anaemia due to hemolysis, the abnormal breakdown of red blood cells (RBCs), either in the blood vessels (intravascular hemolysis) or elsewhere in the human body.</p> | <ul style="list-style-type: none"> • Fatigue • Shortness of breath • Dizziness • Headache • Cold hands or feet • Paleness • Yellowish skin or whites of eyes • Heart problems, including heart failure |
| <p>Idiopathic thrombocytopenic purpura</p> <p>A disease in which the immune system destroys blood platelets, which are needed for blood to clot.</p> | <ul style="list-style-type: none"> • Very heavy menstrual period • Tiny purple or red dots on the skin that might look like a rash. • Easy bruising • Nosebleed or bleeding in the mouth |
| <p>Inflammatory bowel disease (IBD)</p> <p>A disease that causes chronic inflammation of the digestive tract. Crohn's disease and ulcerative colitis are the most common forms of IBD.</p> | <ul style="list-style-type: none"> • Abdominal pain • Diarrhea, which may be bloody <p>Some people also have:</p> <ul style="list-style-type: none"> • Rectal bleeding • Fever • Weight loss • Fatigue • Mouth ulcers (in Crohn's disease) • Painful or difficult bowel movements (in ulcerative colitis) |
| <p>Inflammatory myopathies</p> <p>A group of diseases that involve muscle inflammation and muscle weakness. Polymyositis and dermatomyositis are 2 types more common in women than men.</p> | <ul style="list-style-type: none"> • Slow but progressive muscle weakness beginning in the muscles closest to the trunk of the body. Polymyositis affects muscles involved with making movement on both sides of the body. With dermatomyositis, a skin rash comes before or at the same time as muscle weakness. • May also have: • Fatigue after walking or standing • Tripping or falling • Difficulty swallowing or breathing |
| <p>Multiple sclerosis (MS)</p> <p>A disease in which the immune system attacks the protective coating around the nerves. The damage affects the brain and spinal cord.</p> | <ul style="list-style-type: none"> • Weakness and trouble with coordination, balance, speaking, and walking • Paralysis • Tremors • Numbness and tingling feeling in arms, legs, hands, and feet • Symptoms vary because the location and extent of each attack vary |

| | |
|---|---|
| <p>Myasthenia gravis (MG)</p> <p>A disease in which the immune system attacks the nerves and muscles throughout the body.</p> | <ul style="list-style-type: none"> • Double vision, trouble keeping a steady gaze, and drooping eyelids • Trouble swallowing, with frequent gagging or choking • Weakness or paralysis • Muscles that work better after rest • Drooping head • Trouble climbing stairs or lifting things • Trouble talking |
| <p>Primary biliary cirrhosis</p> <p>The immune system slowly destroys the liver's bile ducts. When the ducts are destroyed, the bile builds up in the liver and damages the liver resulting in hardening and scar, and eventually liver failure.</p> | <ul style="list-style-type: none"> • Fatigue • Itchy skin • Dry eyes and mouth • Yellowing of skin and whites of eyes |
| <p>Psoriasis</p> <p>A disease that causes new skin cells that grow deep in your skin to rise too fast and pile up on the skin surface.</p> | <ul style="list-style-type: none"> • Thick red patches, covered with scales, usually appearing on the head, elbows, and knees • Itching and pain, which can make it hard to sleep, walk, and care for yourself <p>May have:</p> <ul style="list-style-type: none"> • A form of arthritis that often affects the joints and the ends of the fingers and toes. Back pain can occur if the spine is involved. |
| <p>Rheumatoid arthritis</p> <p>A disease in which the immune system attacks the lining of the joints throughout the body.</p> | <ul style="list-style-type: none"> • Painful, stiff, swollen, and deformed joints • Reduced movement and function <p>May have:</p> <ul style="list-style-type: none"> • Fatigue • Fever • Weight loss • Eye inflammation • Lung disease • Lumps of tissue under the skin, often the elbows • Anaemia |
| <p>Scleroderma</p> <p>A disease causing abnormal growth of connective tissue in the skin and blood vessels.</p> | <ul style="list-style-type: none"> • Fingers and toes that turn white, red, or blue in response to heat and cold • Pain, stiffness, and swelling of fingers and joints • Thickening of the skin • Skin that looks shiny on the hands and forearm • Tight and mask-like facial skin • Sores on the fingers or toes • Trouble swallowing • Weight loss • Diarrhea or constipation • Shortness of breath |
| <p>Sjögren's syndrome</p> <p>A disease in which the immune system targets the glands that make moisture, such as tears and saliva.</p> | <ul style="list-style-type: none"> • Dry eyes or eyes that itch • Dryness of the mouth, which can cause sores • Trouble swallowing • Loss of sense of taste • Severe dental cavities |

| | |
|---|--|
| | <ul style="list-style-type: none"> • Hoarse voice • Fatigue • Joint swelling or pain • Swollen glands • Cloudy eyes |
| <p>Systemic lupus erythematosus</p> <p>A disease that can damage the joints, skin, kidneys, heart, lungs, and other parts of the body. Also called SLE or lupus.</p> | <ul style="list-style-type: none"> • Fever • Weight loss • Hair loss • Mouth sores • Fatigue • "Butterfly" rash across the nose and cheeks • Rashes on other parts of the body • Painful or swollen joints and muscle pain • Sensitivity to the sun • Chest pain • Headache, dizziness, seizure, memory problems, or change in behavior |
| <p>Vitiligo</p> <p>The immune system destroys the cells that give your skin its color. It also can affect the tissue inside mouth and nose.</p> | <ul style="list-style-type: none"> • White patches on areas exposed to the sun, or on armpits, genitals, and rectum • Hair turns gray early • Loss of color inside your mouth |



Lymphocyte T helper cells are imbalanced, it can lead to many abnormal immune responses. Like TH1 over activity which can lead to increase in cytotoxic T cells which kill the normal cells by releasing enzymes and reduce antibodies; In case of TH2 overactivity, it can increase antibodies and lower cytotoxic T cell activity and Immune complexes. This is the favourable situation for autoimmune disease and chronic infections. TH17 over activity can also cause damage to self-tissue. The adaptive immune response is meant to attack non-self-pathogens but can sometimes make errors and attack itself. When this happens, autoimmune diseases can develop.³

Gender bias in the incidence of Autoimmune Diseases: Why only women?

