CHAPTER-3

REVIEW OF LITERATURE

The review of literature entails the extensive review which provides a source of insight into research and helps in finding solution. It is presented into seven sections including theoretical frame work.

SECTION I: Studies on Elderly population and distribution in developed and developing countries, magnitude, consequences, feminization and living arrangements of ageing:

“Population ageing, which entails an increasing share of older persons in the population, is a major global demographic trend which will intensify further during the twenty-first century. For statistical purposes, and unless otherwise specified, in this report older persons are considered to be those aged 60 years or older”.

Burden/Magnitude of ageing:

“In 2012, people aged 60 or over represent almost 11.5 per cent of our total global population of 7 billion. By 2050, the proportion is projected to nearly double to 22 per cent.” Error! Reference source not found.

“In 2000, there were more people aged 60 or over than children under 5”. Error! Reference source not found.

Geographical differences in ageing:

“While overall the world is ageing, there are differences in the speed of population ageing. It is happening fastest in the developing world. As most of the developed world is urbanized and most of the developing world still has a high proportion of the population living in rural areas, the proportion of older people by
area at the global level is higher in urban than in rural areas.” Error! Reference source not found.Error! Reference source not found.

Feminization of ageing:

“Women tend to live longer than men, with the result that there are older women worldwide than older men. In 2012, for every 100 women aged 60, there were 84 men. The proportion of women rises further with age. For every 100 women aged 80 or over worldwide, there are only 61 men”. Error! Reference source not found.

“Currently, in many countries, older women have lower levels of education than older men because as girls they were denied the opportunity to go to school or dropped out before completing their education”. Error! Reference source not found.

Consequences of ageing:

“Population ageing has significant social and economic implications at the individual, family, and societal levels. Financial security is one of the major concerns as people age”.

Living arrangements:

“Living arrangements of older people are changing with modernization of societies.” (13).

“Family sizes are decreasing and intergenerational support systems are changing”.

Indian scenario:

“Though Institutionalization of the elderly is a new phenomenon in India, a new trend of admitting more and more senior citizens hailing from the Indian middle class background to old age homes is being observed in recent times. Number of old-age homes has been constantly increasing in many metropolitan and urban areas in India. Changing social structure of Indian society has been reviewed in many studies. Studies have concluded that the breaking down of kinship and family organisations has put the elderly in a state of helplessness, isolation and economic dependence.” Error! Reference source not found.

“A study was conducted by Viveki RG et al. (2013) in Karnataka, to study Socio demographic dimensions and common health problems of inmates of old age
homes and to know various reasons for their admissions and their leisure time activities in old age homes. The study has found that that majority of inmates are females, belonging to the nuclear families. Many of these inmates were widowed and having no children or children staying in abroad.” Error! Reference source not found..

SECTION II: Studies on Health of Elderly - Non communicable diseases in elderly, Psychiatric disorders in elderly, Psychiatric disorders in people living in old age homes.

Health of elderly:

“Health is another major concern for older persons. The numbers of older people affected by psychological problems are increasing due to population ageing. Their management has become an increasing concern for both developing and developed countries”.

Non communicable diseases in elderly:

“Non-communicable diseases (NCDs) especially hypertension is rapidly emerging as major public health problem in many low and middle income countries (LMICs), including India. This is resulting in huge social, economic and developmental implications, apart from direct health impact. In India, hypertension is the leading NCD risk and estimated to be attributable for nearly 10 per cent of all deaths”. Error! Reference source not found..

“Adult hypertension prevalence has risen dramatically over the past three decades from 5 per cent to between 20-40 per cent in urban areas and 12-17 per cent in rural areas. The number of hypertensive individuals is anticipated to nearly double from 118 million in 2000 to 213 million by 2025”. Error! Reference source not found..

“It is estimated that 16 per cent of ischaemic heart disease, 21 per cent of peripheral vascular disease, 24 per cent of acute myocardial infarctions and 29 per cent of strokes are attributable to hypertension underlining the huge impact effective hypertension prevention and control can have on reducing the rising burden of cardiovascular disease (CVD)”. Error! Reference source not found.
In their “Chennai Urban Rural Epidemiology Study (CURES-52).” Mohan, V., et al. have studied 26,001 individuals of age more than 20 years and have reported the prevalence of Hypertension as 20%. In this study 25.2% elderly had isolated systolic hypertension. “Among the total hypertensive subjects, only 32.8% were aware of their blood pressure, of these, 70.8% were under treatment and 45.9% had their blood pressure under control”. Error! Reference source not found.

Kaur, P., et al. in their 2012 study on "Prevalence, awareness, treatment, control and risk factors for hypertension in a rural population in south India", have studied 10,463 subjects and reported the prevalence of hypertension as 21.4% “Overall 20% were on treatment and 6.6% had blood pressure control”. Error! Reference source not found.

Anchala, R., et al. in “their systematic review and meta-analysis on hypertension in India conducted in 2014, have reported that Overall prevalence for hypertension in India was 29.8%. The review also reported that about 33% urban and 25% rural Indians are hypertensive. Of these, 25% rural and 42% urban Indians are aware of their hypertensive status. Only 25% rural and 38% of urban Indians are being treated for hypertension. One-tenth of rural and one-fifth of urban Indian hypertensive population have their BP under control”. Error! Reference source not found.

