Developing and Evaluating a Software Package for Healthcare

By

Megha Murali.K

(14PFD007)

A Thesis submitted to

Avinashilingam Institute for Home Science and

Higher Education for Women

Coimbatore – 641043

In Partial Fulfillment of the Requirements for the

Degree of Master of Science

In

Food Service Management and Dietetics

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29.4.16

Signature of the Guide

28/4/16

Signature of the
Head of the Department

ACKNOWLEDGEMENT

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The investigator raises her heart in a humble prayer of thanks giving to the **ALMIGHTY GOD** for His manifold mercies which enabled her to successfully complete this research study.

The investigator records her sincere thanks to the present and former Chancellor **Padmashri Dr. P.R**. **Krishnakumar** and **Dr. Thiru. T.S.K Meenakshi Sundaram M.A., M.Phil., Ph.D.,** Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for providing the infrastructural facilities for the conduct of the study.

The investigator wishes to express her profound gratitude to **Hon. Col. Dr.Premavathy Vijayan, M.sc, M.Ed, Dip. Spl.Edn, M.Phil., Ph.D.** Vice Chancellor (i/c) and **Dr. (Tmt) Sheela Ramachandran, M.Sc., P.G. Dip., Ph.D.,** former Vice Chancellor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for being a constant source of guidance during the course of the study.

The investigator extends her sincere thanks to **Dr. (Tmt) A. Venmati, M.Sc., M.Phil., Ph.D.,** Registrar(i/c), and **Dr. (Tmt) Gowri Ramakrishnan, M.Sc., M.Phil., Ph.D.,** (Former Registrar), Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for extending all possible help for the smooth conduct of the study.

She expresses her hurtful gratitude to **HON.COLONEL Dr. (Mrs.) SAROJA PRABHAKARAN,** MA, Dip.Ed. (Madras), Ph.D (Mother Teresa), the Director, Hall of Residence, Avinashilingam Educational Trust Hostel, Coimbatore for her concern and encouragement.

The researcher expresses her respectful regards and sincere thanks to **Dr.(Tmt) N. Vasugi Raaja,** Dean, Faculty of Home Science, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for rendering all help needed for the successful completion of the study.

The investigator owes her heartfelt thanks and gratitude to **Dr.(Tmt).G.VASANTHAMANI. M.Sc., M.Phil., Ph.D.** Professor and the Head of the Department of Food Service Management and Dietetics, Avinashilingam Institute for Home

science and Higher Education for Women, Coimbatore, for her keen interest, valuable suggestions rendered for the conduct of the study.

The investigator expresses her deep sense of gratitude and whole hearted thanks to her supervisor **Dr.R.RADHA. M.Sc., M.Phil., Ph.D.** Assistant Professor, Department of Food Service Management and Dietetics, Avinashilingam Institute for Home science and Higher Education for Women, Coimbatore, for her keen interest, whose ability to probe beneath the text was a true gift and her insight have strengthened this study significantly. Her meticulous guidance, care, deep concern, constructive suggestion, continued motivation, chiseled the investigator to carry out the research work. Endurance of support and gentle care facilitated to carry out the study from the initial to the final level successfully.

The investigator acknowledges with gratitude the good wishes and encouragement to **ALL THE STAFF MEMBERS** of the Department of Food Service Management and Dietetics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore.

The investigator is deeply indebted and expresses her gratitude to her **DEAR AND LOVING PARENTS, BROTHER and FRIENDS** for their constant encouragement, steady support and valuable help in the completion of the study.

Lastly, she offers her regards and profound thanks to all those who supported her in any respect during the course and completion of the study.

CONTENTS

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF APPENDICES

INTRODUCTION

I. INTRODUCTION

"He who takes food in proper measures lives a long life, and lives without disease, gets strength and alertness of mind. Moreover, his children are born healthy and without any deformity or disease"

Mahabharata

The World Health Organization (WHO) defines health as a "State of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". The World Health Organization also states that the diet people eat, in all their cultural variety, define to a large extent people's health, growth and development.

Gopalan (2011) states that nutrition is an integral component of health and wellbeing of an individual. Good nutrition enables one to lead a socially and economically active life and it improves the quality of life as evidenced through enhanced nutritional status of the population groups, better work efficiency rate, reduced mortality and morbidity rate by raising the standard of living.

Nutrients are consumed through the food that we eat, and through metabolic processes in the digestive system these nutrients are absorbed at a cellular level in the body Optimum nutrition contributes to health, wellbeing, normal development, and high quality of life However, under nutrition, over nutrition, and malnutrition are linked to suboptimal health outcomes (Gibney *et al.,* 2009).

Vitamin is an organic compound ,essential in very small amount in supporting normal physiologic function. That cant generally be biosynthesized at rates equivalent to the needs of the body (Kathleen *et al., 2000).*

The best and the only certain source of all the vitamins is a well balanced diet. Treatment of vitamin deficiencies requires an adequate, balanced, high protein, high vitamin diet in addition to vitamin supplements. Vitamins are constant constituent of living tissues. Although in very

small amounts, maintenance of health is dependent on their action. Vitamins influence markedly the production of hormones and external secretion (Panda 2002).

Healthy diet is one that helps to maintain or improve health. It is important for the prevention of many chronic health risk such as obesity, heart disease, diabetes , and cancer. A healthy diet involves consuming appropriate amounts of all nutrients and adequate amount of water. A healthy diet needs to have a balance of macronutrients and energy. Micro nutrients meet the need for human nutrition without inducing toxicity from excessive amounts (Ghongans 2011).

Poor diets have been linked to the occurrence of chronic diseases, including cardiovascular disease, Type-2 diabetes, cancer, osteoporosis and anaemia (Lytle *et al.*, 2002). For example, research reports that low intake of fruit and vegetables increases the risk for developing cancer (Steinmetz *et al.,2000*), as well as cardiovascular disease (Hung *et al.*, 2004), whereas low intake of dietary fibre has been linked to being overweight (Patrick *et al.*,2004).

Diet modification has been proved to play a major role in these cases. For practical purposes the constituents that can contribute appreciable to weight loss over the short term are water, fat, protein, and glycogen. In much longer term situations, deficits of minerals (both bone and soft tissues) also make a small contributions. (Mohit *et al.*,2011).

Nature cure is a constructive method of treatment which aims at removing the basic cause of disease through rational use of elements freely available in nature. It's not only a system of healing but also a way of life, a complete revolution in the art of science and living (Bakhru 2000).

Natural remedies are related to the nature. One can discover an amazing array of healers in nutrients and therapies from vitamins, minerals, herbal supplements and flower essence to Yoga and Taichi to alternate therapies. When used correctly natural remedies help to address different health conditions and enhance overall well being. Natural remedies offer a valuable alternative to conventional medicine (Chrystle 2009).

Medicinal plants have important contributions in the healthcare system of local communities as the main source of medicine for the majority of the rural population (Ahmad *et*

al., 2009). Out of the total 422,000 flowering plants reported from the world, more than 50,000 are used for medicinal purposes (Hamilton 2004). About 60 per cent of the world population and 80per cent of the population of developing countries rely on traditional medicine (Bhat *et al.,* 2013).

The use of herbal medicine becoming popular due to toxicity and side effects of allopathic medicines. This led to sudden increase in the number of herbal drug manufactures (Agarwal 2005). Herbal medicines as the major remedy in traditional system of medicine have been used in medical practices since antiquity. The practices continue today because of its biomedical benefits as well as place in cultural beliefs in many parts of world and have made a great contribution towards maintaining human health (Ranjith *et al*., 2010).

Plants for health care form the largest segment of the biodiversity used by indigenous people for basic needs. The local uses of plants as a cure are common particularly in those areas, which have little or no access to modern health services such as the innumerable villages in India (Darshan 2000).

The concept of ideal weight for height stems from the increasing stress on a favorable Body Mass Index (BMI). BMI today is considered to be the best proxy for human body fat percentage among the various weight –height ratios available today on grounds of easy calculations and better applicability to all populations at all times (Keys *et al.,* 2002).

Keeping a constant and ideal BMI has lesser incidence of obesity related morbidity and mortality.To maintain this BMI a multimodal approach is often recommended. It varies from individual to individual. Weight loss results when a person maintains a negative energy balance for a period (Blair 2003). Epidemics of nutritionally related disease have arisen, including cardiovascular disease, cancers of the colon and breast and obesity, particularly in developed countries (Kohlmeier 2001).

Ninety per cent of all adults knew about the importance of exercise for good health and fitness. More than 100 national survey most important reason why people are engage in regular exercise (Charles *et al.,* 2000). Exercise enhance the metabolic rate by multiplying the number of mitochondria in muscle cells (Mito chondria are the microscopic power house within cells which covert glucose into energy). Regular exercise sustained for 25-30 minutes or 5 times a week can

have a significant effect on fat burning (Caroline 2002). More than 150 studies confirm that exercise reduces depression and anxiety and is therefore a useful adjunct to antidepressant drugs and psychotherapy (Arent *et al.,* 2000).

Physiologist and endocrinologist may be interested in the effect of exercise is the self concept of, on basal metabolic rate, fat cell size, distribution, and dietary induced thermogensis, whereas psychologists may be concerned about the possible effect of exercise on body image and self –concept, feelings well being and adherence to an exercise plan (Curioni *et al.*,2005).

It has been suggested that yoga can lead to enhanced productivity and increased quality of life. The aim of this study is to investigate the health benefits of yoga across several dimensions of wellness. Yoga is explored in a physiological context as an exercise form, and the potential of yoga as a continued source of Complementary and Alternative Medicine (CAM) in western culture is broadly discussed (Smith *et al.,* 2011).

It has been established that higher intensity and integrative yoga practices coincide greater health benefits. As the concept of yoga continues to commercialize, these benefits are becoming more evident to the general population (Thersa *et al.,* 2010).

Nowadays, yoga is considered as an alternative exercise approach to obtain personal health and wellbeing.Yoga's holistic methodology strives to unite one's body, mind, and spirit; it is a method of exercise mirrored in the physical, mental, and emotional benefits in body (Nagarathna *et al.,* 2011).

Over the past 30 years the practice of meditation has become increasingly popular in clinical settings. In addition to evidence-based medical uses, meditation may have psychiatric benefits. Meditation has also been studied in psychiatric settings. While the evidence for its efficacy is preliminary and inconclusive at present, meditation's possible benefits may include ameliorating depression, improving anxiety, promoting abstinence from drugs of abuse, and reducing the self-injurious behaviors of personality disordered patients. In this review, the available literature on the role of meditation in addressing psychiatric illness, and specifically substance use disorders, will be addressed (Dakwar *et al.,* 2011).

A healthy amount of sleep is paramount to leading a healthy and productive lifestyle. Although chronic sleep loss is common in today's society, many people are unaware of the potential adverse health effects of habitual sleep restriction. Under strict experimental conditions, short-term restriction of sleep results in a variety of adverse physiologic effects, including hypertension, activation of the sympathetic nervous system, impairment of glucose control, and increased inflammation. (Alvarez *et al.,* 2004).

According to Michael *et al.,* (2007) stress is defined as a pattern of cognitive appraisals, physiological responses and behavioral tendencies that occur in response to a perceived imbalance between situational demands and the resources needed cope with them.

The term stress appears regularly in our every day discourse. Psychologist have viewed stress in there different ways as a stimulants, as a response and as an ongoing interaction between an organism and its environment. Stress can also be a response that has cognitive physiological and behavioral components. The presence of negative emotions is an important feature of the stress response and links the study of stress with the field of emotion (Zauta, 2003).

The time and effort you spend relaxing and learning new stress management skills is always well-spent because of the emotional and physical health benefits it brings. If you are willing to make a change in just one area, let it be an increase in the time you spend relaxing. (David *et al.,* 2004).

According to Anita *et al,* (2011) food adulteration is an act of intentionally debasing the quality of food offered for sale either by the mixture (or) substitution of inferior substances or by the removal of some valuable ingredient. The survey conducted by the field researches of FSSAI on 2014 says that, they viewed more than 117000 loose and packed samples. The samples are collected and analyzed in government laboratories for a period of one year. The survey found that 14000 samples or 12.65per cent were adulterated (Seema, 2011).

First aid is the immediate care given to the injured or suddenly ill person. First aid does not take the place of proper medical treatment. It consists only of giving temporary assistance until competent medical care, if needed is obtained or until the chance of recovery without

medical care is ensured. Most injuries and illness require only First Aid care (Thygerson *et al.*, 2000).

Properly applied First aid may mean the difference between life and death, rapid recovery and long hospitalization or temporary disability and permanent injury. First Aid involves more than doing things for others. It also includes the things that people can do for themselves (IFRC 2011).

By considering the above facts and for the healthcare of all, the study was framed with the following objectives.

- Collection of materials and development of software package for healthcare.
- Evaluation of the software package and incorporation of corrections.

REVIEW OF LITERATURE

II.REVIEW OF LITERATURE

Review of literature pertaining to the study **"Developing and Evaluating a Software Package for Healthcare"** is discussed under the following headings.

A. **Various Ailments**
B. **Herbs that Heals Ailments**
C. **Foods that Heals Ailments**
D. **Nutrients that Heals Ailments**
E. **Computer based Education**

A. VARIOUS AILMENTS

According to Bakhru (2011) **Acne** is the most common chronic skin disease. It is an inflammation condition of the sebaceous glands and hair follicles usually found on the face, the neck, chest and shoulders. Nearly eight out of the ten young people between the age 12 and 24 suffer from some degree of acne. It is closely related to the disturbances in the hormones experienced at puberty.

Fatima *et al.,* (2008) highlights that the symptoms of acne are common in people. The pimples may appear as small pin head. Which grow with time pus may develop in them and the pimples become hard. If pus develops then the pimples change into yellow color on the surface.

Recent studies done by Keri *et al., (2000)* reveal a potential role of diet in the pathogenesis of acne. Individuals that have a diet with a high glycemic load or increased milk consumption are reported to have a greater likelihood of having acne.

According to International Federation of Red Cross (2011) **Acute Myocardial Infarction** (AMI) is the most significant consideration in those suffering chest pain, sequelae of which include shock, cardiac arrest and death.

Bjorksten (2001) highlights that the incidence of food **allergy** appears to be stable. Heredity plays an important role in the development of allergic disease. Kjellman (2000) documented that a child with a family history of atopic runs a significantly increased risk of becoming allergic.

According to WHO (2011) **anemia** is considered the most common nutritional deficiency worldwide and in 95 per cent of cases it is associated with an iron-poor diet. Romilda *et al.,* (2014) observed that iron deficiency anemia is common worldwide. It is estimated that 25 per cent of the population is affected by iron deficiency and the most common groups affected are children of 4-24 months of age, schoolchildren, adolescent girls, pregnant and breastfeeding women.

Bhakru (2010) states that anaemia, which means "lacking in blood ", is among the most common diseases affecting human beings. It denotes a shortage of rich red blood cells and colouring matter and usually results from consumption of refined foods.

Jordao *et al.,* (2009) opined that anemia is a term given to a pathological process in which erythrocyte hemoglobin (Hb), hematocrit (Ht) and the concentration of red blood cells per unit of volume are abnormally low compared to the peripheral blood parameters of a reference population. In normal individuals, hematocrit and hemoglobin levels vary in accordance with the phase of development of the individual, and as a function of hormonal stimulation, environmental oxygen pressure, age and gender. Braga (2008) conveys that, the amount of iron in the body varies according to weight, gender, hemoglobin level and the size of body iron stores.

Plaut (2000) opined that **asthma** is one of the most common chronic diseases in the world. It is associated with variable airflow obstruction, airways hyper-responsiveness and chronic airway inflammation. Food is most important factor for cause allergic disease like asthma, urticaria rhinitis etc. Tricon *et al.,* 2006 observed that increase in asthma at the same time as the decline in dietary intakes of antioxidant-rich foods.

Studies done by Shukla *et al.,* (2012) suggested a minor role for individual antioxidants in asthma prevention, perhaps working in larger food groups instead. The toxicity of oxidants which are caused due to cigarette smoking, air pollution or it may be generating by inflammatory process.

Jarvis (2002) highlights that development of **atopic** disease depends on many variables and reflects the interaction between genetic factors and environmental exposure. Although allergic diseases of the respiratory tract are increasing among children and adolescents.

Jacobs, *et al.,* (2004) states that **Cardiac Arrest** (CA) is the termination of cardiac mechanical activity. According to Resuscitation Council (2011) cardiac arrest most often due to

Ischaemic Heart Disease (IHD). Rea *et al.,* 2010 highlights that the patho physiology consists of cardiac arrhythmia with impaired cardiac output and subsequent systemic ischaemia and metabolic cell death. As cerebral hypoxic injury starts to occur within 3 minutes of CA, timely interventions are necessary to achieve a successful outcome.

The **common cold** is a viral illness it is caused by various respiratory viruses most commonly rhino viruses. Young children may have as many as six to eight episodes. A common cold is characterized by sore throat, malaise, and low-grade fever at onset (Wood *et al.,* 2004).

According to Farokh (2000) it is a self-limiting disease, which resolves within five to ten days on its own. Symptoms include nasal congestion and discharge, sneezing, cough, sore throat and fever .Symptoms usually peak around day 3 or 4 and cold and cough medications are among the top 20 substances leading to death in children younger than five years (Bronstein *et al.,2010)*and begin to resolve by day 7 (Heikkinen *et al.,2003).*

Nasal discharge, appearing at the peak of illness, can become thick and purulent and may be misdiagnosed as a bacterial sinus infection. (American Academy of Pediatrics 2003).

Nanal (2006) states that **Conjunctivitis is** an eye infection that can be caused by bacteria, a virus or sometimes allergies, and spreads through skin to skin contact. It is different to sticky eye which is caused by a blocked tear duct.

According to WHO **Coronary Artery Disease** (CAD) is a major cause of mortality and morbidity all over the world. Enas *et al.,(2000)*says that the burgeoning burden of CAD in India can be explained by the alarming rise in the prevalence of coronary risk factors like diabetes, hypertension, atherogenic dyslipidemia, smoking, central obesity and physical inactivity. Rapid urbanization and change in lifestyle that occurred during the past two decades have led to the growing burden of coronary risk factors in India. They were thought to be genetically preordained to develop the disease (Yusuf *et al., 2004).*

Mathew (2006) opined that there is a close association between diet and heart attack. Balanced diet which avoids excess of saturated fats, refined white sugar products, and processed starches-white bread and white rice items with low fiber content is advised by doctors to keep heart disease at bay. Excessive consumption of food containing saturated fat and sugar adds to the body weight and also increases blood cholesterol. The diet should have adequate calories, protein, fats, carbohydrates, minerals and vitamins. The correct diet started from school-going

age and continued all through adult life goes a long way in preventing Heart Diseases. According to a world Health Organization (WHO) report, Heart Disease in children due to obesity is likely to be one of the biggest killers by 2015(Anant 2006).

Dandruff is a common scalp disorder affecting almost half of the population at the pre-pubertal age and of any gender and ethnicity. (Ranganathan. *et al.,* 2010). No population in any geographical region would have passed through freely without being affected by dandruff at some stage in their life (Gupta *et al., 2004*).

The word dandruff (dandruff, dandriffe) is of Anglo-Saxon origin, a combination of ‘dan’ meaning ‘tetter’ and ‘drof’ meaning ‘dirty’. Dandruff affects aesthetic value and often causes itching. It has been well established that keratinocytes play a key role in the expression and generation of immunological reactions during dandruff formation (Franchimont et al., 2013).

According to Gaurav *et al., (2015)* **dementia** is decreased cognitive development, intellectual, memory functions due to atrophic changes. This leads to difficulty in problem solving, judgement, abstract thinking, geographical orientation, inability to carry out daily activities. Minor memory lapses like forgetting keys or forgetting names does not means dementia. But if one gets lost in familiar surroundings, fails to recognize his or her spouse suggests dementia.

According to Shaw *et al.,* (2012) **diabetes** is a national health priority. The number of people with type 2 diabetes is growing, most likely the result of rising overweight and obesity rates, lifestyle and dietary changes, and an ageing population. Within 20 years, the number of people in Australia with type 2 diabetes may increase from an estimated 870,000 in 2014, to over 2.5 million.

Santhosh *et al.,* (2011) states that diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar. Hyperglycemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels. Early diagnosis can be accomplished through relatively inexpensive blood testing. Treatment of diabetes involves lowering blood glucose and the levels of other known risk factors that damage blood vessels.

Diarrhoea is a common symptom in children with viruses, infections and allergies, and can be related to taking antibiotics to help treat these things, so it is usually nothing to be concerned about unless it appears with other more serious symptoms which may indicate food poisoning or dehydration. (Shankar *et al., 2003).*

Glaucoma is a common visual disorder whose frequency among people of the world has not been analysed comprehensively. Open Angle Glaucoma (OAG) is a slowly progressive atrophy of the optic nerve, characterised by loss of peripheral visual function and an excavated appearance of the optic disc by ophthalmoscopy (Quigley 2006).

The causes of OAG are not clear, though the Intra Ocular Pressure (IOP) is a risk factor. An abnormally high IOP level is not an effective diagnostic criterion for OAG, since some of those affected have IOP within the normal range (Somme *et al.,* 2003). Among people with glaucoma in developed countries only half are likely to be known to the health care system. In developing countries, the number is surely less (Tielsch *et al.,* 2000).

Halitosis is defined as an unpleasant odor that emanates from the oral cavity with intra–oral and/or extra–oral origins. Fifty percent of people worldwide view themselves as having halitosis, with 90 per cent of the etiology being intra oral. Halitosis and oral malodor are labels placed on an unpleasant smell or odor that may emanate from the oral cavity. With up to 50 per cent of people worldwide assessing themselves as having frequent or constant incidents of malodor, it is a common complaint of many adults. (Brenda *et al.,* 2010).

The etiology of halitosis can be of systemic (extra–oral) or intra–oral origins. Halitosis is often caused by food debris and biofilm buildup on the teeth and tongue. The odor emanating from the oral cavity is produced by microbial putrefaction of the debris left in the mouth, resulting in the production of malodorous Volatile Sulfur Compounds (VSCs). Systemic or extra–oral conditions may also produce volatile compounds that are eliminated through exhaled air, contributing to halitosis. (Porter *et al.,* 2006).

Helicobacter pylori is causally associated with peptic ulcer disease and gastric carcinoma. Typically children get infected with this organism during the first decade of life but diseases, associated with *H. pylori,* are seen mainly in adults. In India, almost 80 per cent of

population is infected with H. pylori and most of them by 10 years of age (Ujjal *et al.,* 2007) *H. pylori* infects at least 50 per cent of the world's human population (Ernst *et al.,* 2000).

H. pylori transmission is primarily "person-to person" via fecal-oral, gastric-oral or oral-oral routes. Children acquire infection mainly through feco-oral route as *H. pylori* has been cultured from the stool of infected children (Thomas *et al.,* 2005). Poor socioeconomic status, overcrowding and unhygienic conditions contribute to the high prevalence of *H. pylori* infection in developing countries. Majority of infection is acquired in the first decade of life. The sero-prevalence studies from Hyderabad and Mumbai have shown that by 10 years of age more than 50 per cent and by 20 years more than 80 per cent of population is infected with *H.pylori* (Graham,*et al.*,2000, Gill *et al.*,2003).

Young adults are at risk of having *H. pylori* associated duodenal ulcer. Besides virulence of the organism, the host genetics and environmental factors (like diet, alcohol, smoking, *etc.*) play an important role in the pathogenesis of peptic ulcer and gastric cancer and this can explain why *H. pylori* infection in childhood produces diseases in adulthood (Cederberg, *et al.*,2004).

According to Bailey (2004) **hemorrhoids** or piles are a common ailment among adults. More than half of men and women aged 50 years and older will develop hemorrhoid symptoms during their lifetime. The actual cause of hemorrhoids is not known (Madoff, *et al., 2004).*

Few of the earliest proposed cause include temperament, body habits, customs, passions, sedentary life, tight-laced clothes, climate, and seasons (Dennison *et al., 2000).* Hemorrhoids are rare in children but now days several reports state the occurrence of hemorrhoids in children, (Heaton, *et al., 2002).* And in elderly people (Navarra *et al., 2000).*Silvia *et al.*,(2004) estimated that hemorrhoids can affect both men and women.

Hemorrhoids are common in patients with spinal-cord injuries, constipation, chronic diarroea; poor elimination/defecation habits, postponing bowel movements, and a poor-fiber diet are also considered to be contributing causes (Yarnell 2000).

Hypertension is high blood pressure, people sometimes confuse hypertension with stress but hypertension is an internal stress and external condition (Cataldo *et al.,* 2006). It is not a disease and has no characteristics symptom of many diseases as well as a root cause of cardiac

disorders. High blood pressure is dangerous because it makes the heart work harder to pump blood to the body and it contributes to hardening of the arteries. (Naveen 2005).

The DASH diet, which stands for Dietary Approaches to Stop Hypertension is an example of such an eating plan, patients who were on the DASH diet reduced their blood pressure within two weeks.(Reddy 2002).

In childhood too, **hypothyroidism** can occur. In a clinic-based study from Mumbai, out of 800 children with thyroid disease, 79 per cent had hypothyroidism. Common causes of hypothyroidism in these Children were thyroid dysgenesis, dyshormonogenesis, and thyroiditis (Desai 2009). Obesity in children likely to be one of the biggest problems confronting parents in the next five years.

Insomnia is among the most prevalent sleep complaints reported by older adults characterized by difficulty initiating or maintaining sleep, accompanied with daytime consequences. Studies have estimated that up to 40-50 per cent of adults over the age of 60 report disturbed sleep (Ancoli 2000).

Subtypes of insomnia include sleep onset insomnia (difficulty initiating sleep), sleep maintenance insomnia (difficulty maintaining sleep throughout the night), early morning insomnia (early morning awakenings with difficulty returning to sleep), and psychophysiologic insomnia (behaviourally conditioned sleep difficulty resulting from maladaptive cognitions and/or behaviours), the most common among older adults being maintenance and early morning insomnia. (Dam *et al., 2008).*

Depending on the course of the sleep disturbance, insomnia can be classified as transient (lasting only a few days before or during a stressful experience), short-term (lasting a few weeks during an extended period of stress or adjustment), or chronic enduring several months or years after a precipitating event. (Blackwell et al., *2006).*

Chronic Kidney failure (CKD) requiring treatment with dialysis or transplantation is the most visible outcome of CKD. However, Cardio Vascular Disease (CVD) is also frequently associated with CKD, which is important because individuals with CKD are more likely to die of CVD than to develop kidney failure (Shulman *et al., 2009).* The number of individuals with

kidney failure treated by dialysis and transplantation exceeded 320 000 in 1998 and is expected to surpass 650 000 by 2010 (Mark *et al.,* 2009).

Ulijaszek and Lofink (2006) observed that increasing rates of **obesity** across the world are broadly attributed to environments that are obesogenic, against an evolutionary heritage that is maladaptive in the new contexts. Extensive emergence and rise of obesity among most of the world's populations indicate that the ability to become obese is universal whereas great variations in obesity rates across geographical regions indicate possible population differences in genetic susceptibility to obesity. Human genetics are likely to have undergone selection for traits that promote energy intake and energy storage and that minimize energy expenditure, and there are a great many obesity related genotypes.