There are many clinical differences between each autoimmune disease with respect to targeted tissues, age of onset, and response to immunosuppressive therapies. But one feature that is common in all autoimmune diseases is the higher prevalence in women with over 80% of patients being of female sex. The most striking sex differences in autoimmune diseases are observed in Sjogren's syndrome, systemic lupus erythematosus, primary biliary cholangitis, autoimmune thyroid disease (Grave's and Hashimoto's

diseases), and systemic sclerosis. Many theories have been attempted to answer the common question of defining the sex-related factors that influence susceptibility to autoimmunity and whether gender influences the natural course of disease as well as response to therapy.⁴

Differences in the Innate and Adaptive Immune Systems

Men and women differ in their immunological responses to foreign and self-antigens and show distinctions in innate and adaptive immune responses. In general, women have an enhanced antibody production and increased cell-mediated responses following immunization, while men produce a more vigorous immune response to infectious organisms. Furthermore, females show higher CD4+ T-cell counts than males, which contribute to an increased CD4/CD8 ratio, produce higher TH2 response and antibodies, and greater TH1 cytokine production. Hence they have a more active immune system. But the hyper immune response makes them susceptible to autoimmune diseases. The increase in the incidence of autoimmune disease in women has led to a belief that increased immune system function causes increased susceptibility to autoimmunity in women. Males generate more of TH17 response and are less likely to develop autoimmunity but have higher percent of non-reproductive cancers.⁵

Genetics and sex chromosomes

Women have two X chromosomes (one maternal and one paternal X chromosome) and males have paternal Y chromosome and a maternal X. Many of the genes on the X chromosome regulate immune function and are important in immune-related diseases, these genes encode for proteins which are important for the development of immune system. Any abnormality in X chromosome can lead to immune system disorders

The X-chromosomes play an important role in immune function as proved by many studies that major sex chromosome abnormalities are associated with an increased incidence of autoimmune diseases compared to sex-matched general population.

For example, women with Turner syndrome, a condition that affects only females, resulting from missing of one of the X chromosomes, have lower IgG and IgM levels and lower T-cell and B-cell levels compared to normal females. The patients with Turner disease exhibit an increased susceptibility to autoimmune diseases, in particular for those autoimmune diseases with a male predominance.

Similarly, men with Klinefelter syndrome which results from two or more X chromosomes in males, have two X and one Y chromosomes, resulting in low testosterone levels, increased gonadotropins, and high estrogen concentration; thus, patients with this disorder are immunologically similar to females, with higher immunoglobulin levels, increased CD4 + T-cells, CD4/CD8 T-cell ratios, and B-cells than normal male controls. These XXY cases have a 14-fold increase in the prevalence of SLE compared with general male population, which is equal to the incidence of SLE in female population.

X chromosome Inactivation

Normally to avoid double dosage of X chromosome-derived proteins, in women, one of the X chromosomes is randomly silenced during the early stages of embryogenesis. Although one of the X chromosomes is almost completely silenced, approximately 15% of the genes escape X chromosome inactivation (XCI), leading to overexpression of some X-linked genes in female. In some situations, up to 10% are differently spared from XCI in different individuals.

This type of escape from inactivation can randomly occur in tissues, stable with the same chromosome being inactivated in progeny cells; however, in some cases, the XCI can be skewed due to severe mutations; skewing happens when one of the two alleles (either maternal or paternal) is in the active X chromosome in more than 75% of the cells. It appears that skewed XCI is more prevalent in patients with autoimmune diseases than in healthy controls, in particular in female-preponderant disorders such as autoimmune thyroid diseases and SSc. Although the exact mechanism is still unclear, skewed XCI might lead to a situation in which X-linked antigens are insufficiently expressed in immunological critical tissues such as the thymus but with a sufficient expression in peripheral tissues, thus creating the stimuli for the break of immune tolerance and explaining the production of autoreactive white blood cells.

One more hypothesis is that skewed XCI leads to the inactivation of a gene protective against autoimmunity and overexpression of a susceptibility gene leading to increase in autoimmune diseases' prevalence.

A further mechanism studied as a genetic influence on autoimmune disease is the chromosome X monosomy, meaning abnormality in one of the chromosomes. The X chromosome monosomy may cause a situation where the

total level of a gene product (a particular protein) produced by the cell is about half of the normal level and that is not sufficient to permit the cell to function normally. In case of X-linked genes that escape XCI, the autoreactive T-cells are not exposed to self-antigens encoded by one of the two X chromosomes and react against them generating an autoimmune response.

Sex hormones

There are hormone receptors on immune cells. Steroidal sex hormones which bind to these receptors, affect the strength and quality of immune responses in opposite directions. Testosterone and progesterone have an overall immunosuppressive effect on the immune cells and estrogen – in particular 17-β estradiol – a major sex hormone and prolactin has enhancing effects on antibody mediated immunity. It favours the T-helper 2 (TH2) lymphocyte dominance with the consequence of more B-cell activation and antibody production. In contrast, androgen favors the development of a Th1 response and CD8 + cell activation.

