Abstract of dissertation entitled

**Light therapy for treatment of elderly depression in institution**

Submitted by

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Depression is an uprising medical condition affecting many aged Hong Kong population. However, this situation was held undercover or unexplored. The present situation relies on psychotic medication and cognitive behavioural therapy. These two approaches have their own merits and demerits.

Light therapy suggested by many studies is effective in managing seasonal depressive symptoms in the population. It is a relatively economic and convenient therapy that can be self-administered individually. Some studies supported that Light therapy is effective for managing non seasonal depressive symptoms. However, the results and evidence are not well organized or fully applied in Hong Kong.

In this thesis, studies related to the effectiveness of light therapy on depressive symptoms
alleviation among older adults were reviewed and critically appraised. The potential to apply the findings of these studies to the aged Chinese population in Hong Kong is discussed and presented.
Light therapy for treatment of elderly depression in institution

by

Lee Ka Ki

A dissertation submitted in partial fulfillment of the requirements for the Master of Nursing at The University of Hong Kong

July 2015
Declaration

I declare that this thesis represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualifications.

Signed ...................................................................................................

Lee Ka Ki
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Chapter 1

Background

Depression is a growing global public health concern that significantly affects people across the world. According to the American Psychological Association, depression is a state of low mood that adversely affect a person’s thoughts and behaviors. It presents with persistent low mood, loss of interest, loss of pleasure and energy, feeling low sense of self and guiltiness, worthlessness and even suicidal ideation. It is also associated with poor appetite, sleep quality and concentration. According to the Mental Health Survey conducted in 17 countries by the world health organization (WHO) in 2012, it was estimated that every 1 in 20 people reported having an episode of depression in the previous year. Depression can be chronic and recurrent. In serious cases, depression may cause an individual to commit suicide. According to the WHO, depression is the leading cause for the total potential year lost in 2012. Almost 1 million lives are lost per annum due to suicide, which translates into 3000 deaths every day.

Managing depression

Depression is a disorder that can be reliably diagnosed and treated in a primary care setting. As outlined in the WHO MH GAP Intervention Guide, preferable treatment options consist of basic psychosocial support combined with antidepressant medication or psychotherapy, such as cognitive behavior therapy, interpersonal psychotherapy or problem-solving treatment. Antidepressant medications and brief, structured forms of psychotherapy are effective. Antidepressants can be a very effective form of treatment for moderate-severe depression but are not the first line of treatment for cases of mild or sub-threshold depression. As an adjunct to care by
specialists or in primary health care, self-help is an important approach to help people with depression. Innovative approaches involving self-help books or internet-based self-help programs have been shown to help reduce or treat depression in numerous studies in Western countries (Andrews G, Cuijpers P, Craske MG, McEvoy P, Titov N. 2011).

From macroscopic view to microscopic sight:

With medical and technology advancement, a longer life expectancy with a decreasing birth rate gives rise to progressive aging population in developed countries globally. According to the result of the 2011 Population Census Thematic Report, there were nearly 1 million elderly (aged 65 or above) in Hong Kong, which composed over 10% of Hong Kong population. The proportions of persons aged 65 & above increased from 5.4% in 1976 to 13.7% in 2012. Among the elderly population, the oldest (aged 80 or above) composed 28.8%. The latest projections by the Census and Statistics Department show that Hong Kong population will continue to grow in the next 20-30 years, from 7.2 million today to 8.5 million in 2041. One in eight persons will be the older-old, i.e. aged 80 and above. On the other hand, 8.6% of the elderly population is living in non-domestic households i.e. homes for the aged, hospital and penal institutions etc.

Why elderly is vulnerable of depression?
Growing old is a multidimensional and continuous aging process in physical, psychological and social aspects. Elderly experienced retirement, loss of spouse and friends, deteriorating physical health and functional ability. They are also a group of minority having financial strain, experiencing loneliness and suffering from chronic illness. These multiple stress factors make the elderly susceptible to mental illness, especially depression.

Depression is a common mental disorder in Hong Kong. It was reported up to 5-10% of the whole population possesses some kind of depressive symptoms. It is one of the most prevalent conditions among elderly and is a significant health problem in later life. (Chi, I., Yip, P. S. F., Chiu, H. F. K., Chou, K. L., Chan, K. S., Kwan, C. W., et al. 2005) In a cohort study by Sun et al (2011) with 55946 elderly, with the cut off point set at 8 under the Geriatric depression Scale, the prevalence rate of clinical significant depressive symptoms was 9.7%. In another cohort study involved 3900 elderly, the prevalence rate of depressive symptoms was 9.3%. (Wong SYS, Woo J, Hong, AWL, et al., 2007)

Therefore, depression in the elderly population (whose age is more than 65 years old) could be a pressing issue. Elderlies in the long-term care facilities represent a more “frail” group of elderly in the society, because many of them have multiple medical and surgical comorbidities, poor mobility and impaired ability to perform activities of daily living. Jongenelis et al 2004 can validate the fact that depressive disorders were common in nursing home, it was estimated that the prevalence rate of depression in cognitively intact nursing home residents is 10%-20% while for the cognitively impaired residents, the prevalence rate paramount to 50% to 60%. (Major depression
composed 8.1%, minor depression 14.1% while 24% suffered from subclinical depression.)

Wong et al (2007) has shown that Depression rates were similar in men and women, which is 8.1% and 8.4% respectively. Moreover the prevalence of depression was associated with the number of chronic medical conditions with an odd ratio 1.27 (CI: 1.16–1.39). Other studies conducted in the elderly also demonstrated a significant association between depressive symptoms and a number of different chronic conditions including osteoporosis, chronic obstructive pulmonary diseases, lower urinary tract symptoms and stroke. In that sense, depression would be an important mental problem in the institutionalized elderly as many of them are suffering from these chronic medical conditions. Although currently there are no studies that report the prevalence of depression of elderly in long term care facilities, it can be deduced that the prevalence will not be less than the general population.

*How is depression being treated in Hong Kong?*

This relies heavily on clinicians. The modalities of treatment include psychotherapy, counselling and supportive therapy, pharmacological agents and electroconvulsive therapy for severe depression.

In general, most clinicians will choose to use first-line antidepressants with benign side effect profiles. SSRI (Selective serotonin uptake inhibitors) are widely used. It is proved to be effective with response rate 50-60% in clinical trials. (Katona et al., 1996) (Alexopoulos et al., 2001) However, it needs time to titrate the drug level to optimal dose, which probably takes for 2 months if tolerated. After remission, the continuation of 6 months to 2 years maintenance therapy is needed to prevent relapses and
recurrence. The guideline for maintenance or so called wean off SSRI regime was not well developed and clinicians need to assess case by case. Some even advocate long-term drug treatment for depressive elderly.

Electroconvulsive therapy is another choice and the effectiveness is promising up to 80-90%. The adverse side effect is transient memory impairment. As the cost is quite high, it was used mostly on severely ill patients.

Short-term treatment also involved cognitive behavioral therapy, interpersonal psychotherapy, and problem solving therapy, which consume up to two to 6 months. As human resources are limited, the “social support group” for depression elderly in Hong Kong is not well developed and the accessibility is poor. In addition, the elderly may hold a conservative belief that openly seeking help is shameful or humiliating. On the other hand, alternative-alleviating method such as psychotherapy, reminiscence therapy, Qigong, Tai-chi have all been used to enhance social wellbeing among the elderly (Areań et al., 1993; Gatz et al, 1999). However, not all elderly are able to pay for these types of adjunctive therapies. So, the remaining strategy depends mainly on medicine and the elderly self-coping mechanism or family support.

As a nurse in Hong Kong, the role in helping depressive patients is limited and passive. Only simple counselling and general support could be given to the patients and their families. It would be innovative to explore how nurses can help more in this group of patients.

*How does depression affect elderly’s health?*

In many countries, especially those South Asia countries, the suicide rate in elderly is
higher than younger age group. In older people, suicidal attempts or ideation occur frequently in the context of major depression. According to the social indicators 2012, the elderly suicidal rate is 20.3 per 100000, which is 2 fold of the general suicidal rate. Chiu et al reported that 86% of the suicide elderly victims in Hong Kong suffered from psychiatric problems (major depression composed 53%).

Depression in the elderly is associated with many adverse effects on their health. In the most serious cases, patients will commit suicide. Physical disability, illness, bereavement or interpersonal problems are the common associates of elderly depression. Some report that it can exacerbate the underlying comorbidities, possibly due to self-neglect, poor hygiene, non-compliance to medications, and a number of neurophysiological factors. In a cohort study in Hong Kong, Sun et al (2011) has shown that Depressive symptoms were associated with all-cause mortality in men. Depression acts as a triggering factor between life problems and suicides in elderly. If unfortunately, the individual personality is not strong enough to counteract the depression curse, the outcome could be terminal. This is why adequate treatment with alternative tools for curing depression should be considered to improve their comorbidities or even save a life.

*Is there any alternative method help easing elderly depressive symptom with limited resources available?*

Light therapy as the treatment of choice for seasonal affective disorder, is more common in countries such as Ireland and Finland. The proposed pathogenesis of this disease is due to the lack of natural sunlight during autumn or winter, and therefore “artificial bright light” was used to replenish the natural light. This modality of
treatment has been proved to be effective by many high quality studies including randomized controlled trial. In Hong Kong, seasonal affective disorder is much less common because of the geographical location. Therefore light therapy was seldom used in Hong Kong psychiatric service. However upon research there are a number of studies, which show that light therapy is also useful for the treatment of non-seasonal depression. The term “non-seasonal depression” refers to the type of depressive disorder in which no seasonal rhythm is exhibited, which means that its recurrence is not primary due to seasonal changes or change in environmental luminous condition. It is the type of depressive disorder commonly encountered in clinical practice in Hong Kong. Studies have shown light therapy can serve as both monotherapy or as an adjunction to traditional antidepressants in the treatment of non-seasonal depression.