Anderson and Butcher (2006) have documented trends in children's obesity and examine the possible underlying causes of obesity epidemic. Energy intake of children is affected by increasing availability of energy dense, high calorie foods and drinks through schools. Changes in the family structure, particularly an increase in dual career or single parent working families, may also have increased demand for food away from home or prepared foods.

A host of factors also have contributed to reduction in energy expenditure. Nowadays, children seem less likely to walk to school and to be travelling more in cars than they were doing in the early mesures, perhaps because of changes in the built in environment. Finally, children spend more time viewing television and using computers (Srilakshmi 2012).

The **Polycystic Ovary Syndrome** (PCOS), one of the most common causes of infertility due to anovulation, affects 4–7 per cent of women (Ehrmann *2005).* According to the National Institutes of Health, basic diagnostic criteria should be the presence of hyperandrogenism and chronic oligo-anovulation, with the exclusion of other causes of hyperandrogenism such as adult-onset congenital adrenal hyperplasia, hyperprolactinaemia and androgen-secreting neoplasms *(*Zawadski *et al.,* 2012).

Whereas hyperandrogenism and menstrual irregularities represent the major complaints in young women with the PCOS, symptoms related to androgen excess, oligorrhoea or amenorrhoea and, particularly, infertility are the main complaints of adult women with PCOS during the reproductive age. Obesity has an important impact on the severity of these

manifestations in proportion to its degree and particularly in the presence of the abdominal phenotype (Geetha 2006).

Rheumatic Heart Disease (RHD) remains a major public health problem in many parts of the world. (World Health Organization 2001). It is widely perceived that with the economic transformation in India there is a burgeoning epidemic of lifestyle diseases such as coronary artery disease, diabetes and hypertension, whereas the prevalence of RHD is declining (Rogers 2010).

Rheumatic Heart Disease (RHD) continues to be a major health problem in many parts of the world. The epidemiology of Rheumatic Heart Disease in India is of special interest as it may help to understand the effects of economic transition on this enigmatic disease. Critical appraisal of the published literature suggests the possibility of a real decline in the occurrence of the disease in some parts of the country, but a continuing onslaught in several other regions. The rate of decline seems to correlate more with improved public health facilities than with economic development alone. (Ramakrishnan *et al.,* 2009).

Skin diseases are numerous and a frequently occurring health problem affecting all ages from the neonates to the elderly and cause harm in number of ways. Maintaining healthy skin is important for a healthy body. Many people may develop skin diseases that affect the skin, including cancer, herpes and cellulitis (Marks et al., 2006).

There are more than a thousand conditions that may affect the skin but most skin diseases can be categorized into nine common types, these includes rashes, viral infections, bacterial infections, fungal infections, parasitic infections, pigmentation disorders, tumors and cancers, trauma. Because it interfaces with the environment, skin plays a key role in protecting (the body) against pathogens (Proksch et al., 2008).

Deasai (2007) states that Thyroid diseases are, arguably, among the commonest endocrine disorders worldwide. India too, is no exception. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases. Among the various varieties of hypothyroidism, congenital hypothyroidism is probably the most important, as it is requires an early diagnosis, which is usually followed by appropriate therapy that can prevent the onset of brain damage.

Among adult people in India, the prevalence of hypothyroidism has been recently studied. In this population-based study done in Cochin on 971 adult subjects, the prevalence of hypothyroidism was 3.9 per cent. Recent population studies have shown that about 12 per cent of adults have a palpable goiter (Usha *et al., 2009).* Autoimmune thyroid disease is probably common than iodine deficiency as a cause of goiter in areas that are now iodine sufficient.

Pandey (2008) states that **Tonsillitis** do the job of watchman, their role is to warm the body about a possible infection. The symptoms of tonsillitis are sore throat, and red and swollen tonsils that may have white patches on them. If a child has severe and frequent attacks leading to ear infection and deafness. Tonsilitis lead to middle ear infection and chronic deafness.

Vitamin D deficiency is considered to be the most common nutritional deficiency (Holick 2012). Though majority of population in India lives in areas receiving ample sunlight throughout the year, vitamin D deficiency is very common in all the age groups and both the sexes across the country. (Harinarayanan *et al., 2009).*

It is observed among breastfed infants at one end with dietary calcium deficiency in older children at the other end. Between these two extremes, it is likely that vitamin D insufficiency and decreased calcium intake or high phytate intake combine to induce vitamin D deficiency and rickets, which may be the most frequent cause of rickets globally (Pettifor 2004) .Routine vitamin D supplementation to all the pregnant women is controversial (Thomson *et al., 2004).* Administration of high dose of vitamin D (400-6400 IU) daily to breast feeding mothers increases the anti-rachitic activity of breast milk without causing hyper vitaminosis in the mother.(Basile *et al., 2006,* Wagner *et al.,2006)*

B. HERBS THAT HEALS AILMENTS

According to Rotblatt, *et al.,*(2002) herb can be any form of a plant or plant product, including leaves, stems, flowers, roots, and seeds. These plants can either be sold raw or as extracts, where the plant is macerated with water, alcohol, or other solvents to extract some of the chemicals. The resulting products contain many components, including fatty acids, sterols, alkaloids, flavonoids, glycosides, saponins, and others.

Herbal medicines are currently in demand and their popularity is increasing day by day. About 500 plants with medicinal use are mentioned in ancient literature and around 800 plants have been used in indigenous systems of medicine. India is a vast repository of medicinal plants that are used in traditional medical treatments (Chopra *et al.*,2000).

National Academies Press (2005) classifies herbs as dietary supplements. This law defines supplements quite broadly as "anything that supplements the diet." Supplements therefore include vitamins, minerals, herbs, amino acids, enzymes, organ tissues, metabolites, extracts, or concentrates. A major difference between a drug and a dietary supplement is that dietary supplements may not claim to "diagnose, cure, mitigate, treat, or prevent illness.

Linde, *et al., (*2006) states that ***Echinacea (***Uruvakkavum) is most commonly used for treatment of the common cold. A subsequent large, high-quality randomized controlled trial found number of benefit of *Echinacea angustifolia* for the treatment of experimentally induced rhinovirus infection (Turner,*et al.*,2005). However, some authorities believe that a different species *(Echinacea purpurea)* or a higher dose of the species studied, would have been more likely to find an effect on common on cold (Blumenthal et al., 2005).

Oken et al., (2000) states that ***Ginkgo*** *(Amrithavalli)* extracts are among the best characterized herbal products, and are generally standardized to 24 per cent flavonoids and 6 per cent terpenoids. Although reviews of prior trials have found inconsistent results, ginkgo is likely effective for dementia, providing a small benefit of approximately 3 per cent in the Alzheimer 's disease. It is interesting to note that ginkgo was not effective for improving cognitive function in elderly patients without dementia (Solomon et *al.*, 2002).

Ginkgo was found to improve pain-free walking distance in patients with claudication, a small benefit of unclear clinical significance.(Pittler *et al.*,2000)While side effects from ginkgo and placebo are similar in clinical trials (Birks *et al.*,2002)

a significant concern regarding the use of ginkgo is the reported association with spontaneous bleeding (Bent *et al.*,2005).

Mint is a broad term given for a group of aromatic perennial herbs belonging to the genus *Mentha* and the family Labiatae. It is one of the most important culinary and medicinal plants in

the world. In various traditional medicines, mint is used as a stomachic, tonic, carminative, antispasmodic, and anthelmintic (Bakhru 2013).

Chamomile *(seemai chamanthi)* has been used for thousands of years for numerous ailments and is commonly used in teas (as a mild sedative) or in herbal products used for sleep disorders, anxiety, or gastrointestinal problems. There are no high-quality scientific studies to support efficacy for any of these indications. The herb is generally believed to be safe, but there are case reports of serious allergic reactions. (Ulbricht *et al.,* 2005.)

Kava is traditionally used in the islands of the south pacific as a sedative and relaxant. Prior clinical studies suggest a small benefit for the treatment of anxiety (Use of this herb has been limited by the reported association to several cases of severe hepatotoxicity (Pittler *et al.,* 2003).

Curry leaves (karivepillai) is commonly used in India as a natural flavoring agent for preparations. and it is useful for skin and stomach cancer (Srividya 2007). Eating 10 fresh fully grown curry leaves every morning for three months is said to be prevent diabetes due to the hereditary factors. It will prevent the stomach upsets also. (Bakhru 2013) Coccinia indica (ivy gourd) is a creeping plant that grows wildly in many parts of the India subcontinent, and is used to treat "sugar urine" (madhumeha) in Ayurveda, a traditional East Indian healing system.

Aloe vera is the most well-known species of aloe, a desert plant resembling the cactus in the Liliaceae family. It is popularly used to treat burns and promote wound healing. The dried sap of the *Aloe vera* is a traditional remedy for diabetes mellitus (Pandey, *et al.,2001).* Aloe gel, obtained from the inner portion of the leaves, contains glucomannan, a hydrosoluble fiber which may in part account for its hypoglycemic effects. Aloe gel is reported to contain glycoprotein's, polysaccharides and other constituents and is essentially used for the treatment of various skin conditions (burnas, agrasions, bruises, cuts, psoriasis, herps simplex, etc (Shane *et al., 2001).*

Silibum marianum *(*milk thistle), a member of the aster family, has been primarily studied for its purported effects on alcoholic and viral hepatitis, rather than for glycemic control. However, silymarin is rich in flavonoids, potent antioxidants, and some have postulated a potential benefit for those who have insulin resistance secondary to hepatic damage (Hinerman *et al.,* 2000).

Opuntia streptacantha (nopal) or the prickly pear is commonly used for glucose control. It has a highsoluble fiber and pectin content, which may affect intestinal glucose uptake, partially accounting for its hypoglycemic actions (Shapiro *et al., 2002).*

Gymnema sylvestre is another commonly used herb in ayurveda. Chewing the leaves causes a loss of sweet taste, hence the popular Hindi name of the plant "gurmar," meaning "destroyer of sugar." Early animal studies reported blood glucose– lowering effects in animals with residual pancreatic function (Shanmugasundaram *et al.,2003).*

The **neem** has been a part of Indian folklore for thousands of years. It has numerous medicinal properties hence used in various problems ranging from digestive disorders to diabetes and from high cholesterol to cancer. Neem leaves reduce the blood glucose hence it is used in various number of anti diabetic ayurvedic preparations and formulations (Nanal 2006).

External application of neem leaves paste with butter milk is highly effective for controlling the allergic conditions. as it is started earlier that bacterial and fungal growth is prevented by acidic pH (Pandey 2008).

Abrus precatorius plant has been used in hindu medicine from very early times, as well as china and other ancient cultures. In Ayurveda the plant is considered beneficial for the hair and the seed extract is used externally in the treatment of ulcers and skin infections (Gautam *et al., 2000). In* India a hot water extract of the leaves and roots or seeds is applied topically for eye diseases and taken orally as an ememernagogue.(Jain *et al.,*2009).Agglutinin protein purified from the seeds of Abrus precatorius showed high anti tumor activity (Paneer *et al.,*2000).

Acorus calamus has long been known for its medicinal value. It is particularly used to enhance memory (Major Herb in Ayurveda) the rhizomes of this herb is used in many different disorders , mainly as a nerve stimulant to enhance memory and as an aromatic digestive (Tyler 2000).It is also been used in the treatment of epilepsy, chronic diarrhoea , dysyndry and kidney and liver diseases (Motley 2004).

Phyllanthus niruri (Shutter stone) the herb has been used in ayurveda for over 2000 years and has a wide range of traditional uses, both internally and externally the plant is used

mainly to treat all kind of jaundice as a single remedy and as a choleretic and liver protectant, as well as for diabetes, dyspepsia, inflammations, fever and frequent menstruation. (Ross 2000)

Adhatoda vasica (Malabar nut) is has been used in Indian medicinal for over 2000 years. It is most commonly used for the treatment of respiratory complaints and diseases such as cough, cold and asthma (Claeson et *al.,* 2000).Paste of the leaves is sometimes applied to the abdomen to treat urinary disorderds (Siddique *et al.*,2004).

Andrographis (Kamegh) has been used over many countries. It is mainly used to treat liver diseases like jaundice (International Institute of Rural Recommendation 2001).

Asaparagus racemosus roots are used mainly to promote milk secretion and as a decoking, diuretic antiseptic, antidiarrhoeal and infertility, impotence and stomach ulcers (Ahmed et al., 2011).

Bacopa monniera (Brahmi) possesses numerous medicinal properties. The herb is used as an astringent and coolant it is mainly used to promote the intellect and as a potent nervier. It is recommended for children suffering from bronchitis and diarrhoea and the fresh juice of the plant is applied to inflamed joints to relieve pain (Jha 2012).

Berberies a tincture made from the stem and root bark is used as a tonic, stomachic, cholagogue, and alternative and for periodic neuralgia. It is particularly important in the treatment of remittend and intermittend fevers and consequent debility and for fevers and the accompanied by bilous symptoms and diarrhoea (Ahmed *et al.,* 2011).

Among all medicinal plants, globally, **ginseng** is probably the most famous and extensively investigated plant. It is considered as a sovereign remedy in almost all diseases (Ji *et al.,* 2009).

Ginseng has been used to improve the body's resistance to stress, to increase vitality, increase general well-being, immune function, libido, and athletic performance. Preclinical studies suggest it to possess adaptogenic, anti-inflammatory, antineurological, hypoglycemic, antineoplastic, immunomodulatory, cardiovascular, central nervous system, endocrine, and ergogenic effects (Seervi *et al.,* 2010).

C. FOODS THAT HEALS AILMENTS

Coriander is one of oldest recorded spices, mentioned in ancient Sanskrit and in Exodus (Coriander is one of the bitter Passover herbs). The seeds are stimulant and digestive (The encyclopedia of herbs and spices 2005) Coriander act as an aphrodisiac, help in the removal of catarrhal matter and phlegm from the bronchial tubes thereby counteracting any spasmodic disorders. Coriander seeds reduce fever and promote a feeling of coolness. Coriander juice is highly beneficial in deficiencies of vitamin A, C and iron. (Bakhru 2010)

According to Stevinson *et al.*, (2000) ***garlic (Poondu)*** is used for many purported medicinal properties, but the most substantial body of research examines the effect on cholesterol. The most recent systematic review concluded that garlic lowers cholesterol levels by 4–6 per cent, Koren (2005) opined that which is a modest effect in comparison to the 17–32 per cent reduction achieved with the use of statin drugs. Farooq (2005) states that the cholesterol lowering effect of garlic was also seen in rabbits that were fed 2 g cholesterol/day for 16 weeks.

Bakhru (2013) observed that garlic is used for the treatment of Asthma, in Ayurveda a decoction of garlic boiled in milk is considered a wonderful drug for tuberculosis. Garlic is one of the most effective remedy for lowering the high blood pressure. Following a recent study a West German doctor claims that garlic may prevent heart attack. Although the anti cancer properties of garlic have been recognized since ancient times (Farooq 2005).

Turmeric is a member of the ginger family, is believed to have medicinal properties because it inhibits production of the inflammation related enzyme cyclo-oxygenase 2 levels of which are abnormally high in certain inflammatory diseases and cancer, especially bowel and colon cancer (Srividya 2007).

Turmeric has many medicinal virtues. The rhizome is aromatic, stimulant and a tonic. It is useful in relieving flatulence. It corrects the disordered processes of nutrition and restores the normal function of the system. It is also useful in curing periodic attacks of hysteria and convulsions. Turmeric is a very useful intestinal antiseptic. Its juice or dry powder, mixed in

butter milk or plain water, is highly beneficial in intestinal problems, especially chronic diarrhoea (Bakhru 2011).

Turmeric has long been used in both Ayurvedic and Chinese medicines as an anti-inflammatory agent, a treatment for digestive disorders, and to enhance wound healing. Several clinical trials have demonstrated turmeric's antioxidant, anti-inflammatory, and antineoplastic effects. It has also been suggested as a treatment for colitis, chronic neurodegenerative diseases, arthritis, and cancer. (Yang *et al.,* 2003)

The usual dosage of standardized turmeric powder is 400–600 mg taken three times per day is good for health. (Burton 2000).

Fennel seeds are known to stimulant gastrointestinal motility and are useful for treating digestive disorders such as mild spasm of upper gastrointestinal tract and flatulence. Leaves of fennel are useful in respiratory disorders like asthma and bronchitis. The juice may be given in the treatment of such conditions. Eating fennel seeds with figs is also a good medicine for cough, bronchitis and lung abscesses. (Bamji.2013). It is believed that fennel benefits the eyes. Herbalists today like recommend bathing the weakened, sore or inflamed eyes with fennel tea. Regular application of the leaf-juice boiled with honey, is said to cure conjunctivitis (Bakhru 2011).

Vasundhara (2011) states that **cumin or jeera** is cooling, astringent, digestive, anti-inflammatory herb. It is used to increase the breast milk secretion and used for the jaundice treatment also .Cumin was established as inhibiting platelet aggression in experimental studies.

Ernst et al.,(2000) opined that ***ginger (Inji)*** is commonly used as a treatment for nausea. Randomized controlled trials have examined the efficacy of ginger for prevention of postoperative nausea, and although 2 suggested a benefit, the combined summary of the 3 studies did not find a statistically significant benefit**.** Bakhru (2013) highlights that it is externally useful in the treatment of dyspepsia, flatulence, colic and other painful affections of the stomach and the bowels. The herb is an excellent remedy for coughs and colds.

Studies have shown that ginger possesses antimicrobial, antischistosomal, anti-inflammatory, antipyretic, antioxidative, hypoglycemic hepatoprotective, diuretic, and

hypocholesterolemic effects. Ginger is also beneficial to the gastrointestinal tract, to increase bile secretion, and to prevent gastric ulcers. Scientific studies have also shown that ginger prevents nausea and/or emesis resulting from pregnancy, motion sickness, postoperation chemotherapy, and radiation, thereby validating the traditional observations and emphasizing its broad-spectrum antiemetic effect (Chrubasik *et al.*, 2005).

Farokh (2004) says that **cinnamon (llavankappattai)** Every night, take half a teaspoonful of honey mixed with a pinch or two of powdered cinnamon. This improves memory.

Recent researches reveled that advanced cancer of the stomach and bones have been cured successfully. Patients suffering from these kinds of cancer should daily take one table spoon of honey with one teaspoon of cinnamon powder for one month 3 times a day **(Srividya** 2007).

Naik (2010) states that **carrots** contain high anti-cholesterol soluble fibre including pectin. This reduces the bad LDL cholesterol and raises the good HDL cholesterol. The fibre in two carrots can lower the cholesterol by 10 – 20 per cent. Beta-carotene in the carrots also raise good HDL cholesterol. Eat at least two raw and fresh carrots daily, thus keeping the heart free from any diseases.

According to Panda (2008) **orange** contains vitamin C, iron, potassium, and orange juice is suitable for all age and can be safely given in all kinds of diseases like typhoid, measles, tuberculosis, etc. In the body orange acts as diuretic, heart tonic, control of the secretion of bile, and gives a cooling effect and reduces the blood activity.

Soy, a common source of dietary phytoestrogens that has weak estrogenic activity, is commonly used for the treatment of menopausal symptoms (primarily hot flushes) and for lowering cholesterol. A recent systematic review identified clinical trials examining the effects of increased dietary soy and additional trials examining the efficacy of soy extracts, and concluded that neither was effective for menopausal symptoms (Lethaby *et al.,* 2007). A recent reviews found that soy was effective for lowering total and Low-Density Lipoprotein (LDL) cholesterol by 4–5 per cent **(Taku** *et al.,* 2007).

Ramesh (2005) opined that **bitter gourd** is used for various diseases like ulcers, gout, diabetes, high blood pressure, and diarrhoea. The juice of its leaves relieves the burning sensation of the soles.

Flight *et al.*,(2006) says that consumption of **whole grains** reduces cardiovascular diseases. This effect may be related to fiber intake but all studies have not indicated that the relationship with fiber intake is independent of other variables.

Ganesh (2006) states that the head ache caused by heat can be cured by taking **tamarind** water twice a day. Soak the tamarind in water, mash it and mix with sugar before taking it. Bakhru (2011) highlights that tamarind the whole plant has medicinal virtues. Its leaves are cooling and antibilious, while the bark is an astringent, a tonic and reduces fever. The fruit pulp is digestive, antiflatulent, cooling, laxative and antiseptic. Its seeds are also astringent. Digestive Disorders Pulp of the ripe fruit is beneficial in the treatment of bilious vomiting, flatulence and indigestion. It is also useful in constipation. An infusion of the pulp prepared by softening it in water is particularly useful for loss of appetite and lack of inclination for food intake.

Nuts are good sources of MUFA, fiber, minerals and flavanoids walnuts are particularly rich in PUFA such as linolenic acid and alpha- lino lenic acid (Feldman 2002). Farokh (2004) described that walnuts is known to be highly beneficial in failing memory due to weakness of brain.

Most of the **fruits and vegetables** contain lot of nutrient , high amount fiber are a source of low calorie , several studies suggest that fruits (Apple , Orange, Pineapple, Cherry, and peach) and vegetables (Carrots, Parsley, beetroot, capable spinach and tomato) help in the prevention of Chronic Heart Diseases (HuFB *et al.*,2002)

D. NUTRIENTS THAT HEALS AILMENTS

According to Shankar (2011) there are six major classes of nutrients namely carbohydrates, dietary fiber, fats, minerals, protein, vitamins and water, these nutrients can be categorized as their macro nutrients or micronutrients. The macro nutrients provide structural material and energy for body. Sarma *et al., (2000)* opined that Protein forms the main structural components of the body cells and energy giving substances are carbohydrates and fat.

Vitamin intake and health issues is one of the most fundamental, controversial and potentially most important current issues in human nutrition. **Vitamins** are essential organic micro nutrients which cause deficiency disorders when intake is adequate. (Suzannel *et al.,* 2000)

Zinc is important in functions of various enzymes. It is required in the synthesis of insulin and also it has important function in immune system. It is absorbed by mucosal cells in the intestine. The pancreas uses zinc to make digestive enzymes and secrete them into intestine (Arthur *et al.,* 2003).

Weiss (2002) opined that human body contains around 4-5 gm of **iron**. Seventy percentage of this is in the form of circulating Hemoglobin. It is part of the protein myoglobin in muscles,which makes oxygen available for muscle contraction. Schaible (2004) states that Iron involved in the regulation of cytokine production and in the activation of protein kinase C, which is essential for phosphorylation of factor regulating cell proliferation.

Jain *et al.,* (2011) highlights that **Iodine** is essential for thyroid hormone synthesis. Deficiency may occur in populations consuming goitrogens. They are the substances which interfere with iodine utilization by thyroid gland. Iodine is a component of two thyroid hormones that help to regulate growth, development, and metabolic rate.

Balakrishnan (2012) says that **calcium** is one of the most important mineral required for the normal cellular function. It has a major role in the mineralization of cartilage, coagulation cascade, neuro-transmission, skeletal and cardiac muscle contraction, endocrine and exocrine functions of several glands. Thys (2000) observed that calcium has importance in the prevention of osteoporosis pregnancy induced hypertension and premenstrual tension.

Vitamin A is essential for the maintenance of epidermal and mucosal integrity, thus low plasma vitamin A concentrates have deleterious effects on membrane integrity and mucosal function. It is well known that impaired intestinal immunoglobulin A (IgA) production is attributed to impaired of gut associated immune response. As vitamin A defiency has been associated with an increased morbidity and mortality from infectious diseases (Vora 2012). In epidemiological studies, a low intake of vitamin A has consistently been associated with increased risk of developing certain cancers (Kummet *et al.,* 2003).

There are several theorized mechanisms to explain cancer risk reduction by vitamin A. It is well established that vitamin A required for the maintenance of epithelial tissues, where many cancers are seen (Blank 2010). The pigment rhodopsin occurring in rods is a vitamin A protein complex which is disrupted by light to yield vitamin A aldehyde and Protein (Sharma 2012)

Vitamin E is a potent antioxidant and it has been suggested that the function of vitamin E is to serve in this function in the body. Antioxidants are substances that protect other chemicals of the body from oxidation reaction, by reacting with oxidizing agents within the body. Recent research also suggests that vitamin E required for the normal functioning of the immune system and by regulating production of prostaglandians thereby control the aggregation of blood platelets during the formation of blood clots (Srilakshmi 2012).

Vitamin E is the major peroxidation chain –breaking antioxidant in membranes. The influence of Vitamin E on the immune function has been shown to affect different aspects of immune functions. In humans, primary deficiency of vitamin E rarely occurs. Whereas secondary deficiency is observed as a consequences of certain diseases such as primary cirrhosis, intestinal malabsorption disorders and several viral hepatitis and human immune deficiency virus. (Maggini *et al.*,2007) It is stable to heat and acids. It is rapidly oxidized in rancid fats. Many studies shows that supplements of this vitamin can prevent or cure a wide variety of diseases, from reproductive function to skin problems such as psoriasis and acne. It is potent natural antioxidant found in food (Shobha 2012)

According to Johnson (2002) fruits and vegetables constitute the major sources of **carotenoid** in human diet. Agarwal *et al.*, (2000) states that they are present as micro-components in fruits and vegetables and are responsible for their yellow, orange and red colors. Carotenoids are thought to be responsible for the beneficial properties of fruits and vegetables in preventing human diseases including cardiovascular diseases, cancer and other chronic diseases.

Ascorbic acid being a water soluble compound is easily absorbed but it is not stored in the body. Based on clinical and epidemiological studies it has been suggested that a dietary intake of 100 mg/day of ascorbic acid is associated with reduced incidence of mortality from heart diseases, stroke and cancer (Carr *et al.,* 2000).

Shukla (2006) observed that ascorbic acid plays a critical role in wound repair and healing/regeneration process as it stimulates collagen synthesis. Adequate supplies of ascorbic acid are necessary for normal healing process especially for post-operative patients. It has been suggested that there will be rapid utilization of ascorbic acid for the synthesis of collagen at the site of wound/ burns during post-operative period.

Akhilender (2003) opined that ascorbic acid is widely distributed in fresh fruits and vegetables. It is present in fruits like orange, lemons, grapefruit, watermelon, papaya, strawberries, cantaloupe, mango, pineapple, raspberries and cherries. It is also found in green leafy vegetables, tomatoes, broccoli, green and red peppers, cauliflower and cabbage.

Vitamin D plays an important role in maintaining an adequate level of serum calcium and phosphorus. Without vitamin D, only 10 to 15 per cent of dietary calcium and about 60 per cent of phosphorus is absorbed (Holik *et al.,* 2006) Muscle weakness is also a prominent feature of vitamin D deficiency. Patients with nonspecific muscle weakness, muscle aches and pains have also been found with vitamin D inadequacy (Plotnikoff *et al.,* 2000). Vitamin D enhances the Calcium and Phosphorus absorption and promotes bone formation (Ashok 2004).

Vitamin D is one of the most potent vitamins for regulating cell growth. It was discovered that many cell types contain vitamin D receptors. These receptors can be activated by 1, 25 (OH) 2 D, and induce differentiation into normally functioning cells, and inhibit proliferation, invasiveness, angiogenesis, and metastatic potential. In tumor models such as cancers of the lung, colon, kidney, breast, prostate vitamin D played a role in activity against metastasis (Sundaram *et al.,* 2003).

Vitamin K is required for normal formation of prothrombin, a precursor of thrombin, which form the blood clot. Vitamin K deficiency is manifest by failure of the blood to clot severe deficiency animals may bleed to death. (Sherman 2001).

