CHAPTER 1

INTRODUCTION
“Research [USEPA, 1991] gathered over recent years has highlighted the countless benefits to people, wildlife and the environment that come from planting trees and creating new woodland habitat. It is obvious trees are good things,” says Clive Anderson [Cambridge, 2010]. Trees are so important that world without trees are unimaginable.

The belief that plants and gardens are beneficial for patients in healthcare environments is more than one thousand years old, and appears prominently in both Asian and Western cultures [Ulrich et. al, 1992]. During the middle ages in Europe, for example, monasteries created elaborate gardens to bring pleasant, soothing distraction to the ill [Gierlach-Spriggs et al., 1998]. European and American hospitals in the 1800s commonly contained gardens and plants as prominent features [Nightingale, 1860].

Plants provide a variety of resources that contribute to the fundamental needs of food, clothing and shelter. Among plants of economic importance, medicinal and aromatic plants have played a vital role in alleviating human sufferings [Baquar, 2001]. Plants are utilized as therapeutic agents since time immemorial in both organized (Ayurveda, Unani) and unorganized (folk, tribal, native) form [Girach et al 2003].

The awareness of positive influences of outdoor environment on patients’ healing process has long been recognized in hospital architecture. [Dejana, 2010] The term healing garden applies to the gardens that promote recuperation from illness. In this context, 'healing' does not necessarily refer to curing, but to the overall improvement of well-being.[ S.H.Park, et. al, 2011] Integration and unity of hospital buildings and their surrounding outdoor spaces contribute to creation of hospital as a 'small city within a city', with its own specific patterns of use. [S.H.Park, et. al, 2009]

Gardens became less prevalent in hospitals during the early decades of the 1900s, however, as major advances in medical science caused hospital administrators and architects to concentrate on creating healthcare buildings that would reduce infection risk, filter the air, cool down the ambiance, enhance the level of oxygen, soothing to eyes and serve as functionally efficient settings for new medical technology. [Chang et. al, 2005]

The strong emphasis will be on infection reduction, together with the priority given to functional efficiency, due to lack of maintenance and over-crowding. Some of our hospitals
are unacceptably stressful and unsuited to the emotional needs of patients, their families, and even healthcare staff. [Kaplan et. al., 1995] Despite the intense stress often caused by illness, pain, and traumatic hospital experiences, little attention was given to creating environments that would calm patients or otherwise address emotional needs. [Adachi et. al, 2000]

Hartig (1991) also used both physiological and psychological measures to study restoration in non-patient subjects who were stressed because they either had driven an automobile through urban traffic or completed a series of difficult tests. His findings were broadly similar to those described above, more specifically, blood pressure data and emotional self-reports converged to indicate that recovery was appreciably greater if persons looked at a nature setting dominated by vegetation rather than a built environment without nature [Hartig et. al, 1991].

In the case of hospitals and other healthcare facilities, there is mounting evidence that gardens’ function are especially effective and beneficial settings with respect to fostering restoration for stressed patients, family members, and staff [Ulrich et. al, 1999]. Cooper-Marcus and Barnes (1995) used a combination of behavioral observation and interview methods to evaluate four hospital gardens in California. They found that restoration from stress, including improved mood, was by far the most important category of benefits derived by nearly all users of the gardens -- patients, family, and employees.

Likewise, a recent study of a garden in a children’s hospital identified mood improvement and restoration from stress as primary benefits for users [Whitehouse et al., 2001]. This conclusion was supported by convergent results from behavioral observations, interviews, and surveys.

The fact that stress is a pervasive, well documented, and very important health-related problem in hospitals implies major significance for the finding that restoration is the key benefit motivating persons to use gardens in healthcare facilities [Ulrich, 1999].

Landscape architecture comprises of elements such as water, sand, rocks, hardscapes and soft landscape. The importance on soft landscape which is garden, or merely “Green Elements” is observed through various researches than the importance of other landscape elements.
1.1 Importance of the Subject:

The healing power in green elements may not be a new or recent discovery. The capacity in the green elements to contribute positively both physically and psychologically in creating conducive ambiance is a known fact. What is required is: “A quantitative research on the role of landscape architecture in and around hospital premises as an aid to medical treatment.”