**How does light therapy work for depression?**

Serotonin is a hormone secreted by the brain responsible for mood elevation. Cortisol is a hormone related to stress level. The higher the cortisol level, the more stress you feel. Melatonin is a hormone associated with the sleep control. Our body will secrete melatonin at nighttime to induce sleep.

According to a cohort study with 101 men in Melbourne, the turnover of serotonin in the brain was affected by luminosity changes, with higher serotonin value observed in the blood samples on *bright days* than on *dull days*. (p=0.01) (Lambert et al., 2002) As serotonin level is responsible for mood augmentation, while its level is associated with the bright light exposure, the mechanism of bright light therapy is to mimic the role of sunlight for those people who are deprived of sunlight exposure due to their own environmental shortcomings.
Advantages of using Light Therapy

Light therapy was almost never used for treatment of depression for the elderly patients in Hong Kong despite its proven efficacy. And in fact, it would be an excellent treatment if it can be adopted in the elderly home for the following reasons: Firstly, the environment in the old age home mimics the least luminous seasons in the Northern countries in some sense. Elderly with multiple comorbidities and impaired mobility are often confined in their rooms for the most time of the day, if not they were seldom brought to the outdoors. Therefore they are usually exposed to a less luminous environment than the general population. It would be sensible to deduce that if these elderly has depressive symptoms, the pathogenesis would be similar to that of seasonal affective disorder. Their symptoms, if not directly caused by this environmental factor, would be at least partially contributed, precipitated or even perpetuated by it. Thus it would be reasonable to employ light therapy for this group of elderly with depression. Secondly, antidepressants are notoriously known for their slow onset of effects after commencement. Around four to six weeks’ time will be needed for a selective serotonin reuptake inhibitor (SSRI) to exhibit its full effects.

Moreover they could also exacerbate the depressive symptoms in the first one to weeks of treatment. This could pose dangers to those who have more serious symptoms or who are socially neglected. In contrast, it was proven that by several randomized control trial that the onset of effect of light therapy is faster than SSRI. It can be as short as one week’s time. Therefore it would be very useful to be an adjunctive treatment to antidepressants prescribed by physicians. Thirdly, antidepressants have many potential side effects. Although the newer generations of
antidepressants have less adverse effects than the traditional ones such as the tricyclic depressants, these potential side effects can still be detrimental to the frail elderly in the old age home. Their sedative properties can lead to falls. They can also interact with the multiple medications that these elderly are taking. Side effects of light therapy have been reported, which are mild and include dizziness, visual disturbance and these will improve promptly once the light source was removed. Potential precautions and contraindications of light therapy would include elderly with a history of epilepsy, in which the bright light can trigger a breakthrough attack.

Most importantly, light therapy is easy to be carried out and monitored by nursing staff. All we need is a lamp illuminating bright light. Nursing staff can take a proactive role by performing screening by simple tools such as Geriatric Depression Scale, to find out the elderly that will potentially benefit from this therapy.

To conclude, light therapy has been proven to as monotherapy or adjunctive treatment to antidepressants in the treatment of non-seasonal depression. It would worth a change in the current practice for the treatment of mild to moderate depression and research to confirm its efficacy in the elderly home. Nursing staff can take a more active role in finding out and helping the elderly in the aged home with depression. They can potentially carry out light therapy, as it is a simple, cost-effective and low risk therapeutic measure in the elderly home.

The objective of this study was to collect evidence to judge the effectiveness of light therapy as an adjunctive therapy in relieving non-seasonal depression in elderly. The PICO and research question are listed as follows:
P: elderly
I: light therapy
C: dim light therapy or no treatment
O: non seasonal depressive symptoms

My Research question: Is Light therapy a possible adjunctive for treatment of elderly depression in institution?

I would like to use this chance to undergo vigorous systematic review and gather relevant evidence to develop an evidence-based nursing protocol for light therapy for treatment of “non-seasonal depression” in institutionalized elderly in Hong Kong. Throughout the research process, I would like to know how light therapy is carried out. What related equipment is needed in light therapy? How the environment should be set for the best result in light therapy? Which kinds of patients benefit the most from this therapy and in what aspects? I would like to sort out the best ways to quantify or evaluate the effectiveness of light therapy in order to make appropriate improvement. Last but not least, are there any possible side effects related to light therapy and what special precautions we have to make in carry out light therapy?
Chapter 2:

Search and appraisal strategies (Appendix A)

Relevant studies were located through four medically related databases including PubMed, OVID, CINAHL EBSCOhost Cochrane library and Hospital Authority. The information was accessed through The Universities of Hong Kong electronic resources and Hospital Authority intranet.

Keyword search involves three components, which includes target population, intervention and outcome. For target population, it would be mainly focus on elderly in long-term care units; keywords “elderly in long term care” “older people” “institutionalized elderly” are used.

Bright Light therapy is the intervention we aimed at investigates in this research, so relevant keywords “Bright Light therapy” “Light therapy” “Light treatment” “Bright Light treatment”. Furthermore, we hope to explore the effect of bright light therapy in alleviating the depressive symptoms, so the outcome we measured is “sleep quality” “subsyndromal seasonal affective disorder” “non-seasonal depression” “depression” “minor depression” “major depression”.

After identifying search key words, a search was done on 15th July in the four databases we mentioned. To trim down the search results, inclusion and exclusion criteria were set. Researches with experimental design were included as it gave us a higher evidence level. Journals with target population 65+ matched our research topic are welcomed. Only papers are written in English and full text available would be chosen. Papers that investigate the effect of Bright Light therapy with open age group
study population would be considered as reference. Journals that talk about seasonal depressive symptoms or elderly with delirium will be rejected.

Results

11 papers from 1999 to 2012 were chosen from the databases with the application of our search strategies. The papers included 9 RCTS and 2 cohort studies.

Data were extracted to generate a table of evidence according to Scottish Intercollegiate Guidelines Network SIGN. Bibliographic citations, type of the study, level of evidence, patient characteristics, sample size, interventions and comparisons, lengths of follow up, outcome measures and effect size are clearly shown in the table of evidence in Appendix A

Appraisal strategies were provided by SIGN methodology checklist for randomized controlled trials. The chosen papers are as follow:


- Geoffry W. & Kathryn A. EFFECTS OF LIGHT THERAPY ON SLEEP, MOOD, AND TEMPERATURE IN WOMEN WITH NONSEASONAL MAJOR DEPRESSION Issues in Mental Health Nursing, 26:781–794, 2005


- Leah Friedman, Jamie M. Zeitzer, Clete Kushida, Irina Zhdanova, Art Noda, Tina Lee, Bret Schneider, Christian Guilleminault, MD Javaid Sheikh, MD and Jerome A. Yesavage Scheduled Bright Light for Treatment of Insomnia in Older AdultsJAGS 57:441–452, 2009 r 2009, Copyright the Authors Journal compilation r 2009, The American Geriatrics Society
- Isabel; C. Sumaya, beth M. Rienzi, Jess F. Deegan II, Donald E. Moss Journal of Gerontology : Bright Light Treatment Decreases Depression in Institutionalized Older Adults: A Place-bo-Controlled Crossover Studymedical science 2001. Vol 56A No M356-M360

**Participants**

The number of participants in the 11 studies ranged from 8 to 102. Four papers focused on elderly with age 60 or above. 5 of them recruited participants openly without age discrimination. One paper investigates the effect of bright light therapy on adolescents aged 14-17 while one paper focus on menopause women with mean age 37.5. Participants were made confirmed by having non-seasonal affective symptoms by Diagnostic and Statistical Manual of Mental Disorders DSM III R or DSMIV, Structured Interview Guide for the Hamilton Depression Rating Scale-SADSIGH SAD, Geriatric Depression Scale GDS, Behavioral Pathology in Alzheimer Disease scale (Behave-AD) They are recruited in community settings either by clinical referrals, local advertisement or convenient samplings. All studies provided baseline characteristic comparison of both intervention groups and control/compare groups.

**Intervention and control**

All studies included in the research process investigated the same intervention, which is Bright Light Therapy by light box with no doubt, and the differences among them are their format of approach and their comparison groups. The light boxes used by the studies quoted difference in the light emission from 2500 lux to 10000 lux. Six papers
develop their experimental design in a straightforward approach as treatment group against control group.


The remaining 4 papers address their design in their specific approaches.
- Anthony et al (2002) used 5000-lux light box on Seasonal affective disorder (SAD) patients and Subsyndromal patients and compare the result using pre–posttest.
- Sara et al (2012) used 10000-lux light box in early morning versus using it with no fix time schedule.
- Leah et al (2009) divided the sample in 2 portions, first group used 4000 lux light therapy in either morning or evening; second is using 65 lux light box in either morning or evening.

**Outcome measures**

Among the paper chosen, their outcome measurement can be categorized into assessment through clinician rated scale; and self-reported measurement. They both

**Clinician rated**

In the paper of Clinician rated depression scales of Martiny et al (2005), he used the Hamilton Depression Rating Scale (HAM-D17), Hamilton six-item subscale (HAM-D6), Melancholia Scale (MES) and the seven ‘atypical’ items from the SIGH-SAD as outcome measure.