Folic acid is a water soluble essential nutrient good food sources of folate are leafy vegetables and fruits. There is an increased requirement for folic acid during pregnancy. (Kathleen *et al.,* 2004).

Riboflavin is essential for the metabolism of carbohydrates, amino acids, and lipids and supports antioxidant protection. Its measured in milligrams in foods is widely distributed in foods like rapidly growing leafy vegetables (Suzannek *et al.,* 2000).

Niacin formerly known as nicotinic acid was originally obtained by the oxidation of nicotin. The Niacin required by all cells. It plays a vital role in the release of energy from all the energy yielding nutrients like carbohydrates, fats, protein. It also required for the synthesis of protein, fat and five carbon sugars (pentoses) needed for the formation of DNA and RNA (Bender *et al.,* 2002).

E. COMPUTER BASED PATIENT EDUCATION

Computer-based patient education methods resulted in improved clinical outcomes when compared with traditional patient education methods, DIABETO developed in France is a computer assisted diet education package for diabetic patient self monitor their diets and balance their meals with personalized counseling. Diabeto appears to be an effective tool in the control of metabolic diseases .was found to significantly improve their dietetic knowledge and dietary habits (Turnin *et al.,* 2000).

Osman *et al.,* (2001) found that computer-generated booklets distributed to adult patients with asthma resulted in decreased hospital admissions. Huss *et al.,* (2000) developed a program that was designed to be an adjunct to the traditional education provided to patients with atopic asthma. For these patients, repeated instruction by use of computers resulted in more changed behavior than did single-session traditional instruction.

The Computerized Health Enhancement Support System (CHESS) was developed as an online interactive computer-based system to provide information, referral, and support for patients. Target populations for CHESS included adult children of alcoholics, patients with HIV, patients with breast cancer, and victims of sexual assault. Research and usage statistics revealed that the system was found to be most useful for patients with HIV and patients with breast cancer (Gustafson *et al., 2012).*

Kathryn 2002 states that Applications that use computer capabilities in calculations and data management are widely available. Software for desktop computers and programmes for hand-held computers are useful for many formulas used in nutrition assessment, including basal metabolic energy needs, Body Mass Index (BMI), desirable body weight, nitrogen and diabetic food exchanges. Adjustments can be made based on a variety of parameters.

According to Hendricks (2005) computer based nutritional assessment tools are useful in hospital and community research and service settings. They allow for the use of more precise calculations, rather than rule of thumb calculations, with fewer errors in making decisions about nutrition care. These tools can be less cumbersome than manuals. An example of a health information system software is "ProMis". It is a tool to manage large amounts of data like severity of malnutrition or diarrhoea. Save the children used the system to rectify discrepancies in food rationing. Nutrient-drug interaction software is an example of a specialised database for clinical nutrition. It allows the user to quickly assess any nutrients that may be compromised

with a medication regimen. These aids make it more likely that interactions will be considered when prescribing medicines.

Nilasena (2005) opined that computerized reminder systems developed in Hungery have been shown to be effective in improving physician compliance with preventive service guidelines. Computerized reminder systems improve compliance with recommended care more by facilitating the documentation of clinical findings and the ordering of recommended procedures than by providing the clinician with patient specific information about guideline compliance status.

Hurtado et al., (2000) highlights that Patient-centered applications are defined as systems that enable a partnership among practitioners, patients, and their families (when appropriate) to ensure that procedures and decisions respect patients' needs and preferences. Developers should solicit patients' input regarding the education and support that patients require to make decisions and participate in their own care. Such applications bridge clinical and nonclinical sectors and include both individual and population health-oriented tools. They encompass different communication channels such as web-based systems, portable monitoring tools, and mobile devices.

Carson *et al*., (2005) describes that the application of computers –based techniques with in an inelegant, knowledge- based frame work to the management of diabetes. This technique combines knowledge based advisory system and glucose/insulin model as patient simulator ,that can be tested as a potential decision aid for adjusting insulin dosage on a daily basis.

METHODOLOGY

III. METHODOLOGY

The present study on Developing and Evaluating a Software Package for Healthcare was carried out in the following phases.

PHASE I. DEVELOPMENT OF THE SOFTWARE PACKAGE

1. Collection of Material for Development of Package
2. Developing the Screens using the Resource Materials

PHASE II. EVALUATION OF THE DEVELOPED SOFTWARE PACKAGE

1. Selection of Subjects for Evaluation
2. Preparation of the Interview Schedule
3. Evaluation of the Developed Software Package and Feedback

PHASE I. DEVELOPMENT OF SOFTWARE PACKAGE

1. Collection of Material for Development of Package

First step in the development of software package consists of drafting an effective programme. This was carried out by reviewing and synthesizing materials on nutritional assessment like anthropometric measurements, dietary aspects, clinical examinations, biochemical aspects and numerous natural remedies for various diseases, materials on stress, first aid, sleep, food adulteration and integrating them towards developing an interactive package. Reliable information were collected from various literatures and modified to suit the Indian conditions. Before framing the package nutritional professionals, physicians, dieticians were consulted and the necessary guidelines were obtained.

2. Developing the Screens using the Resource Materials

After collecting the resource materials script was prepared in a note book indicating each slide in one page with necessary diagrammatic representations wherever required. In the next step screens were developed using PHP,MYSQL, HTML, JAVA SCRIPT, CSS applications.

This software package has been done in HTML as front end and PHP/MYSQL as back end. PHP is not a language it is server side scripting language developed by Danish Greenlander Rasmus Lerdorf. And all the texts were typed in text boxes, and pictures scanned were copied to the slides and each screens was developed by adjusting the font size, colour of the text, fore colour and background colour of the screens.

The software package thus framed consisted of the details on the following aspects.

- Anthropometric measurements
- Dietary aspects
- Clinical examinations
- Biochemical parameters
- Natural remedies- herbal, home based and nutrient based
- Sleep
- Exercise and yoga
- First aid
- Food adulteration
- Stress

Plate 1

Home page

The Plate 1 shows the home page of the software package developed

A link has been provided to all the parameters like anthropometric, dietary, clinical, biochemical, natural remedies, sleep, exercise yoga, first aid, food adulteration and stress. If one moves the cursor closer to the icon it will indicate the title of the page to be connected.

The next tab is the anthropometric measurement tab so one can click on this know the various parameters available like Body Mass Index (BMI), Waist Hip Ratio (WHR), Visceral Adiposity Index (VAI), Brocas Index (BI), Normal Standards (Shown in Plate 2).

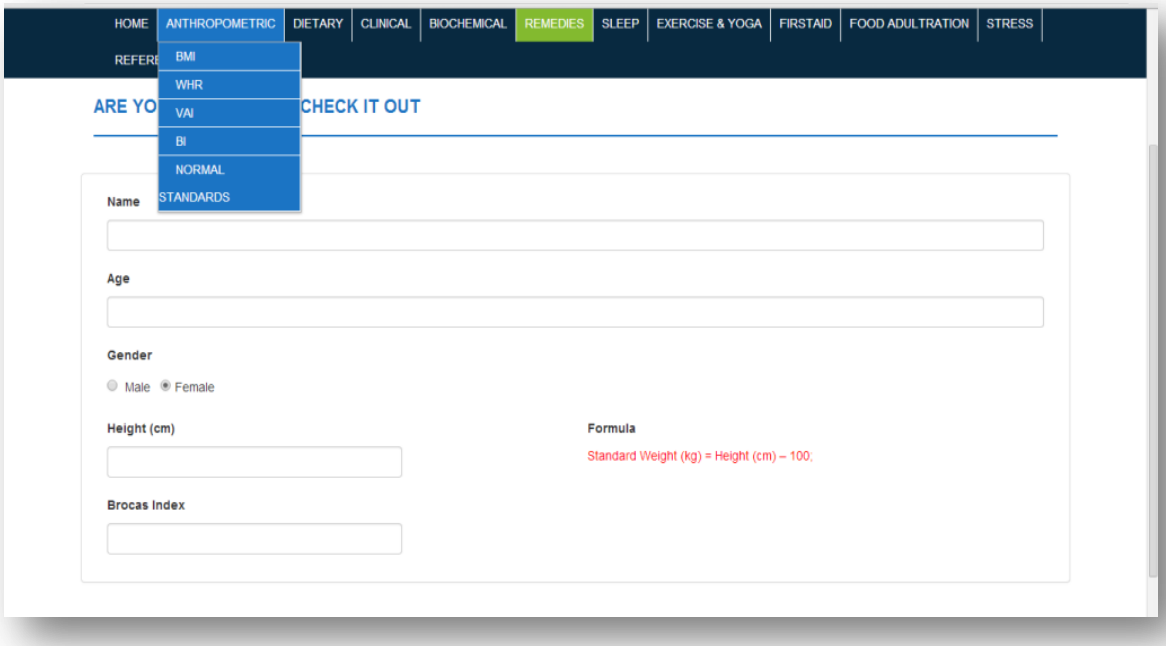


Plate 2

Anthropometric Measurements

To find out the Body Mass Index (BMI) one has to click on BMI tab , enter the required parameters and click enter it will calculate and display the BMI of the individual .One can compare with the normal standards which is displayed in the same screen (Shown in Plate 3)

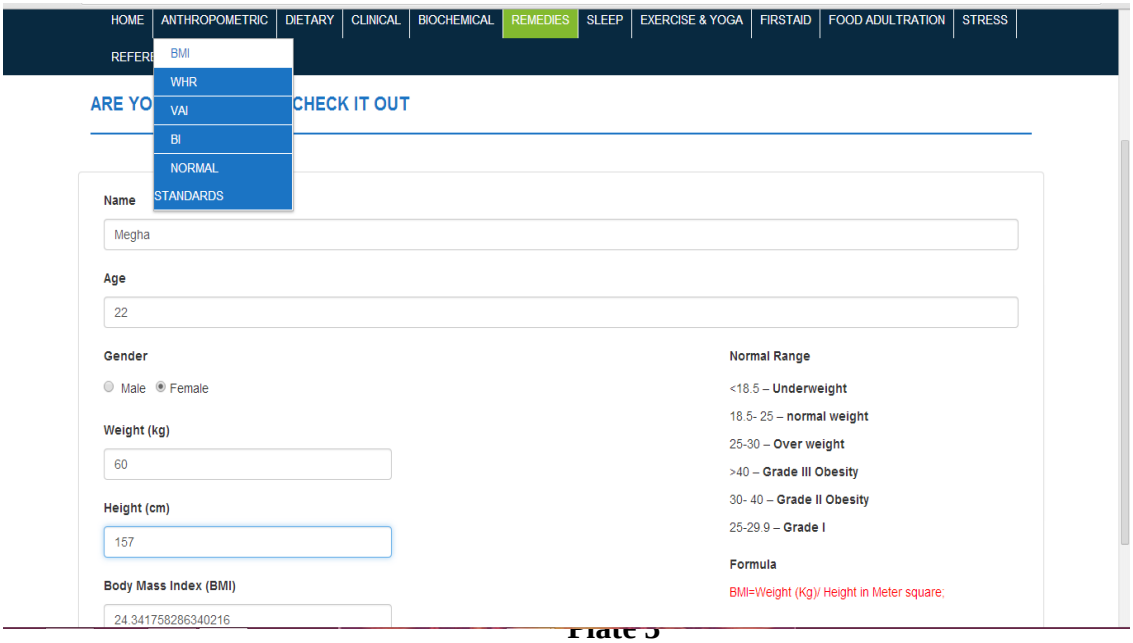


Plate 3

Body Mass Index Calculation

Similarly one can find out their Waist Hip Ratio (WHR), Visceral Adiposity Index (VAI), Brocas index (BI), to know their health status (Shown in Plate 4, 5, 6)

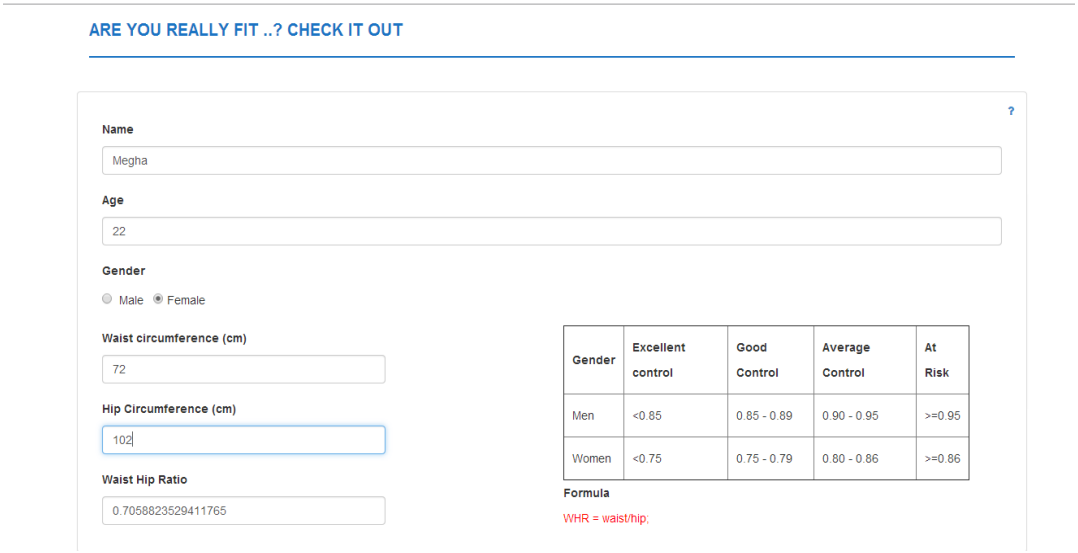


Plate 4

Waist Hip Ratio Calculation

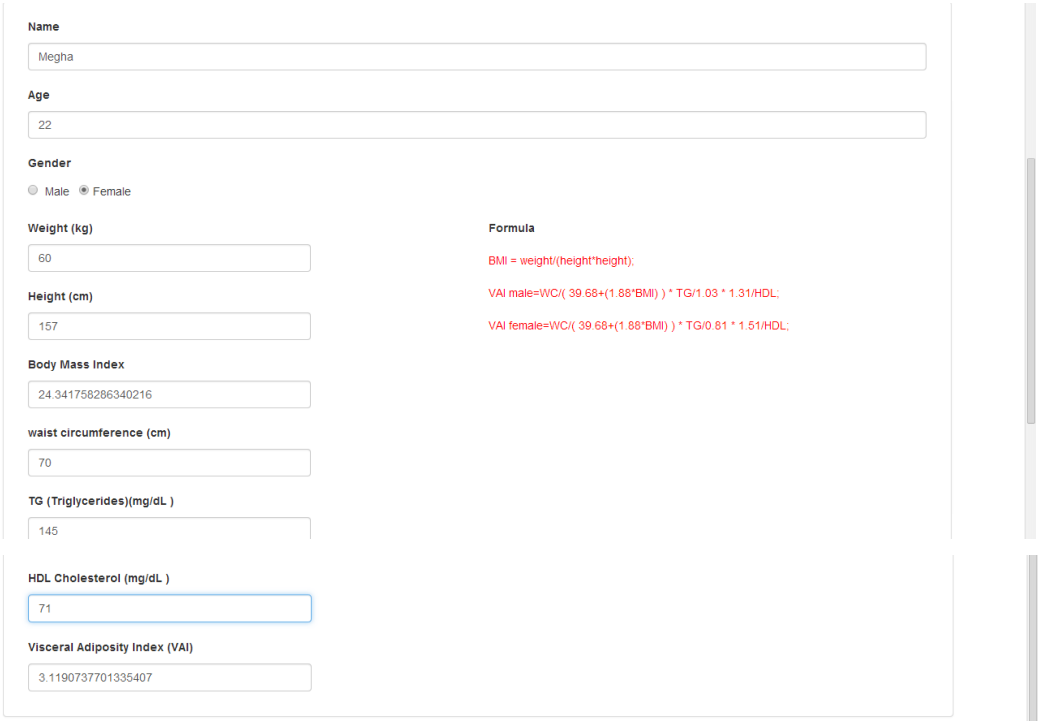


Plate 5

Visceral Adiposity Index Calculation

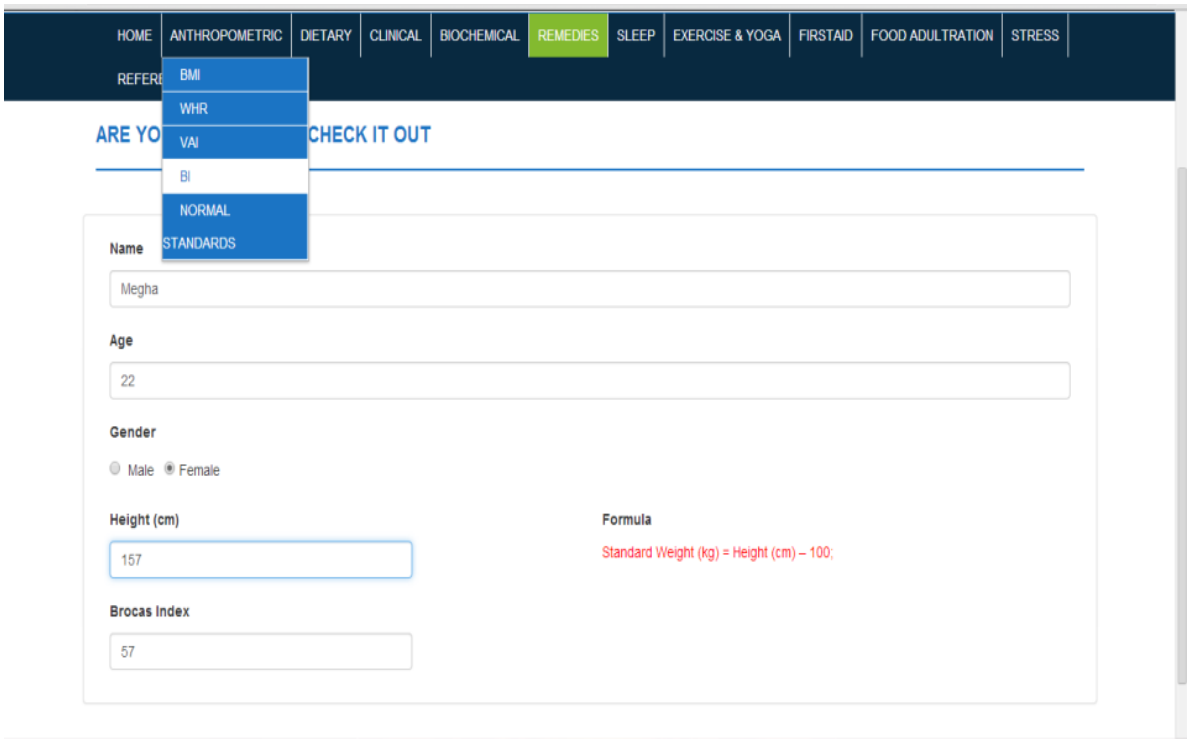


Plate 6

Brocas index Calculation

In anthropometric tab the last option is on normal standards. Under that one can find whether their actual weight is in line with the weight recommended in the table against their age (Shown in Plate 7)

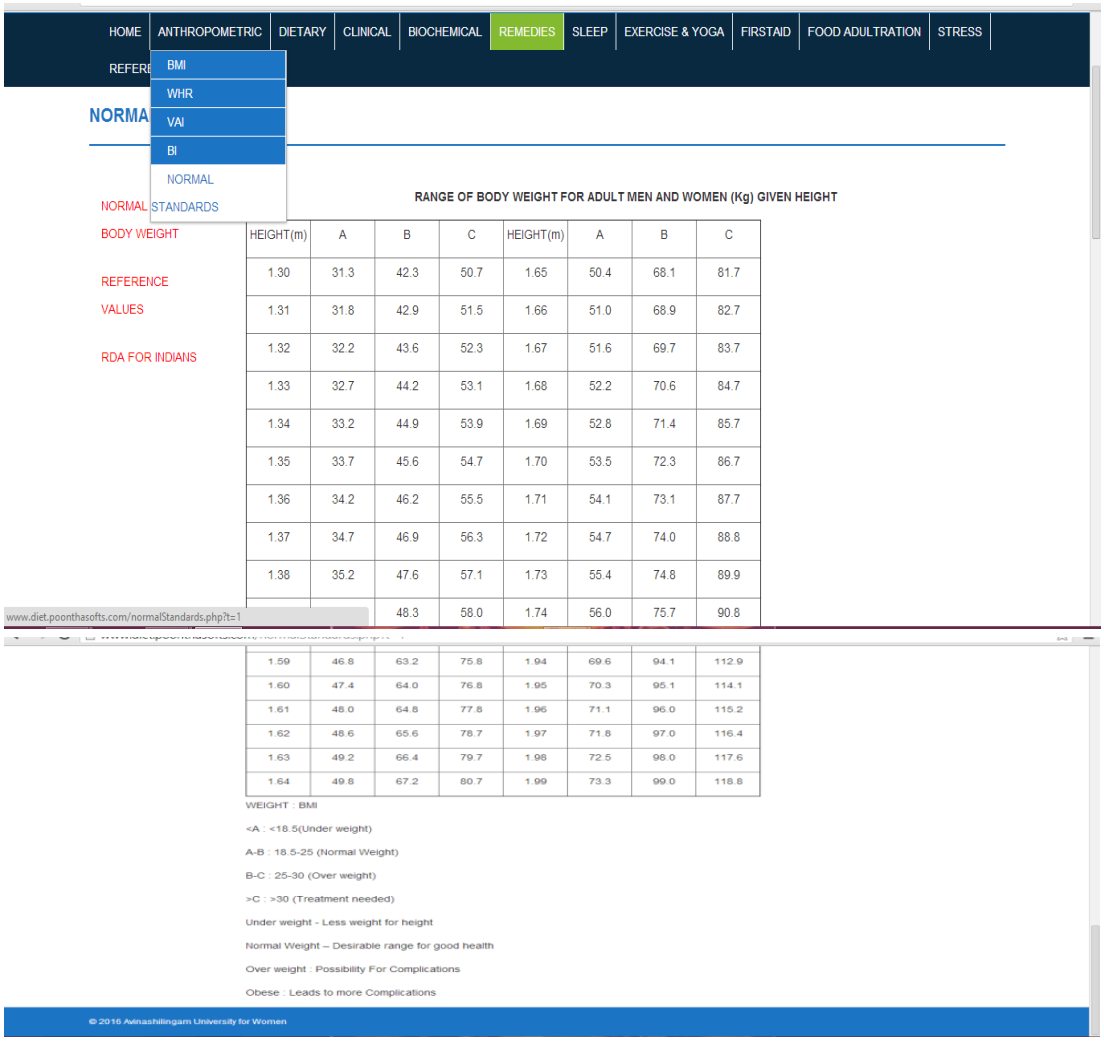
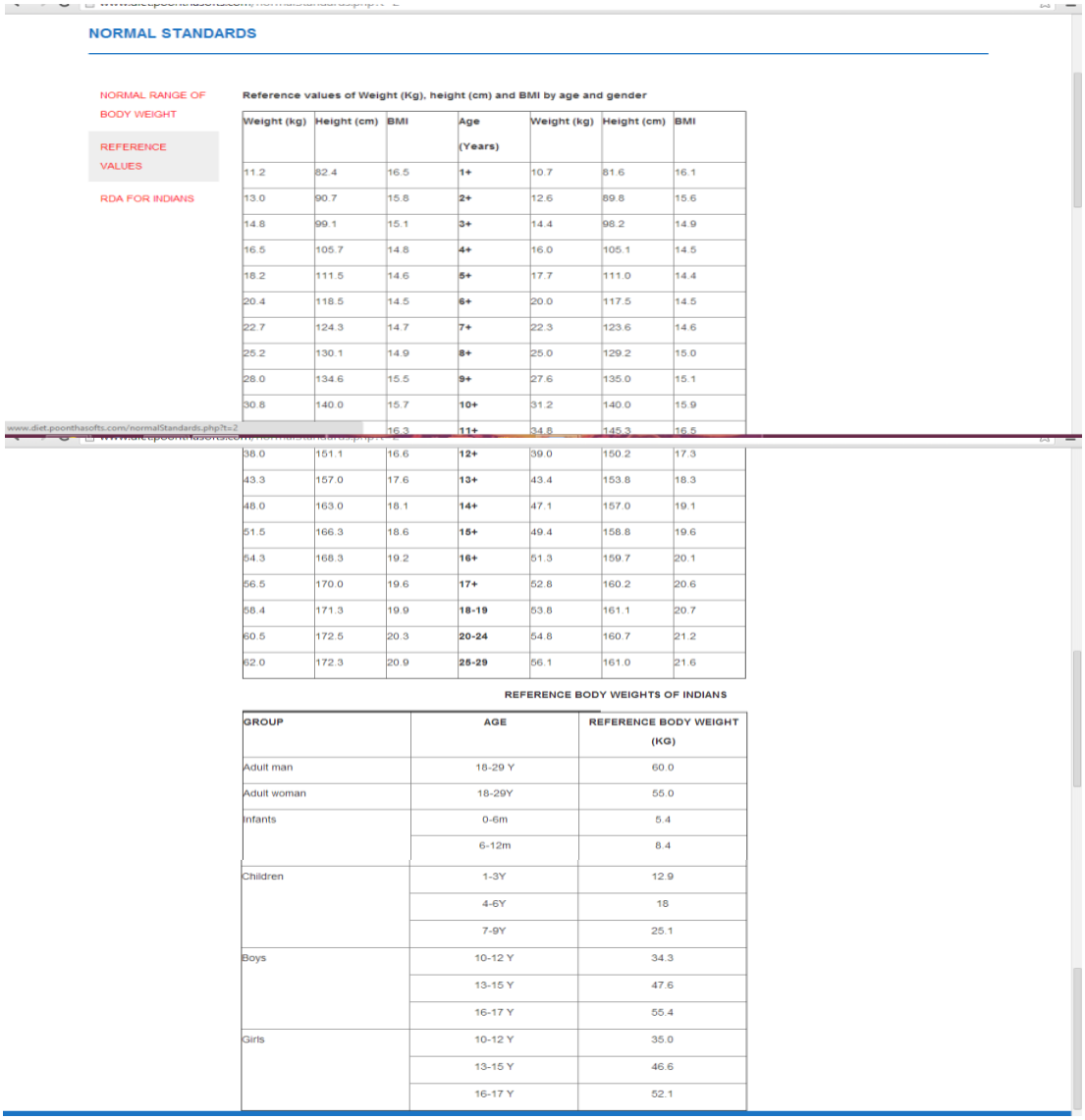


Plate 7

Normal range of body weight and height

The second option is on reference values for height, weight and BMI for particular value. In this one can check their reference BMI and its respective parameters for their age. (Shown in Plate 8)