“Country level data on levels of blood pressure control in various populations are not available from India. Careful observation of many cross sectional studies conducted across the country reveals that, in many populations, the blood pressure control is sub optimal and there is huge dependence on pharmacological therapy, with sub optimal utilization of various non pharmacological preventive and control measures”. (45)

Psychiatric disorders in older people:

“In India, there is a paucity of systematically conducted epidemiological studies on mental health problems among the elderly. The realistic planning of mental health care services and an assessment of prevalence of psychiatric disorders on the elderly population living in various settings is the need of the hour”. Error! Reference source not found.
“Mental health surveys have reported variable psychiatric morbidity in the elderly viz., 2.23% (KC D et al. 1970) Error! Reference source not found., 33.3% (Nandi DN AS et al. 1975) Error! Reference source not found.; 17.39% (Premarajan KC DM et al. 1993) Error! Reference source not found.; 8.1% (urban) and 4.9% (rural) (Reddy VM CC et al. 1998) Error! Reference source not found.; 35% (Ramachandran V MM et al. 1982) Error! Reference source not found.; 42.0%, (Prakash R CS et al. 2004) Error! Reference source not found.; 8.9% (Rao AV MT, 1982) Error! Reference source not found. and 23.6% (rural and urban) (RK S, 2007).” Error! Reference source not found.

“A study conducted by Reddy NB et al. (2012) among 800 rural elderly subjects aged 60 years and more, living in ten randomly selected villages, served by the Rural Health Training Center (RHTC), Valadi, in Tamilnadu, India. They have reported majority of the subjects to be widows / widowers, illiterates, living with family, and showing economic dependency. The prevalence of cognitive impairment was 43.25%, and the depression was 47.0%”. Error! Reference source not found.

“In a study by Seby K et al. (2011), to study the frequency and pattern of psychiatric morbidity and it’s association with physical illness in an elderly urban population, the authors have used General Health Questionnaire-12, Mini Mental State Examination, CAGE Questionnaire and Geriatric Depression Scale apart from physical examination and consulting the available documents. Other family members were also interviewed to verify the information. The study found, Psychiatric illnesses in 26.7% of the subjects while physical illnesses were present in 69.8% of the population surveyed”. Error! Reference source not found.

“In a study conducted by Tiwari et al. (2013), to diagnose psychiatric morbidity in rural population from randomly selected two revenue blocks of Lucknow district, Uttar Pradesh, the authors have reported 23.7 per cent (95% CI=21.89-25.53) overall prevalence of psychiatric morbidity in rural older adults”. Error! Reference source not found.

“In another study conducted by Tiwari et al. (2014), the prevalence of neuropsychiatric disorders (with/without co morbidities) was 11.8% in the elderly (60 years and above) highest being in the 60-69 years age group”. Error! Reference source not found.
Psychiatric disorders in people living in old age homes:

“A study conducted by Viveki RG et al. (2013) in Karnataka, has concluded that, Old age homes enable the elderly to remain sociopsychologically healthy and lead active lives if effective medical and emotional support is given”. Error! Reference source not found.

“A study by Singh AP et al. (2012), have done a comparative study on the prevalence and pattern of psychiatric disorders in geriatric population in old age homes with those living with the families; and its association with the socio demographic variables. The authors have concluded that, the overall prevalence of Psychiatric disorders was less in the geriatric population in old age homes because of the better availability of care, being engaged in regular activities as per the schedule, group works, etc.” Error! Reference source not found.

“In another study by Tiwari SC et al. (2012), depression (37.7%) was found to be the most common mental health problem followed by anxiety disorders (13.3%) and dementia (11.1%). A majority of the inhabitants (64.4%) were having psychiatric morbidity”. Error! Reference source not found.

“A study was conducted by Depla MF et al. (1999), involving participants in six projects set up jointly by mental health care facilities and homes for the elderly. These projects were designed to offer protection and guidance in residential homes to older people whose psychiatric problems have rendered them permanently dependent on professional care. The primary focus of the study was on their problems and care needs. Structured interviews were conducted with 136 residents and with their supporting and treating staff. In this group, only 37% of the residents were free of cognitive problems, and only 18% had no physical impairments”. Error! Reference source not found.

“A study by Verma GR et al. (2010) reported that the residents living in a home for the elderly scored better in all domains except for role-physical and role-emotional. The authors have recommended, setting up more charity-based homes for the elderly may be one of the options for relative betterment of the Quality of Living of the elderly, particularly those who are socially and economically deprived”. Error! Reference source not found.

SECTION III: Studies on History and progression of music therapy
One of the major negative perceptions regarding various main stream therapeutic systems was that they deal with the symptoms of the disease instead of dealing with the person as a whole. Others are, their poor efficacy in chronic and psychological conditions, higher cost and concerns regarding their safety. “Various Complementary therapies came in to limelight as result of strong desire for holistic treatment”, which have also offered solutions for the above mentioned problems. “Music therapy has been evolving as one of the key complimentary therapies, with a considerable historical background. Evidence regarding the therapeutic use of music in history dates back to writings of ancient Greek philosophers Aristotle and Plato”. (51).

“A brief account of music therapy, which has been rooted in antiquity and pervaded almost all civilizations across the globe, may help us to understand the perspective and current status of the music therapy in a better manner. “The early Chinese thought that music had healing powers and that it also had the ability to please. Confucius believed that the nature of the music in a society reflected that very society and if it changed, so did society. Pythagoras taught his students that certain musical chords, melodies, melodic intervals and rhythms could produce particular responses in people such as improving health, increasing the speed of wound healing and positively changing behaviour. Similarly, Aristotle thought that flute music could 'arouse strong emotions and thus often lead to a state of cathartic release'. However, it was Zenocrates, Sarpander and Arion who were regarded as the first to regularly use music as a therapeutic intervention. Many centuries later, and as an indication of the more recent use of music as therapy, it is known that music was used to treat the mental health problems of notable figures from history such as King Philip V of Spain, King Ludwig II of Bavaria and King George II of Great Britain. An important early book on the subject was entitled The Influence of Music on Health and Life, written by Dr Hector Chomat in 1846. This book described the use of music in healing many cases, including that of epilepsy”. Error! Reference source not found.