Constantine et al (1999) has mentioned drop out rate with intention to treat, the raters were blinded using Behavioral Pathology in Alzheimer Disease scale (Behave-AD) and sleep log.


**Self reported outcome**

Both subjective and objective measurement included.

Geoffry et al (2005) quantified sleep patterns by electroencephalogram (EEG) and electrooculogram (EOG), and used standardized techniques 13-item Beck Depression Inventory and 18-item Visual Analog Scale-Fatigue for measurement of Depressive Mood, Fatigue, and Energy.

Leah et al (2009) compared his within-group changes by subjective (sleep logs, questionnaires) and objective (actigraphy, polysomnography) sleep measures after morning or evening bright light.


**Effects of interventions on depressive symptoms**

In Anthony et al (2002) paper, it compared the light therapy effectiveness between SAD patients and subsyndromal patients. A reduction of pre and post assessment score in HRDS, SIGH-SAD was shown in both groups, which indicated light therapy is effective in both seasonal as well as non-seasonal depressive patients.

In Martiny et al (2005), a clinician rated paper, showed significant difference in the score of HAM-D17, HAM-D6, MES, SIGH-SAD between bright light group and dim light group (control). (P<0.01). Reciprocally, in the self-reported part, the reduction of MDI scores was numerically greater in the bright light group than in the dim light group, but did not reach statistically significant (P <0.55). SCL-90R reached
statistical significance in bright light group. (P<0.05) On the other hand, the dim light group experienced a later wake up time (17.4 minutes) than the bright light group (15 minutes). Light therapy helps to improve sleep algorithm were supported by Constantine et al (1999), Helmut et al (2012), Geoffry et al (2005) and Leah et al (2009). Geoffry et al (2005) paper showed the BDI (severity of depressed mood) (p=0.02) and the SCL-90-Revised depression subscale (distress related to depressed mood) (p=0.01) improved significantly in the treatment group but not in the placebo group.

Sara et al (2012) confirmed the usefulness of LT as non-pharmacological anti-depressant therapy for non-seasonal depression by the reduction of score in HDRS (x2= 186.82, P<0.00001). Sara et al (2012) as well as Leah et al (2009) further showed that LT effectiveness correlated with the time of administration. (p=0.012).

Isabel et al (2001) used Geriatric Depression Scale to show the effectiveness of LT. It reached statistically significant in the treatment group while non significant in placebo group.

Yun et al (2004) further reinforce Light therapy effectiveness in GDRS with significant at P=0.000.

Jan et al (2002) (2002) research showed that the effectiveness of LT with a placebo drug was superior to dim light-drug group or bright light-drug group. (with 3 groups shown statistically significant)
Helmut et al (2012) support LT by BDI scores with score reduction greater in light therapy treatment than in placebo with the same group of patients ($p=0.014$). It further confirmed the biological mechanism of light therapy by the raise of melatonin level in evening ($p=0.045$) and fall in cortisol level in saliva in evening during treatment.

**Randomization**

Out of our ten chosen papers, 2 of them are cohort studies, while the remaining are randomized control trials. If further dig in those papers, Constantine et al (1999), Helmut et al (2012), Geoffry et al (2005), Isabel et al (2001) and Jan et al (2002) (2002) self claimed RCT but did not mentioned the randomization method.


All the papers chosen did not mention about the concealment method, which may overestimate the research result.

**Baseline characteristic**

All papers provided detail description of the participants’ baseline characteristics to ensure the treatment groups and the control groups did not possess any difference in
their demographics except Anthony et al (2002). Since he was doing an investigation in comparing the effectiveness of LT in 2 different groups seasonal affective disorder patient and minor subsyndromal disorder patients, the baseline characteristics were known to be different with SAD has significantly higher baseline rate score on 21-items HDRS and 29-item SIGH-SAD than subsyndromal SAD.

**Findings**

Depression is commonly known in elderly. The prevalence rate of late life depression varied from 9% to 18%. (Beckman et al., 2000). Depression is not only a psychiatric problem, which affect quality of life and endanger life as comparable to acute or chronic diseases. Using magic pills or behavioral therapies are well known approaches in dealing psychiatric problem. However, medication may incur undesirable side effects or the therapy support groups may only be accessible to elderly who are physically and mentally fit. In this moment, a trustworthy adjunctive therapy can help relieving the depressive symptoms for them to a certain extent.

Bright light therapy is known to effect in treating seasonal affective disorder. And circadian rhythm sleep disorder. (Ely et al., 2004) Bright light treatment for seasonal depression (SAD) was accepted in the Clinical Practice Guidelines issued by the U.S. Department of Health and Human Services since 1993. Its therapeutic effect was proven by Helmut et al (2012) with its ability to manipulate the cortisol and melatonin level as mentioned above. With through research and vigorous critical appraisal, the functions of Light therapy are further explored. Anthony et al (2002) suggested that LT is an effective treatment in treating major and minor depression with time effect. Yun et al (2004) highlighted light therapy significant impact on reducing elderly

**Equipment and Time duration**

In a summarization of the papers, the set up for light therapy is rather simple and straightforward. The selected studies reported successful treatment for the non-seasonal major depression with 1 to 2 hrs of 2500 to 10000 lux light. The selected studies all carry out LT in community settings like participants’ residential housing; a separate room in long term cares facilities or clinical settings. They were allowed to do some reading or watch television concurrently with light therapy.

The study of Sara et al (2012) obtained more benefit with morning than with afternoon or evening treatment. Leah et al (2009) supported that bright light therapy in morning or evening are beneficial than dim light. A crucial considering element would be the symptoms of sleep timing. Morning light treatment is preferable for patients tend to have difficulties in getting up in morning or having trouble to sleep at night. Vice versa, patients who fall asleep early but suffer form early awakening will well tolerate late light treatment.

Light treatment is effective, safe and cost effective as known to American Psychiatric Association’s Treatment of Psychiatric Disorders, it still need careful supervision as it may interact with lithium user or may cause possible retinal damage. Light therapy was found effective with moderate depressive symptoms but not agitated patients.
Conclusion

From the review above, light therapy is a cost effective treatment in reducing the depressive symptoms in community dwelling elderly as it costs so much less than several modern medication or psychotherapy. It works well as an adjunctive therapy co-administered with antidepressant drug or works solely alone. This non-pharmacological treatment can also improve the circadian rhythm. In sum, bright light therapy offers a safe alternative treatment for elderly patients with non-seasonal depressive disorder who refuse resist or cannot tolerate medication. Patients with disabilities and morbidity can also benefit from this user-friendly home-based treatment.
CHAPTER 3

3.1 IMPLEMENTATION POTENTIAL

Depression is a prevalent problem in older people. However depression is not an inevitable process of aging. Socio-economic and psycho-environmental variables contribute to the root of depression. Elderly is the frail group of population that has poorer health conditions, as well as more economically and socially exploited. They may not have good education level and physical health. They may be living alone but a significant proportion of them live in nursing home. The innovation in the coming proposal aims at helping the elderly in nursing homes (or commonly known as old-age-homes) to ease their depressive symptoms before the depression further progresses and deteriorates. Depression is a mental disorder that can be diagnosed and treated in primary care settings, especially for mild and sub-threshold depression. If we can take the initiative to treat institutionalized elderly with depressive symptoms by light therapy, many of them can have a better quality of life.

3.1.1 Target population and setting

The innovation is proposed to be a morning light therapy section for older adults who suffer from depressive symptoms after appropriate assessment done by professional staff. The innovation would take place in a private nursing home setting in Hong Kong Island. As previously discussed, light therapy is a treatment choice of seasonal
affective disorder in foreign countries. The mentioned pathogenesis of the disease is due to lack of natural sunshine during rainy and cloudy season in autumn and winter. The artificial sunlight was used to substitute the natural sunlight and it was proved to be effective in easing the seasonal depressive symptoms. Among the studies we came over, light therapy is not solely effective in treating seasonal affective disorder, but also non-seasonal depression.

Nursing home A is an elderly institution consists of 100 elderly aged 60 or above. There is a big dining room with television and newspapers provided. Dining room is the place where most windows located. Each elderly lived in his individual 30 feet partition with his own wardrobe and bed. Lighting of the institution is scheduled from 8am to 9pm every day. Elderly will relatively good cognitively function and dexterity are allowed to have their own bedside lamps. Only 1 out of 10 elderly has good mobility and are allowed to go outside of the nursing institution. Those with poorer mobility will to be chair-bound throughout the day. In essence, majority of the elderly (90%) will not be exposed to the natural environmental lighting due to cognitive and functional impairment.

In our translational process, we target our subjects to be aged 60 or above, living in the specified nursing home with depressive symptoms according to the Geriatric depression scale

3.1.2 Transferability of the findings
The proposed innovation is to be carried out in the nursing home A. Among the papers reviewed, there are no specific restrictions in carrying out light therapy. The therapy took place at the patients’ own home, long-term care institutions, hospital settings and rehabilitation center. Nursing home meets the criteria in carry out light therapy. Elderly in nursing home with limited mobility lacks the chance to enjoy outdoor sunshine and is confined to internal dim light. It would be sensible to deduce that light therapy can compensate the deficiency.

According to the searched literatures, 4 of them aimed at older adults aged 60 or above while the remaining is open to public without any age restriction. This implied that light therapy effectiveness is not affected by age. Furthermore, there are literatures showing positive result of using light therapy at elderly aged 60 or above. As a result, these studies can be directly applied to the proposed settings.