NORMAL STANDARDS

NORMAL RANGE OF BODY WEIGHT

REFERENCE VALUES

RDA FOR INDIANS

Reference values of Weight (Kg), height (cm) and BMI by age and gender

Weight (kg)	Height (cm)	BMI	Age (Years)	Weight (kg)	Height (cm)	BMI
11.2	82.4	16.5	1+	10.7	81.6	16.1
13.0	90.7	15.8	2+	12.6	89.8	15.6
14.8	99.1	15.1	3+	14.4	98.2	14.9
16.5	105.7	14.8	4+	16.0	105.1	14.5
18.2	111.5	14.6	5+	17.7	111.0	14.4
20.4	118.5	14.5	6+	20.0	117.5	14.5
22.7	124.3	14.7	7+	22.3	123.6	14.6
25.2	130.1	14.9	8+	25.0	129.2	15.0
28.0	134.6	15.5	9+	27.6	135.0	15.1
30.8	140.0	15.7	10+	31.2	140.0	15.9
		16.3	11+	34.8	145.3	16.5
38.0	151.1	16.6	12+	39.0	150.2	17.3
43.3	157.0	17.6	13+	43.4	153.8	18.3
48.0	163.0	18.1	14+	47.1	157.0	19.1
51.5	166.3	18.6	15+	49.4	158.8	19.6
54.3	168.3	19.2	16+	51.3	159.7	20.1
56.5	170.0	19.6	17+	52.8	160.2	20.6
58.4	171.3	19.9	18-19	53.8	161.1	20.7
60.5	172.5	20.3	20-24	54.8	160.7	21.2
62.0	172.3	20.9	25-29	56.1	161.0	21.6

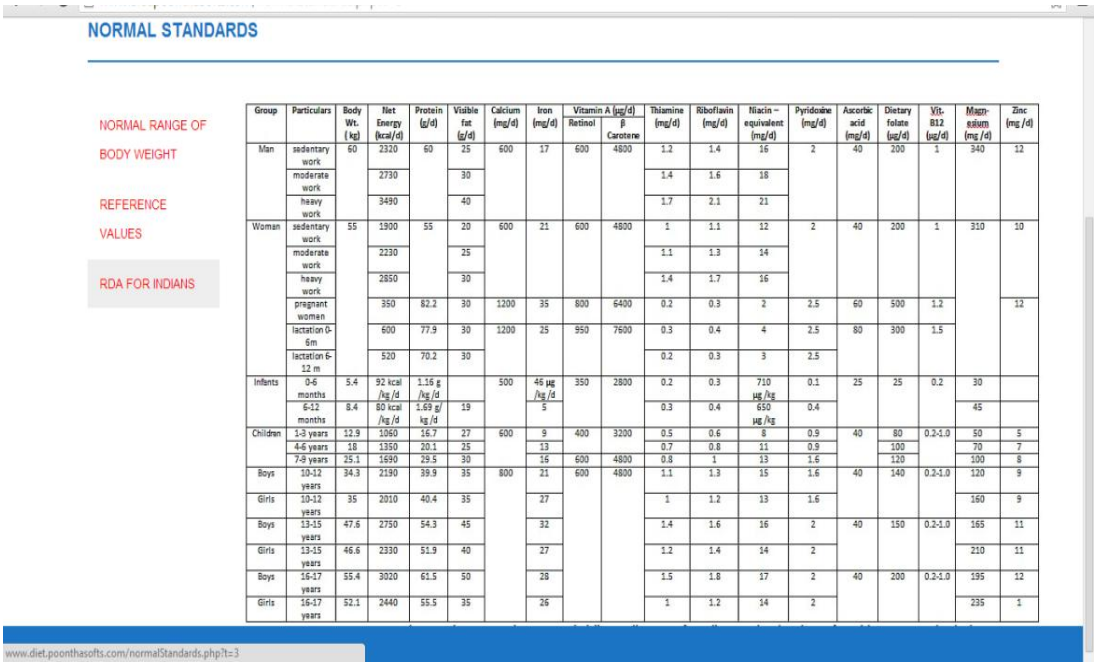
REFERENCE BODY WEIGHTS OF INDIANS

GROUP	AGE	REFERENCE BODY WEIGHT (KG)
Adult man	18-29 Y	60.0
Adult woman	18-29Y	55.0
Infants	0-6m	5.4
	6-12m	8.4
Children	1-3Y	12.9
	4-6Y	18
	7-9Y	25.1
Boys	10-12 Y	34.3
	13-15 Y	47.6
	16-17 Y	55.4
Girls	10-12 Y	35.0
	13-15 Y	46.6
	16-17 Y	52.1

Plate 8

Reference Values of Weight, Height for Different age groups

The third option is on Recommended Dietary Allowances (RDA), in this all the recommended nutrients according to the age group one fits into is given. (Shown in Plate 9)



Group	Particulars	Body Wt. (kg)	Net Energy (kcal/d)	Protein (g/d)	Visible fat (g/d)	Calcium (mg/d)	Iron (mg/d)	Vitamin A (µg/d) Retinol	Vitamin A (µg/d) β Carotene	Thiamine (mg/d)	Riboflavin (mg/d)	Niacin – equivalent (mg/d)	Pyridoxine (mg/d)	Ascorbic acid (mg/d)	Dietary folate (µg/d)	Vit-B12 (µg/d)	Magnesium (mg/d)	Zinc (mg/d)
Man	sedentary work	60	2320	60	25	600	17	600	4800	1.2	1.4	16	2	40	200	1	340	12
	moderate work		2730		30					1.4	1.6	18						
	heavy work		3490		40					1.7	2.1	21						
Woman	sedentary work	55	1900	55	20	600	21	600	4800	1	1.1	12	2	40	200	1	310	10
	moderate work		2230		25					1.1	1.3	14						
	heavy work		2850		30					1.4	1.7	16						
	pregnant women		350	82.2	30	1200	35	800	6400	0.2	0.3	2	2.5	60	500	1.2		12
	lactation 0-6m		600	77.9	30	1200	25	950	7600	0.3	0.4	4	2.5	80	300	1.5		
	lactation 6-12 m		520	70.2	30					0.2	0.3	3	2.5					
Infants	0-6 months	5.4	92 kcal /kg /d	1.16 g /kg /d		500	46 µg /kg /d	350	2800	0.2	0.3	710 µg /kg	0.1	25	25	0.2	30	
	6-12 months	8.4	80 kcal /kg /d	1.69 g/ kg /d	19		5			0.3	0.4	650 µg /kg	0.4				45	
Children	1-3 years	12.9	1060	16.7	27	600	9	400	3200	0.5	0.6	8	0.9	40	80	0.2-1.0	50	5
	4-6 years	18	1350	20.1	25		13			0.7	0.8	11	0.9		100		70	7
	7-9 years	25.1	1690	29.5	30		16	600	4800	0.8	1	13	1.6		120		100	8
Boys	10-12 years	34.3	2190	39.9	35	800	21	600	4800	1.1	1.3	15	1.6	40	140	0.2-1.0	120	9
Girls	10-12 years	35	2010	40.4	35		27			1	1.2	13	1.6				160	9
Boys	13-15 years	47.6	2750	54.3	45		32			1.4	1.6	16	2	40	150	0.2-1.0	165	11
Girls	13-15 years	46.6	2330	51.9	40		27			1.2	1.4	14	2				210	11
Boys	16-17 years	55.4	3020	61.5	50		28			1.5	1.8	17	2	40	200	0.2-1.0	195	12
Girls	16-17 years	52.1	2440	55.5	35		26			1	1.2	14	2				235	1

Plate 9

Recommended Dietary Allowances for Indians

When one clicks on the diet tab several options like balance diet, cyclic menu, therapeutic diets, food exchange list, processed food database, recipes, raw food database, and 24 hour diet recall. (Shown in Plate 10)

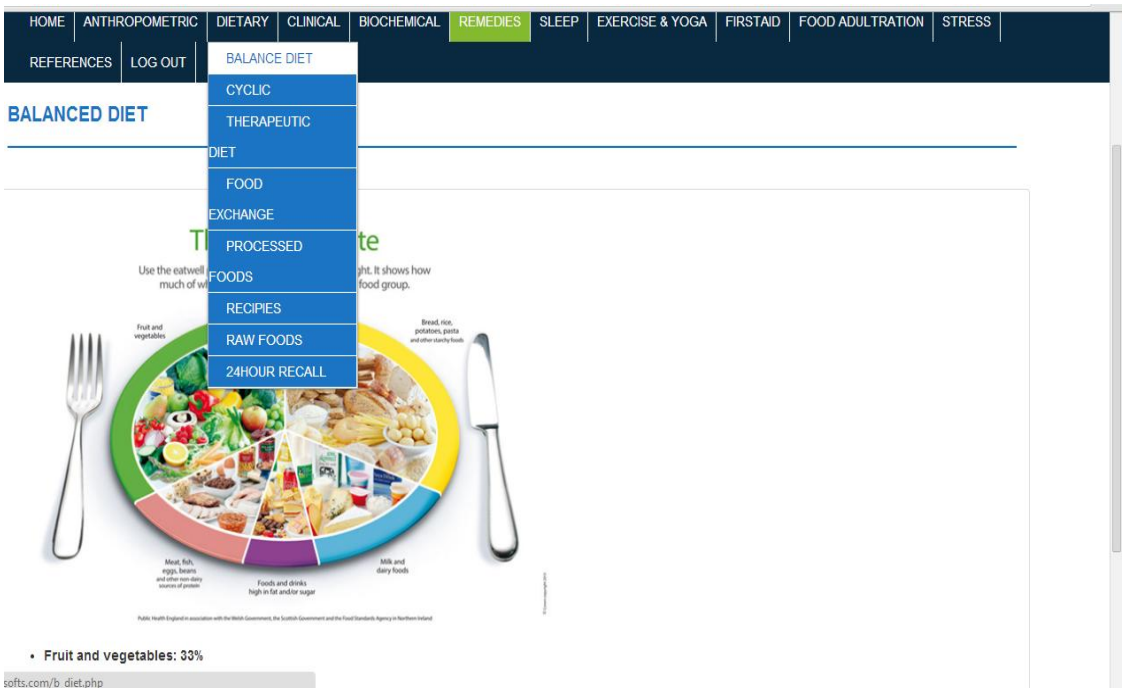


Plate 10

Balance diet

In balance diet tab eat well plate its shown ,how much of what one should eat from each food group like cereals, pulses, fruits, vegetables, milk and meat products, fish (other non diary protein sources),and fats and sugars is provided (shown in plate 11)

Plate 11

Eat Well Plate

Under cyclic menu option seven days menu is provided as day 1 to day 7 for different age groups like pregnancy, infancy, pre- school, school going, adolescent boy, adolescent girl, adult, and old age. According to the age group one can select their menu for different day (Shown in plate 12).

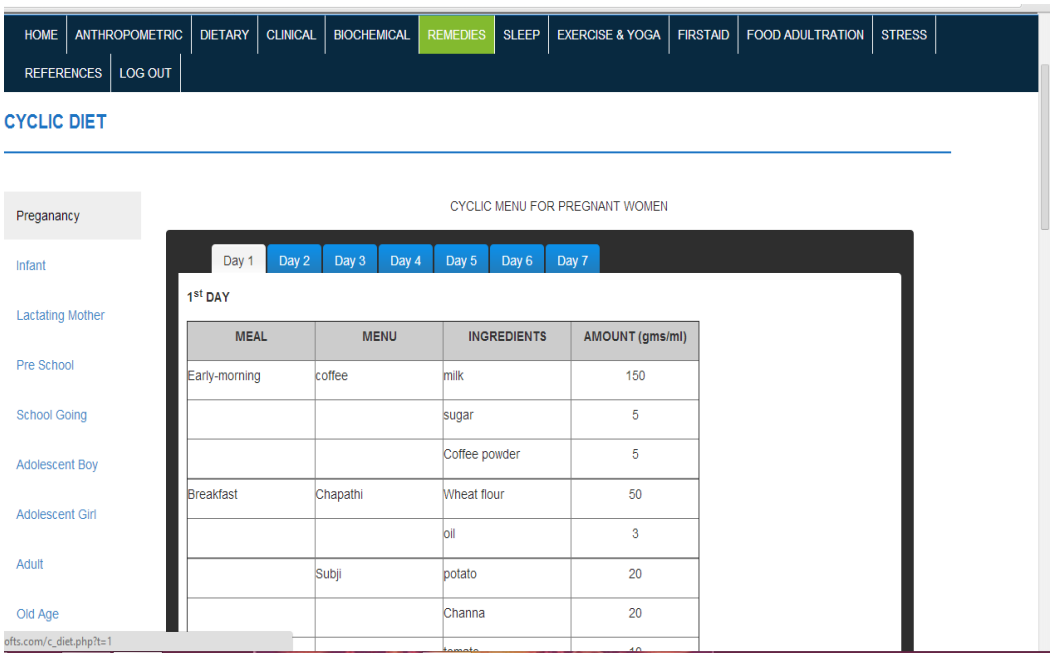


Plate 12

Cyclic Menu

Similarly under therapeutic diet option various diets for different ailments like atherosclerosis, diabetes mellitus, cirrhosis, constipation, diarrhoea, gastritis, hypertension, etc are provided. (Shown in Plate 13)

Plate 13

Therapeutic diets

Under food exchange list option one can choose between the various choices of food available in the same food group having similar nutritive value are provided. If one is allergic or doesn't like any food item they can choose the equivalent food from the food exchange list (Shown in Plate 14).

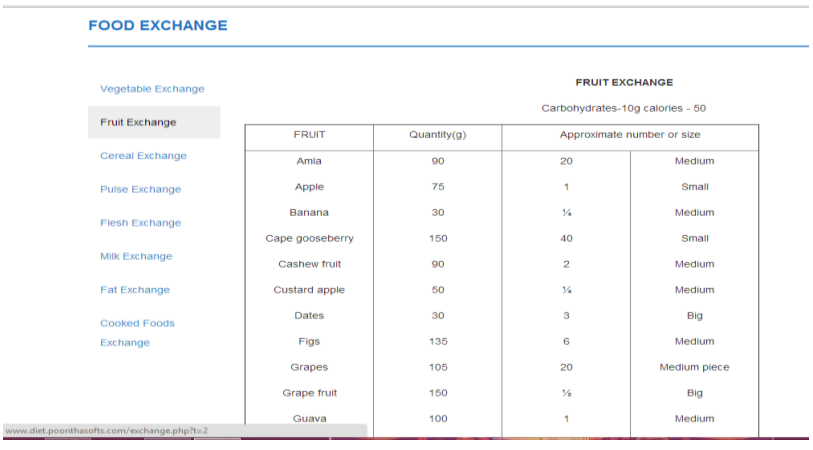


Plate 14

Food Exchange List

In processed food data base option nutritive value of cooked foods of different food groups like cereals, pulses, fruits and vegetables, milk and meat products, and fats & sugars. (Shown in plate 15).

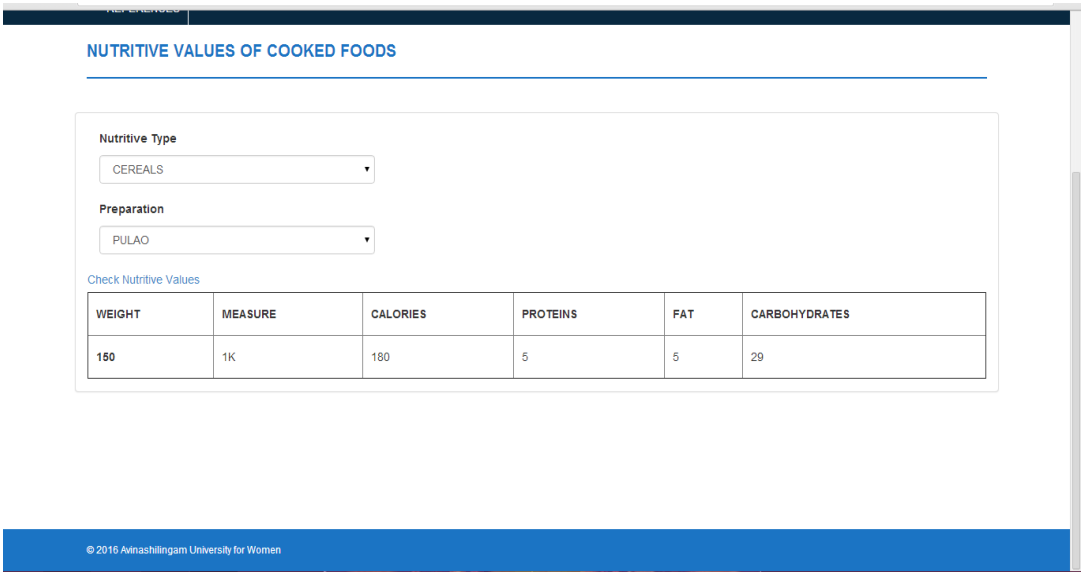


Plate 15

Processed Food Data base

In recipe option if one wants to know the nutritive value of particular recipe for example pulao one has to enter the ingredients like rice, carrot, peas, onion, coriander leaves etc. with the quantity in order to know the total nutritive value (Shown in the Plate 16 and 17).

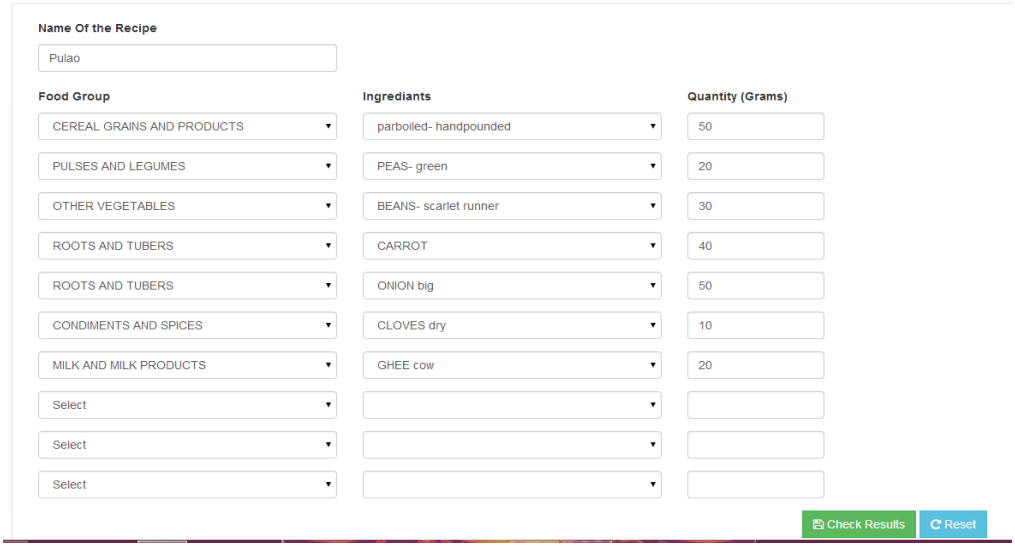


Plate 16

Nutrient calculation for a recipe

PULAO - CONTAINS

Back

Ingredients	moisture (g)	protein (g/d)	fat (g/d)	energy (Kcal/d)	calcium (mg/d)	iron (mg/d)
parboiled- handpounded	6.3	4.25	0.3	174.5	5	1.4
PEAS- green	21.87	2.16	0.03	27.9	6	0.45
CORIANDER LEAVES	8.63	0.33	0.06	4.4	18.4	0.142
CARROT	34.4	0.36	0.08	19.2	32	0.412
ONION big	34.64	0.48	0.04	20	18.76	0.24
BEANS- scarlet runner	17.49	2.22	0.3	47.4	15	0.78
CLOVES dry	2.52	0.52	0.89	28.6	74	1.17
GHEE cow	0	0	10	90	0	0
Total	**125.85**	**10.32**	**11.7**	**412**	**169.16**	**4.594**

Plate17

Nutritive Value of Recipes

In raw food database nutritive value of all ingredients of different food group like cereals (bajra, barley, Italian millet, rice, ragi, wheat etc), pulses like (bengal gram, black gram dhal, red gram dhal, horse gram, green gram, green peas, etc), vegetables like (ash gourd, bitter gourd, potato, onion, carrot, bens, agathi, curry leaves, coriander leaves, spinach, etc), Fruits like (amla, apple, orange, pomegranate, sweet lime, papaya, etc), milk and meat products like (cow's milk, buffalos' milk, meat, fish, egg, etc), fats & sugars like (oils, ghee, cain sugar, honey, etc) is provided. One can click on the ingredient to know its nutritive value (shown in plate 18)

RAW FOODS

Type

CEREAL GRAINS AND PRODUCTS

Food	Quantity	Protine (g)	Fat (g)	Minerals (g)	fiber (g)	CHO (g)	Energy (kacl)	Calcium (mg)	Iron (mg)	Carotene (mg)	Vit. C (mg)
BAJRA	50	5.8	2.5	1.15	0.6	33.75	180.5	21	4	66	0
BARLEY											
ITALIAN MILLET											
JOWAR											
MAIZE- Dry											
MAIZE- Tender											

Plate 18

Raw food data base

The key feature of the software is 24 hour recall. If one types the ingredient with quantity for all the meals he/she consumed like breakfast, mid morning, lunch, evening tea, dinner, and bed time. Then they would get the total nutritive value of the food they consumed for the last 24 hours. Then it will be compared with the Recommended Dietary Allowances (RDA) of that particular age group and it will show what are all the nutrients they have consumed in deficit and in excess on that particular day (Shown in Plate 19, 20).

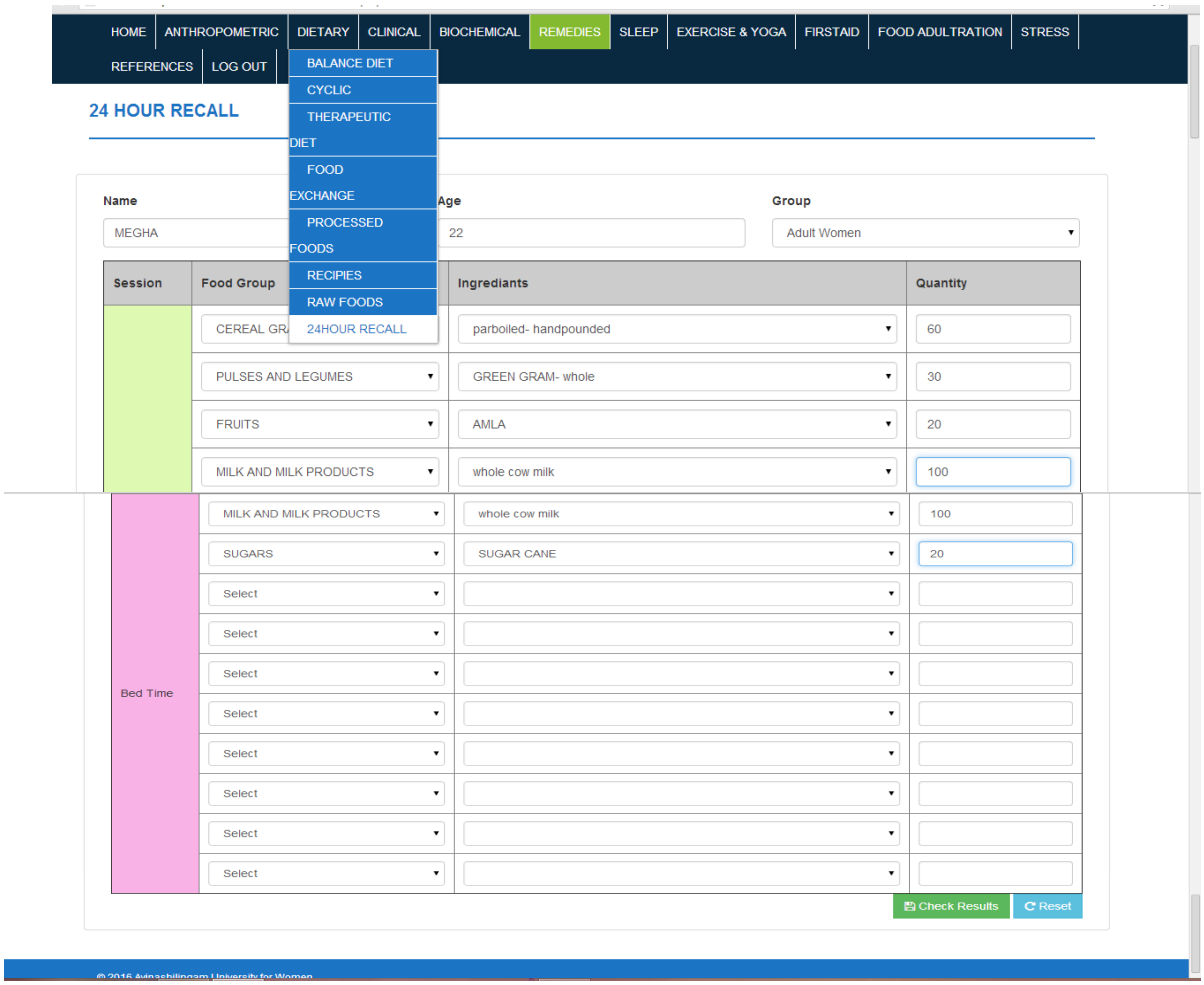


Plate 19

24 Hour diet recall

MEGHA - (22)

Back

Session	Food	Energy (Kcal/d)	Protein (g/d)	Fat (g/d)	Calcium (mg/d)	Iron (mg/d)
morning	parboiled-handpounded	279.2	6.8	0.48	8	2.24
morning	GREEN GRAM- whole	133.6	9.6	0.52	49.6	1.76
morning	whole cow milk	413	20	25.9	956	0
morning	AMLA	11.6	0.1	0.02	10	0.24
Total morning		837.4	36.5	26.92	1023.6	4.24
midmorning	APPLE	47.2	0.16	0.4	8	0.528
midmorning	whole cow milk	413	20	25.9	956	0
midmorning	SUGAR CANE	39.8	0.01	0	1.2	0.0155
Total midmorning		500	20.17	26.3	965.2	0.5435
lunch	parboiled-handpounded	244.3	5.95	0.42	7	1.96
lunch	CARROT	14.4	0.27	0.06	24	0.309
lunch	ONION big	20	0.48	0.04	18.76	0.24
lunch	AGATHI	55.8	5.04	0.84	678	2.34
lunch	BOTTLE GOURD	4.8	0.08	0.04	8	0.184
Total lunch		339.3	11.82	1.4	735.76	5.033
tea	whole cow milk	413	20	25.9	956	0
tea	BENGAL GRAM whole	144	6.84	2.12	80.8	1.84
dinner	POTATO	38.8	0.64	0.04	4	0.192
dinner	BRINJAL	4.8	0.28	0.06	3.6	0.076
dinner	DATES fresh	43.2	0.36	0.12	6.6	0.288
Total dinner		323.6	9.58	1.31	64.39	4.152
bed	whole cow milk	413	20	25.9	956	0
bed	SUGAR CANE	79.6	0.02	0	2.4	0.031
Total bed		492.6	20.02	25.9	958.4	0.031
Actual intake		**3072.6**	**126.9**	**109.97**	**4878.15**	**16.1725**
Recommended Dietary Allowances LEVEL		**1900**	**55**	**20**	**60**	**21**
		Exceeds the maximum limit	**Exceeds the maximum limit**	**Exceeds the maximum limit**	**Exceeds the maximum limit**	**Deficit**

Plate 20

Nutritive Value of 24 Hour Diet Recall

By comparing the results with the help of this data one can adjust or modify their diet Pattern.

To verify their clinical status of various body parts one can click on the tab Clinical. The screen will show two drop down menus namely site and sign. (Shown in Plate 21).