“The North American Obkibwa healers would sing songs to the sick and the native Australians used song as a form of oral history and the sound of the bullroarer enabled them to be contacted by the gods. Buddhist belief and healing practice centres on the singing of mantra and sutra. Ancient Indians (particularly Hindus) also
attributed great power to music, believing, for example, that singing could bring about the relief of famine by inducing rain.”

Raga Therapy in India:

“The ancient Indians, especially Hindus had relied on music for its curative role: the chanting and toning involved in Veda mantras in praise of God has been used from time immemorial as a cure for several disharmonies in the individual as well as his environment. Several sects of 'bhakti' such as Chaitanya Sampradaya, Vallabha Sampradaya have all accorded priority to music. Historical records indicate that one Haridas Swami who was the guru of the famous musician in Akbar’s time, Tan Sen is credited with the recovery of one of the queens of the Emperor with a selected raga”.

“The great composers of classical music in India called the 'Musical Trinity', - who were curiously the contemporaries of the ‘Trinity of Western Classical Music, Bach, Beethoven and Mozart’ – were quite sensitive to the acoustical energies. Legend has it that Saint Thyagaraja brought a dead person back to life with his Bilahari composition Naa Jiva Dhaara. Muthuswamy Dikshitar’s Navagriha kriti is believed to cure stomach ache. Shyama Sastry’s composition Duru Sugu uses music to pray for good health. Living systems show sensitivity to specific radiant energies – be it acoustical, magnetic or electro-magnetic. As the impact of music could be easily gauged on emotions and thereby in mind, it can be used as a tool to control the physiological, psychological and even social activities of the patients”.

“According to an ancient Indian text, Swara Sastra, the seventy-two melakarta ragas (parent ragas) control the 72 important nerves in the body. It is believed that if one sings with due devotion, adhering to the raga lakshana (norms) and sruti shuddhi, (pitch purity) the raga could affect the particular nerve in the body in a favourable manner”.

“While the descending notes in a raga (avarohana) do create inward-oriented feelings, the ascending notes (arohana) represent an upward mobility. Thus music played for the soldiers or for the dancers have to be more lively and up lifting with frequent use of arohana content. In the same way, melancholic songs should go for 'depressing' avarohanas. Although it is not a rule, most of the Western tunes based
on major keys play joyful notes, while those composed in minor keys tend to be melancholic or serious”.

“Certain ragas do have a tendency to move the listeners, both emotionally as well as physically. An involuntary nod of the head, limbs or body could synchronize with lilting tunes when played”.

“Raga chikitsa was an ancient manuscript, which dealt with the therapeutic effects of raga. The library at Thanjavur is reported to contain such a treasure on ragas that spells out the application and use of various ragas in fighting common ailments”.

“The usefulness and medical benefits of most of the leading Indian Classical Ragas have been documented in the recent past and it is found that Raga Malkauns as well as Hindolam lower blood pressure and prevent cardiovascular problems.”

Even though the historical evidence regarding the use of music therapy has been documented in many ancient civilizations but “Only in the late nineteenth century and early twentieth centuries after the establishment of scientific foundations of medicine the music therapy has progressed from no science to soft science and to actual brain science in the recent past”. Error! Reference source not found.

Thaut MH et al. in their review of "early music therapy" practices were able to differentiate five different theories and applications of early music therapy. These theories were:

- “Music in Supernatural Petitions: In accordance with the views on illness as caused by supernatural forces, music’s healing function is indirect. It is a form of special communication with magic forces to petition for healing.”
- “Music in Early Science: Causes of illness are not viewed in magical or religious terms. Music is viewed as a model of the physics of the universe, and by studying and listening to it can bring the order and harmony of the universe to the disturbed soul and mind. It can also strengthen education and character.”
- “Music in Rational Medicine: Music’s affective qualities can also provide for release of negative emotional states like depression or grief.”
- “Music in a Physiological Model of Healing: Science and medicine of the Baroque provide a model of healing through the effects of the physical
properties of music on the physiology of the human body and mind via vibrations.”

- “Music in a Psychological Model of Healing: science and medicine of the Baroque still provide a basis for music therapy, but the therapeutic effect of music lies in its affective properties to stimulate appropriate feelings and emotions for healing psychological states of illness.” Error! Reference source not found.

Early twentieth century scientific discovery that “music perception and music playing can create neuroplastic changes has led to the insight that music therapy can address specific brain and behaviour dysfunctions. However, it took a linkage of the neurosciences and musicology to base music in therapy more firmly in the hard sciences and brings the age-old history of music therapy to its present state”. Error! Reference source not found.

In the initial days, majority of the published reports of music and its use have documented the utility of music invention mainly in inpatient settings. The disorders treated included a heterogeneous group of psychiatric and neurological diseases.

“Now, music therapy has also moved into the field of primary care. The range of diseases in which its role has been documented had expanded gradually and included tinnitus, cardiac rehabilitation patients, various malignancies, palliative care etc. With this new evidence base, and with an imperative to continuum of care, community music therapy programs have come into limelight. Over a period of time these new initiatives providing Home Based Music Therapy (HBMT) have gained increasing importance.” Error! Reference source not found.

In recent years, many studies have also documented utility of music therapy as a non pharmacological approach in reducing the pain and anxiety in intensive care set ups. Error! Reference source not found.