These hormones have different effects depending either on their concentration or the site of the targeted cells. For example, high concentrations of estradiol (E2), such as during pregnancy, exert mostly anti-inflammatory effects, by the inhibition of production and signaling of pro-inflammatory cytokines (proteins that are important in cell signaling and regulate immunity)- tumor necrosis factor (TNF), interleukin (IL)-1 β and IL-6, and natural killer (NK) cell activation; by the induction of anti-inflammatory cytokines in favor of a Th2 phenotype, such as IL-4, IL-10, and transforming growth factor-β; and by the activation of T regulatory cells (Treg).

Conversely, low concentration of E2 can stimulate TNF, interferon-γ, IL-1 β, and NK cells, while enhancing antibody production by B-cells both at high and low concentrations. These data point out that estrogens are capable of modulating both pro- and anti-inflammatory activities of CD4+ T-cells and thus have the potential to influence the outcome of CD4+ T-cells immune responsiveness. Prolactin - increases the antibody production, regulates the development of CD4+ T-cells, and triggers the pro-inflammatory cytokine production.

Progesterone leads to switch from a predominantly pro-inflammatory to an anti-inflammatory immune response, promoting skewing of CD4+ T-cell responses from Th1-type toward Th2-type responses, favours regulatory T-cell

differentiation, and exerts an inhibitor effect on NK cells.

Several studies indicate that testosterone and androgens have suppressive effects on the immune system by inhibiting the pro-inflammatory cytokine production, Th1 differentiation, immunoglobulin production, and NK cell cytotoxic activity and by potentiating the expression of anti-inflammatory cytokines.

Sex hormones modulate the hypothalamic-pituitary-adrenal axis and are capable to modulate the stress response. Women have higher corticosterone–cortisol concentrations compared to men, and glucocorticoids suppress the production of sex hormones and the production of these hormones in tissues.

Along with the effects of sex hormones on the immune system and possibly disease susceptibility, severity changes of autoimmune diseases are observed during pregnancy, when estrogens and progesterone reach their highest peak. Since it is essential to maintain the maternofetal immune tolerance there is an immune shift from a pro-inflammatory Th1 response toward a Th2 response; Therefore, pregnancy has opposite effects on some autoimmune diseases, i.e., it is associated with an increase in disease flares in SLE, this effect being related to the increased Th2 response and enhanced production of pathogenic autoantibodies. In contrast, pregnancy has a protective effect in Th1-dominant immune diseases, such as rheumatoid arthritis and multiple sclerosis.

Gut microbiota

Several animal studies have reported different effects of the gut microbiota on the mouse immune system; like development of lymphoid tissues (which modulates immune response) in the gut. When mice are made free of all microorganisms they show reduced immune cells. Gut microbiota plays an important role in shaping the immune system even in humans.

Gut microbiota and immune system influence each other in their way of functioning. After puberty there is a difference between the gut microbiota exerting a protective or detrimental effect on susceptibility to autoimmune diseases. The effect of this difference between microbiome environment can be seen in the differences in gut microbial composition in male and female gender and gender difference in autoimmune disorders.

Further research has to be done whether the beneficial properties of microbiota may be used for microbiota

transplantation and similar types of manipulation as therapies for autoimmune disease.

To evaluate whether sex can predict the severity of autoimmune diseases, it is necessary to compare them in males and females and assess if their natural history changes during periods of sex hormone fluctuations (e.g., during pregnancy, before puberty, and after menopause). This evaluation has been made possible mainly through clinical observation and research studies on rodents. Summary of the findings is given below:

Systemic lupus erythematosus

Due to higher incidence of SLE in women it is considered as "woman's disease". Many studies have been conducted relating to women and SLE. In SLE the overall female-to-male prevalence ratio is around 9:1 in premenopausal age and declines to 4:1 in pediatric age and 5:1 in postmenopausal age-matched individuals. According to this data both sex hormones and reproductive activity might be important factors in the age of onset and sex bias in SLE.

Studies in experimental models show that lupus can be influenced by estradiol (E2) via estrogen receptor α and mice deficient in this estrogen receptor protein develop a milder disease, with decreased proteinuria and renal disease activity. In one study progesterone showed protective effect in female mice, attenuating immune dysregulation and target organ damage. Hence, estrogen and progesterone may induce different effects on autoantibody production. The balance between these two hormones could influence disease development and progression.

It is observed that, women who present a first episode of SLE have normal estrogen levels and lower levels of androgens and progesterone. Due to this hormonal imbalance there is autoantibody production by dysregulated B-cells, organ infiltration by inflammatory T-cells, and aberrant immune cell activation.

On the other hand, in men potential risk factors include X chromosome abnormalities (as suggested by SLE susceptibility in patients with Klinefelter disease), other somatic genetic polymorphisms, and environmental factors, such as infectious agents, ultraviolet lights, and cigarette smoking. SLE in men does not correlate with the hormone concentration.

Rheumatoid arthritis

The male to female ratio of prevalence of RA is 3:1

suggesting a correlation with sex hormones in development of RA. But the effect of hormones on RA is much lesser predominant than SLE. Rheumatoid arthritis is normally found in the age group of 45-75 years; therefore factors other than estrogen and progesterone are under the spotlight when talking about RA onset. But concentrations of estrogen were elevated in synovial fluid and higher disease activity has been reported in women than in men, indicating that estrogen is a detrimental factor on disease activity. Conversely, when the androgens levels are high in men before 55 years disease onset and severity is lower showing an inverse association with disease onset and androgen concentration.