According to Constance (1999), his paper clearly demonstrated that Light therapy couldn’t alleviate agitated behaviors in dementia elderly. As a result, this innovation would not be suitable for demented patients due to the lack of evidence.

### 3.1.3 Philosophy of introducing Light therapy

The aim of introducing light therapy in community dwelling elderly is to reduce the use of psychiatric medication and the burden of public medical service. Light therapy can serve as a pilot intervention for mild depression elderly before seeking formal medical help. It is different in institutionalized elderly. They are often more frail in
terms of physical health. Many of them are confined to a small, dim area due to poor mobility and functional status, and this can be the root of depressive symptoms. By light therapy it tries to ameliorate the depressive symptoms by resembling the natural lighting environment.

The principle of the proposed intervention is to arouse the awareness of health care professionals in elderly mental health as the current trend focuses on physical health. By introducing the intervention, health care staff in long-term care institutions will assess and evaluate the mental health status of the elderly from time to time. In other words, they will spend extra time and effort in caring and communicating with the elderly residents. Elderly can maintain good mental status, at the same time rapport and relationship would be established with nursing staff.

3.1.4 Feasibility

**Step 1 Introduce Light therapy to Managerial Rank (1st - 2nd month)**

The administrative staff or managers working in Nursing home A will be presented with tangible evidence of the severity of elderly depression. It will be emphasized that it is not a normal stage of aging process. Instead, it is highly reversible and treatable if it can be detected early and then followed by proper intervention. Light therapy can be regarded as a new branch of service of that particular nursing home. From marketing view, it could be a gimmick to attract new residency. It usually takes a week or two for them to discuss and digest the proposed program. If the intervention
plan is feasible, the next step is to gather financial support.

**Step 2 The technical and financial aspects (3rd to 16th month)**

To exercise light therapy in the old age home, light source has to be provided to the potential elderly who will benefit from it. The light source should at least emit 2500 lux. To start with, five light boxes will be applied first (Philips SAD Light, 10,000 LUX, dimmable HF3305).

A single lamp costs $600 and accounted for the fixed cost, with the electricity cost and maintenance fee as variable cost. According to the protocol, 1 hour of light therapy will be given before 10am every morning regardless their wake up time. The fixed cost sum up to $3000 for 5 lamps with variable electricity cost estimated to be about $100 monthly. The special light bulb costs $100 each with 2-year life span. Extra $500 for light bulb changing is needed.

The expenditure mainly covered by “THE SIR ROBERT HO TUNG CHARITABLE FUND”. It is a charity fund that provides financial support to non-governmental organizations in the areas of medicine and health, as well as social welfare. To apply that fund, drafting proposal with proper quotation and budgeting quotation is needed. It may take 2 months to draft the proposal and time is needed to collect quotation from light box company. It also takes another year for the fund to reply and accept the proposal and deliver sponsorship afterwards.
**Working Out Light therapy**

Light therapy is an individualized self-help therapy for depressive patients. So, it is free from recruitment stress and elderly consent is required before therapy start. They are free to try and terminate. An audit will be carried out regarding the outcomes of the light therapy on depressive symptoms. GDS will be carried out every 2 weeks to see if there is any improvement after the therapy. If it is cost effective, this therapy can be applied in the long run in the old age home.

**Possibility of interference with current staff functions**

In exercising the bright light therapy, nurses will play multiple roles: To advocate (introduce new treatment method to potential patients), to counsel (establish nurse-client relationship through communication), to enforce (enforcing the patients’ compliance of the therapy every morning). Last but not least, to screen and identify the patients for the therapy, and to evaluate the outcomes regularly.

The nursing staff may feel doubtful about this new idea. Not all of them will welcome the novel bright light therapy and they may resist from adopting it. This is because some of them will be afraid of the complexity of the project and also an increase in workload, while some of them are skeptical about the benefits.

**Conductive climate to research utilization**

Research evidence of light therapy will be presented to convince them that light therapy is neither something that would increase their workload too much nor a
tedious working procedure. Instead, it is a user-friendly treatment for easing depressive symptoms. Geriatric depression scale and Mini mental state examination are the tools that nurses working in elderly nursing home are familiar with. Nurses can perform assessment and evaluation progress through daily communication dialogue with the participants easily. A clear protocol and flowchart will be given to them to carry the project. A half day program will be given to the staff and on site practice will be provided. Of course, if they notice any flaws or areas need to be improved, they are free to discuss and raise questions.

To benefit patients the most, it is important that the nurses also be equipped with the scientific knowledge while they are carrying certain interventions. The Institute of Medicine's 13 Future of Nursing report recognized academic and health service partnerships as a possible avenue for facilitating the matching. Partnerships between academic and health service centers provide opportunities to leverage clinical, intellectual, and financial resources to generate new knowledge and translate that knowledge into innovative, real-world patient care practices.

**Resistance from patients and relatives**

After suitable patients are chosen for enacting light therapy, discussion with the patients and their families would be held to see their willingness in participating in the intervention. However due to the novelty of the idea and it is almost never heard of in
our locality, resistance and doubt from them will be anticipated. They may be denial against being labelled as “psychiatric” or “depressed” patient.

Patients and families are very much concerned with the quality of life and mental health of their close relatives resided in the old age home. Their apprehension towards any new interventions to the frail elderly is understandable. It can be resolved if academic and evidence based practice be presented clearly to them, and free of major side effects should also be emphasized. This can be further reinforced if good outcomes can be shown to them. Nevertheless, a formal consent form will be given to the relatives and patients to sign before starting the light therapy. When new scientific discoveries matched with patients’ needs in the form of evidence support and health care professionals mentoring, their ultimate support for the innovative bright light therapy can be gained.

**Equipment and facilities**

Light therapy required light boxes, light bulbs for maintenance, bedside table or individual room for light therapy, last but not least, electricity. It also requires health care workers to be familiar with simple set up skill of light therapy and safety precautions. Staff would need to be released from other activities to learn about and implement the innovation in the half day section.
**Appropriateness of the measuring tool**

The Geriatric Depression Scale (GDS) is a commonly used screening tool for depression for the elderly. It was developed by Yesavage in the early 1980s. In Hong Kong the Cantonese version had been validated. Chiu et al has shown that it was a reliable screening tool for depression Chinese elderly patients.

Mini-Mental State Examination score is a useful tool to screen out cognitively impaired patients in order to maximize the benefit of light therapy.

If the progress and outcome of light therapy of a particular elderly is not welcoming, they are free to withdraw. That elderly will be referred to visiting medical officer for further treatment.

**Cost / Benefit ratio of the innovation**

*Risk to clients*

Light treatment is in general effective, safe and cost effective. According to the American Psychiatric Association’s Treatment of Psychiatric Disorders, it still needs careful supervision as it may interact with lithium user or may cause possible retinal damage. Light therapy was ineffective with agitated patients.

*Potential benefits to the clients*

Elderly who possesses mild depressive symptoms will be undergoing the trial of light therapy instead of proceeding to complex psychological therapy or medications with numerous side effects. They are scheduled to have regular assessment and evaluation
to monitor their psychological status and the effectiveness of the light therapy.

*Potential benefits to the institution*

It may build up better image and reputation among elderly care as the institution takes the initiative to focus on elderly mental health. Light therapy uses limited resources to achieve as much outcome as possible. Even if light therapy does not succeed in curing the patients; follow up and referrals will be given by informing the visiting medical officers.

*Possible complications of light therapy*

According to literatures, light therapy has minimal side effects. Irritation of eyes is a possible side effect but it is uncommon.

*Material cost and long term costs of innovation*

Set-up cost for light therapy is high at the beginning but the maintenance is easy. Lump sum payment is need at the first stage to purchase light boxes. Long term cost will be cost of electricity and cost to purchase extra light bulbs.

*Non-material costs of innovation*

Extra time cost and manpower are needed in enacting the light therapy. Effort is needed in accessing, evaluating and monitoring the flow of light therapy.
To conclude, though the material costs and waiting time of running the therapy would be quite high in the short term, the non-material benefits of the innovation would be valuable to the targeted patients. As a result, the innovation could be promoted and established in the targeted population. Details and flowchart of the innovation are found in appendix C and D.

The material costs to start the light therapy will be high at the beginning stage. The waiting time for the sponsor would be unpredictable as well. However, once funding is received and appliances are bought, carrying out light therapy will be easy and straightforward. As a result, with supporting evidence, the innovation could be promoted to the suitable population. Details and flowchart of the innovation are found in appendix C.
3.2 EVIDENCE-BASED PRACTICE GUIDELINE NAME

“Light Up your life”

PURPOSE

The purpose of this intervention is to provide evidence and support for institution to promote and conduct the light therapy for depressed elderly.

TARGET GROUP

Target participant would be non-demented Cantonese speaking elderly living in Nursing Home A with poor mobility and scored 8 or above in the 15-item Geriatric Depression scale.

THE GUIDELINE

Recommendation 1

1. Light therapy is recommended as physical activity for alleviating depressive symptoms in elderly living in old age home A. (Grade A)

Evidences:

“One-hundred and two patients were included in the study. Analyses showed that the reduction in depression scores in the bright light group was statistically significantly larger than in the dim light group on all scales. The scale most sensitive at endpoint was the HAMD6, which includes the core symptoms of depression. …..The study
results support the use of bright light as an adjunct treatment to antidepressants in non-seasonal depression.” (Matiny et al, 2005) (1++)

“Compared to other areas, the climate in subtropical regions is very humid and the air is stuffy. These factors discourage old people from going outside and decrease their exposure to sunlight. Moreover, hospitalization may be another factor limiting opportunities for the elderly in subtropical regions to experience sunshine. To the best knowledge of the research team, no studies have thus far focused on evaluating the effects of light therapy on elderly people with depression in a subtropical climate area………..