So finally it can be concluded that, art, dance, and music therapy have been in existence since time immemorial and gained significance as an important form of complementary medicine in future. “Although the current body of solid research is small compared with that of more traditional medical specialties, the arts therapies are now validating their research through more controlled experimental and descriptive studies. The arts therapies also contribute significantly to the humanization and
comfort of modern health care institutions by relieving stress, anxiety, and pain of 
patients and caregivers. Arts therapies will greatly expand their role in the health care 
practices of this country in the twenty-first century”. Error! Reference source not 
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SECTION IV: “Studies on the effect of music therapy on psychological problems 
of the elderly”:

“A study conducted in 1997 by Cruise CJ et al. on elderly patients who were 
undergoing cataract surgery has evaluated the effect of music therapy. The authors 
found that, the people undergoing surgery were “more satisfied with their experience 
if they heard relaxing music rather than relaxing suggestions or white noise or 
operating room noise”. But anxiety level remained same with all types of auditory 
stimuli. Basing on the study findings, the authors felt that “music plays a role in 
enhancing this satisfaction, and is a useful tool in outpatients undergoing peripheral 
procedures with monitored anaesthetic care”. Error! Reference source not found.  

“In a study by Bekiroglu,T., et al. conducted in 2013, the authors have 
evaluated the impact of Turkish classical music on blood pressure and anxiety levels, 
by a randomized controlled trial. This trial was performed on 60 elderly home 
residents, who were suffering from hypertension. Hamilton anxiety scale was used to 
assess the anxiety levels in the study. The subjects were randomly allocated to two 
treatment groups and made to listen to Turkish classical music (music therapy) or 
were asked to rest (control group) for 25 min. The authors have observed a 13 mmHg 
mean reduction in systolic blood pressure in music therapy group, compared to 6.50 
mmHg in the control group. Both the treatment groups had similar amount of 
reduction of 10 mm of Hg, in diastolic blood pressures”. Error! Reference source 
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“Blackburn R et al. reviewed published literature on effect of music therapy 
on various behavioural aspects of elderly people suffering from dementia, in United 
Kingdom. After reviewing six studies published on the subjects, the authors 
concluded that “music therapy may have potential benefits in reducing anxiety, 
depression and agitated behaviour displayed by elderly people with dementia as well 
as improving cognitive functioning and QOL. Other aspects of music therapy, like 
lower treatment cost, safety and feasibility of administration by trained mental health
nurses or even care takes of the patients were also emphasized by the reviewers”.

“Chu H. et al. in randomized controlled study conducted in 2014 evaluated the impact of group music therapy in elderly persons with dementia. It was found that music therapy appeared to reduce elders’ depression and also delayed the deterioration of cognitive functions. There was a strong positive response especially in short-term recall function. The authors highlighted non invasive and inexpensive nature of music therapy and recommended Group Music therapy as very useful intervention among elderly persons with mild and moderate dementia”. Error! Reference source not found.

“Jimenez-Palomares, M., et al. have conducted a “systematic review of randomized controlled trials, case-control and pilot studies published from January 2000 to January 2012 using the Cochrane Database of Systematic Reviews, MEDLINE, Dialnet and CSIC”. The review mainly focused on studies, comparing the music therapy with other regular therapeutic and occupational treatments, in patients over 65 years of age, suffering from moderate dementia. This review suggested that Music Therapy had a significant positive influence on elderly people with dementia by means of improving their level of behavioural and cognitive functioning. The social participation of subjects was also reported be enhanced by music therapy”. Error! Reference source not found.

“Kneafsey. R & et al., in their review conducted in 1997, has reviewed studies published on therapeutic use of music in a care of the elderly setting. The authors particularly focused the review on the utility of music in elderly patients with dementia and Parkinsonism. The role of music therapy on pain control was also briefly studied. This review suggested significant positive impact on cognitive function and other subjective aspects of patients well being in elderly population”. Error! Reference source not found.

“Leners, J. C. et al. in 2013 review titled ”Music and elderly” have reviewed the role of music therapy in elderly subjects as an educational, recreational activity and as a therapeutic approach”. “They have concluded that music therapy is a low cost intervention, with minimal side effects, with utility in disorders ranging from pulmonary disorders to a lot of neurological chronic diseases, including aphasia, dementia or Parkinson. They have specially emphasized the remarkable place the
music therapy can have in expressing or supporting strong emotional feelings”. **Error! Reference source not found.**

“Ashida S, et al. in their study has evaluated the effect of reminiscence music therapy on changes in depressive symptoms in elderly persons suffering from dementia. Elderly dementia subjects, residing at two different residential care facilities were included in the study. The study results indicated that, participation in small group reminiscence focused music therapy groups will help to minimize the depressive symptoms in elderly people suffering from dementia”. **Error! Reference source not found.**

“Chan MF, et al. in their 2010 study have attempted to determine the effect of music on sleep quality, vital signs and depression levels quality in elderly people. In this randomized controlled trial the participants were allocated to either to listening to their choice of music for 30 minutes per week, for 4 weeks or the control group. Blood pressure, depression levels, heart rate, and sleep quality were assessed at weekly intervals. The study has reported statistically significant reductions in geriatric depression scores and sleep quality at the end of four weeks. But the study has found no statistically significant differences between the groups in other outcome parameters”. **Error! Reference source not found.**

“Chan MF, et al. in 2009 in their randomized controlled study to determine the effect of music on depression levels in elderly people have randomly allocated 47 elderly people to music therapy and control groups. Blood pressure, heart rate, respiratory rate (RR), and depression level were the outcome variables in the study”. The study has reported, “statistically-significant decreases in depression scores (P < 0.001) and blood pressure (P = 0.001), HR (P < 0.001), and RR (P < 0.001), in music therapy group after 1 month”. “The authors have concluded that nurses can administer music as an effective intervention for elderly patients with depressive symptoms in the community setting”. **Error! Reference source not found.**

“Chang FY, et al. in 2010, studied the effect of a lunch time music programme on problem behavior among institutionalized older residents affected by dementia. The results showed that music programme reduced, significantly, physical and verbal aggressive behavior among the older residents with dementia. The study also pointed out that there can be time lag of one-week for the music programme to demonstrate significant effect on the residents. The authors recommended music therapy to address
problem behavior among the older with dementia”. Error! Reference source not found..