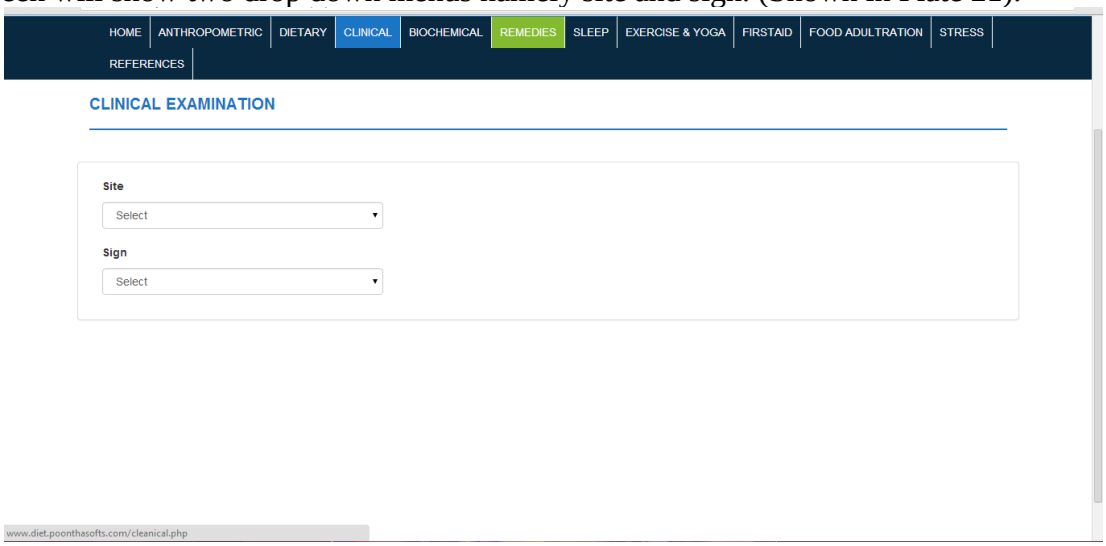


Plate 21

Clinical Examination I

Under the drop down menu “site” one can choose the part of the body whose status they want to verify (Shown in Plate 22, 23)

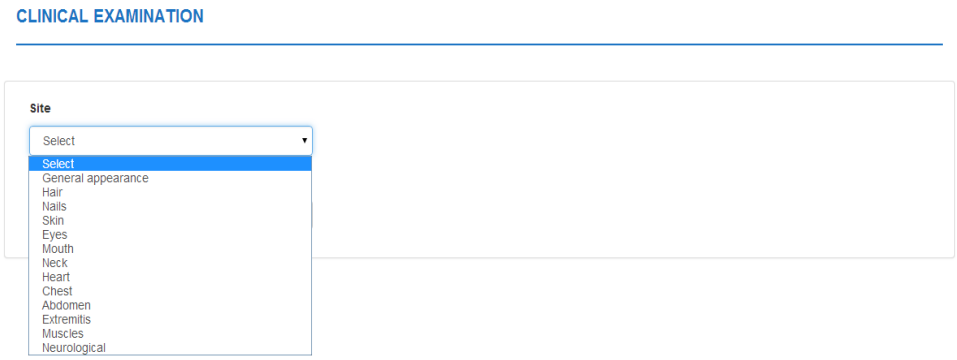


Plate 22

Clinical Examination II

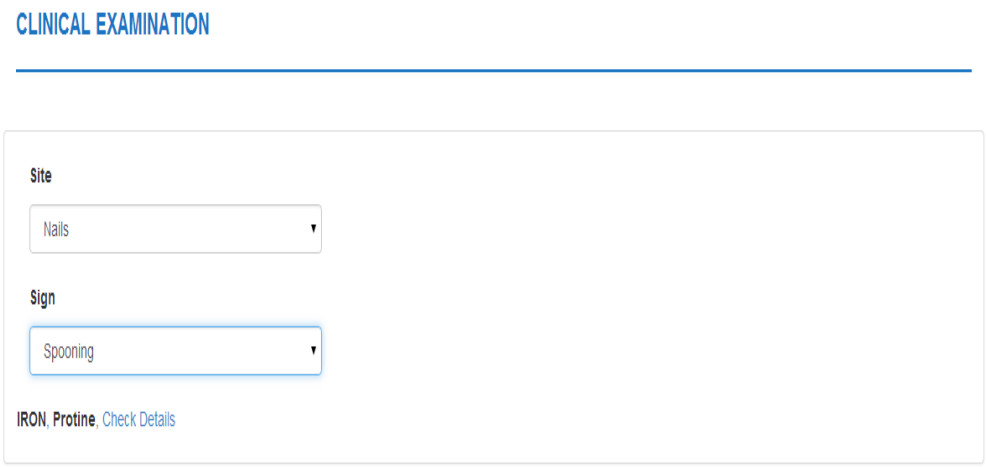


Plate 23

Clinical Examination III

Then check for the respective sign and choose it. It will show you the result like nutrient one is deficient in eg. protein, iron, biotin, riboflavin, carotene etc. Then one has to click on the tab “check details” it will show the nutrient deficiency, its sources to avoid the same and its functions (Shown in Plate 24 and 25).

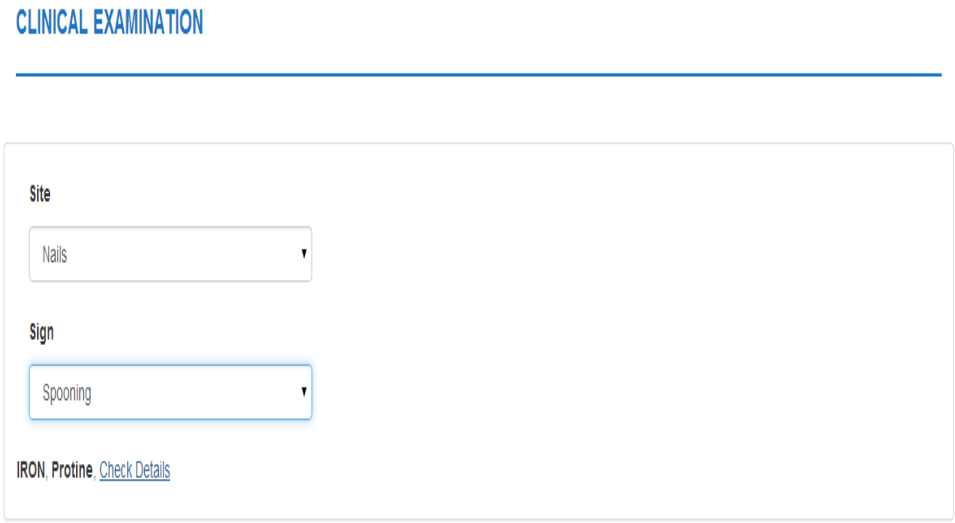
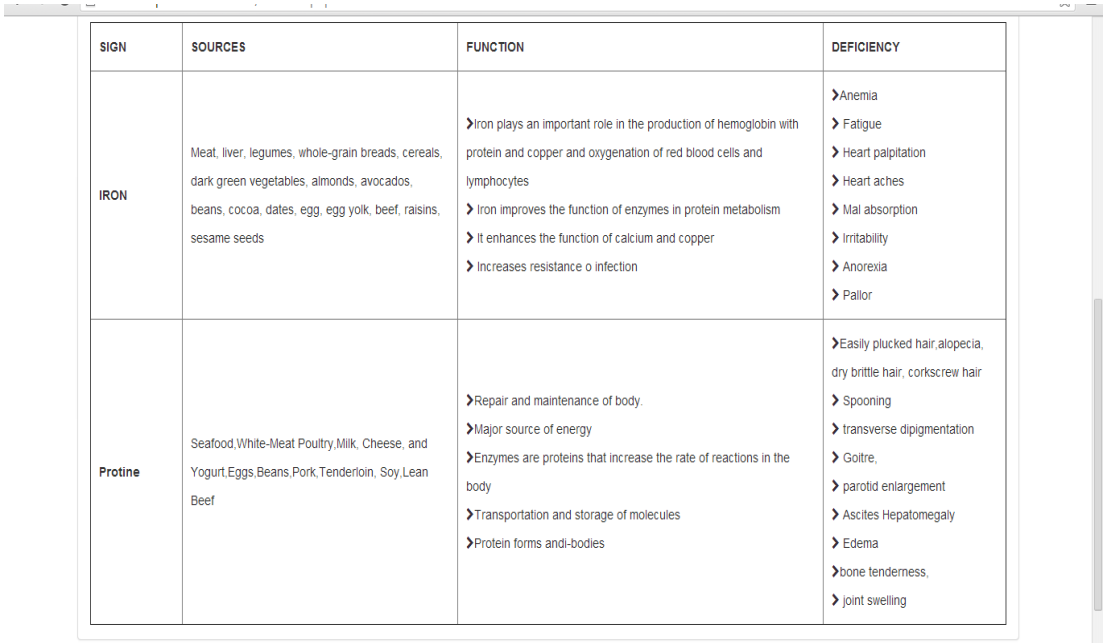


Plate 24

Clinical Examination IV



SIGN	SOURCES	FUNCTION	DEFICIENCY
IRON	Meat, liver, legumes, whole-grain breads, cereals, dark green vegetables, almonds, avocados, beans, cocoa, dates, egg, egg yolk, beef, raisins, sesame seeds	›Iron plays an important role in the production of hemoglobin with protein and copper and oxygenation of red blood cells and lymphocytes › Iron improves the function of enzymes in protein metabolism › It enhances the function of calcium and copper › Increases resistance o infection	›Anemia › Fatigue › Heart palpitation › Heart aches › Mal absorption › Irritability › Anorexia › Pallor
Protine	Seafood,White-Meat Poultry,Milk, Cheese, and Yogurt,Eggs,Beans,Pork,Tenderloin, Soy,Lean Beef	›Repair and maintenance of body. ›Major source of energy ›Enzymes are proteins that increase the rate of reactions in the body ›Transportation and storage of molecules ›Protein forms andi-bodies	›Easily plucked hair,alopecia, dry brittle hair, corkscrew hair › Spooning › transverse dipigmentation › Goitre, › parotid enlargement › Ascites Hepatomegaly › Edema ›bone tenderness, › joint swelling

Plate 25

Clinical Examination V

When one clicks on the biochemical tab it will take them to the screen which contains all parameters like Red Blood Cells (RBC), White Blood Cells (WBC), Platelet Count, Hemoglobin Fasting Blood Sugar (FBS) level, Random Plasma Sugar (RPS), Post Pranchial Plasma Glucose, Blood Pressure (BP), Total Cholesterol, Serum Cholesterol, Serum Triglycerides, HDL Cholesterol , LDL Cholesterol ,VLDL Cholesterol, Total Protein, Albumin, Globulin, Creatinine, Serum Glutamate Pyruvate Transferase (SGPT), Total Bilirubin, Direct Bilirubin, Conjugated billirubin, Blood urea, Sodium, Potassium,Uric acid .

One has to enter their values and click on check results. It will show the results i.e whether the user's biochemical values are high or low (Shown in Plate 26, 27).

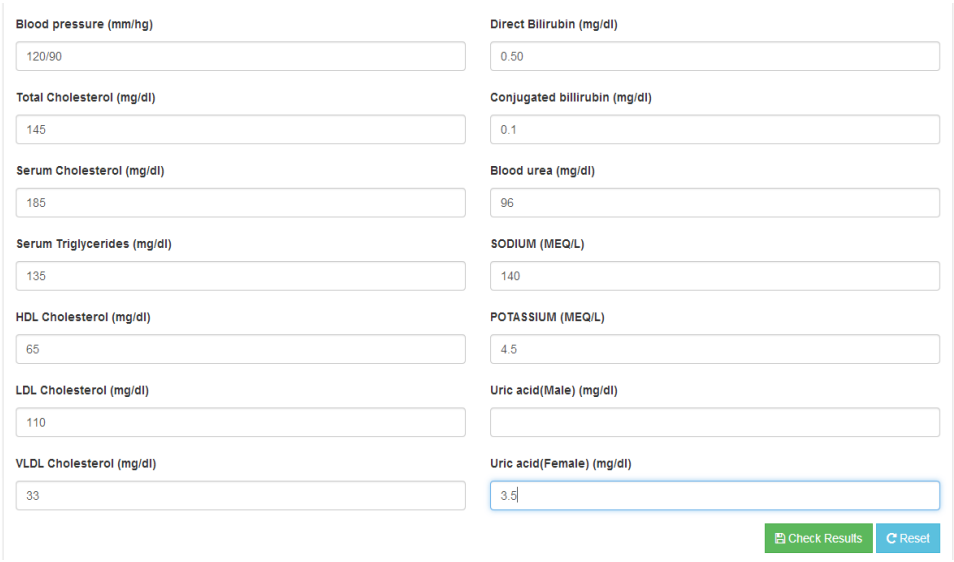


Plate 26

Biochemical Parameters

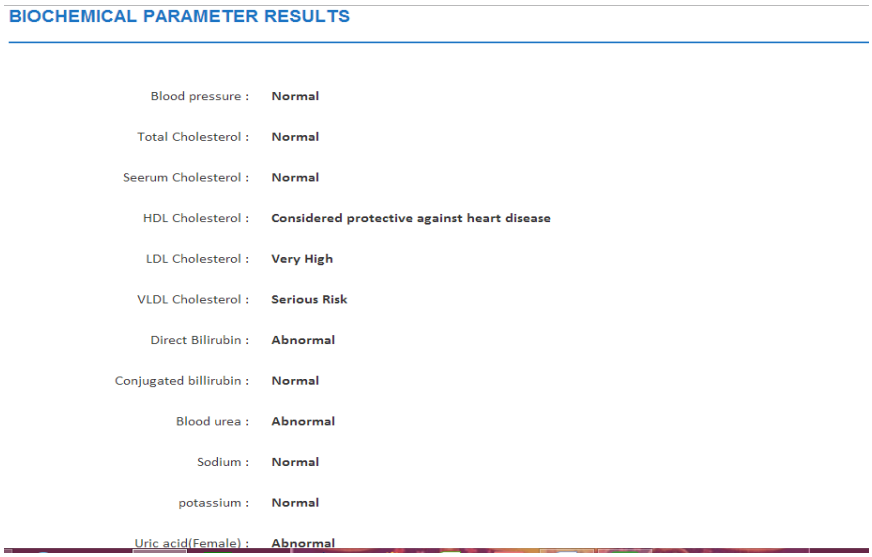
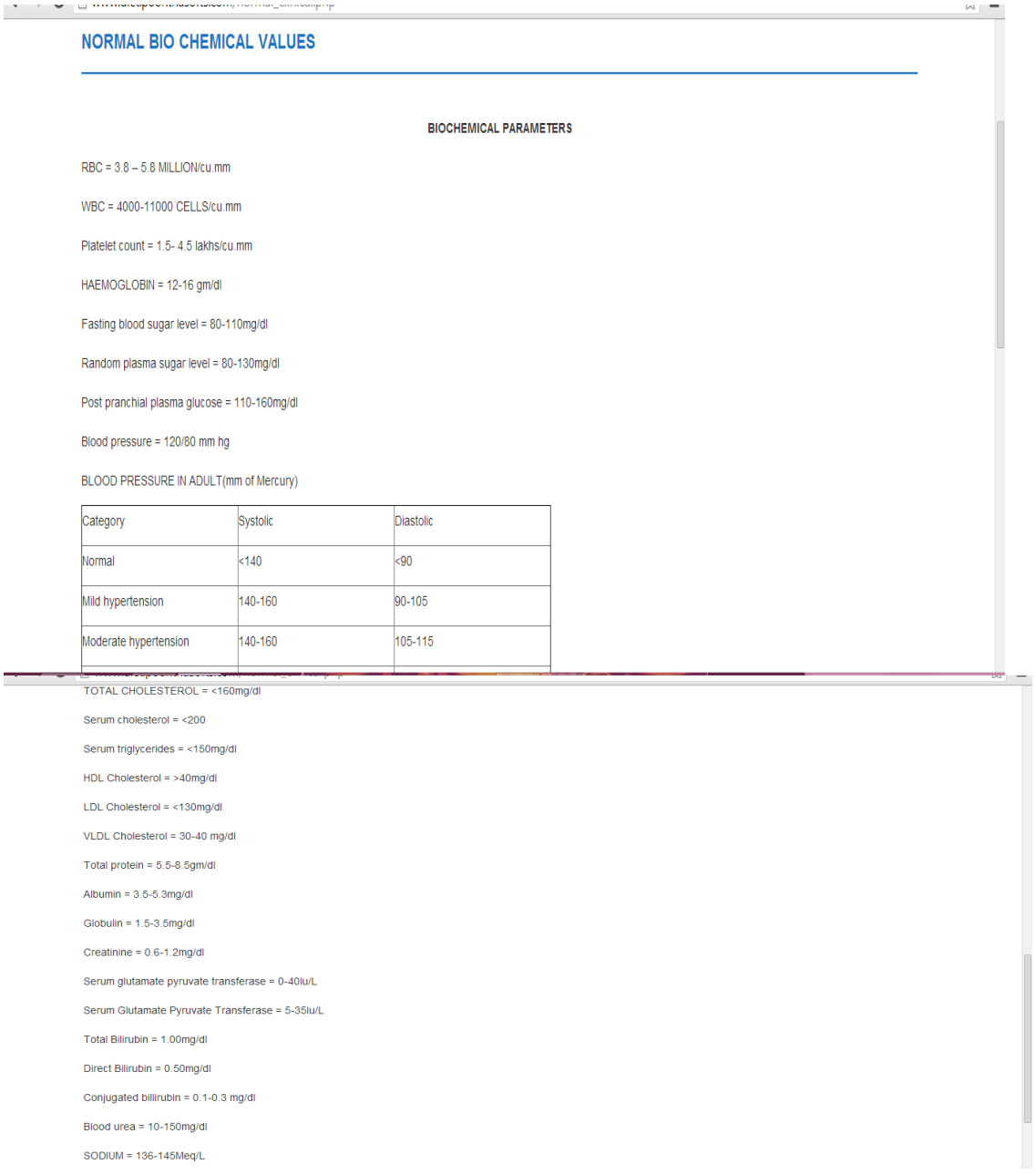


Plate 27

Biochemical Parameters Result

To know the reference values one has to click on the " check for reference link" which is provided in the same screen. It will show all the normal values. (Shown in Plate 28).



NORMAL BIO CHEMICAL VALUES

BIOCHEMICAL PARAMETERS

RBC = 3.8 – 5.8 MILLION/cu.mm

WBC = 4000-11000 CELLS/cu.mm

Platelet count = 1.5- 4.5 lakhs/cu.mm

HAEMOGLOBIN = 12-16 gm/dl

Fasting blood sugar level = 80-110mg/dl

Random plasma sugar level = 80-130mg/dl

Post pranchial plasma glucose = 110-160mg/dl

Blood pressure = 120/80 mm hg

BLOOD PRESSURE IN ADULT(mm of Mercury)

Category	Systolic	Diastolic
Normal	<140	<90
Mild hypertension	140-160	90-105
Moderate hypertension	140-160	105-115

TOTAL CHOLESTEROL = <160mg/dl

Serum cholesterol = <200

Serum triglycerides = <150mg/dl

HDL Cholesterol = >40mg/dl

LDL Cholesterol = <130mg/dl

VLDL Cholesterol = 30-40 mg/dl

Total protein = 5.5-8.5gm/dl

Albumin = 3.5-5.3mg/dl

Globulin = 1.5-3.5mg/dl

Creatinine = 0.6-1.2mg/dl

Serum glutamate pyruvate transferase = 0-40Iu/L

Serum Glutamate Pyruvate Transferase = 5-35Iu/L

Total Bilirubin = 1.00mg/dl

Direct Bilirubin = 0.50mg/dl

Conjugated billirubin = 0.1-0.3 mg/dl

Blood urea = 10-150mg/dl

SODIUM = 136-145Meq/L

Plate 28

Normal Biochemical Parameters

Remedies page indicates the common ailments and its natural remedies. Here two drop down menu has been provided. The first menu lists all the common ailments from A to Z where as the second one lists the mode of remedies like home remedies, herbal remedies and nutrient remedies (Shown in Plate 29).

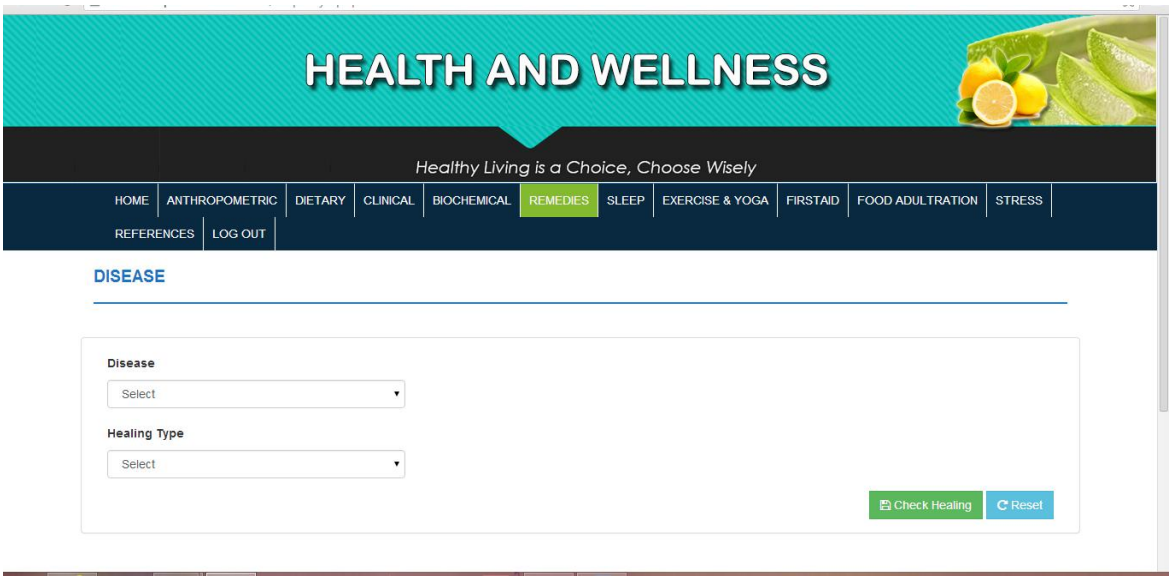


Plate 29

Natural Remedy

One can selected the ailment from the first drop down menu then for that particular ailment can select any of the three remedies. There would be multiple remedies available for each ailment.

This is shown in the following screen shots. (Shown in Plate 30 and 31).

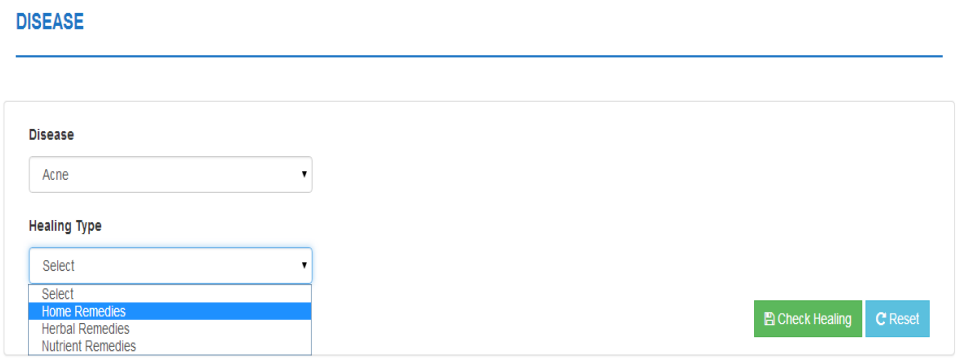


Plate 30

Healing Types

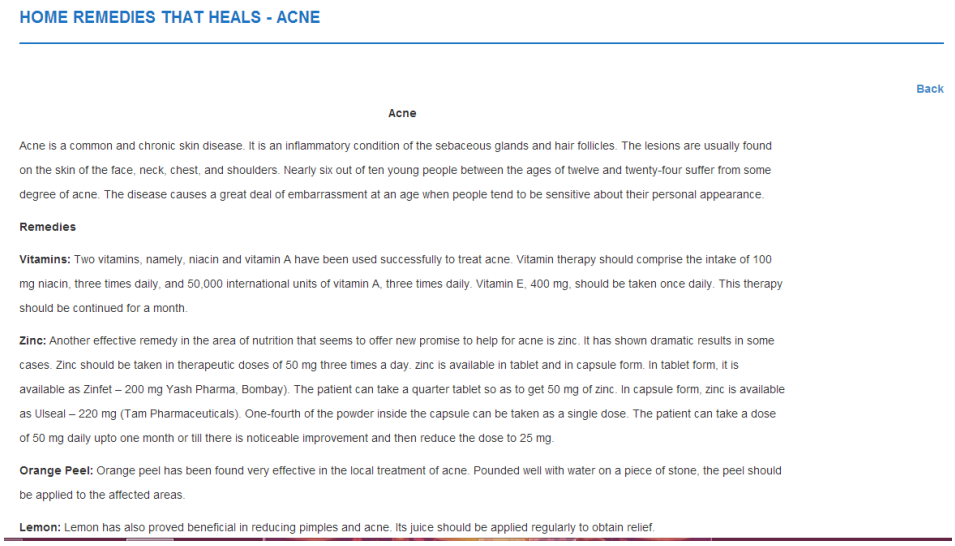


Plate 31

Remedies for different ailments

The sleep tab contains two options namely sleep duration and why sleep is important (Shown in Plate 32)

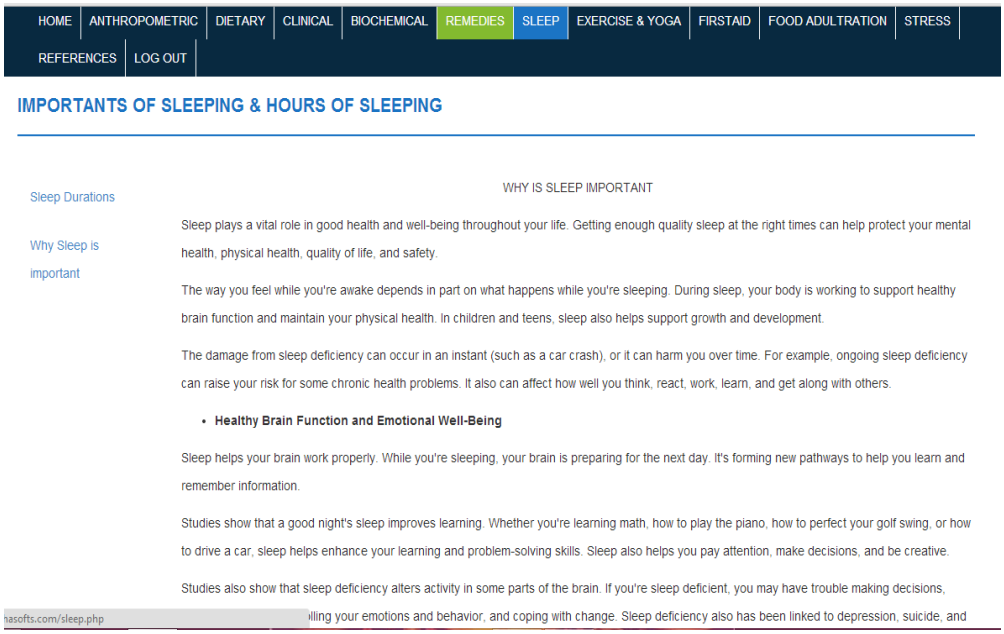


Plate 32

Sleep

When one clicks on sleep duration it will take to the screen where one has to enter their age and number of hours slept per day .Then click ok check results then the software will suggest

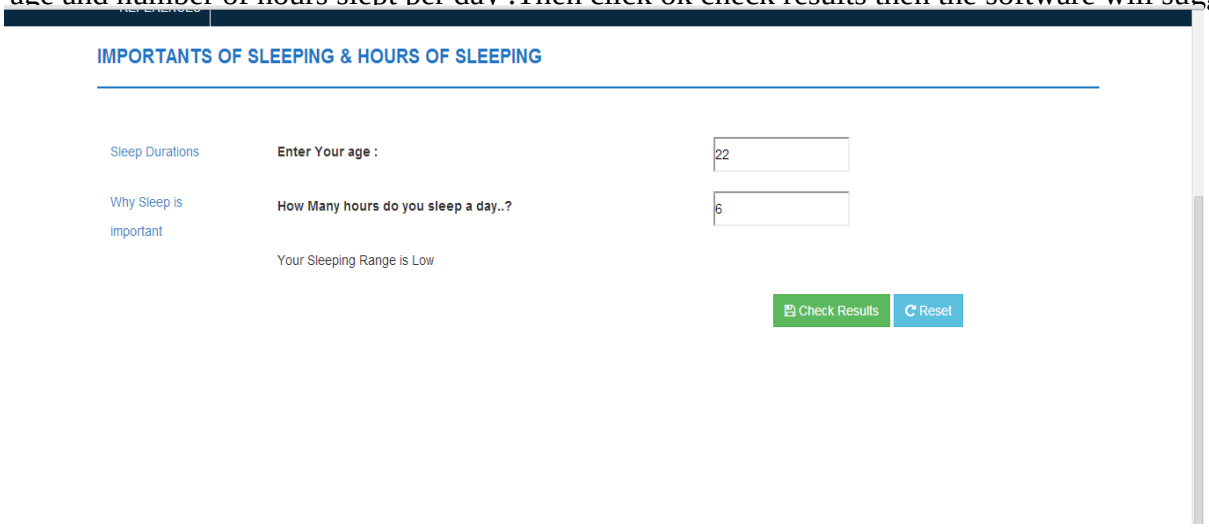


Plate 33

Sleep Duration

And when one click on importance of sleep it will show the importance of good sleep for healthy life. (Shown in Plate 34).