Therefore, Depressive symptoms were significantly reduced in the experimental group at post-test but no significant decline was found in the control group. Based upon the results of this study, light therapy could be used to decrease depressive symptoms in the elderly.” (Yun et al, 2004) (1+)

“Response was defined in a variety of ways to reflect the fact that subsyndromal SAD subjects had milder symptoms. Forty-six subjects entered treatment and 44 (SAD, n=529, subsyndromal SAD, n=515) completed at least 2 weeks. Response rates were generally similar in SAD subjects (64–69%) and subsyndromal SAD (40–67%) patients. There was a trend for longer exposure to be associated with better outcome……..

Light therapy may be an effective treatment for subjects with both major and minor
depression with a seasonal pattern. Optimal duration, for the light therapy unit used in this study, is likely 45–60 min daily.” (Anthony et al, 2001) (1+)

2. Light therapy will use at least 2500lux light box and will be held in morning before 11am. (Grade A)

Evidences:
- Martiny et al used 1000- lux light box
- Constantine et al used 10000-lux light box
- Helmut et al used 2500-lux light box versus
- Geoffry et al used 2500-lux
- Yun et al used 5000-lux light box
- Isabe et al used 10000-lux light box

3. The light therapy will last for at least 1 week. (Grade A)
- Martiny et al treated for 5 weeks with 1 hour
- Leah et al treated for 12 weeks with 45 minutes
- Yun Fang tsau et al treated for 5 days for 50 minutes
- Isabel et al treated for 1 week for 30 minutes

4. The suitable elderly reach 8 out of 15 in the geriatric depression scale (GDS) and without evidence of cognitive impairment in the Cantonese version of mini-mental state examination. (Grade A)
- The cuff-off of MMSE for cognitive impairment would be below 19 for those with no formal education, below 22 for those with more than 2 years of education. (Chiu HFK et al, 1994)

- The cut-off of GDS would be 8 or above to indicate probable depression. (Lee CHB et al 1993)

5. Elderly who does not show psychiatric need but have trouble in sleeping are welcome if resources available. (Grade A)

Evidences:

“Patients randomized to the BLT condition exhibited a statistically significant improvement in nocturnal sleep from a mean of 6.4 hours/night to 8.1 hours/night 4 weeks later (p<0.05). The sleep of patients in the control condition did not improve significantly. There were no other significant differences between baseline and follow-up, nor between BLT and control treated patients on the other outcome measures, which included the Behavioral Pathology in Alzheimer Disease scale (Behave-AD) and the Cornell Scale for Depression in Dementia. Patients with dementia in chronic care who exhibit agitated behaviors sleep more hours at night when administered morning BLT. However, BLT does not lead to improvements in agitated behaviors in institutionalized patients with dementia with non-disturbed sleep-wake cycles.” (Constantine et al, 1999) (1+)

“Within-group changes for subjective sleep measures after morning or evening bright
light were not significantly different from those observed after exposure to scheduled dim light. Objective sleep changes (actigraphy, polysomnography) after treatment were not significantly different between the bright and dim light groups. Scheduled light exposure was able to shift the circadian phase predictably but was unrelated to changes in objective or subjective sleep measures. A polymorphism in CLOCK predicted morningness but did not moderate the effects of light on sleep. The phase angle between the circadian system (melatonin midpoint) and sleep (darkness) predicted the magnitude of phase delays, but not phase advances, engendered by bright light. ” (Leah et al, 2009) (1+)

The results of the present study suggest that bright light treatment may be effective among institutionalized older adults, providing nonpharmacological intervention in the treatment of depression. Furthermore, the length of institutionalization may play an important role in determining the efficacy of bright light treatment for older adults in the nursing-home setting. (Isabe et al, 2001) (1+)

6 Patient will be provided a private room to experience the light therapy and they are free to do the activities they want except watching TV. They are instructed to sit at a distance of 30-40 cm from lamp and not gaze at the lamp directly or wearing glasses. (Grade A)

Patients sat in front of the light box between 9 am to 12 pm. by considering previous
designs of light therapy studies (Yun et al, 2004) (1+)

Patients were instructed to sit in a distance of 40 cm from the lamp (gauge supplied), to gaze directly into the light twice a minute, and to sit with their head directed towards the lamp during the whole time while reading or eating. Watching television and using spectacles with toning effect were not allowed. (Martiny et al, 2005) (1++)

Bright light therapy was administered for 1 hour every morning using a 10,000 lux full spectrum lamp at 3 feet. This intensity of lights was chosen to ensure adequate administration of light therapy to persons with dementia, who have difficulty sitting still. Patients were allowed to participate concurrently in other activities such as reading, watching television, listening to music or eating, although they had to have their face within 3 feet of and directed towards the light during the entire treatment. (Constantine et al, 1999) (1+)
CHAPTER 4: IMPLEMENTATION PLAN

In this chapter, the communication plan for the program set up will be discussed. There are various parties that would be involved in the program implementation. A well-planned communication procedure should be drafted to ensure the smooth running of the program and prevent unnecessary complication due to communication error.

4.1 Communication

This Light Therapy would involve three main parties: the targeted elderly, their family members and the nursing staff enacting the program. The hierarchy flow includes the approval by the managerial level staff, training and acceptance by the nursing staff, and the gathering of enough financial support.

It is predicted that the first challenge would come from getting the approval from the managerial level staff. A detailed and well-rounded proposal is needed to persuade the manager of nursing home A. The process of communication will start from top to the bottom.

It is further predicted that nursing staff enacting the program may show inertia or resistance to the newly implemented intervention, as it will increase the workload of their usual routine. To overcome this obstacle, the implementation approach will start from persuading the nurses of newer generation and those who are interested. Banner
and poster will be posted in different parts of the nursing home environment for promoting the scheme “Light up your life”. It will be promoted that nursing home A is an elderly home, which pays great attention to the psychological need and mental health of the elderly. Related journals and posters are passed around to arouse curiosity and interests among the staff. A reader friendly table of evidence will be circulated around. (refer to Appendix E) Casual discussions are welcomed and ideas are encouraged to throw freely during the preparation period.

4.2 Financial sponsor

The next challenge is to get the funding successfully by fulfill the requirement and criteria of “THE SIR ROBERT HO TUNG CHARITABLE FUND”. Detailed application paper work and statistical quotation are needed to apply the fund.

4.3 Promotion strategy

TV commercial, graphics and posters are vivid and tangible promotion tool to implant light therapy to the mindset of laymen. A promotion video in the form of health promotion talk will be shot and play everyday during lunchtime. A psychiatrist will be invited to share about the importance of psychological health and gives an introduction of light therapy is in the video. The invited psychiatrist will be the honorary consultant who provides medical and psychiatric knowledge during the implementation of light therapy.

On the other hand, concrete data and evidence will be provided in the posters and
banner within the nursing home. The target audience is the relatives and our staff who are educated or literate. The details of the light therapy will be shown in a 3 meters x 5 meters notice board with journal and evidence support. Pictures and graphics will be used to enrich the legibility and promotes their understanding.

4.4 Initiation of the change

Previous evidence supports the use of light therapy in seasonal depression, as in certain countries over the northern latitude in the world. In those countries, Norway, or Sweden, due to the high altitude there would be no sunshine or the environment remained dim for a prolonged period of time every year. Depression episodes were observed to be precipitated and perpetuated by such kind of environment with inadequate ambient lighting. The pathophysiology is largely unknown, but it is believed that human’s mood is governed and regulated by certain biochemical substances or hormones which would fluctuate with different level of ambient lighting.

The setting in old age homes is somehow similar to the “dark period” of those countries in the northern latitude. Each elderly is usually restricted to a small cubicle which consists of their own bed and a chair. The environment of most old age homes is dim with inadequate environmental lighting. This is especially problematic for elderly who have problems with impaired mobility, for example those with underlying cerebrovascular disease, cognitive impairment and joints problems. Moreover,
evidence showed that depression or the presence of depressed mood is both more prevalent in this group of patients. Therefore the environmental lighting is a possible target and reversible element in the therapeutic management of depression in this group of elderly.

It is noted that in the literature research, there have been few addressing the use of light therapy in non-seasonal depression. Nevertheless, a few papers support the use of light therapy in easing non-seasonal affective disorder in western country. The first-line management of the latter was psychological therapy, including cognitive behavioral therapy and family therapy, etc. In Hong Kong and for institutionalized elderly, however the problem was predominantly treated with pharmacological therapy due to lack of manpower, high cost, time-consuming and the doubtful benefit in elderly with cognitive impairment. The advantage of drug therapy is the relatively fast onset and easy administration, but the drawback is their side effects. The side effects are especially prominent and susceptible in the elderly, including excessive sedation, drowsiness, postural dizziness and risk of fall is potentially increased. On the other hand, light therapy is non-invasive and carries minimal side effects. It is also easy to administer and manage. The cost is also relatively low.

Therefore, the initiation of light therapy signifies a non-invasive intervention for elderly with mild depression or with milder symptoms of depressed mood. It represents a potential therapeutic intervention in the treatment of depression in this
particular group of patients. The current plan of implementation can serve as a pilot study i.e. a good exploratory and preliminary analysis of this intervention as well.