“Chikamori F et al. in their 2004 study have evaluated the role of music therapy in minimizing the peri-operative mental dysfunction of elderly patients undergoing surgery. Basing on their study findings, the authors concluded that the music therapy in elderly patients does not change postoperative hemodynamic parameters, but helps to maintain peri operative mental functioning”. Error! Reference source not found..

Gerdner LA in 2000, “Effects of individualized music to classical relaxation music on the frequency of agitated behaviors in elderly persons with Alzheimer's disease and related disorders, showed a significant reduction in agitation during and following individualized music compared to classical relaxation music”. Error! Reference source not found..

“Guetin S, et al. in 2009, Effects of music therapy on anxiety and depression in patients with Alzheimer’s type dementia, reported significant improvements in anxiety (P< 0.01) and depression (P< 0.01) in the music therapy group from week 4 and until week 16. The effect of music therapy was sustained for up to 8 weeks after the discontinuation of sessions between weeks 16 and 24 (P < 0.01). The authors also recommended that, considering the simplicity of music therapy, it can easily be integrated in a multidisciplinary programme for the management of Alzheimer's disease”. Error! Reference source not found..

“Hars M, et al. in 2014, have evaluated four years outcomes of music-based multitask training on physical function and fall risk in older adults, who are at increased risk of falls received a 6-month music-based multitask exercise program. After 4 years follow up there was significant gait (gait speed, P = 0.006) and balance (one-legged stance time, P=0.015) improvements in the intervention group. The program also reduced the risk of falling. The study findings suggest that long-term maintenance of a music-based multitask exercise program is a promising strategy to prevent age-related physical decline in older adults”. Error! Reference source not found.)

“Hori M, et al. in 2014 evaluated the effect of at-home music therapy intervention using video phone (Skype) for elderly people with dementia. The study
has demonstrated the feasibility of conducting music therapy for individuals with dementia using a video phone. The results showed that participants demonstrated significant signs of improvement as measured by the smile degree (Smile scan) and Behavior Pathology in Alzheimer's Disease (BEHAVE-AD) scale”.

“A randomized controlled study by Iliya YA, et al. in 2014, has examined the effectiveness of music therapy as grief therapy for adults suffering from mental illness and complicated grief. The study revealed a greater decrease of grief symptoms in the experimental group, compared with the control group”.

“Im ML, et al. in 2014, have examined the effects of art and music therapy on depression and cognitive function in a group of the elderly and revealed a statistically significant difference in before and after treatment depression scores of participants, with music therapy”.

“Lee YY, et al. in 2010, studied the effect of music on the quality of life in a group of community-dwelling older people in Hong Kong. The study has randomly allocated a total of 66 older people to either a 30-minute music intervention or a rest period for 4 weeks. In this study, quality of life improved weekly in the music group, indicating a cumulative dose effect, and a statistically significantly better quality of life was found over time in each sub-score for those in the music group compared with the controls. The study has concluded that being engaged in music activities can help a person to connect with their life experiences and with other people, and to be more stimulated. Music is a non-invasive, simple and inexpensive therapeutic method of improving quality of life in community-dwelling elders”.

SECTION V: “Studies on the effect of music therapy on Biophysical problems in Old age people:

“Bekiroglu, T., et al. in their 2013 study on effect of Turkish classical music on blood pressure: a randomized controlled trial in hypertensive elderly patients, have evaluated the effect of Turkish classical music on blood pressures and anxiety levels among elderly population. Elderly subjects were randomly assigned to either music therapy and control groups. The mean reduction in systolic blood pressure was 13.00
mmHg in the music therapy group and 6.50 mmHg in the control group. The median reductions in diastolic blood pressures were 10 mmHg both in the music therapy and control groups”.  

“Teng, X. F., et al. in their 2007 study on the effect of music on hypertensive patients has randomly assigned 30 people between 63-93 years to either music therapy or control groups. Music therapy was given, 25 min every day for 4 weeks. After 4 weeks, the average decline of systolic blood pressure (SBP) was 11.8 mmHg and diastolic blood pressure (DBP) was 4.7 mmHg with music therapy. No significant changes in SBP or DBP were observed in the control group”.  

“Tse, M. M., et al. in 2005, studied the effect of music therapy on postoperative pain, heart rate, systolic blood pressures and analgesic use following nasal surgery. They showed that the prevalence of unrelieved postoperative pain is high and may lead to adverse effects including prolonged hospitalization and delayed recovery. Distraction may be an effective pain-relieving strategy, and can be implemented by several means including affective imaging, games, and possibly music. The aim of this study was to explore the effect of music therapy on postoperative pain. Significant decreases in pain intensity over time were found in the experimental group compared to the control group (P< 0.0001). In addition, the experimental group had a lower systolic blood pressure and heart rate, and took fewer oral analgesics for pain. These findings suggest that music therapy is an effective non-pharmacologic approach for postoperative pain management”.  