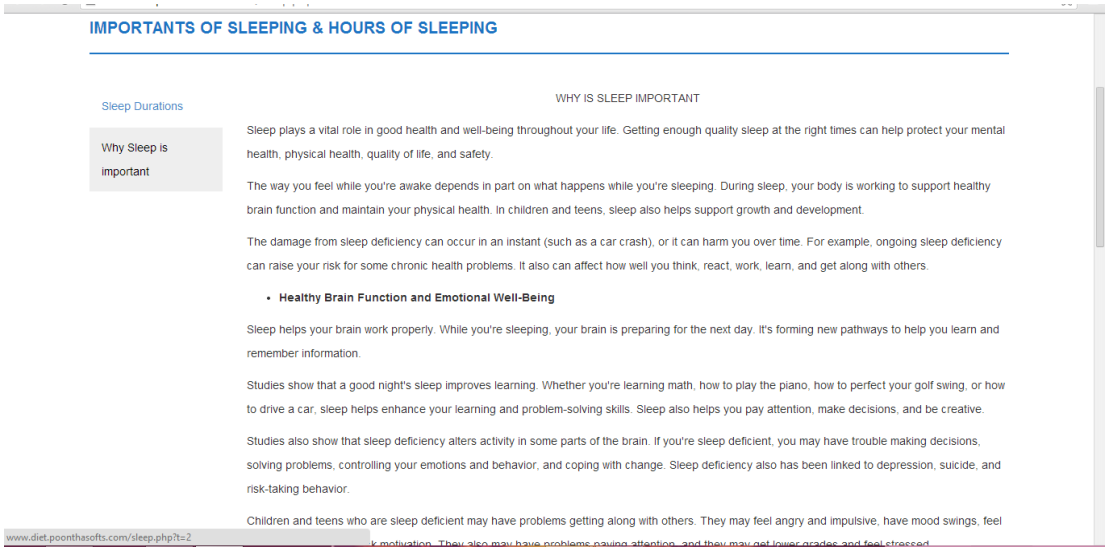


Plate 34

Importance of Sleep

This tab on exercise and yoga has 5 links (Shown in Plate 35)

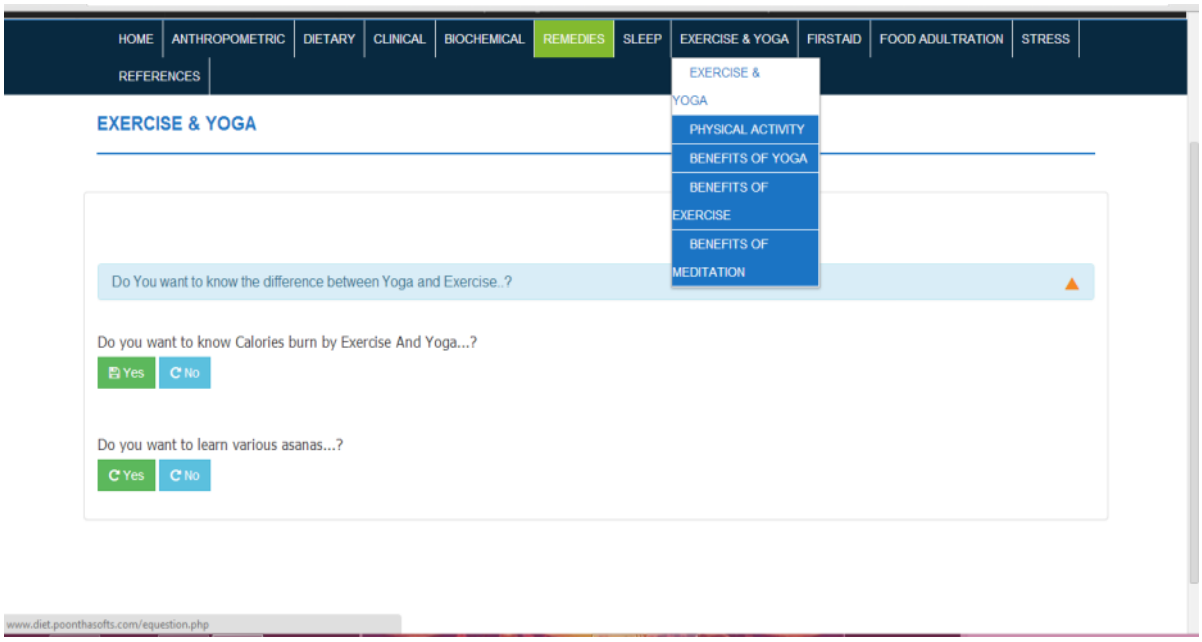


Plate 35

Exercise and Yoga I

The first link is on Exercise and Yoga

If this is selected it will show you 2 options like calories burnt for each type of exercise and a link to various asanas. Also it shows the difference between physical exercise and yoga (Shown in Plate 36).

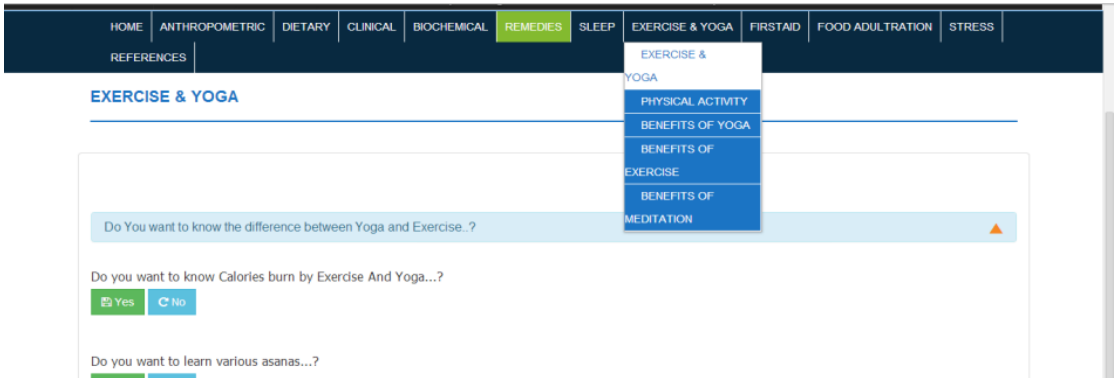


Plate 36

Exercise and Yoga II

If one selects the tab “calories burnt by exercise and yoga” it will display the calorie expenditure for various activities/ exercise. One can learn the calories spent for the exercise they do and modify according to their need (Shown in Plate 37).

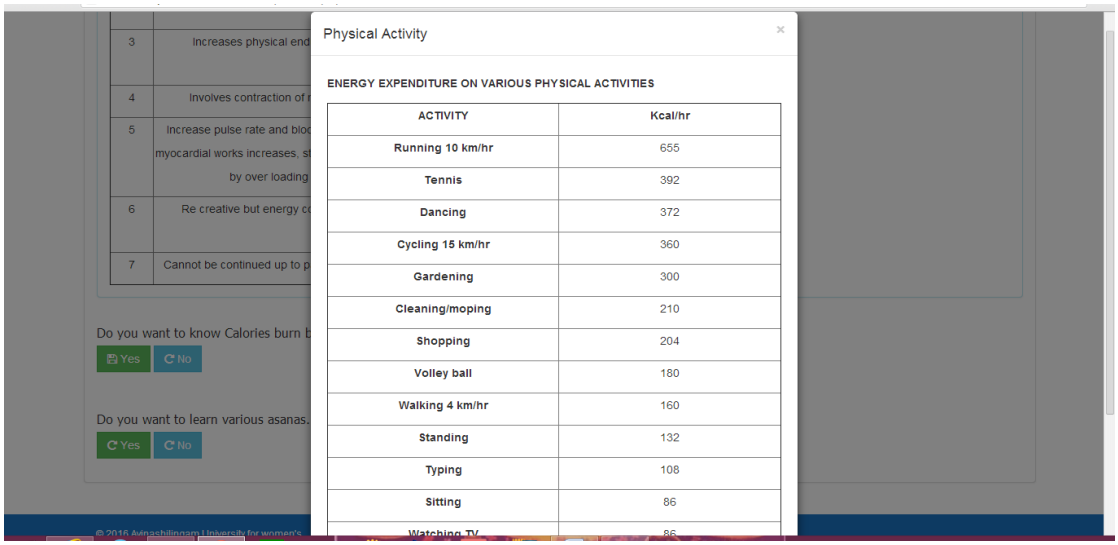


Plate 37

Exercise and Yoga III

If one clicks on the tab “Do you want to learn various asanas?” it will take them to a separate PowerPoint presentation, where all the asanas and their procedure with a pictorial illustration is given (Shown in Plate 38).

Plate 38

Various Asanas

The next option is about work type. One has to enter their type of occupation then click enter .(Shown in Plate 39) it will show you whether they are in to sedentary, moderate or heavy activity (Shown in Plate 40) and it will also show the possible risk factors (Shown in Plate 41).

One can click on the link “activity pyramid” it will show the pyramid which helps for a healthy life style (Shown in 42)

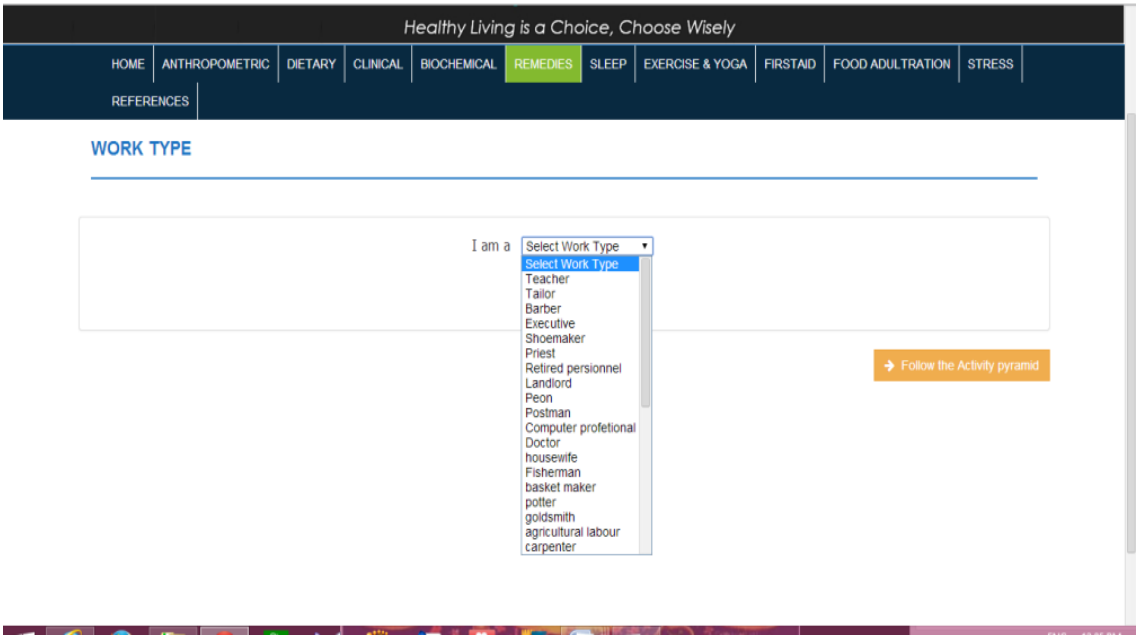


Plate 39

List of Work Types

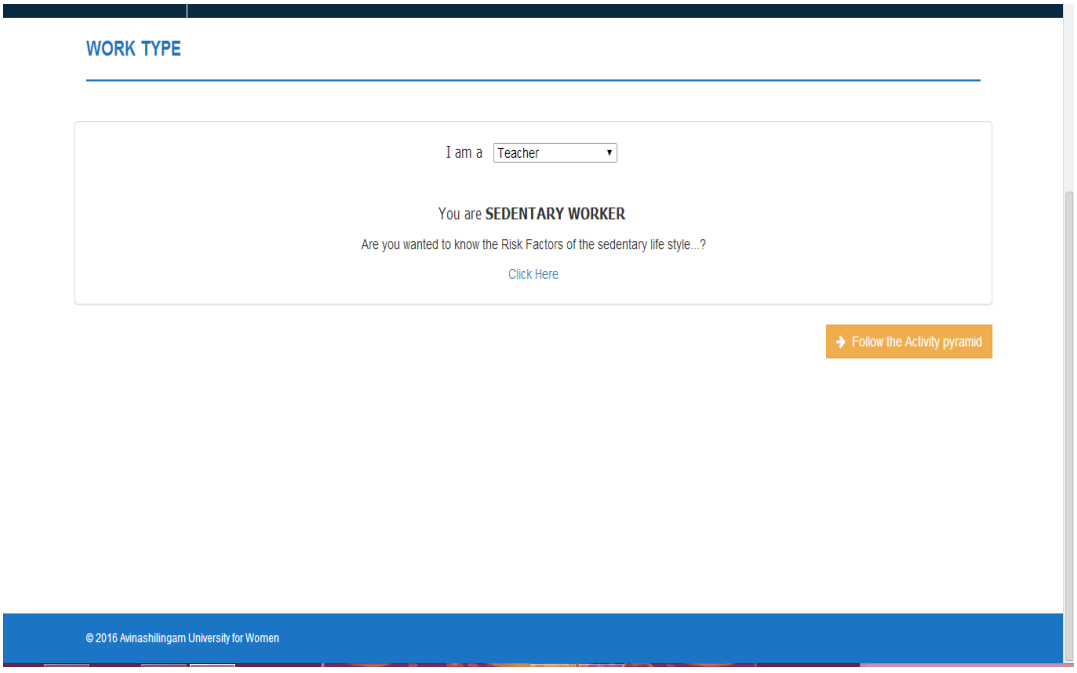


Plate 40

Check out the Work Type

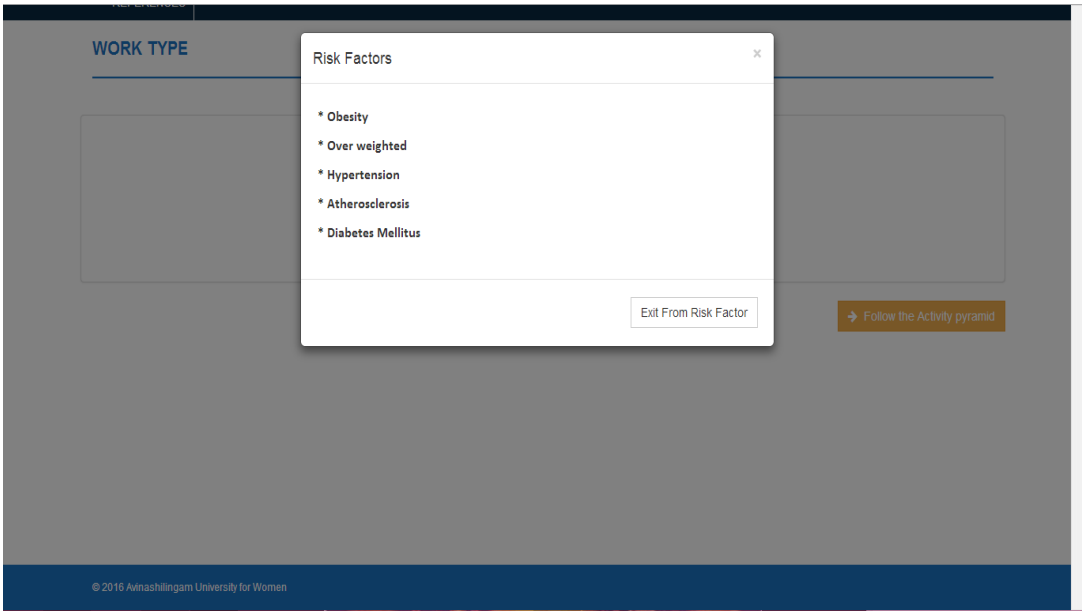


Plate 41

Risk factors of sedentary life style

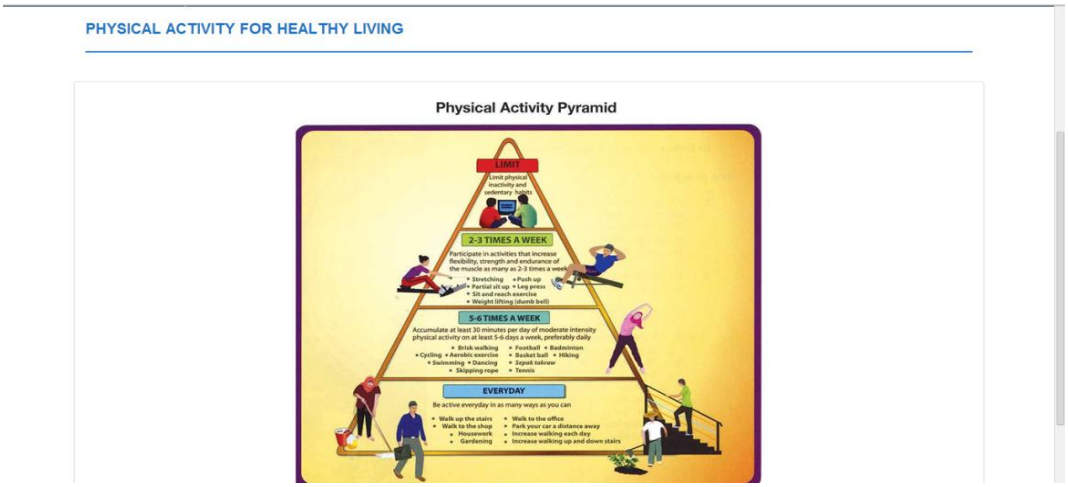


Plate 42

Physical Activity Pyramid

The following tabs shows the benefits of exercise, yoga and meditation (Plate 43, 44, and 45)

BENEFITS OF YOGA

1 . Increases body awareness

2 . Stretches and lengthens the muscles.

3 . Stretches the soft tissues of the body. (Tendons, ligaments, and the fascia sheath that surrounds the muscles.)

4 . Releases lactic acid build up. (Lactic acid can cause muscle soreness, stiffness, pain, and fatigue.)

5 . Increases range of motion in the joints.

6 . Increases muscle tone. (From the larger ones to some of the smaller, less-used muscles.)

7 . Increases endurance. (This depends on the style, as some are more conducive to improving endurance, such as vinyasa, ashtanga, and other power styles.)

8 . Helps develop motor skills for kids.

9 . Improves balance.

10 . Improves coordination.

1 2 3 4 5 6 7 8 9 10 11 > >>

Page 1 of 11 Total Records : 102

Plate 43

Benefits of Yoga

BENEFITS OF EXERCISE

1 . Reduces blood pressure

2 . Reduces cholesterol levels

3 . Increases the concentration of high-density lipoprotein (HDL or ?good? cholesterol in the blood)?

4 . Reduces chances for coronary heart disease?

5 . Increases efficiency of heart and lowers resting heart rate?

6 . Makes heart muscles stronger?

7 . Improves contractile function of the heart?

8 . Strengthens lungs

9 . Improves respiratory function?

10 . Improves cardiovascular endurance and performance?

1 2 3 4 5 6 7 8 9 10 > >>

Page 1 of 10 Total Records : 100

Plate 44

Benefits of Exercise

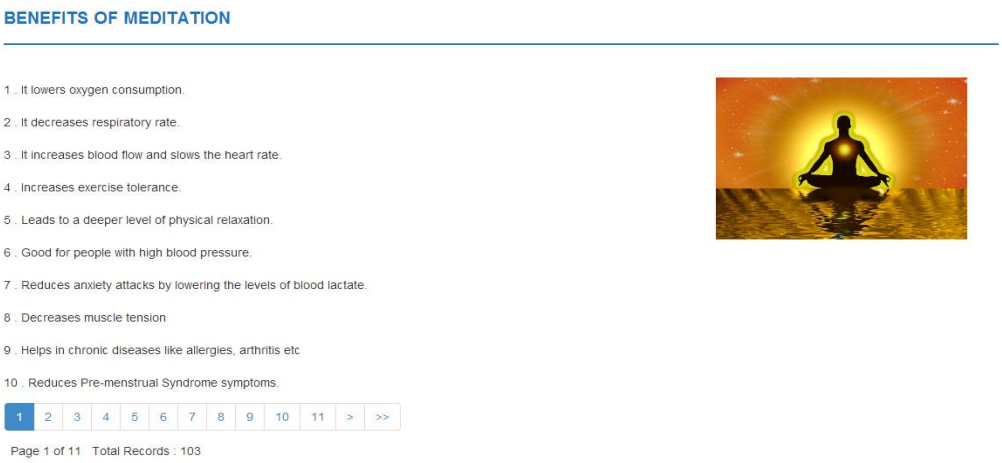


Plate 45

Benefits of Meditation

The first aid tab is on first aid (Shown in Plate 46).

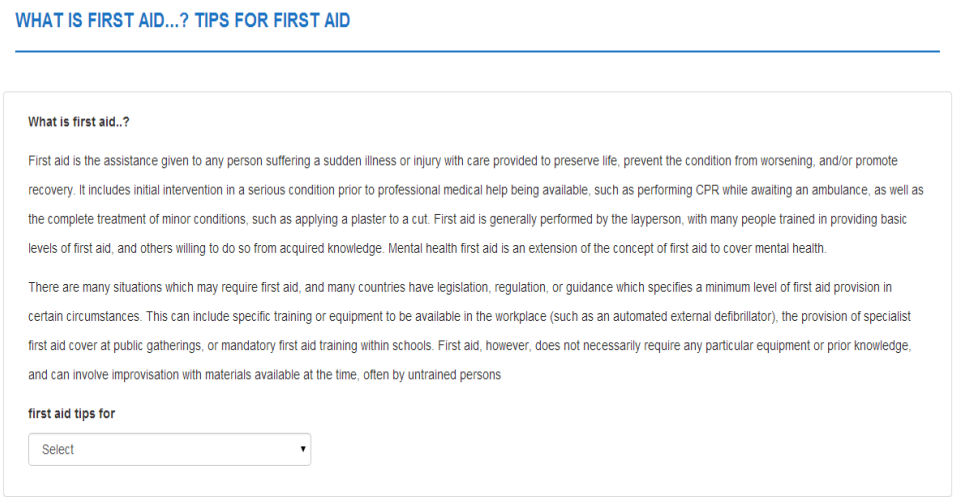


Plate 46

First aid

From the first aid menu one can select various methods of first aid for different types of injuries (Shown in Plate 47 and 48).

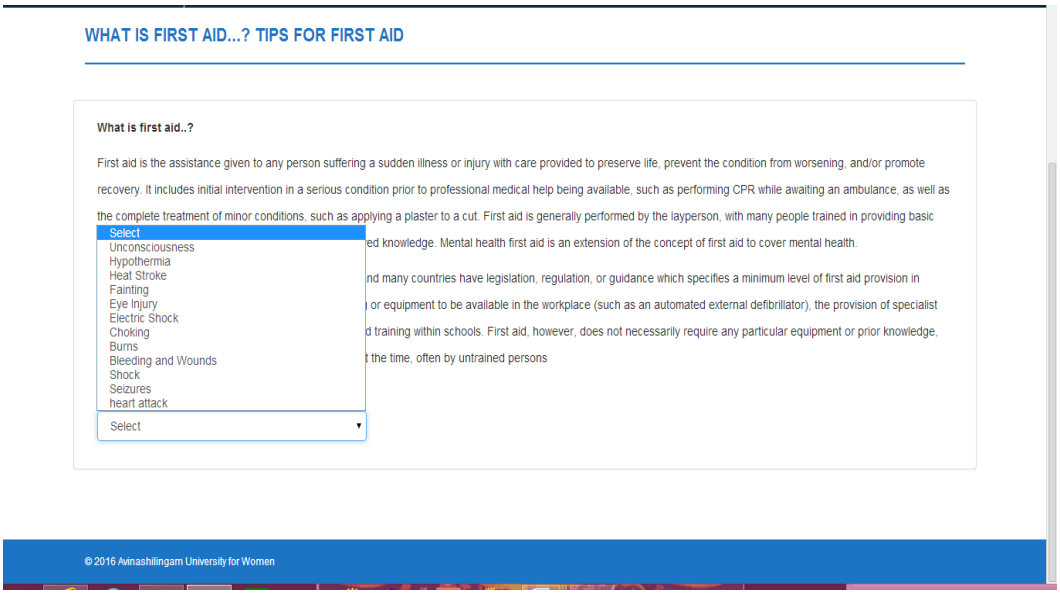


Plate 47

Different First aid techniques

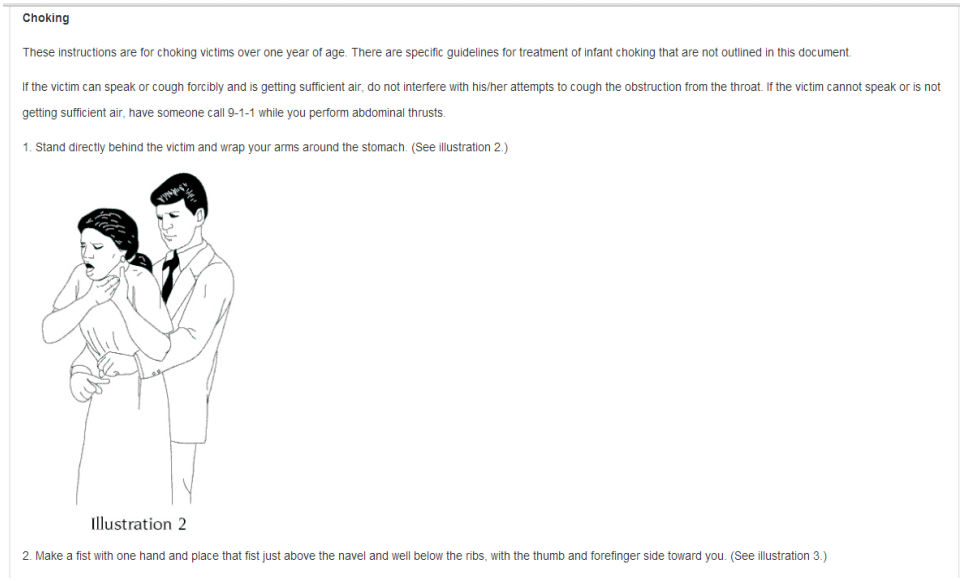


Plate 48

First aid technique for chocking

From the food adulteration tab one can find out various adulteration methods/practices for different ingredients. These are the simple methods which can be followed by any one (shown in plate 49 and 50).