The Impact of Pregnancy

For women who have an autoimmune disease and subsequently become pregnant, pregnancy can induce amelioration of the mother's disease, such as in rheumatoid arthritis, while exacerbating or having no effect on other autoimmune diseases like systemic lupus erythematosus. Despite these observations, the common clinical experience states that in the setting of rheumatic diseases, pregnancy represents one of the most delicate situations where remissions and flares are not predictable and the spectrum of available medications narrows due to the risk of pregnancy adverse outcome. The association between the hormone levels and RA is not completely understood due to limited options in the selection of therapeutics options. Therefore it is important to understand whether the efficacy of antirheumatic drugs varies between pregnant and nonpregnant population.⁴

Conclusion

Sex chromosomes, and their interaction with element extrinsic to the host, such as the gut microbiota, can influence susceptibility, pathogenesis, and severity of autoimmunity. When considering the disease management of autoimmune diseases gender has to be considered as one of the factor affecting the outcomes of treatment. sexually dimorphic prevalence of autoimmune diseases remains one of the most intriguing clinical observations among this group of diseases.

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INDUSTRY ROUND UP

Glenmark Pharma launches anti-diabetes drug in India

Drug major Glenmark Pharma announced the launch of its anti-diabetes drug Remogliflozin in India. Glenmark is the first company in the world to launch the novel SGLT2 inhibitor Remogliflozin and India is the first country to get access to this innovative drug. The drug is indicated in the treatment of type-2 diabetes mellitus in adults," the company said in a regulatory filing.

SGLT2 inhibitors are oral anti-diabetes drugs that provide glycemic control, induce weight loss and reduce cardiovascular risks.

Glenmark said it will commercialise Remogliflozin in India under the brand names 'Remo' and 'Remozen'. It received regulatory approval for Remogliflozin etabonate 100 mg tablets after successfully completing phase-3 clinical trials.

"Diabetes is a key area of focus for Glenmark and with the launch of Remogliflozin, the company aims to improve access to SGLT2 inhibitors by providing an effective, high quality and world-class treatment option to patients in India," said Sujesh Vasudevan, President, India Formulations, Middle East and Africa at Glenmark Pharmaceuticals.

Quoting IQVIA data, Glenmark Pharma said India's diabetes market is estimated at Rs 11,413 crore as of MAT March 2019. The market size of SGLT2 inhibitors is estimated at Rs 574 crore as of MAT March 2019.

India made cardiac stent wins quality and efficacy

test against international brands

An Indian medical device company has claimed that the drug eluting stent (DES) it locally manufactures is as safe and efficacious as any other DES imported and marketed by global medical device majors in the country.

The company, Translumina Therapeutics LLP presented the 10-year patient safety and efficacy data of its drug eluting stent (DES) Yukon Choice PC at an event organized by the American Heart Association in Chicago, Illinois, United States in the presence of leading cardiologists from all over the world to support its claim.

The company states that no other medical device maker has so far attempted to document and publish the safety and efficacy data of DES over such a long period.

Axiostat: India's first USFDA-approved wound dressing product

Being touted as the first US Food and Drug Administration (USFDA) approved wound-care product from India, Axiostat stops uncontrolled bleeding from wounds. Easy to use, it is a handy pack of about 8X8 centimeters. The patch when applied on a wound reacts with blood and within a minute of application forms a clot and becomes an extremely sticky adhesive.

Talking about the product, Leo Mavelly, founder and CEO of Bengaluru-headquartered Axio Biosolutions, says, while the company was set up about a decade ago, it went commercial only in 2014. It got the approval from the US drug regulator in February this year.

The company has so far supplied the product to the Indian army and some of the military and private (corporate) hospitals. "So far, we have shipped close to 450,000 units. About 18 months ago, we set up our own manufacturing unit (earlier used to outsource) in Ahmedabad with a capacity to make 850,000 units per annum and this we hope will handle demand for the next two years," says Mavelly.

Pfizer's Rituxan biosimilar bags FDA approval

The US Food and Drug Administration (FDA) has approved Pfizer's Ruxience (rituximab-pvvr), a biosimilar to Roche's Rituxan (rituximab).

The treatment has been approved in adult patients with non-Hodgkin's lymphoma (NHL), chronic lymphocytic leukemia (CLL), and granulomatosis with polyangiitis (GPA) and microscopic polyangiitis (MPA).

The approval was based on the review of a comprehensive data package, which demonstrated biosimilarity of Ruxience to Rituxan, including results from the

REFLECTIONS B3281006 clinical comparative study, which evaluated the efficacy, safety and immunogenicity, pharmacokinetics and pharmacodynamics of the biosimilar and found no clinically meaningful differences in safety or efficacy in patients with CD20-positive, low tumor burden follicular lymphoma.

"Rituximab became one of the first monoclonal antibody (mAb) cancer treatments when it was initially approved by the FDA, representing a significant treatment advance and the only option available to oncologists and their patients for a period of time," said Dr Jeff Sharman, medical director, US Oncology Hematology Research. "With this FDA approval, clinicians have an additional treatment option that will help improve access to care for patients in need of anti-CD20 mAb therapy."

Both Rituxan and its biosimilar work by targeting a protein called CD20, which is present on the surface of B cells. When it attaches to CD20, rituximab helps destroy the B cells.

POLE TO POLE

Artificial intelligence in healthcare becoming a reality

Machines giving suggestions to doctors about treating their patients, a scene straight from a sci-fi movie and a fantasy of the healthcare community, is becoming a reality now.

In a first of its kind move, the US Food and Drug Administration (FDA) recently gave green signal to market IDx-DR, a medical device to detect diabetic retinopathy, a disease in which high blood sugar damages blood vessels in the retina of eyes and leads to the vision loss.

Made by the US-based IDx LLC, the software analyses images of the eye taken by a camera and tells the doctor accurately about the extent of the disease, called as 'diabetic retinopathy'. Approved last month, this is the first approval in the area of artificial intelligence that can potentially replace a specialized doctor to interpret medical imagery and decide on the medical outcome.