“Trappe, H.-J. in 2012 studied the effects of music on the human being and concluded that music may not only improve quality of life but also effect changes in heart rate (HR) and heart rate variability (HRV). A greater modulation of HR and HRV was shown during musical performance compared to listening to music. Music significantly decreases the level of anxiety for patients in a preoperative setting compared to midazolam (STAI-X-1 score 36) (p<0.001). Listening to music while resting in bed after open-heart surgery leads to significant differences in cortisol levels between the music (484.4 mmol/l) and the non-music group (618.8 mmol/l) (p<0.02).”
“In a study conducted by Claudia Regina et al. in 2009 on Music Therapy Effects on the quality of Life and the Blood Pressure among the hypertensive elderly patients. The mean systolic blood pressure before and after the music therapy was 149.7± 6.4 mmHg and 138±13.4 mmHg respectively. The diastolic blood pressure was 89.1±9 mmHg and 80.1±10.6 mmHg respectively. There was an elevation of scores on all variables indicating an improvement in the quality of life of those who participated in the music therapy sessions after three months of intervention”. Error! Reference source not found.

“Maeona K. et al. in 2001 study titled, a trio to treasure: the elderly, the nurse, and music, have concluded that music is a powerful tool for maintaining and restoring health and is particularly suited to elder care. Music can be used to induce relaxation, alter moods, and create distraction. Music’s effect is attributed to its vibrational properties, which are processed through the senses and integrated within the central nervous system. Nurses have a major responsibility to understand, appreciate and use music in their practice. In summary, music as therapy fits well with nursing given its tradition of using noninvasive, holistic means to contribute to health and healing. The nurse’s role in advocating for and using music in elder care is important. Understanding the varied effects and individual responses to music for health and healing is primary. Once understood, the use of music in providing elder care can be appreciated. Once appreciated, the performance may be outstanding”. Error! Reference source not found.

“Mockel, M., et al. in 1994, have studied immediate physiological responses, including cardiovascular, hormonal and mental changes of a group of healthy volunteers to different types of music. Pulsed wave Doppler echocardiography, blood sample analysis and psychological testing were used before and after listening to three different examples of music: a waltz by J. Strauss, a modern classic by H. W. Henze, and meditative music by R. Shankar. To assess small haemodynamic changes, mitral flow, which reflects left ventricular diastolic behaviour, was measured by Doppler ultrasound. Heart rate, arterial blood pressure and plasma concentrations of adrenocorticotropic hormone, cortisol, prolactin, adrenaline, noradrenaline, atrial natriuretic peptide (ANP) and tissue plasminogen activator (t-PA) were determined simultaneously. Transmittal flow profile is characterized by early E-wave and late atrial induced A-wave. Velocity-time integrals were measured and the atrial filling
fraction was calculated. The mental state was measured by using a psychological score (Zerssen) with low values (minimum 0) for enthusiastic and high values (maximum 56) for depressive patterns. Music by J. Strauss resulted in an increase of atrial filling fraction (AFF; 29% vs 26%; P<0.05) and ANP (63 pg·ml\(^{-1}\) vs 60 pg·ml\(^{-1}\); P<0.05). The mental state was improved (Zerssen: 6.5 vs 11 points; P<0.05).

After the music of H. W. Henze prolactin values were lowered (7.7 ng·ml\(^{-1}\) vs 9.1 ng·ml\(^{-1}\); P<0.01). The music of R. Shankar led to a decrease of cortisol concentrations (57 ng·ml\(^{-1}\) vs 65 ng·ml\(^{-1}\); P<0.001), noradrenaline concentrations (209 μg·l\(^{-1}\) vs 256 μg·l\(^{-1}\); P<0.01) and t-PAantigen concentrations (1.1 ng·ml\(^{-1}\) vs 1.4 ng·ml\(^{-1}\); P<0.05).

Heart rate and blood pressure remained unchanged during the whole experiment. We concluded that different types of music induced changes of left ventricular diastolic function and plasma hormone concentrations. After rhythmic music (Strauss) AFF and ANP increased significantly, the mental state being improved. Meditative music (Shankar) lowered plasma cortisol, noradrenaline and t-PA concentrations; the observed increase of early left ventricular filling was not statistically significant. Prolactin concentrations decreased after modern music (Henze). Thus, it would seem to be possible to detect cardiovascular changes following different types of music by Doppler ultrasound and hormone analysis, meditative music having promising therapeutic implications in the treatment of conditions of stress.”

“D. K. Aruldas et al. in their 2011 study titled, a review on influence of music on brain activity using signal processing and imaging system, have evaluated the scaling in the EEG in three groups of subjects, no music, listening to classical music and listening to rock music by DFA algorithm method. In this review, various techniques used to study the effect of music on brain function were discussed. Effect of music on brain function was studied using EEG, evoked potential and f-MRI. While listening to music, the variations in the brain activity were determined and results were compared between musicians and non-musicians. Most of the studies showed that the brain active ability is improved by classical music and decreased by rock music. In musicians, the left hemisphere of brain region was dominant and the right hemispheric dominance in non musicians was observed while listening to music. When the brain processes music, the frontal EEG activity is increased. Some of the results obtained failed to clarify the effects of music on learning. These issues should be addressed in the future research. This
study put forward that music can be used as an effective relaxation and stress management tool. In most of the software industries, due to cognitive workload (stress) employees quit their job. Music can used to relieve stress among employees while performing cognitive tasks. Music can be used to cure insomnia, hypertension, etc.” Error! Reference source not found..

“Another study in 2013 has reported that a reduction of mean systolic blood pressure by 8.6 mmHg and mean diastolic blood pressure by 5.8 mmHg, pulse rate by 5.2 beats per minute and mean respiratory rate by 2.5 per minute irrespective of various socio demographic and behavioral factors in music therapy group compared to control group”. Error! Reference source not found..