Moreover, the proposed intervention can arouse the awareness of health care professionals in concerning elderly mental health as well as physical health. If light therapy succeeds, it would be a possible self-help solution other than relying on medical treatment, while at the same time with limited harmful effect. However, Light therapy has never been introduced in Hong Kong. It would be a good chance to review the current practice and attitudes of health care professionals towards elderly.

4.5 Clear vision

Light therapy is a way to manage depressive symptoms with relatively low costs and fewer side effects. It can alleviate depressive symptoms in a non-pharmacological manner which current practice cannot achieve. By introducing the intervention, health care staff in long-term care institutions will assess and evaluate the mental health status of the elderly from time to time. In another words, they will spend extra time and effort in caring and communicating with the elderly residents. It is a positive change that elderly can maintain good mental status, at the same time rapport and relationship would be established with nursing staff.

4.6 Guiding the change

To facilitate the smooth implementation of the therapy, the advocator of the program (i.e. me) would be the leader during the pilot testing. As I know the details of the
rationale and mechanism of the use of light therapy. I would be responsible for listening to recommendations by different parties and making appropriate modifications. A thorough discussion with other nursing staff will be held before the pilot study commences. Exclusion criteria, inclusion criteria and the eligibility of the participants and detailed description of the therapy will be discussed. Patients who are the most suitable for light therapy will be chosen. Consent will be signed before the therapy started. A manual guide of the therapy with recommendation and flow chart will be circulated among the staff who will participate in the therapy for reference and guidance. A detailed rehearsal will be carried out before the actual implementation of the intervention. During the rehearsal potential problems encountered will be documented in details and solutions to those would be carefully sought in a meeting after the rehearsal. This is to ensure a smooth running of the whole intervention.

4.7 Sustaining the process

If the pilot program succeeds, light therapy will be introduced as a long-term program and every staff will participate in the light therapy programme and be able to lead the program independently.

Pilot study plan

A pilot test would be conducted to test the feasibility of the guideline. Training regarding the rationales of Light therapy and gerontology knowledge will be delivered in a 2-day training program. Powerpoint slides and notes will be distributed to the
Nurses’ attitudes toward elderly are assessed using Kogan’s Old People’s Scale (KOPS)(Appendix F). Nurses’ knowledge is measured using Palmore’s Facts of Ageing Quiz (PFAQ) (Appendix G). The therapy will first be implemented on 2 elderly in the pilot program, in which one of them suffer from insomnia and the other one from depressive symptoms.

Participants of the piloting would undergo pre- and post- therapy assessment of their depressive score to determine the efficacy and cost-effectiveness of the activity; In addition, their sleeping quality are recorded through self-reporting and sleep chart by nursing staff.

During the pilot testing, information related to the difficulties met by staff from nursing home or the participants would be collected through meeting and discussion in between sessions and anytime during the application of light therapy. The user-friendliness of various charts and reporting systems could also be improved during pilot study.

At the end of the pilot testing, a sharing session would be held with all staff involved together with our psychiatric consultant. An individual interview would be held with the two participants with the consultant to gather their opinions and to assess their psychological status. Opinions collected would be processed and possible amendment to the program would be made.
4.8 Outcomes

Patient outcomes

The aim of applying light therapy is to improve sleep quality and the depressive symptoms in selected elderly. There are several outcomes that we want to measure after implementation of light therapy. The primary outcome would be a reduction of depressive score (by geriatrics depression scale) between pre and post testing in the same individual. The second outcome is the comparison of sleeping duration and quality before and after the intervention.

Bright light therapy is a useful adjunctive treatment for insomnia. Elderly living in nursing home seldom go out to receive sunshine or incur in social activities unless their mobility are good. They may easily suffer from circadian rhythm mistiming which results in insomnia or susceptibility to develop depression. Sleeping quality will be measured by a sleep chart, which documents the time that the elderly fall asleep and time of wake-up and the time and frequency the elderly stay awaken at night. The time the elderly fall asleep at daytime will be recorded in the chart as well. The difference in geriatric depression score and the sleep pattern will be analyzed by statistical methods.

The third outcome represents the indirect benefit from the light therapy, i.e. enrichment of social circle. Elderly are expected to be more open and socialized in participating the light therapy and they will share their experience and feelings of
light therapy among themselves and health care staff.

**Cost and effect**

The cost and benefit ratio will be evaluated in money term, time cost and manpower exhaustion. The main expenditure comes from the electric bills. It is expected that the increase of electric bill expenditure will not be higher than 5% seasonally. However, there may be unexpected materials or hardware need or maintenance cost that cannot be accurately predicted. Time cost and manpower exhaustion will both evaluated by the self-report from frontline staff. At the end of the program, channel will be opened to discuss how, when and where the most suitable way to carry out light therapy.

**Healthcare provider outcomes**

Training and a session of rehearsal are given to health care providers beforehand. Their knowledge and skills of implementing the intervention will be enriched and polished respectively. A simple true or false pre-and-post testing will assess how much they learn from the workshop.

**Attitude towards elderly**

Another indirect benefit of light therapy is the improvement of health care worker’s attitude towards the elderly. Assessment will be carried out by Kogan’s Old People (KOPS) questionnaire consisting of 13 positive statements and 13 negative statements. The positive and negative statements scores range from 13 to 65 respectively. The
positive and negative statements are randomized in the questionnaire. To obtain a positive score, the summing up of the positive answers is calculated separately from the negative ones. A higher score on the KOPS indicates a favorable attitude toward older adults. It is expected that there would be an improvement in the individual total score after the workshop and implementation of the therapy.

System outcomes

The programme would be considered as effective if it could reduce depressive symptoms among the elderly. Moreover, the costs would be taken into account. The initial set-up cost and the final expenditure in running the therapy would be compared for better financial planning for future. Moreover, the number of psychological or psychiatric referrals for depressed would be compared as an early detection of mental abnormality.

4.12 Data analysis

The data would be entered into a computer database for analysis. 2 sample t-test would be used for comparison between 2 groups of continuous variables, namely the pre-and post-geriatrics depression score, pre- and post-changes in the score of sleeping quality etc.

4.9 Conclusion

In this dissertation, the possibility of light therapy as an adjunctive therapy to alleviate
depressive symptoms among the aged population was discussed. Literature search of use of Light therapy on the management of depressive mood in all age groups including geriatric population was performed and critically appraised. The findings of these studies were analyzed and recommendations were retrieved. Daytime bright light therapy was suggested by the findings of the studies, the feasibility and transferability of the findings of the search were described. An evidence-based guideline with six recommendations was developed for promoting the intervention to the target population.

A communication plan was developed for introducing the intervention to potential users of the therapy (e.g., managerial ranking, staff and participants). A plan for pilot test and its evaluation was prepared for preliminary analysis of the intervention.

For nurses, this innovation could serve as a guide for better nursing practice in the future. This innovation is a management of depressive symptoms in non-pharmacological approach. It may become a new direction to future nursing practice on depression in the institutionalized elderly.

The innovation “Light Up your life” is the first evidence-based therapy aim at institutionalized elderly with depressive symptoms and insomnia. This therapy provides a novel idea in caring depressed community-dwelling elderly for their depressive symptoms using non-pharmacological means. The success of this programme would help to ease the burden of medical expenditure by decreasing the
need of psychiatric magic pills and the cost of pharmacological intervention, and possibly the cost of admissions related to psychiatric illnesses in this age group. It can promote the importance of healthy aging and reduce the use of unnecessary drugs or restraints.

If the program showed success, it is highly suggested that light therapy should be promoted in different long care facilities and institutions in Hong Kong, and even on the household level to benefit the greatest number of elderly in Hong Kong.
Reference:


8. CONSTANTINE G. LYKETSOS*, LORI LINDELL VEIEL, ALVA BAKER AND CYNTHIA STEELE. A RANDOMIZED, CONTROLLED TRIAL OF BRIGHT LIGHT THERAPY FOR AGITATED BEHAVIORS IN DEMENTIA PATIENTS RESIDING IN LONG-TERM CARE


16. Leah Friedman, Jamie M. Zeitzer, Clete Kushida, Irina Zhdanova, Art Noda, Tina Lee, Bret Schneider, Christian Guilleminault, MD Javad Sheikh, MD and Jerome A. Yesavage Scheduled Bright Light for Treatment of Insomnia in Older AdultsJAGS 57:441–452, 2009 r 2009, Copyright the Authors Journal compilation r 2009, The American Geriatrics Society


29. Tuunainen A, Kripke DF, Endo TThe Cochrane Collaboration. Published by John Wiley & Sons, Ltd. Light therapy for non-seasonal depression (Review)


Appendix A

<table>
<thead>
<tr>
<th></th>
<th>Pudmed OVID</th>
<th>Cochrane library</th>
<th>CINAHL</th>
<th>Hospital Authority EKG</th>
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<tr>
<td>1) Depression OR Depressive Symptoms</td>
<td>52343</td>
<td>54189</td>
<td>5234</td>
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<tr>
<td>2) Light therapy OR Bright Light therapy</td>
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<td>3) Elderly</td>
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<td>Limited to RCT</td>
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<td>results</td>
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<td>11</td>
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PRISMA 2009 Flow Diagram