This week, the FDA gave go ahead to Boston-based Beta Bionics, which has a partnership with Novo Nordisk, to test its autonomous bionic pancreas that employs artificial

intelligence to vary hormone doses in adults and children with Type 1 diabetes. Beta Bionics' iLet device, an infusion pump that mimics functions of a pancreas, can deliver required quantity of insulin with artificial intelligence to calculate and decide the dose delivery, based on the body weight and data with the help of a glucose monitor. The product is expected to reach markets by 2020.

The global digital therapeutics market, which includes apps, mobile health tools and related products, was estimated at \$1.7 billion in 2016 and is expected to grow at 21 per cent compounded annual growth rate (CAGR) from 2017 to 2025 to \$9.4 billion by 2025, estimate various research agencies. So far over a dozen "prescription digital therapeutics" companies working in the area of diabetes management, cocaine and substance abuse, cardio vascular diseases etc., have come up in the west.

Sources say most of the leading drug makers in the world like Pfizer, GSK and Novartis have ongoing projects, in partnership with AI specialized companies and related drug discovery start-ups, to develop new drugs. The US FDA is also developing a framework to approve use of AI in

regulating such healthcare products based on machine learning.

In India, the digital therapeutics and AI in healthcare is yet to catch up. Recently, Microsoft and Apollo Hospitals' group had partnered to create an AI based data network in cardiology.

• **Robots to help produce new class of antibiotics**

A team from The University of Manchester has engineered a common gut bacterium to produce a new class of antibiotics by using robotics.

The antibiotics, known as class II polyketides, are also naturally produced by soil bacteria and have antimicrobial properties which are vital in the modern pharmaceutical industry to combat infectious diseases and cancer.

The naturally produced *Escherichia coli* bacteria are difficult to work with as they grow in dense clumps that are incompatible with the automated robotic systems used for modern biotechnology research. By transferring the production machinery from the soil bacteria into *E. coli*, the Manchester team is now making this class of antibiotics accessible for much more rapid exploration.

In this work, published in the journal *PLoS Biology*, the group led by Professor Takano, professor of Synthetic Biology, shows the potential of this approach. By combining the bacterial production machinery with enzymes from plants and fungi, they found it was possible to produce new chemical compounds not previously seen in nature.

Using this plug-and-play platform, the data means it will now be possible to explore and engineer polyketides using robotic systems to develop new and diversified polyketides in an 'automated, rapid and versatile fashion.'

Eriko Takano commented: "Nature is a huge treasure trove for powerful chemical compounds to treat a wide range of diseases. However, the most interesting chemicals often come from organisms that are difficult to work with in the laboratory.

"This has been a major bottleneck for our work on type II polyketides, a group of important chemicals, which are mostly produced by soil bacteria and other microorganisms that are challenging to grow. By successfully moving the production machinery for these compounds into the "laboratory workhorse" bacterium *E. coli*, we can finally

produce and engineer type II polyketides in our rapid robotic systems.

"This not only allows us to trial new polyketides in an automated manner, but we will also be able to quickly rewrite the DNA sequences of the antibiotic biosynthesis pathways and combine them with new components from other organisms, such as medicinal plants and fungi, to produce variations on the antibiotic theme – including compounds that are not produced by the natural pathways, but may have enhanced or novel activities in the treatment of important diseases."

It could take a person a whole year to make and test ten new potential antibiotics, but this automated robotic system can make thousands in that time. This would hugely decrease the time it takes for new antibiotics to reach patients, and provide the necessary agility to react to new pathogen strains and outbreaks.

Early this year, the FDA had approved clinical decision support software that uses AI algorithms to help neurovascular specialists gauge brain deterioration.

• **Prophylactic antibiotics could reduce infection risk after operative vaginal delivery**

Women who receive a single dose of amoxicillin and clavulanic acid within 6 hours of operative vaginal delivery could significantly reduce their postpartum infection risk, according to the UK-based ANODE* trial.

"Almost one in five women experience an infective complication and our results show that this can be reduced by almost half with routine use of antibiotic prophylaxis at operative vaginal delivery. This equates to prevention of over 7,000 infections annually in the UK," said lead investigator Professor Marian Knight from the University of Oxford, Oxford, UK.

"These findings highlight the urgent need to change current [World Health Organization] antibiotic guidelines and other guidance from organizations in the UK, North America, and Australasia, that do not recommend routine antibiotic prophylaxis for assisted childbirth," she added.

This multicentre (27 obstetric units in the UK) trial involved 3,427 women (aged ≥ 16 years) at ≥ 36 weeks gestation who were randomized to receive a single intravenous dose of amoxicillin (1 g) plus clavulanic acid (200 mg; n=1,719) or placebo (n=1,708) within 6 hours following a vaginal

delivery requiring vacuum or forceps extraction (35 and 65 percent, respectively). Seventy-seven percent of women were primiparous, 49 percent had induction of labour, and 89 percent had undergone episiotomy. Women with a clinical indication for post-delivery antibiotic therapy were excluded.

Fifteen percent of women experienced infection, as determined by a new antibiotic prescription for perineal wound-related infection, endometritis or uterine infection, urinary tract infection with systemic involvement, or other systemic infection, or culture-diagnosed infection.

In the 6 weeks following delivery, infections occurred less frequently among women assigned to amoxicillin plus clavulanic acid than those assigned to placebo (11 percent vs 19 percent, risk ratio [RR], 0.58, 95 percent confidence interval [CI], 0.49–0.69; p<0.0001). [*Lancet* 2019;393:2395-2403]

The infection incidence remained lower in women assigned amoxicillin plus clavulanic acid than placebo when the analysis was limited to culture-confirmed systemic infection (0.6 percent vs 1.5 percent, RR, 0.44, 95 percent CI, 0.22–0.89; p=0.018).