“Laukka, P. in his 2006 study, Uses of music and psychological well-being among the elderly living in Sweden. The study results showed that listening to music is a common leisure activity encountered in many everyday situations, and that listening to music is a frequent source of positive emotions for older adults. Also, the participants reported using a variety of listening strategies related to emotional functions (e.g., pleasure, mood regulation, and relaxation) and issues of identity, belonging, and agency. The associations between listening strategies and well-being were explored through correlation and multiple regression analyses where the influence of background variables was controlled for. Health status and personality were the most important predictors of well-being, but some listening strategies were also significantly associated with psychological well-being. The results give important insights into older adults uses of music in everyday life and give clues regarding possible relationships between musical activities and well-being.” Error! Reference source not found..

SECTION VI: Theory of gross physical anatomy in relation to EEG

The nervous system

To understand and appreciate brain electrical activity and EEG, we need to understand the gross anatomy and physiology of the nervous system of human being.

The Nervous System

It consists of two components; central and peripheral. It is further consists of three independent components; sensory, motor and integrating inter neurons and can also be divided into two semi-independent systems.
a) Voluntary/Somatic. This allows us to consciously deal with the external environment.

b) Involuntary/ Autonomic nervous system (ANS). This deals with the internal functions.

The nervous system, along with the endocrine system, automatically controls most of the functions for the body without any conscious effort. (95).

**The Autonomic Nervous System (ANS)**

ANS is also known as the vegetative, visceral, or involuntary nervous system. The word “autonomic” was introduced for two reasons;

1) The ganglia of this system are situated outside the central nervous system.
2) Many of the viscera innervated by this system, e.g., heart, intestines, or uterus, show spontaneous rhythmic activity when suspended in a suitable medium after the removal from the body.

However, in vivo, the activities of the autonomic nervous system are coordinated with those of the somatic nervous system and there are reflex pathways and centers at different levels by which this integration is affected. From anatomical, physiological and pharmacological viewpoints the autonomic nervous System falls naturally into two main divisions:

1) The Sympathetic or thoracic lumbar outflow.
2) The Parasympathetic or Cranio-sacral outflow.

**The Sympathetic Nervous System (SNS)**

The cells of origin of this division are situated in the lateral horns of the spinal cord (intermedio lateral) from the 8th cervical or 1st thoracic to the 2nd or 3rd lumbar segments. The ganglia are arranged in three systems or groups: (A) Paravertebral, (B) Prevertebral and (C) terminal (or peripheral).

A. The Paravertebral Ganglia and the gangliated cord. The paravertebral group lies in close relation to the vertebral bodies and consists, on each side of a series of some 22 ganglia connected together by intervening fiber tracts to form an odular cord extending from the neck to the front of the coccyx. This is known as the sympathetic chain. The sacral portion of the two sympathetic trunks converges below and fuses upon the anterior surface of the coccyx to
form a terminal swelling-theccocygeal ganglion or ganglion impar.

B. The Prevertebral Ganglia. These lie in the thorax, abdomen and pelvis in relation to the aorta and its branches. There are three types of ganglia; (a) The Celiac/Solar ganglion, (b) The superior mesenteric ganglion and (c) The inferior mesenteric ganglion. The third one is rarely present in man.

C. The Terminal Ganglia. These consist of small collection of ganglion cells situated in close relation to the innervated organs, especially those of the pelvis, e.g., the bladder and rectum.

The Parasympathetic Nervous System (PNS)

PNS is situated at three different levels of the central nervous system viz., the midbrain, the medulla oblongata and the sacral part of the spinal cord as follows. PNS ganglia are found on the organs innervated by the system. Integration of cranial and sacral components is essential for minimizing the ill effects of stress etc. (96).

The Autonomic Integrating Components

The Autonomic impulses are integrated at several hierarchical levels listed below.

1) The cerebral cortex and the limbic system act to produce behavioral component of the autonomic response over the full range of environmental challenge.
2) The hypothalamus acts to produce and integrate behavioral, autonomic and endocrine response over the full spectrum of physiological changes concerned with the survival of the individual and the species.
3) Reticular centers in the brain stem, such as cardiac and respiratory center, coordinate the activities of individual organ system.
4) Pre-ganglionic autonomic motor neurons modulate reflex autonomic activity in large segment of the body.
5) Post-ganglionic autonomic motor neurons integrate reflex activity in specific organs.
6) Local neurons integrate reflexes in local areas of organs.

Electroencephalogram (EEG)

Recording of brain electrical activity is called electroencephalography and the electroencephalogram (EEG) is a graphic representation of the electric activity of the cerebral cortex and the influence that sub-cortical structures have
upon the cerebral cortex. It is a record of more or less rhythmic fluctuations in the electrical potentials that occur in the brain. The EEG is a graph of voltage against time and is shown as series of biphasic waves, possessing both positive and negative polarities.

“According to Kiloh et al. (1981), the distinction of making the first observations of the electrical activity of the brain goes to Caton, who, in 1875, reported that he had detected current from electrodes placed on the skull or exposed brain in rabbits and monkeys.” (97)

“In 1924, Hans Berger, for the first time, recorded the electrical activity of the human brain from the scalp and in 1931, demonstrated that the potential originated in the brain and is cortical in origin”. (97)

**Anatomy and Physiology**

In order to understand the origin of brain electrical activity that can be recorded from the surface of the head it is necessary to study and understand the following parts, which are generating the activity.

**The Thalamus:**

The nuclei of the thalamus are very specific and act as a gateway for the sensory inputs for reaching the cerebral cortex.

**The Reticular formation:**

The reticular formation is a large complex of nerve cells and fibers, occupies the central region of the entire brainstem (Midbrain, Pons and Medulla). Throughout the brainstem the axons give off branches to innervate the various cranial nuclei.

**Inputs**

There are inputs derived from other areas of cortex, via axons.

1) From the corresponding regions of the opposite hemisphere via the corpus callosum.