- Records identified through database searching
- Additional records identified through other sources
- Records after duplicates removed (n = 70)
- Records screened (n = 43)
- Records excluded (n = 12)
- Full-text articles assessed for eligibility
- Full-text articles excluded, with reasons
- Studies included in qualitative synthesis
- Studies included in quantitative synthesis (meta-analysis)
<table>
<thead>
<tr>
<th>Study design</th>
<th>Evidence Level</th>
<th>Subject characteristic</th>
<th>Intervention (Risperidone group with light therapy n=48)</th>
<th>Comparison (Risperidone only n=54)</th>
<th>Outcomes</th>
<th>Effect size</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT</td>
<td>++</td>
<td>fulfilling the diagnostic criteria for major depression according to DSM-IV and not fulfilling the seasonal pattern</td>
<td>white bright light for 5 weeks at home (10 000 lux, 1 h daily)</td>
<td>received light treatment (with red filter dampened to emit 50 lux duration: 30 minutes)</td>
<td>clinician rated patients depression</td>
<td>later wake-up time of 17.4 min (P &lt; 0.01) from week 1–5 in DL and of 15.6 min BL (P &lt; 0.07).</td>
<td>BL did not appear to have experienced an earlier awakening due to the 1-hour light therapy than DL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All patients were treated with sertraline, intended to</td>
<td>Treatment duration was 60 min in the bright light group</td>
<td>Hamilton Depression Rating Scale (HAM-D17), Hamilton six-item subscale (HAM-D6), Melancholia Scale (MES) 7 atypical items from</td>
<td></td>
<td></td>
<td>BL therapy as an adjunctive treatment to sertraline in non-seasonal major depression</td>
</tr>
</tbody>
</table>

Adjunctive bright light in non seasonal major depression: results from clinician-rated depression scales.
be administered in a fixed dose of 50 mg daily | the SIGH-SA D. | DL>BL3.6
<table>
<thead>
<tr>
<th>Study design</th>
<th>Evidence Level</th>
<th>Subject characteristic</th>
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<td>RCT</td>
<td>++</td>
<td>fulfilling the diagnostic criteria for major depression according to DSM-IV and not fulfilling the seasonal pattern</td>
<td>white bright light for 5 weeks at home (10 000 lux, 1 h daily) Treatment duration was 60 min in the bright light group</td>
<td>received light treatment (with red filter dampened to emit 50 lux duration:30 minutes</td>
<td>-Major Depression Inventory (MDI) -Psychological General Well-Being Scale (PGWB) -Symptom Check List</td>
<td>-MDI : all visits score reduction BL&gt;DL but insignificant (P &lt;0.55). -PGWB: The increase scores in BL &gt; DL but insignificance (P &lt;0.23). -SCL6SCL63-item The score reduction BL&gt;DL (P &lt; 0.05) (sig)</td>
<td>The results advocate the use of bright light as an adjunctive treatment of non-seasonal depression.</td>
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</table>

be administered in a fixed dose of 50 mg daily
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<tr>
<th>Study design</th>
<th>Evidence Level</th>
<th>Subject characteristic</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Outcomes</th>
<th>Effect size</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>N=15 subsyndromal SAD</td>
<td>N=29 SAD</td>
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</tbody>
</table>

A comparison of open treatment of seasonal major and minor depression with light therapy  
Anthony J. Levitt, Raymond W. Lam, Robert A comparison of open treatment of seasonal major and minor depression with light therapy  

| cohort | + | - Aged 20-65  
- major depression or minor depression with seasonal pattern  
- Scored 10 marks or above in SIGH-SAD  
- exclusion criteria: with eye condition, exposure to light therapy, planning, taking light sensitizing drug, alcohol or drug dependence  
- Treatment involved 3 weeks of light therapy at home with a fluorescent light box, the Original Bright Light (Philips)  
- 30 min daily, within half an hour of waking, and before 10 am.  
- The light unit 5000 lux at level of eyes at 12 inches from screen. | - 21-item HRDS  
- 8-item SIGH-SAD addendum  
- 29-item total score on SIGH-SAD | SAD n=29  
21-item HRDS  
17.0-7.5=10.4  
8-item SIGH-SAD  
13.2-4.1=9.1  
29-item total score on SIGH-SAD  
31.1-11.7=19.4 subsyndromal SAD n=12  
21-item HRDS  
12.9-6.1=6.8  
8-item SIGH-SAD  
12.2-6=6.2  
29-item total score on SIGH-SAD | ➢ a trend for longer LT exposure to be associated with better outcome.  
➢ LT may be effective treatment for major and minor depression  
➢ Optimal duration, for |
<table>
<thead>
<tr>
<th>Study design</th>
<th>Evidence Level</th>
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<th>Intervention N=49</th>
<th>Comparison N=21</th>
<th>Outcomes</th>
<th>Effect size</th>
<th>Interpretation</th>
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<tr>
<td>Optimized light therapy for non-seasonal major depressive disorder: Effects of timing and season</td>
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<tr>
<td>Cohort</td>
<td>+</td>
<td>Unipolar Depression</td>
<td>Current depressive episode without psychotic features (DSM-IV criteria; SCID interview)</td>
<td>None of the patients fulfilled DSM-IV criteria for seasonal pattern of recurrence</td>
<td>-(n = 49) received LT in the early morning following a predictive algorithm based on MEQ scores and aimed at causing a 2 h phase advance</td>
<td>-( n = 21) received LT at a fixed time at 11:00 a.m. Patients were assigned to treatment conditions based on a computer-generated randomization schedule.</td>
<td>Hamilton Depression Rating Scale (HDRS)</td>
</tr>
<tr>
<td>Study design</td>
<td>Evidence Level</td>
<td>Subject characteristic</td>
<td>Intervention</td>
<td>Comparison</td>
<td>Outcomes</td>
<td>Effect size</td>
<td>Interpretation</td>
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| A RANDOMIZED, CONTROLLED TRIAL OF BRIGHT LIGHT THERAPY FOR AGITATED BEHAVIORS IN DEMENTIA PATIENTS RESIDING IN LONG-TERM CARE CONSTANTINE G. LYKETSOS*, LORI LINDELL VEIEL, ALVA BAKER AND CYNTHIA STEELE. A RANDOMIZED, CONTROLLED TRIAL OF BRIGHT LIGHT THERAPY FOR AGITATED BEHAVIORS IN DEMENTIA PATIENTS RESIDING IN LONG-TERM CARE INTERNATIONAL JOURNAL OF GERIATRIC PSYCHIATRY Int. J. Geriat. Psychiatry IR, 520±525 (1999) | RCT crossover design | +                        | N=8 (mean age 80.8) All met DSM-IV criteria for dementia and scored greater than four points on the Behavioral Pathology in Alzheimer Disease scale (Behave-AD; 13) | Bright light therapy was administered for 1 hour every morning using a 10,000 lux full spectrum lamp at 3 feet for 4 weeks | a dim, digital, low-frequency blinking light positioned in the middle of the active bright light therapy was used for 4 weeks | -Outcome ratings were carried out by staff who were blind  
- sleep log for hours  
-Behavioral Pathology in Alzheimer Disease scale (Behave-AD; 13)  
-the Cornell Scale for Depression in Dementia | Treatment group before tx sleep average: 6.4hrs  
4th wks: 8.1hrs (statistically significant p<0.05)  
control condition: None of the changes across time in the control condition were statistically significant (p >0.05). | Behave-AD + CSDD were not | BLT may not be an effective treatment for agitated behavior in institutionalized dementia patients  
-However, it may be a useful means of improving or stabilizing sleep disturbances. |
statistically significant (in all cases, p > 0.05)
<table>
<thead>
<tr>
<th>Study design</th>
<th>Evidence Level</th>
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<th>Comparison</th>
<th>Outcomes</th>
<th>Effect size</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT</td>
<td>+</td>
<td>aged 14-17 mild depressive disorder according to DSM-IV</td>
<td>bright light therapy (2,500 Lux) for 1 week. - other 14 patients received first bright light therapy and then placebo</td>
<td>50 lux light therapy for 1 hr a day for 1 week</td>
<td>Beck’s depression inventory scales</td>
<td>BDI scores improved significantly during BL&gt;DL P=.017 The assays of saliva showed significant differences between treatment and placebo.</td>
<td>Antidepressant response to bright light treatment in this age group was statistically superior to placebo.</td>
</tr>
<tr>
<td>Study design</td>
<td>Evidence Level</td>
<td>Subject characteristic</td>
<td>Intervention</td>
<td>Comparison</td>
<td>Outcomes</td>
<td>Effect size</td>
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<tr>
<td>RCT</td>
<td>+</td>
<td>mean age 37.5y.o. pre-menopausal or post-menopausal women with nonseasonal, non bipolar depression..</td>
<td>Light therapy was implemented with the use of a light visor (Bio-BriteTM, Bio-Brite, Inc., Bethesda, MD) set at 2500 lux which comparable to a 10,000 lux light box administered in the morning during the first waking hour for each of the 26 days</td>
<td>wearing a pair of “circadian adaptation glasses” designed to filter out light (UVEX Safety, LLC, Smithfield, RI). Participants were instructed to wear the glasses for one hour before bedtime.</td>
<td>Pre and post measures of sleep and core temperature - measures of depressed mood, fatigue, and energy - 13-item Beck Depression Inventory (BDI) (Beck, 1961) - the 18-item Visual Analog Scale-Fatigue (VAS-F)</td>
<td>Treatment group improved significantly but not placebo group <strong>Beck depression</strong> 25.6-14.1=11.5 (P=0.02) <strong>SCL 90R</strong> 2.72-1.44=1.28 (p=0.01) <strong>Perception of energy</strong> 39.64-65.22=-25.58 (p=0.02) <strong>Temperature</strong> 37.3-36.8=0.5 (p=0.036) <strong>Wake in 1st 3rd of night</strong></td>
<td>Light therapy yielded significant improvement in depression when compared with placebo intervention and core temperature mesor returned to normal.</td>
</tr>
</tbody>
</table>
26.2-13.9=12.3
(p=0.31) (insig)
### Study design

<table>
<thead>
<tr>
<th>Study design</th>
<th>Evidence Level</th>
<th>Subject characteristic</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcomes</th>
<th>Effect size</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT</td>
<td>++</td>
<td>(mean ages 75.3)</td>
<td>Patients sat in front of a light box, receiving 5000 lux in the morning. The light therapy course was administered for 50 minutes per day and lasted for 5 days.</td>
<td>No treatment</td>
<td>GDS</td>
<td></td>
<td>Light therapy is shown to have a significant impact on reducing elderly patients’ depressive symptoms. Therefore, this non-pharmacological therapy can be considered as a possible treatment to decrease these patients’ depressive symptoms.</td>
</tr>
</tbody>
</table>

#### The effects of light therapy on depressed elders


- At pre-test the average GDS scores TX = 18.0 (SD=44.3) control=16.9 (SD=45.2) no significant differences between them (t=0.9, df=58, p=0.38).