The incidence of superficial or deep incisional infections were also halved in the amoxicillin plus clavulanic acid compared with the placebo group (4 percent vs 8 percent, RR, 0.53 [superficial] and 2 percent vs 5 percent, RR, 0.46 [deep]; p<0.0001 for both).

Secondary outcomes such as perineal pain (RR, 0.84; p<0.0001), wound breakdown (RR, 0.52; p<0.0001), and use of pain relief for perineal pain (RR, 0.72; p=0.0073) within 6 weeks of delivery were also less common among women assigned amoxicillin plus clavulanic acid than placebo. Systemic sepsis occurred at a similar rate between groups (p=0.307).

Three adverse events (AEs) occurred within 6 hours after antibiotic or placebo administration, one in the placebo group (skin rash) and two in the amoxicillin plus clavulanic acid group (other allergic reactions, one deemed a serious AE).

"We found that for each additional 100 doses of antibiotic used in prophylaxis, 168 treatment doses will be saved, representing a 17 percent overall reduction in antibiotic use with a policy of universal prophylaxis," Knight added.

Future research should investigate the optimal time of antibiotic administration and the necessity of multiple doses, as well as the efficacy of oral antibiotics, noted Knight and co-authors.

• **Coffee, black tea possibly protective against non-melanoma skin cancer**

Caffeinated drinks, such as coffee and black tea, may protect against non-melanoma skin cancer (NMSC) among Chinese in Singapore, according to a recent study.

"In this large prospective cohort of middle-aged and elderly Chinese, we found that those who consumed coffee or black tea daily had a reduced risk of developing NMSC," said researchers. "Specifically, coffee drinking was associated with reduced risk of both [basal cell carcinoma (BCC)] and [squamous cell carcinoma (SCC)], whereas daily tea drinking reduced the risk of BCC."

Drawing from the Singapore Chinese Health Study (n=61,321; mean age, 56.4±8.0 years; 55 percent female), researchers identified 427 and 182 incident cases of BCC and SCC, respectively, over a mean follow-up of 18.3±5.7 years. Males accounted for 48.3 percent of all cases; mean age at skin cancer diagnosis was 74.3±8.9 years. [*J Am Acad Dermatol* 2019;81:395-402]

Majority (70.4 percent) of the study population drank coffee every day, while 11.2 percent reported consumption of black tea with the same frequency. A daily green tea habit was observed in 12.4 percent. Sodas, in comparison, were less popular, with only 4.3 percent of the participants reporting intake of ≥ 3 times per week.

Coffee had a significant and dose-dependent protective effect against NMSC risk. For instance, those who drank 1–2 cups per day were significantly less likely to develop the disease than those with less than a weekly frequency of consumption (hazard ratio [HR], 0.74, 95 percent CI, 0.61–0.89).

This effect was more pronounced in participants who drank ≥ 3 cups per day (HR, 0.47, 0.29–0.75), such that the trend was statistically significant (p=0.0001).

A similar effect was observed for black tea, though to a lesser degree. Only those with daily consumption enjoyed significant protection relative to nondrinkers (HR, 0.70, 0.52–0.94; p-trend=0.015). No such effects were observed for green tea (p-trend=0.42) and soda (p-trend=0.89).

Disaggregating according to NMSC subtype, researchers found that coffee was significantly protective against both BCC (vs nondrinkers; ≥ 3 cups per day: HR, 0.54, 0.31–0.93; 1–2 cups per day: HR 0.78, 0.62–0.98; p-trend=0.017) and SCC (≥ 3 cups per day: HR, 0.33, 0.13–0.85; 1–2 cups per day: HR, 0.64, 0.45–0.91; p-trend=0.001).

Black tea, on the other hand, was only effective against BCC (vs nondrinkers; daily: HR, 0.74, 0.52–1.04; weekly to <daily: HR, 0.69, 0.51–0.93; p-trend=0.01), but not against SCC (p-trend=0.57).

"To our best knowledge, this is the first prospective study to show an inverse association between coffee or caffeine and risk of SCC, which contradicts the largely null associations from previous studies," said researchers.

Several important limitations are worth considering, they continued. Among these are the measurement of caffeine intake at baseline, failure to account for possible decaffeinated beverages, and the shortage of data on other potential confounders, such as family history, chemical exposure or outdoor sun exposure.

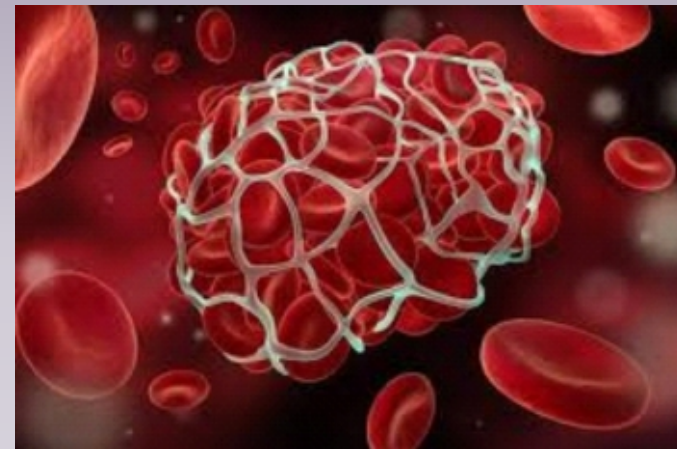
"We hope that our study can provide the impetus for further research to determine which component(s) of coffee and tea are responsible for the chemoprotective effect and whether caffeine is indeed the agent responsible for this effect," researchers added (source:CIMS)

Treatment and home management for blood clots

Blood clotting is a vital process that prevents excessive bleeding following an injury to a blood vessel. However, a blood clot can sometimes form inside a blood vessel that has not sustained any damage. Some clots may also fail to dissolve fully once an injury has healed. These clots can travel through the circulatory system and may end up restricting blood supply to a vital organ. These types of blood clot are very serious and require urgent treatment.