2) From the other cortical areas in the same hemisphere via the associated fibres Inputs from sub-cortical structures, particularly thalamus (thalamus passes on to the cortex information received by way of all the sensory pathways, except olfactory path) and reticular formation, cerebellum and basal ganglia.

The inputs from different parts of the body are also carried to the cerebral
cortex. Cranial nerves of Autonomic Nervous system carry sensory information from different organs of the body to the connected nuclei in the brainstem. Other involuntary information is also carried to the cerebral cortex through different nuclei in the brain.

Once input has gained access to the cortex, the information contained within the message of nerve impulses is processed by the cortical neurons. The business of processing is transected in a vertical axis. All this information produces different electrical signals in the brain and if these signals are integrated the resultant electrical charge produces a stable state of the brain.

**Output**

The output from the cortical columns is sent to other cortical areas as well as to the sub-cortical nuclei.

**The neural basis of EEG:**

“According to research findings and reports there are many factors which are responsible for neuro-physiological basis of EEG. The important ones are,

1) The repetitive waves are summated by the synaptic potentials generated by the pyramidal cells in the cerebral cortex.
2) The synaptic potentials are the responses of the cortical cells to rhythmic discharges from thalamic nuclei.
3) The frequencies and amplitudes of the thalamic discharges (and hence of the cortical potential) are determined by the special arrangements of excitatory and inhibitory interconnections among thalamic cells.
4) During activation, inputs from the reticular formation abolish the rhythmic discharges in the thalamic nuclei and cause the cortical potentials to become desynchronized”.

**Normal EEG**

The following waves are seen in the EEG. (21)

**Alpha Waves**

“According to known wisdom, the alpha waves are rhythmical waves that occur at a frequency of between 8 and 13 Hz. In the time domain analysis of the EEG, the alpha rhythm is used as the yardstick for reporting. It has been reported that good regulation of frequency and voltage of the occipital alpha rhythm is characteristic of
the EEG's of approximately 80 per cent of young adults”.

“In 1934, Adrian and Matthews showed that alpha rhythm was predominant in posterior part of brain, especially parietal-occipital region and anterior half was relatively silent. They confirmed that the rhythm was most evident when the subject was relaxed with eyes closed and that it could be diminished or abolished by opening them. This effect is called alpha blocking or de-synchronization. They also showed that the two hemispheres produced alpha rhythm at apparently the same frequency and in approximately equal amounts, although the amplitudes did not always fluctuate together on the two sides”. (97).

“Alpha rhythm is an important rhythm in the quantitative analysis of the encephalogram. The frequency of the occipital alpha rhythm is closely related to cerebral blood flow and has shown that if cerebral perfusion falls below a certain level, the occipital alpha rhythm slows. It also represents the calm and quite reflective brain activity and mind.”

**Beta Waves**

“Beta waves are between 8 and 13 Hz. They reflect the active brain activity and the fluctuating mental conditions”.

**Theta Waves**

“Theta waves are between 4 and 8 Hz. They are present during the transition phase from wakefulness state to the sleep state.”

**Delta waves**

“Delta waves are between 0 and 4 Hz and occur in very deep sleep”.

**SECTION VI: CONCEPTUAL FRAME WORK**

“A conceptual framework is a process of ideas which are framed and utilized for the development of a research design. It helps the researcher to know what data needs to be collected and gives direction to an entire research process”.

“The study is based on the concept that administration of predesigned instrumental music based on raga Malkauns, for duration of 22 minutes to elderly hypertension patients will reduce bio physical & psychological problems. The investigator adopted the Wiedenbach’s Helping Art of Clinical Nursing Theory (1964) as a base for developing the conceptual framework. Ernestin Widenbach
proposes helping the art of clinical nursing theory in 1964 for nursing which describes a desired situation and way to attain it. It directs action towards the explicit goal.

**This theory has 3 factors:**

1) Central purpose
2) Prescription
3) Realities

**i) Central Purpose**

It refers to what the nurse wants to accomplish. It is the overall goal towards which a nurse strives.

**ii) Prescription**

It refers to the plan of care for patients. It will specify the nature of action that will fulfill the nurse’s central purpose.

**iii) Realities**

It refers to the physical, physiological, emotional and spiritual factors that come into play in situation involving nursing action. The five realities identified by Wiedenbach’s are agent, recipient, goal, means and framework.

The conceptual framework of the nursing practice according to this theory consists of three steps as follows”:

Step I: “Identifying the need for help”
Step II: “Ministering the needed help”
Step III: “Validating that the need for help was met”.

**Step I: Identifying the need for help**

“This step involves determining the need for help. Elderly hypertensive adults were identified based on demographic variables (Age, gender, marital status, educational status, self income, types of exercise, and personal interest on other activities, personal habits, family income and relationship with family) inclusive and exclusive criteria, purposive sampling technique was used to assign the adults in experimental and control group”.

**Step II: Ministering the needed help**
“The participants who were included in listening to a predesigned instrumental music based on raga Malkaus, for duration of 22 minutes at a specified time in the evening for a period of 30 days”.

Agent : Investigator
Recipient : Elderly Hypertensive adults
Goal : To reduce bio physical & psychological problems
Means : “Listening to a predesigned instrumental music based on raga Malkaus, for duration of 22 minutes at a specified time in the evening for a period of 30 days”.

Step-III: Validating that need for help was met.

“It is accomplished by means of post assessment of biophysical & psychological parameters using structured questionnaire to assess subjective well being status and biophysical parameters like the systemic blood pressure, pulse rate, respiration rate and EEG”. It is followed by an analysis of the findings.
Figure 1: CONCEPTUAL FRAMEWORK BASED ON MODIFIED MODEL OF WIEDENBACH’S HELPING ART OF CLINICAL NURSING THEORY (1964)