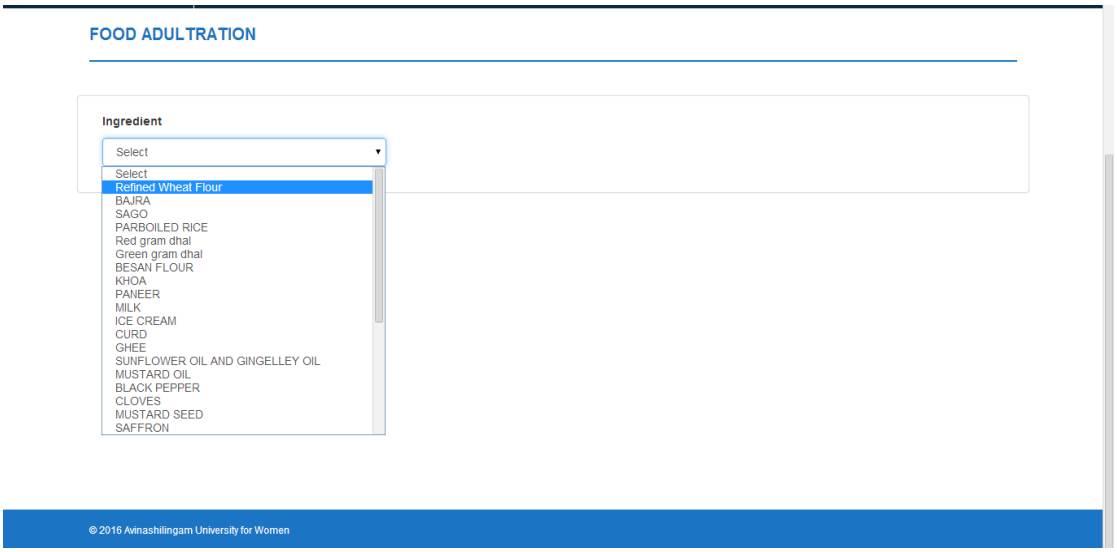


Plate 49

List of Food Adulterants

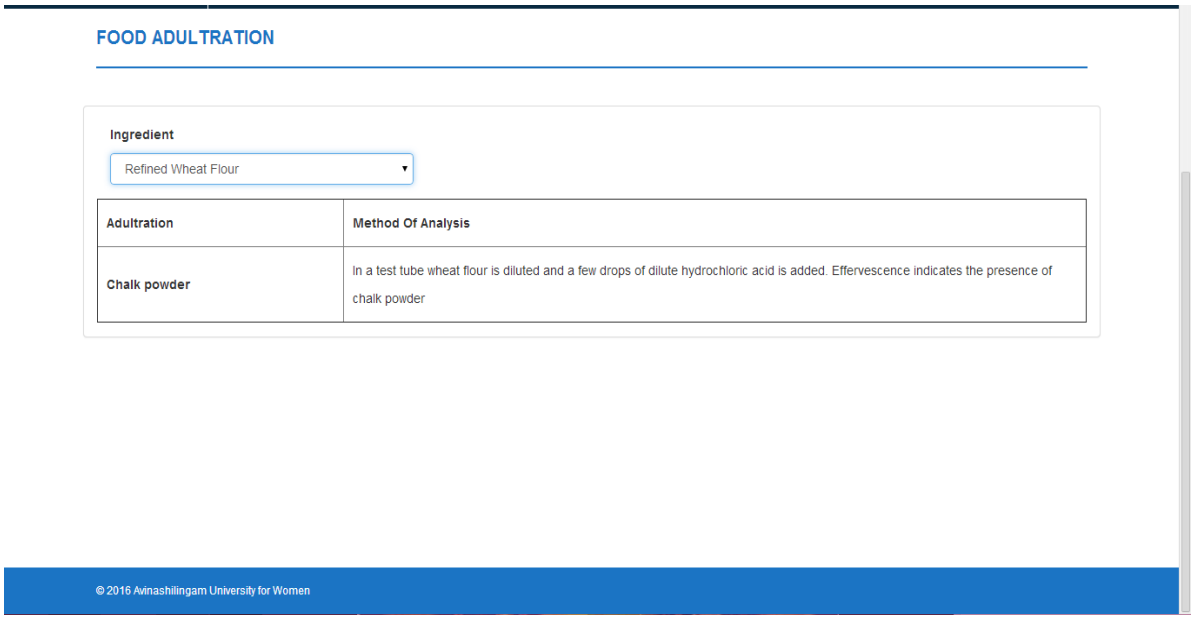


Plate 50

Method of food adulteration Analysis

If one select the stress tab, there would be a question 'Are you under stress' if the person click on yes (shown in plate 51) option there would be a questionnaire (shown in plate 52). Based on the answers given, the software would indicate the stress level of the person like low, moderate or high stress(shown in plate 53) and the software would also provide the stress coping techniques (shown in plate 54).

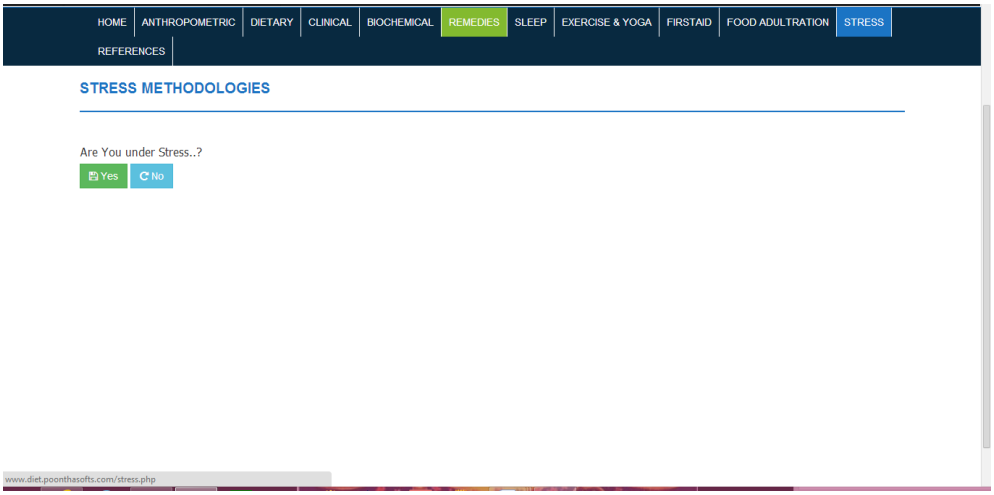


Plate 51

Stress Assessment I

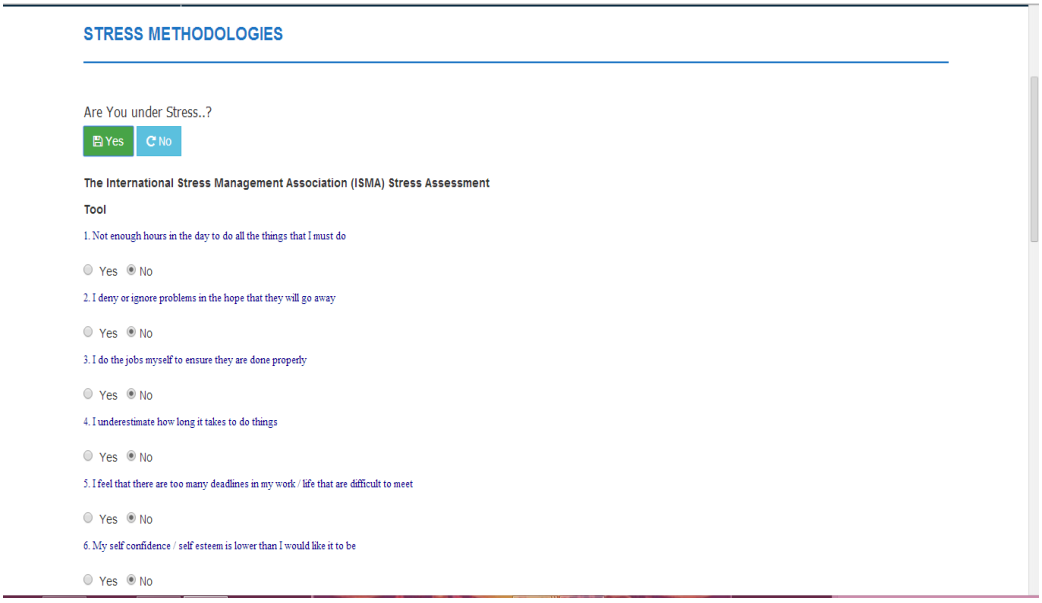


Plate 52

Stress Assessment II

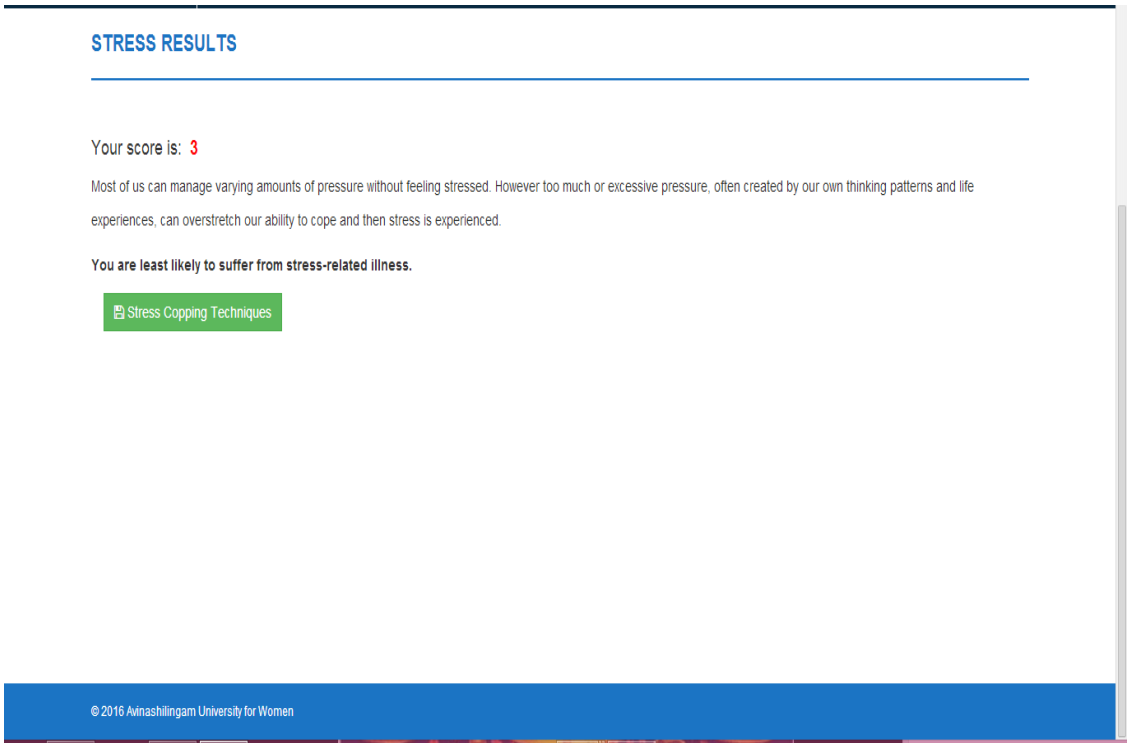


Plate 53

Stress Assessment III

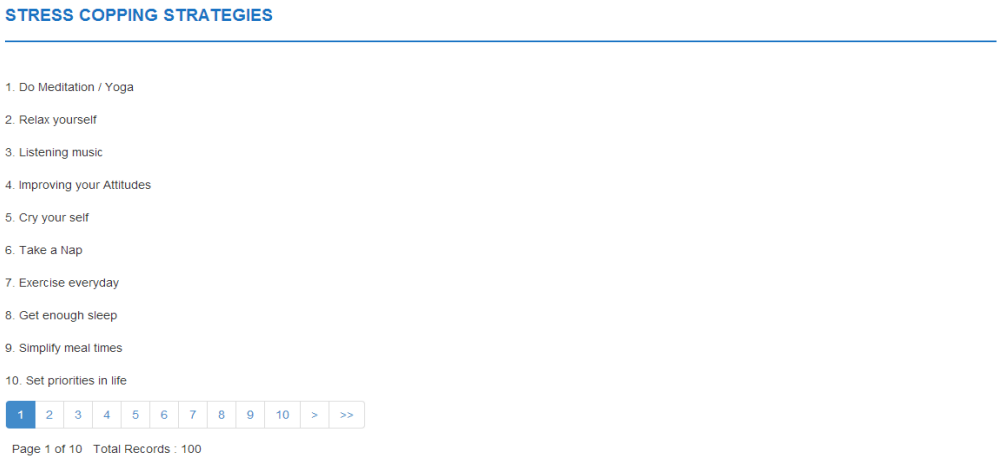


Plate 54

Stress Assessment IV

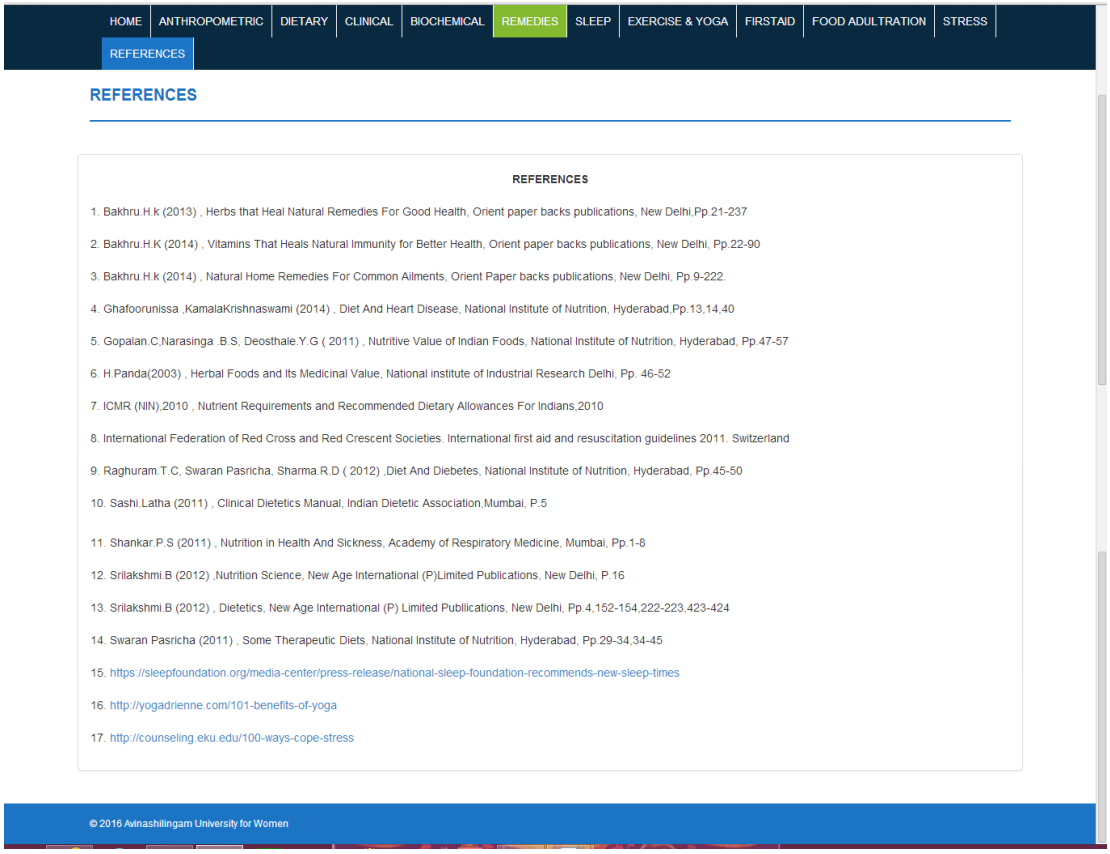


Plate 55

References

PHASE II. EVALUATING THE DEVELOPED SOFTWARE PACKAGE

1. Selection of Subjects for Evaluation

For the evaluation of software package ten subjects in each of the following categories were selected (Academicians, physicians, dieticians, public, post graduate students and software developers) in and around the campus. A well structured interview schedule was framed for the evaluation of the software package shown in Appendix I.

2. Preparation of the Schedule

In the software package, questions on all headings like does the software have an adequate content?, Do you find any difficulty in understanding the content of the software?, for anthropometric Do you feel comfortable to calculate your BMI using this software?, For dietary aspects Are you able to follow the cyclic menu given in the software?, Is the food exchange list is easy to understand?, By checking the clinical examinations menu are you able to correlate with the nutritional deficiencies?, Are you able to find out the deficiencies, nutrient sources and functions easily using this software?,

For biochemical parameters can you compare the normal reference values with your blood profile for selected biochemical parameters? For natural remedies do you feel that the home remedies enlisted in the software helps in the management? Are the details mentioned in sleep column have adequate information in it?,

For exercise and yoga are the details regarding exercise and yoga beneficial for you?, for food adulteration segment Is the method of analysis feasible to carry out at home?, for stress page were the questions illustrated in the page is appropriate enough?, for first aid can you able to follow different first aid techniques for various conditions for the effective evaluation of the software etc were framed.

3. Evaluation of the Developed Software Package and Feedback.

Evaluation can focus on any kind of initiative such as programs, projects, sub- projects, and their components or elements (Yarbrough *et al,* 2011).

The applicability of the software for wider use as determined by collecting suggestions from the evaluators of all categories including academicians, physicians, dieticians, public, post graduate students and software developers. The required modifications were carried out.

METHODOLOGY AT A GLANCE

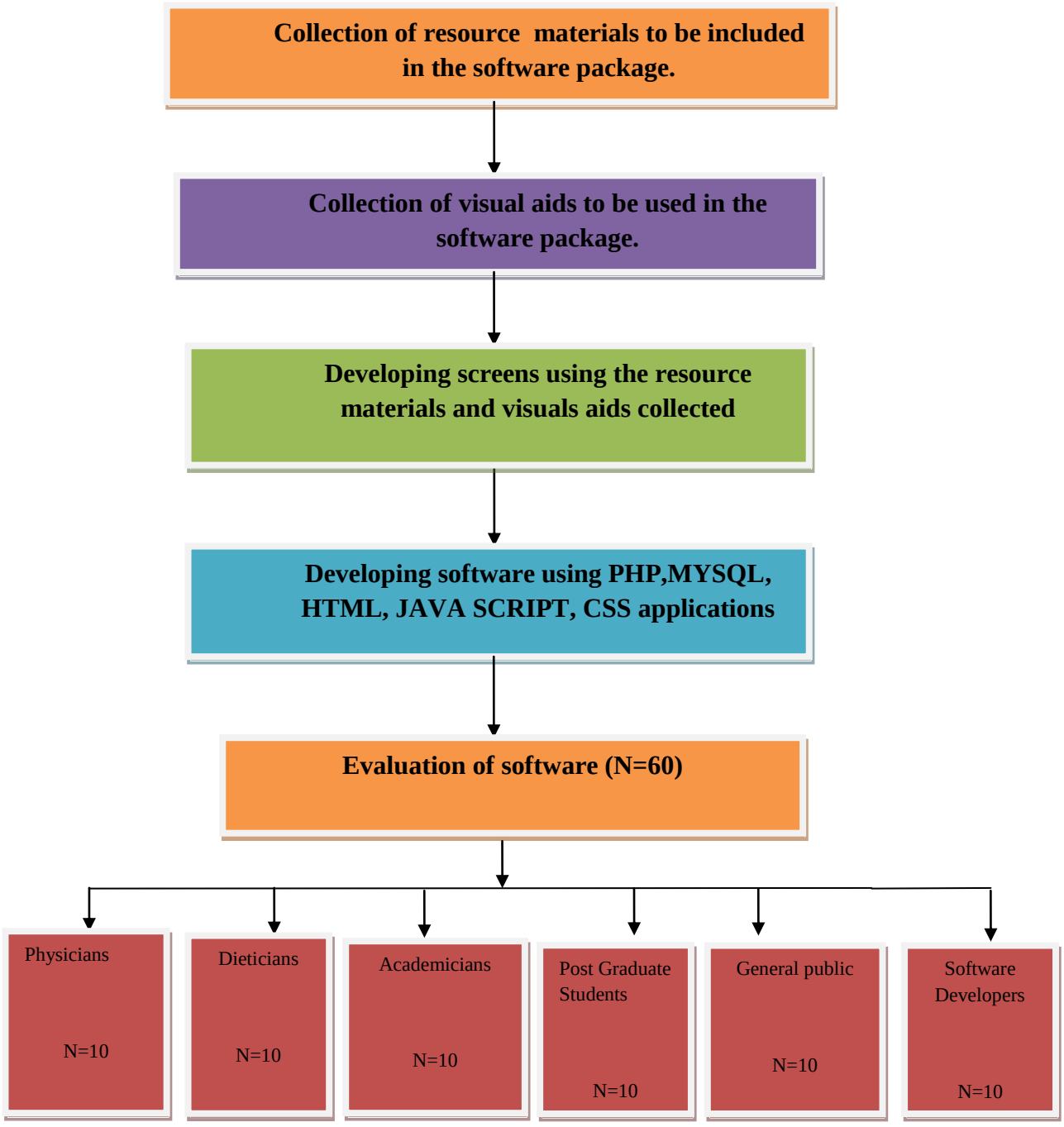


FIGURE 1

RESULTS AND DISCUSSION

IV. RESULTS AND DISCUSSION

The result of the study **"Developing and Evaluating a Software Package for Healthcare"** is presented and discussed under the following headings

- Software evaluation regarding general information
- Evaluation of the package regarding anthropometric measurements
- Evaluation regarding dietary aspects
- Software evaluation regarding clinical examination
- Evaluation of the software regarding biochemical parameters
- Evaluation regarding natural remedies
- Evaluation of the package regarding sleep
- Software evaluation regarding exercise and yoga
- Evaluation regarding food adulteration
- Evaluation of the software package regarding stress
- Software evaluation regarding first aid

TABLE – I

SOFTWARE EVALUATION REGARDING GENERAL INFORMATION (N=60)

General information	E_1		E_2		E_3		E_4		E_5		E_6	
	Yes	No	Yes	No	Yes	No	yes	No	Yes	No	yes	No
Does the software have an adequate content?	10	0	6	4	7	3	10	0	10	0	9	1
Is it time consuming?	8	2	7	3	8	2	9	1	10	0	8	2
Do you find any difficulty in understanding the content of the software?	3	7	0	10	1	9	2	8	1	9	0	10
Is this software useful to you?	10	0	8	2	8	2	10	0	10	0	10	0
Does the software have adequate pictorials?	9	1	7	3	7	3	10	0	8	2	8	2
Does the pictorials make the package more interesting and attractive?	9	1	7	3	7	3	10	0	8	2	8	2
Is it user friendly for you?	10	0	9	1	9	1	9	1	9	1	9	1
Are the fonts easy to read and understand?	9	1	10	0	9	1	9	1	10	0	8	2
Does the package helps for improving your knowledge	10	0	6	4	8	2	10	0	10	0	10	0
Whether the screen designing is good?	10	0	9	1	8	2	10	0	9	1	8	2

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

The above table reveals that except physicians (E2), dieticians (E3), and software developers (E6) all others groups academicians (E1), public (E4), post graduate students (E5), were in total agreement on the Adequacy of the Software content. In groups E2 and E3, majority of respondents said the adequacy was good.

More than 90 per cent of all groups (E1 to E6) felt that the software package is user friendly.

In physicians (E2), post graduate students (E5) and software developers (E6) groups majority of them revealed that they didn't find any difficulty in understanding the content of the software.

More than 85 per cent of all groups, academician (E1) to software developers (E6) felt that the software package has adequate pictorials. That same percentage of evaluators felt that pictorials make the package more interesting and attractive.

More than 90 per cent of all groups, academicians (E1) to software developers (E6) felt that the fonts are easy to read and understand. Few of them suggested that the font size could be increased.

In groups except physicians (E2) 100 per cent all other groups says that this software package helps for them to improve their knowledge.

Academicians (E1) and public (E4) felt that the screen designing is good unanimously .Majority of other groups too felt that the screen designing is good and user friendly.

Majority of the evaluators felt that the software is time consuming; according to the suggestions given by them the package was modified.

TABLE II

SOFTWARE EVALUATION REGARDING ANTHROPOMETRIC MEASUREMENTS

(N=60)

Anthropometric measurements	**E_1**		**E_2**		**E_3**		**E_4**		**E_5**		**E_6**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**yes**	**No**	**Yes**	**No**	**yes**	**No**
Do you feel comfortable to calculate your BMI using this software?	10	0	10	0	9	1	10	0	10	0	10	0
Do you find any difference between your WHR seeing elsewhere outside and measurement using software?	1	9	2	8	1	9	1	9	1	9	1	9
Can you able to comprehend reference values of weight height and BMI of different age groups?	10	0	9	1	9	1	10	0	10	0	10	0
Are you able to find out your health status using this software?	8	2	6	4	7	3	9	1	9	1	9	1

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers ,

All the groups except dieticians (E3), unanimously felt that they were comfortable using the software to calculate BMI.

More than 90 per cent of subjects in each groups revealed that they did not find any difference between their Waist Hip Ratio (WHR) seen elsewhere outside and measurement obtained using the Software.

More than 75 per cent of all groups said they were able to accurately find out their health status using this software.

Except physicians (E2) and dieticians (E3) groups others agreed that they are able to comprehend reference values of weight height and BMI of different age groups In physicians (E2) and dieticians (E3) above 90 per cent also agreed for that.

Thirty per cent of dieticians felt that they were not able to find out their health status. Hence as per the suggestions given by them Visceral Adipose Index (VAI), Waist Hip Ratio (WHR), Brocas Index (BI) were added for the anthropometric measurements and also 24 hour recall method was included so that they can known their health status.