Treatment: The treatment options for blood clots depend on a person's overall health and the location of the blood clot.

Anticoagulant medications: In most cases, a doctor will prescribe anticoagulant medications, which people often refer to as blood thinners. These medications reduce the body's ability to form new clots, while also preventing existing clots from getting bigger.



Doctors usually deliver anticoagulant medications during the first 5–10 days after the diagnosis of a blood clot.

Some people may continue taking anticoagulants for weeks, months, or even years to keep clots from returning.

The most common anticoagulant medications include:

Unfractionated heparin: Unfractionated heparin (UFH) works with antithrombin — a protein in the body — to prevent new clots from forming.

A doctor will administer UFH intravenously or via an injection just beneath the skin to allow the drug to work quickly.

Blood levels of UFH may change intermittently throughout the day. For this reason, a person receiving UFH will require several blood tests daily.

Low molecular weight heparin: Low molecular weight heparin (LMWH) comes from UFH. The effects of LMWH on the body last longer than those of UFH and are more predictable.

People taking LMWH can self-inject it at home, and they do not require routine blood monitoring.

Warfarin: Warfarin works by interfering with the production of vitamin K. The liver uses vitamin K to make proteins necessary for blood clotting.

A doctor may prescribe warfarin pills for people who are transitioning from heparin treatment.

Throughout the first week of treatment, a person will require several blood tests so that doctors can determine the correct dosage. Once a person has an established dosage, routine blood monitoring will be necessary to prevent the

risk of uncontrolled bleeding.

Direct oral anticoagulant medications: Direct oral anticoagulants (DOACs) are a newer class of anticoagulants. These drugs directly target the specific proteins responsible for blood clotting.

DOACs act rapidly, and their effects on the body are short lasting. Missing a dose can increase the risk of blood clots.

When a person takes them correctly, DOACs carry fewer risks than warfarin. They are less likely to cause bleeding and to interact with foods, supplements, and other medications.

However, they tend to be more expensive. It is also vital that people do not miss their regular doses.

Some DOAC drugs include:

- Apixaban (Eliquis)
- Betrixaban (BevyxXa)
- Dabigatran (Pradaxa)
- Edoxaban (Savaysa)
- Rivaroxaban (Xarelto)

Compression stockings: People who develop a blood clot in one of the deep veins in the arms and legs, called deep vein thrombosis (DVT), may go on to experience postthrombotic syndrome (PTS). In people with PTS, the damaged blood vessels become swollen and painful.

Compression stockings are elasticated stockings that fit over the foot and extend up to the calf or groin. These stockings are tight at the foot but get looser further up the leg.

This design assists blood flow out of the lower legs and back up toward the heart, helping relieve the symptoms of PTS.

Compressions stockings are available either on prescription or over the counter at most major drugstores. A pharmacist will need to measure the leg to ensure that the stockings fit correctly.

Thrombolytics: Thrombolytics are drugs that dissolve blood clots. A doctor may give a thrombolytic intravenously, or they may use a catheter in the vein, which will allow them to deliver the drug directly to the site of the clot.

Thrombolytics can increase the risk of bleeding, however.

Doctors usually only recommend them for people who have very large clots or clots that do not resolve with anticoagulant treatment.

These drugs may also be an option for people who have persistent and debilitating PTS.

Surgical thrombectomy

In some cases, surgery may be necessary to remove a blood clot from a vein or artery. This procedure is called a thrombectomy.

A thrombectomy may be necessary for clots that are very large or are causing severe damage to nearby tissues.

People should talk to their surgeon about what to expect during the procedure.

In most cases, the surgeon will make a cut in the area above the blood clot. After removing the clot, the surgeon may insert a small tube or "stent" into the blood vessel to keep it open. They will then close off the blood vessel to restore blood flow.

Vena cava filters: The vena cava is a large vein in the abdomen that transports blood from the lower body back up to the heart and lungs.

A DVT in the legs can sometimes travel up to the lungs through the vena cava. When the clot moves to the lungs and blocks blood flow, it is called a pulmonary embolism (PE). A surgeon may insert a filter into the vena cava to prevent clots from passing through the vein.

The surgeon inserts the filter by making a small incision in a vein in the neck or groin. A series of X-rays helps the surgeon correctly position the filter inside the vena cava.

Doctors usually only use this procedure for people who are at high risk of developing a pulmonary embolism and those who cannot take anticoagulants.

Home management: A doctor will set out a tailored treatment plan to help people manage their condition and prevent further blood clots.

Home management will depend on the type and severity of the blood clot, as well as which medications a person is taking for it.

The plan may involve the doctor referring a person to a team of specialists, who are likely to include a cardiologist, hematologist, and neurologist.

Compression stockings may be beneficial for people recovering from DVT. These stockings help prevent blood from pooling and clotting in the lower leg.

Taking regular walks and elevating the affected leg above the hip can also help by increasing blood flow to the heart.

People who are taking medications should schedule regular blood checks to ensure that their blood does not become too thin or thick.

Prevention According to the American Society of Hematology, blood clots are one of the most preventable types of blood condition.

Some individuals may have an increased genetic risk of developing blood clots. People should tell their doctor if they have a family history of blood clotting disorders.

The doctor may recommend regular checkups to help detect disorders at an early stage.