Further, the scientific researches in this direction will have the below listed benefits:

- Interaction with plants, both passive and active, can change human attitude, behavior and physiological responses.
- The stress-reducing benefits of passively viewing plants in natural settings are well documented.
- Such documented benefits of trees + the environment of illness = Create a conducive environment for patients / non-patients.
- This research shall be constructive in its direct or indirect benefit to the society at large.
- Hospital is the place where greater part of the population will be sick and is the place which is psychologically appalling. Up to the extent possible, attempt should be made to create the ambiance of the hospitals within the range of ‘Comfort zone’ for both patients and non-patients.

1.2 Aim and Objectives:

The aim of the research is to find the appropriate landscape design solution to re-investigate ambiance helpful as an aid to medical treatment in hospitals.

The Objectives of the research are:

1. To identify the types of vegetation suitable for both external and internal landscaping in general, in hospital premises.
2. To find the possibility of internal landscaping in hospitals.
3. To develop strategies, method of plantation, maintenance etc., for internal landscaping in hospitals.
4. To determine ratio between built up area and landscape area.
5. To formulate design guidelines.
6. This research attempts to create two sets of experiments. The first one is done concentrating on the External Landscaping of Hospitals and the second one on the Internal Landscaping of Hospitals. The first experiment narrows down in finding out the ratio (x:y)
for a typical hospital premise, where ‘x’ is the minimum built up area required for ‘n’ number of occupants (patients, non-patients, hospital-staff, etc.) and ‘y’ is the minimum open space required for the medicinal landscape to be executed for a Healthy Hospital. The second experiment is carried out in laboratory with 25 selected species of vegetation. The second experiment will be focused on finding out the optimum requirement of species in the indoor spaces with respect to the human’s five senses.

1.3 Scope of the Research:

1. This research study attempts to re-investigate suitable and conducive ambiance for Medical treatment using Green Elements.
2. Research Studies include both internal and external landscaping as a tool to create desired ambience.
3. The belief that plants and gardens are beneficial for patients in healthcare environments is more than one thousand years old, and appears prominently in Asian and Western cultures [Ulrich et. al, 1992]. Healthcare administrators everywhere are under strong pressures to control or reduce costs yet increase care quality. A limited amount of research suggests that viewing settings with plants or other nature for a few minutes can promote measurable restoration even in hospital patients who are acutely stressed. In the sequence of such researches, this research is the next step of reinvestigating the entire ambience of hospital for all the people occupying there, using landscape tools.
4. The measurable restoration in patients due to landscape is described in terms of ‘Satisfaction Factor’ (SF), which is elaborated in the first experiment. The scope of such measurement is very imperative to calculate the range of comfort zone of the users.

1.4 Limitations of the Research:

1. This research is precisely concentrating on hospital premises.
2. The study is done with respect to Chennai, where tropical vegetation is concentrated.
3. This research does not include the study of landscape elements such as role of water, rocks, soil, etc.
4. This research does not aim towards finding treatment methods or use of green elements as medicines to cure health related problems.
5. Out of the main elements (topography, hydrology, hardscape, etc.) of landscape design, the research concentrates and includes in-depth study of only Green Elements. Other elements might find references but no in-depth study is undertaken.

6. The research is further narrowed down for both internal and external spaces of the hospitals and the analysis is concentrated with respect to the tropical warm humid climate.

1.5 Hypothesis:

1. Despite healing both mental and physical illness of man, the interaction with plants, both passive and active, can change human attitudes, behaviors, and physiological responses.

2. The effects on healing the stress is attributed with the presence of plants. Such stress-reducing benefits of passively viewing plants in natural settings can certainly make positive contribution to recovery.

3. Patients in windowless rooms in hospitals have lower rate of recovery and rate of the physical conditions of their stay as less "pleasant and stimulating" than people in windowed settings with the view of Green elements.

4. As stated above, this research is to find the appropriate landscape design solution to create ambience helpful as an aid to treatment in hospitals. Every man senses his surrounding ambience through the five senses he is possessing, which are seeing (eyes), smelling (nose), tasting (tongue), sensing (skin) and hearing (ear). Creating conditions within the range of ‘Comfort zone’ and by a hygienic ambience for all these five senses will enable the man access his surrounding environment more comfortably; and this rule is applicable for any premises; not just hospitals. But the extent of creating the comfort for all these five senses varies in hospitals due to the characteristic of hospitals.

5. This research is carried out in two experiments:
   a. Experiment No.1 – Survey in the hospital premises with the people to find out their range of comfort zone for external environment of hospitals.
   b. Experiment No.2 – Laboratory tests to evaluate the quantitative analysis of all the five senses with respect to the vegetation for internal environment of hospitals.