TABLE III

SOFTWARE EVALUATION REGARDING DIETARY ASPECTS (N=60)

Dietary aspects	**E_1**		**E_2**		**E_3**		**E_4**		**E_5**		**E_6**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**yes**	**No**	**Yes**	**No**	**yes**	**No**
Do you able to follow the cyclic menu given in the software?	10	0	9	1	8	2	10	0	10	0	10	0
From this software do you able to understand the diet menu setup for different disease conditions?	10	0	8	2	9	1	10	0	10	0	10	0
Is the food exchange list is easy to understand?	10	0	10 0		10	0	10	0	10	0	9	1
Are you able to trace the nutritive value of common foods?	8	2	9	1	9	1	8	2	10	0	8	2

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

Above table reveals that except physicians (E2) and dieticians (E3) , all other groups were in unanimous agreement that they were able to follow the cyclic menu given in the software

Except physicians (E2) and dieticians (E3) 100 per cent subjects of all other groups agreed that they are able to understand the diet menu setup for different disease conditions.

All the groups except E6 were in total agreement that the food exchange list is easy to understand. Also 90 per cent of E6 group agreed that the food exchange list is easy to understand.

In all groups more than 85 per cent agreed that they are able to trace the nutritive value of common foods while using this software.

TABLE IV

SOFTWARE EVALUATION REGARDING CLINICAL EXAMINATION (N=60)

Clinical examination	**E_1**		**E_2**		**E_3**		**E_4**		**E_5**		**E_6**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**yes**	**No**	**Yes**	**No**	**yes**	**No**
By checking the clinical examinations can you correlate with the nutritional deficiencies?	8	2	7	3	7	3	9	1	10	0	10	0
Is it practically feasible to follow the food sources to come out from different diseases?	9	1	9	1	10	0	10	0	10	0	10	0
Food sources given in the software is easily available in the market?	9	1	9	1	10	0	10	0	10	0	10	0
Can you able to find out the deficiencies, nutrient sources and functions easily using this software?	10	0	10	0	10	0	10	0	10	0	10	0

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

Seventy per cent or more of each group agreed that by checking the clinical examination, they are able to correlate to their nutritional deficiencies.

Dieticians (E3), public (E4), post graduate students (E5) and software developers (E6) totally agreed that this software package is practically feasible to follow the food sources to be consumed for different diseases.

Ninety per cent of academicians (E1), physicians (E2) and 100 per cent of all other groups agreed that the food sources given in the software are easily available in the market.

Hundred per cent of all groups totally agreed that they were able to find out the nutrient deficiencies, nutrient sources and their functions easily using this software.

TABLE V

SOFTWARE EVALUATION REGARDING BIOCHEMICAL PARAMETERS (N=60)

Biochemical parameters	**E_1**		**E_2**		**E_3**		**E_4**		**E_5**		**E_6**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**yes**	**No**	**Yes**	**No**	**yes**	**No**
Can you able to compare the normal reference values with your blood profile for selected biochemical parameters?	9	1	8	2	9	1	10	0	10	0	10	0
Is the result given by the software appropriate compare to other measurements?	8	2	6	4	8	2	8	2	9	1	10	0

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software Developers

Eighty per cent of physicians (E2), 90 per cent of academicians (E1), dieticians (E3)and 100 per cent of other groups agreed that they were able to compare the normal reference values with given blood profile for selected biochemical parameters.

Except physicians (E2), all others were 80 per cent or more satisfied that the result given by the software were appropriate compared to other measurements.

Forty per cent of physicians felt that the result given by the software was not appropriate standards. Hence the ICMR standards were used for comparison and to make more appropriate.

TABLE VI

SOFTWARE EVALUATION REGARDING NATURAL REMEDIES (N=60)

Natural remedies	**E_1**		**E_2**		**E_3**		**E_4**		**E_5**		**E_6**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**yes**	**No**	**Yes**	**No**	**yes**	**No**
Is the natural remedies listed able to follow?	10	0	8	2	9	1	10	0	10	0	10	0
Do you feel home remedies enlisted in the software helps for the management?	10	0	10	0	10	0	10	0	10	0	10	0
Are you already aware of the home remedies mention in the software package?	7	3	9	1	9	1	6	4	7	3	8	2
Will you able to follow the procedure of home remedies enlisted in the software?	8	2	6	4	9	1	10	0	10	0	10	0
After using this soft ware can you able to understand different vitamins and its importance in the management of common ailments?	7	3	5	5	6	4	10	0	9	1	10	0
Is the Information regarding vitamins is adequate?	9	1	4	5	5	5	10	0	9	1	10	0
Can you relate the different ailments and its healing facts using this software?	8	2	7	3	9	1	10	0	10	0	10	0
In this soft ware package do you find any names of herbs unfamiliar to you?	6	4	4	6	6	4	8	2	9	1	9	1
Common ailments enlisted is adequate?	8	2	6	4	7	3	10	0	10	0	9	1

Are the availability of herbs easy for you?	7 3	8 2	9 1	6 4	8 2	6 4

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

From the table it is evident that 80 per cent of physicians (E2), and dieticians (E3), 100 per cent of all other groups were able to follow the natural remedies suggested.

Hundred per cent of all groups felt that home remedies enlisted in the software helped them in the management of their ailments.

Above 70 per cent of all groups said they are already aware of the home remedies mentioned in the software package

Public (E4) and software developers (E6) unanimously agreed that they were able to understand different vitamins and its importance in the management of common ailments.

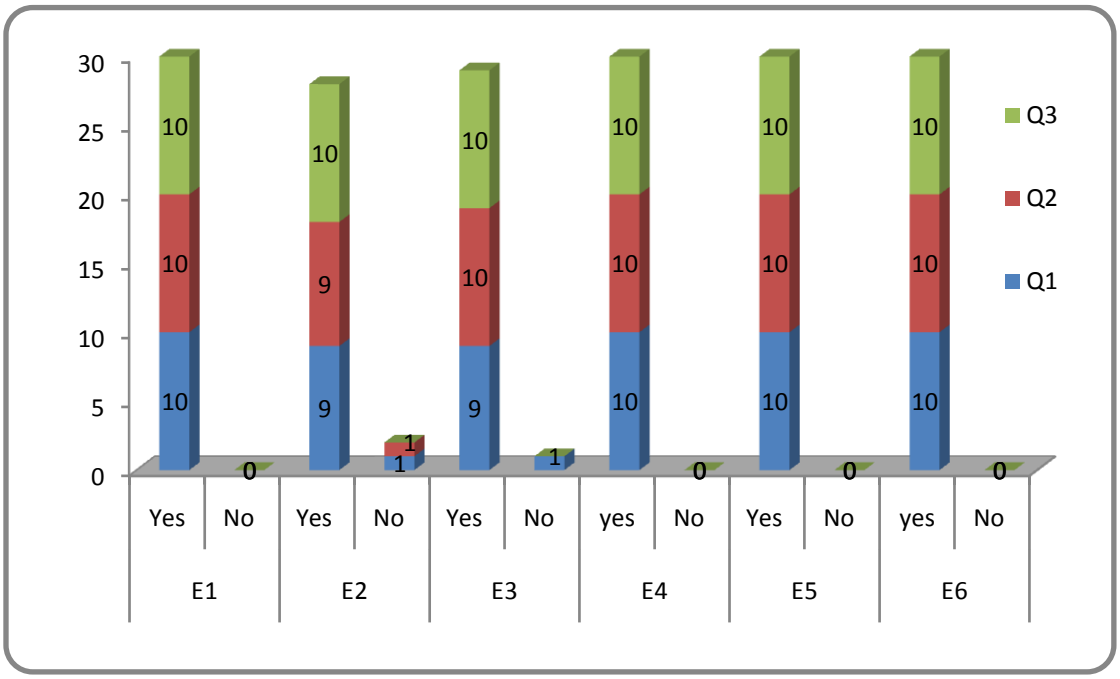
Except physicians (E2) and dieticians (E3), above 90 per cent of all others (academicians, public, post graduate students and software developers) agreed that the information regarding vitamins is adequate.

More than 70 per cent of academicians (E1), physicians (E2) and dieticians (E3) as well as 100 per cent of public (E4),post graduate students (E5) software developers (E6) agreed that they were able to relate the different ailments and its healing remedies using this software.

Ninety per cent of physicians and seventy per cent of academicians felt that they were aware of the home remedies which were provided in the remedy column. Hence few more new remedies which are not common were included.

Fifty per cent of physicians felt that the information on vitamins is inadequate. So function, sources of all vitamins and minerals were added. Forty per cent of physicians felt that common ailments enlisted are inadequate. Hence few more information on this was added.

SOFTWARE EVALUATION REGARDING SLEEP (N=60)



Q1- Is the details mention in sleep column has adequate information in it

Q2- Can you able to figure out the sleeping duration pattern for your age.

Q3- Is the information provided for importance of sleep is useful for you.

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

FIGURE 2

Ninety per cent of physicians (E2), dieticians (E3) and 90 per cent of all other groups were in agreement with the details mentioned that the sleep column had adequate information.

Nine out of 10 respondents of physicians (E2) agreed that they were able to figure out the sleep pattern for different age groups. Other groups totally agreed that they are able to figure out the sleeping duration pattern for their age.

Hundred per cent of all groups felt that the information provided in the column "Importance of sleep" is useful for them.

TABLE VII

SOFTWARE EVALUATION RERGARDING EXERCISE AND YOGA (N=60)

Exercise and Yoga	**E_1**		**E_2**		**E_3**		**E_4**		**E_5**		**E_6**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**yes**	**No**	**Yes**	**No**	**yes**	**No**
Are the details regarding exercise and yoga beneficial for you?	10	0	10	0	10	0	10	0	10	0	10	0
Is the Information on type of activity and risk factors mention thought provoking?	9	1	10	0	10	0	10	0	10	0	10	0
Can you able to follow different asanas given in the software package?	8	2	7	3	7	3	8	2	9	1	7	3
After going through the benefits of meditation and exercise, can you able to practice it regularly?	10	0	10	0	10	0	10	0	10	0	10	0

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

From the table it is clear that 100 per cent of all groups completely agreed that information on exercise and yoga were beneficial to them.

Above 90 per cent of all groups agreed that Information on type of activity and risk factors mentioned is thought provoking.

Above 70 per cent of all groups can follow different asanas given in the software package

The entire group was again in total agreement about the fact that after going through the benefits of medication and exercise, they were able to practice it regularly.

TABLE VIII

SOFTWARE EVALUATION REGARDING FIRST AID (N=60)

First aid	**E_1**		**E_2**		**E_3**		**E_4**		**E_5**		**E_6**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**yes**	**No**	**Yes**	**No**	**yes**	**No**
Is the details regarding First Aid is Beneficial for you?	9	1	7	3	9	1	9	1	10	0	10	0
Can you able to follow different first aid techniques for various conditions?	10	0	10	0	10	0	10	0	10	0	10	0

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

Above 80 per cent in all groups agreed that the details regarding First Aid were beneficial for them.

Hundred per cent of all groups said they are able to follow the different first aid techniques for various conditions.

TABLE IX

SOFTWARE EVALUATION REGARDING FOOD ADULTERATION (N=60)

Food Adulteration	**E_1**		**E_2**		**E_3**		**E_4**		**E_5**		**E_6**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**yes**	**No**	**Yes**	**No**	**yes**	**No**
Information on food adulteration useful for	10	0	10	0	10	0	10	0	10	0	10	0

you?						
Is the method of analysis is feasible to carry out at home?	8 2	9 1	8 2	8 2	6 4	8 2
Does the method of analysis user-friendly for you?	8 2	9 1	8 2	8 2	6 4	8 2

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

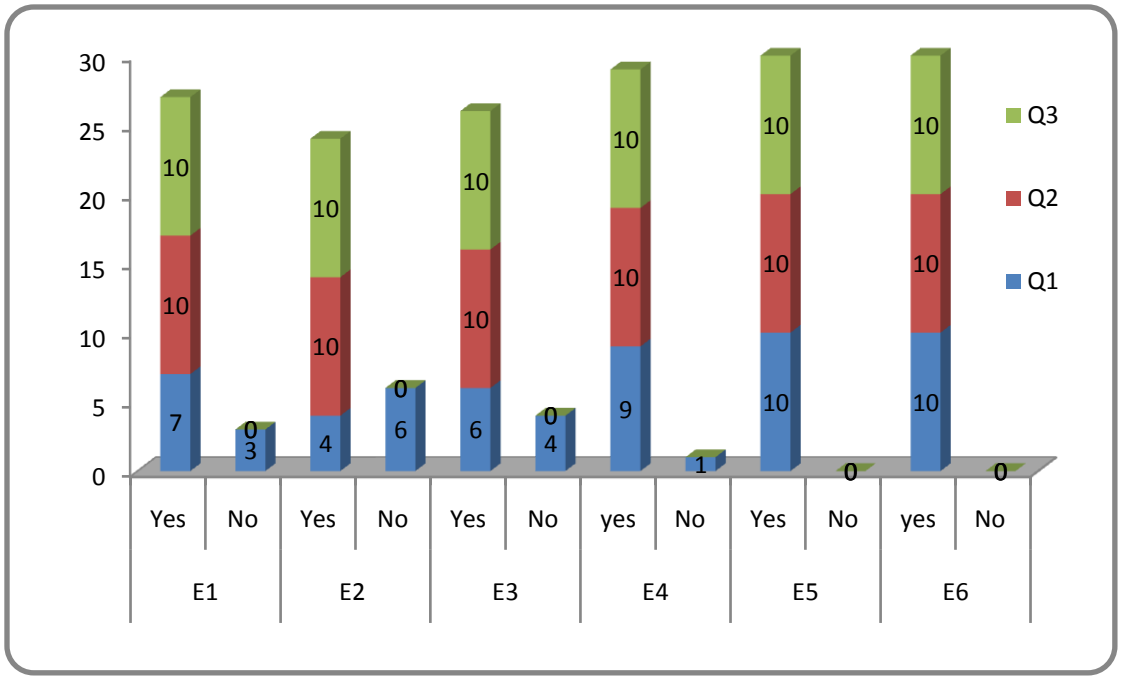
In another clear case of unanimous agreement, all groups agreed that information on food adulteration was useful to them.

Except post graduate students (E5), above 80 per cent of all groups agreed that the methods of analysis to detect food adulteration is feasible to carry out at home.

Above 80 per cent of all groups from academicians (E1) to software developers (E6) felt that the method of analysis is user friendly for them.

Forty per cent of post graduate students felt that the methods provided to detect food adulteration was not user friendly. So few more user friendly methods were incorporated.

SOFTWARE EVALUATION REGARDING STRESS (N=60)



Q1- Were the questions illustrated in this page is challenging

Q2- Was the stress assessment tool useful to you

Q3- Can you able to follow the stress coping techniques in your daily life

E1 –Academicians, E2 – Physicians, E3- Dietitians, E4- Public, E5- Post Graduate students, E6- Software developers

FIGURE 3

Seventy per cent of academicians (E1), 40 per cent of physicians (E2), 60 per cent of dieticians (E3) and 90 per cent of public (E4)felt that the questions asked in the Stress Management page were challenging to answer.

In table 10 all the groups E1-E6 were in total agreement that the stress assessment tool was useful to them.

Hundred per cent of all groups agreed that they are able to follow the stress coping techniques in their daily life.

Forty per cent of dieticians expressed that questions illustrated in stress assessment tool was not challenging. The investigator was not able to change that because it was a standard tool.

SUMMARY AND CONCLUSION

V. SUMMARY AND CONCLUSION

The objectives of the present study entitled "Developing and Evaluating a Software Package for Healthcare" is to give a detailed information for health care i.e. about nutritional assessment like anthropometric, clinical examinations, biochemical parameters, dietary aspects, about natural remedies, benefits of exercise and yoga food adulteration, first aid measures, sleep duration and its benefits, stress and its coping strategies.

This software package has been done in HTML as front end and PHP/MYSQL as back end. PHP is not a language it is server side scripting language developed by Danish Greenlander Rasmus Lerdorf.

Materials were collected from books, journals, magazines, internet sources, pamphlets, and articles etc. After collecting the resources materials script was prepared in a note book indicating each slide in one page with necessary diagrammatic representations wherever required. Senior members, who are well versed in the field, evaluated the package and the necessary corrections indicated were incorporated.

The developed package was evaluated by ten experts each from the following categories - academicians, physicians, dieticians, public, post graduate students and software developers.

An interview schedule was developed for the evaluation of the software package and feedback was collected from all the selected subject experts.

For the evaluation regarding general information, questions like "Is the software package user friendly for you? Does the software package helps for improving your knowledge; Does it has adequate contents etc were included. The evaluation results shows that 90 per cent of all the experts felt that the software package is user friendly and content adequacy is good. Except physicians (E2), hundred per cent of all others said that this software package helps for them to improve their knowledge.

Majority of the evaluators felt that the software is time consuming; according to the suggestions given by them the package was modified.

Regarding anthropometric measurements except dieticians others unanimously felt that they were comfortable using the software package to calculate Body Mass Index (BMI). More than 75 per cent of all groups said they were able to accurately find out their health status using this software package.

Thirty per cent of dieticians felt that they were not able to find out their health status. Hence as per the suggestions given by them Visceral Adipose Index (VAI), Waist Hip Ratio (WHR), Brocas Index (BI) were added for the anthropometric measurements and also 24 hour recall method was included so that they can known their health status.

From the dietary aspects except physicians and dieticians all others were in unanimous agreement that they were able to follow the cyclic menu given in the software. Exception of physicians and dieticians 100 per cent of all others agreed that they were able to understand the menu setup for different disease conditions. In all groups more than 80 per cent agreed that they are able to trace the nutritive value of common foods while using this software package.

Approximately seventy per cent of evaluators in each group agreed that by checking the clinical examination they were able to correlate with nutritional deficiencies. Ninety per cent of academicians and physicians, hundred per cent of all other groups agreed that the food sources for nutritional deficiencies given in the software were easily available in the market. Hundred per cent of all groups totally agreed that they were able to find out the nutrient deficiencies, nutrient sources and their functions easily using this software.

Eighty per cent of physicians, ninety per cent of academicians and dieticians, hundred per cent of all other groups agreed that they were able to compare the normal reference values with given blood profile for selected biochemical parameters.

Forty per cent of physicians felt that the result given by the software was not appropriate standards. Hence the ICMR standards were used for comparison and to make appropriate.

Eighty per cent of physicians and dieticians, hundred per cent of all other groups were able to follow the natural remedies suggested. Hundred per cent of all groups felt that home remedies enlisted in the software helped them in the management of their ailments.

Hundred per cent of public, post graduate students and software developers agreed that they were able to relate the different ailments and its healing remedies using this Software.

Ninety per cent of physicians and seventy per cent of academicians were felt that they were aware of the home remedies which were provided in the remedy column. Hence few more new remedies which are not common were included.

Nine out of ten physician respondents agreed that they were able to figure out the sleep pattern for their age group. Hundred per cent of all groups felt that the information provided on the importance of sleep is useful to them.

Ninety per cent of all groups agreed that information on type of activity and risk factors mentioned in exercise and yoga aspect is thought provoking. Seventy per cent of all groups felt that they can follow different asanas given in the software package. The entire group was again in total agreement about the fact after going through the benefit of meditation and exercise they were able to practice it regularly.

In another clear case of unanimous agreement, all groups agreed that information on food adulteration was useful to them. Except post graduate students, above 80 per cent of all groups agreed that the methods of analysis to detect food adulteration were feasible to carry out at home. Above 80 per cent of all groups from academicians to software developers felt that the method of analysis is user friendly for them.

Forty per cent of post graduate students felt that the methods provided to detect food adulteration was not user friendly. So few more user friendly methods were incorporated.

Seventy per cent of academicians, forty per cent of physicians, sixty per cent of dieticians and 90 per cent of public felt that the questions asked in the stress management page were challenging to answer. All the subjects academicians to software developers were in total agreement that the stress assessment tool was useful to them. Hundred per cent of all groups agreed that they are able to follow the stress coping techniques suggested by the software in their daily life.

Forty per cent of dieticians expressed that questions illustrated in stress assessing tool was not challenging. The investigator was not able to change that because it was a standard tool.

Above 80 per cent in all groups agreed that the details regarding first aid measures were beneficial for them. From academicians to software developers 100 per cent of all said they are able to follow the different first aid measures for various conditions.

From that evaluation process they revealed that the software package would be of immense help to the public in general as it would give them relevant information regarding their anthropometric measurement, help to compare it against standards. It would provide them with precious information on the diet, natural remedies, exercise, yoga, and meditational to the performed based on their health condition or ailments that they may have.

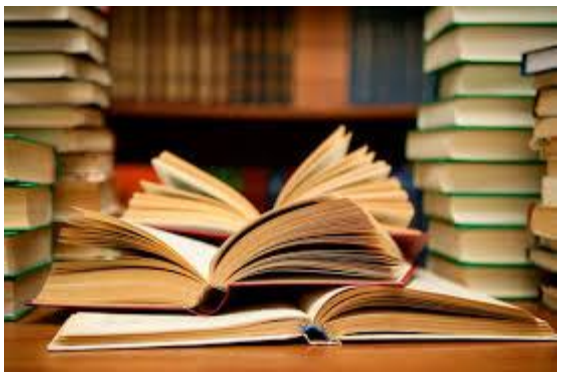
The most significant aspect of this software package is great deal of information it contains on a wide range of health care issues for the general health and wellbeing of an individual. This package contains the most appropriate data according to an individual's ailments or health conditions among the other features of this software is the knowledge one can gain on important subjects like first aid for different conditions. The uniqueness is once again revealed as it covers topics like first aid, food adulteration, techniques to detect food adulteration, stress management etc.

CONCLUSION

This kind of health care software package will help to develop a healthy community. A healthy community reflects a sense of mental and physical well being and is the foundation for achieving all other goals. Good health is often taken for granted but is essential for a productive society. For example, every community needs a healthy workforce upon which to build its economy. A great deal of ill-health in this country and elsewhere is due to ignorance of good nutrition, related aspects and its practical application. This package would help to minimize the ignorance and improve the health status and life style pattern of the community in general.

RECOMMENDATIONS:

- Web based software education package can be developed for wider use.
- Community based health care/education package can be developed
- Health and nutrition care package can be developed for pre-and post natal care.



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APPENDICES

APPENDIX I

Interview Schedule to Evaluate the Effectiveness of the Software Package

A. BACKGROUND INFORMATION

NAME :
AGE :
OCCUPATION :

GENERAL INFORMATION ABOUT SOFT WARE PACKAGE

QUESTIONS	YES	NO
1. Does the software have an adequate content?		
2. Is it time consuming?		
3. Do you find any difficulty in understanding the content of the software?		
4. Is this soft ware useful to you?		
5. Does the software have adequate pictorials?		
6. Does the pictorials make the package more interesting and attractive?		
7. Is it user friendly for you?		
8. Is the directions provided by software is easy to understand		
9. Are the fonts easy to read and understand?		
10. Does the package helps for improving your knowledge?		
11. Whether the screen designing is good?		

ANTHROPOMETRIC MEASUREMENTS

QUESTIONS	YES	NO
1. Do you feel comfortable to calculate your BMI using this software?		
2. Do you find any difference between your WHR seeing elsewhere outside and measurement using software?		
3. Can you able to comprehend reference values of weight height and BMI of different age groups?		
4. Are you able to find out your health status using this software?		

DIETARY ASPECTS

QUESTIONS	YES	NO
1. Do you able to follow the cyclic menu given in the software?		
2. From this software do you able to understand the diet menu setup for different disease conditions?		
3. Is the food exchange list is easy to understand?		
4. Are you able to trace the nutritive value of common foods?		

CLINICAL EXAMINATION

QUESTIONS	YES	NO
1. By checking the clinical examinations can you correlate with the nutritional deficiencies?		
2. Is it practically feasible to follow the food sources to come out from different diseases.?		
3. Food sources given in the software is easily available in the market?		
4. Can you able to find out the deficiencies , nutrient sources and functions easily using this software?		

BIOCHEMICAL PARAMETERS

QUESTIONS	YES	NO
1. Can you able to compare the normal reference values with your blood profile for selected biochemical parameters?		
2. Is the result given by the software appropriate compare to other measurements?		

NATURAL REMEDIES

QUESTIONS	YES	NO
1. Is the natural remedies listed able to follow?		
2. Do you feel home remedies enlisted in the software helps for the management?		
3. Are you already aware of the home remedies mention in the software package?		
4. Will you able to follow the procedure of home remedies enlisted in the software?		
5. After using this soft ware can you able to understand different vitamins and its importance in the management of common ailments?		
6. Is the Information regarding vitamins is adequate.		
7. Can you relate the different ailments and its healing facts using this software?		

8. In this soft ware package do you find any names of herbs unfamiliar to you?		
9. Common ailments enlisted is adequate?		
10. Are the availability of herbs easy for you?		

SLEEP AND ITS BENEFITS

QUESTIONS	YES	NO
1. Is the details mention in sleep column have adequate information in it?		
2. Can you able to figure out the sleeping duration pattern for your age?		
3. Is the information provided for importance of sleep is useful for you?		

EXERCISE AND YOGA

QUESTIONS	YES	NO
1. Is the details regarding exercise and yoga beneficial for you?		
2. Is the Information on type of activity and risk factors mention thought provoking?		
3. Can you able to follow different asanas given in the software package?		
4. After going through the benefits of meditation and exercise, can you able to practice it regularly?		

FIRST AID

QUESTIONS	YES	NO
1. Is the details regarding First Aid is Beneficial for you?		
2. Can you able to follow different first aid techniques for various conditions?		

ABOUT FOOD ADULTERATION

QUESTIONS	YES	NO
1. Information on food adulteration useful for you?		
2. Is the method of analysis is feasible to carry out at home?		
3. Does the method of analysis user-friendly for you?		

STRESS AND ITS COPING STRATEGIES

QUESTIONS	YES	NO
1. Were the questions illustrated in this page is challenging?		
2. Was the stress assessment tool useful to you?		
3. Can you able to follow the stress coping techniques in your daily life?		

APPENDIX II

INSTITUTIONAL HUMAN ETHICAL COMMITTEE CLEARANCE CERTIFICATE

INSTITUTIONAL HUMAN ETHICS COMMITTEE

Avinashilingam
Institute for Home Science and Higher Education for Women
University
(Estd. u/s 3 of UGC Act 1956)

Chairman
Dr. S. Ramalingam
Principal, PSG Institute
of Medical Sciences
& Research, Coimbatore

Member Secretary
Dr. P. R. Padma
Professor, Department of
Biochemistry, Biotechnology and
Bioinformatics

Members
Dr. S. Premakumari
Mr. K.Arulmoli (Legal Expert)
Dr. A. Saraswathy
Mrs. V. Mangayarkarasi
Dr. S. Kowsalya
Dr. N.S. Rohini
Dr.Subhashini K. Sripathi
Mrs. S. Radha Devi
Mrs. Judith Justin

11th March 2016

To
Ms. Megha Murali K
Department of Food Service Management and Dietetics
Avinashilingam Institute for Home Science and
Higher Education for Women
Coimbatore – 641 043

Dear Madam,

Ref : Your proposal No. IHEC/15-16/FSMD/09 entitled "Developing a software package for various ailments using natural remedies" submitted for approval of the IHEC

The Institutional Human Ethics Committee of our University hereby grants approval to your research proposal No. IHEC/15-16/FSMD/09 entitled "Developing a software package for various ailments using natural remedies" submitted by you. The Approval number for the same is AUW/IHEC/FSMD-15-16/XMT-08.

We wish you all the best in your research endeavours.

Regards,
11/3/16
Dr.P.R.Padma
Member Secretary

Institutional Human Ethics Committee