The following lifestyle factors can also lower a person's risk

of developing blood clots:

- Wearing loose fitting clothes, especially on the lower body
- Wearing compression stockings
- Quitting smoking, if applicable
- Drinking plenty of fluids
- Eating less salt
- Exercising regularly
- Maintaining a healthy weight
- Changing position often, especially on long journeys
- Standing or sitting for no longer than an hour at a time
- Avoiding crossing the legs
- Avoiding activities that may bump and knock the legs
- Raising the legs above the level of the heart when lying down

WOMEN ACHIEVEMENTS



Trekking in Himalayas by Amrita Parle, DIPSAR, New Delhi

I am Amrita Parle, with about 34 years of teaching experience and presently working at DIPSAR for about past 24 years.

In July 2019 magnificent Himalayas invited me. It was a pleasure completing about 100 kms trekking in Himalayas, a unique divine experience. Himalaya makes us feel how minuscule we are, in this creation of God. The treks belonged to moderate difficult category, which started at about 8000 ft height and reached upto 13600 ft. They tested me through uphill and downhill boulder terrain, crossing roaring rivers, walking on very narrow slippery paths along the huge, very tall Himalayas with adjacent deep narrow valleys. In the gorges speedy Bhagirathi/Alaknanda Rivers were fighting with boulders creating rapids. Lush green deep forests of tall pine trees, Bhoj trees decorated the Himalayas. Bhrigu Rishi wrote Manusmriti on the bark of Bhoj trees. The flora and fauna

consisted of Ganga Tulsa with strong aromatic fragrance, flowers ranging from minute to big size with vibrant colors, delicate butterflies, mountain ships etc. The waterfalls along the Himalayas were fascinating too. The loosely placed stones on the mountains could fall on you anytime, making it essential to be alert and watchful. Walking through the flowing clouds and then on the glaciers was out of the world feeling. I saw snow peaks named Monam 1, Monam 2, Bhrigu, Shivling, Bhagirath and many more unnamed peaks. Camping was at Bhojbasa valley adjacent to Bhagirathi River. Watching the night sky, studded with stars, in open valley surrounded with snow peaks was humbling. I could experience all the

seasons' viz chilly cold, scorching heat of sun and rains, flowing clouds, glaciers and much more. The confluence of rivers was another attraction where green water of Alaknanda mixed with brown water of Mandakini or pindari or Bhagirathi etc creating two streams of different colours flowing side by side which then merged together to be renamed as Ganga.

In addition, I saw Yamunotri, Gangotri, Gomukh, Kedarnath, Badrinath, Mana village- the last village before China border, Devprayag, Rudraprayag, Karnprayag and Haridwar.

It required grit, stamina and endurance. All of it was worth the efforts; it really made me happy to the core.

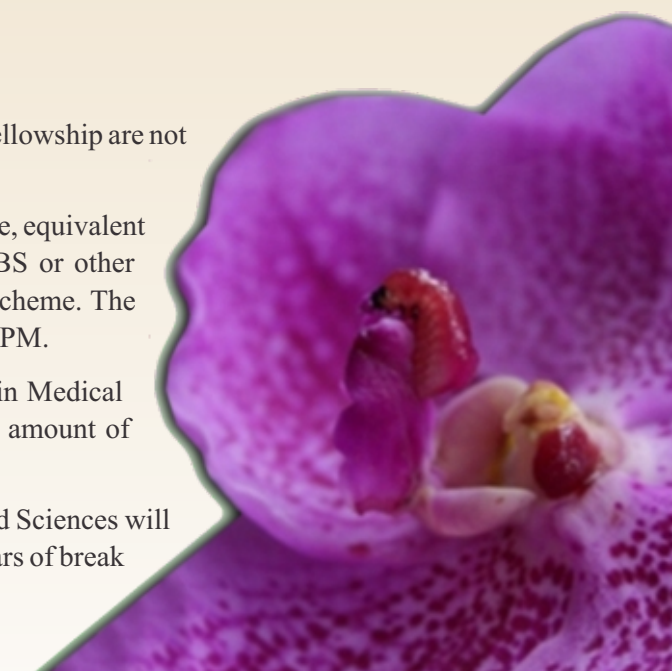
RESEARCH GRANTS

Women Scientists Scheme - A flagship programme for Pharmacists by DST

The "Women Scientists Scheme-A (WOS-A)" for research in basic and applied sciences has been evolved in this context, by the Department of Science and Technology (DST) for providing opportunities to women scientists and technologists between the age group of 27-57 years who desire to return to mainstream science and work as bench-level scientists. Through this endeavour of the Department, a concerted effort would be made to give women a strong foothold into the scientific profession, help them re-enter into the mainstream and provide a launch pad for further forays into the field of science and technology.

Eligibility:

1. Persons already in employment need not apply.
2. Women scientists, less than 27 years of age are not eligible.
3. Candidates who are registered in Ph.D and receiving any fellowship are not eligible to apply.
4. Women scientists, with a minimum of Post Graduate degree, equivalent to M.Sc. in Basic or Applied Sciences or B.Tech. or MBBS or other equivalent professional qualifications, are eligible for this scheme. The amount of fellowship for such candidates will be Rs. 30,000/- PM.
5. Women scientists, with M.Tech. or MD/MS, DM/MCH in Medical Sciences from recognized Universities can also apply. The amount of fellowship for such candidates will be Rs.40,000/- PM.
6. Women scientists having Ph.D. Degree in Basic or Applied Sciences will be entitled for fellowship of Rs.55,000/- PM. Minimum 2 years of break is required after Ph.D award.



LOTUS BACKGROUND STORY

As a lotus is able to emerge from muddy waters un-spoilt and pure it is considered to represent a wise and spiritually enlightened quality in a person; it is representative of woman who carries out their tasks with little concern for any reward and with a full liberation from attachment. Lotus-woman in the moern sense of women's qualities: she is superbly intelligent, highly educated, and totally committed to individualism. She is politically astute and works incessantly for a better and more humane society. She is exquistite in her taste for music, art and culture, abounds in social graces and performs brilliantly in communication.

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