- In the post-test, TX = 13.2 (SD=43.5) control= 16.6 (SD=44.7)

- Univariate Analysis of Variance test showed that there was a significant difference between them (F=26.4, df=459, p=0.000).
<table>
<thead>
<tr>
<th>Study design</th>
<th>Evidence Level</th>
<th>Subject characteristic</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcomes</th>
<th>Effect size</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT parallel group</td>
<td>++</td>
<td>aged 55 and older with insomnia complaints</td>
<td>A 12-week program of sleep hygiene and exposure to bright (4,000 lux) or dim light (65 lux) scheduled daily in the morning or evening for 45 minutes.</td>
<td>Dim Morning (n=7)</td>
<td>Within-group changes were observed for subjective (sleep logs, questionnaires) and objective (actigraphy, polysomnography) sleep measures after morning or evening bright light.</td>
<td>Bright morning</td>
<td>Total sleep time ( p&lt;0.05 )</td>
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<td></td>
<td>Bright Morning (n=19)</td>
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<td></td>
<td>Wake after sleep onset ( p&lt;0.05 )</td>
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<td>Dim Evening (n = 7)</td>
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<td>Sleep efficiency ( p&lt;0.001 )</td>
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<td>Bright Evening (n =17)</td>
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<td></td>
<td>Time in bed, minutes ( p&lt; 0.01 )</td>
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<td>Spielman ( p&lt; 0.001 )</td>
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<td></td>
<td>Epworth Sleepiness Scale ( p&lt;0.05 )</td>
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<td>Sleep Hygiene Questionnaire ( p&lt;0.001 )</td>
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<td>Sleep Satisfaction Scale ( p&lt; 0.01 )</td>
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<td></td>
<td>Mental Component score ( p&lt;0.01 )</td>
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<td>Physical Component score NS</td>
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<td></td>
<td></td>
<td>Bright evening</td>
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<td></td>
<td></td>
<td></td>
<td>Total sleep time ( p&lt;0.01 )</td>
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<td></td>
<td>Wake after sleep onset ( p&lt;0.001 )</td>
</tr>
</tbody>
</table>

Within-group changes for subjective sleep measures after morning or evening bright light were not significantly different from those observed after exposure to scheduled dim light. Objective sleep changes (actigraphy, polysomnography) after treatment were not significantly different between the bright and dim light groups. Scheduled light exposure was able to shift the circadian phase predictably but was unrelated to changes in objective or subjective sleep measures.
<table>
<thead>
<tr>
<th>Sleep efficiency p&lt;0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time in bed, minutes p&lt; 0.05</td>
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<tr>
<td>Spielman p&lt;0.05</td>
</tr>
<tr>
<td>Epworth Sleepiness Scale p&lt;0.05</td>
</tr>
<tr>
<td>Sleep Hygiene Questionnaire p&lt; 0.001</td>
</tr>
<tr>
<td>Sleep Satisfaction Scale p&lt; 0.01</td>
</tr>
<tr>
<td>Mental Component score NS</td>
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<tr>
<td>Physical Component score NS</td>
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<tr>
<td>Study design</td>
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<td>--------------</td>
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<tr>
<td>RCT crossover design</td>
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</table>
Bright light therapy and/or imipramine for in-patients with recurrent non-seasonal depression.


<table>
<thead>
<tr>
<th>Study design</th>
<th>Evidence Level</th>
<th>Subject characteristic</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcomes</th>
<th>Effect size</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT</td>
<td>++</td>
<td>-20-60yr-old -34 in-patients with DSM-III-R diagnosis of major depressive disorder, recurrent type, were randomly allocated into 3 treatment groups.</td>
<td>-Group A: N=11 bright light therapy (5000 lux from 6-8 a.m.) and imipramine 150 mg/day.</td>
<td>-weekly Hamilton Psychiatric Rating Scale for Depression -Clinical Global Impression Scale, Montgomery -Asberg Psychiatric Rating Scale for Depression -Beck Depression Inventory.</td>
<td>BDI from day 0 day 7 day 14 all 3 groups improved significantly (p&lt;0.05) but n.s for day 21 HAMD day 7 all 3 groups improved significantly (p&lt;0.05) but n.s for day 0, 14, 21 CGI day 0 day 7 all 3 groups improved significantly (p&lt;0.05) but n.s for day 14 and 21 MADRS day 0 day 7 all 3 groups improved significantly (p&lt;0.05) but n.s for day 14 and</td>
<td>Bright light therapy can be effective in the treatment of non-seasonal major depressive disorder.</td>
<td></td>
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</tbody>
</table>
Appendix C
Protocol

Identify potential depressed elderly:
The suitable elderly reach 8 out of 15 in the geriatric depression scale (GDS) and without evidence of cognitive impairment in the Cantonese version of mini-mental state examination.

Elderly who does not show psychiatric need but have trouble in sleeping are welcome if resources available.

Light therapy application for 1 month:
Patients are brought to a private room to have light therapy
Or
Lampbox is given to patient’s own section for light therapy

Check if any side effect arisen:
Retinal damage/ agitated behavior/ vertigo/ irritation/other undesirable symptoms
Terminate or adjust the light emission of light boxes

If patient tolerate well:
Monitor the progress by GDS and MMSE
Compare the pre and post result

- Seek for further medical help if the patient shows negative progress after light therapy
- If the patient shows positive improvement, discuss with the patient if he is satisfied with the result. He is welcome to continue until his GDS reaches 18 or below or free to terminate.
Appendix D
Flow chart of the programme

Seek for approval from above--
Introduce Light therapy to the managerial rank

Drafting proposal and collect lamp boxes quotation for charitable fund

Seek for support from below--
Introduce light therapy to colleagues, patients and relatives

- Therapy promotions
  - Staff training programme
  - Patients screening and assessment
  - Patients and relative consents
  - Technical set up and maintenance
  - Modification if question arisen

Evaluation of light therapy
Patients' progresses follow up
Terminate / Modify / Continue
<table>
<thead>
<tr>
<th>Appendix E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bibliography</td>
</tr>
</tbody>
</table>
| Adjunctive bright light in non-seasonal major depression: results from clinician-rated depression scales. (Martiny et al, 2005) | RCT          | ++             | - later wake-up time of 17.4 min (P < 0.01) from week 1–5 in DL and of 15.6 min BL (P < 0.07).  
- HAM-D17 score DL >BL by 2.6  
- HAM-D6 score DL>BL by 2.5  
- MES score DL>BL by 2  
- SIGH-SAD score DL>BL3.6 | Bright Light therapy did not appear to have experienced an earlier awakening due to the 1-hour light therapy than Dim Light therapy  
BL therapy as an adjunct treatment to sertraline in non-seasonal major depression |
| Adjunctive bright light in non-seasonal major depression: results from patient-reported symptom and well-being scales. (Martiny et al, 2005) | RCT          | ++             | - MDI: all visits score reduction BL>DL but insignificant (P <0.55).  
- PGWB: The increase scores in BL > DL but insignificance (P <0.23).  
- SCL6SCL63-item The score reduction BL>DL (P < 0.05) (sig) | The results advocate the use of bright light as an adjunct treatment of non-seasonal depression. |
| A comparison of open treatment of seasonal major and minor depression with light therapy (Anthony et al, 2002) | cohort       | +             | - SAD n=29  
- 21-item HRDS  
17.0-7.5=10.4  
- 8-item SIGH-SAD  
13.2-4.1= 9.1 | a trend for longer exposure to be associated with better outcome.  
LT may be an effective treatment for major and minor depression with a |
<table>
<thead>
<tr>
<th>Optimized light therapy for non-seasonal major depressive disorder: Effects of timing and season (Sara et al, 2012)</th>
<th>cohort</th>
<th>+</th>
<th>-HDRS scores significantly decreased during treatment (Friedman's ANOVA: $\chi^2 = 186.82$, $p&lt;0.00001$).</th>
<th>Confirmed the usefulness of LT as a non-pharmacological antidepressant therapy for non-seasonal depression.</th>
<th>Season and timing of administration and timing of the rest–activity cycle affected response to treatment.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A RANDOMIZED, CONTROLLED TRIAL OF BRIGHT LIGHT THERAPY FOR AGITATED BEHAVIORS</strong></td>
<td>RCT crossover design</td>
<td>+</td>
<td><strong>Treatment group</strong></td>
<td>BLT may not be an effective treatment for agitated behavior in institutionalized dementia patients</td>
<td></td>
</tr>
</tbody>
</table>
|  ➢ 29-item total score on SIGH-SAD  
  31.1-11.7=19.4  
  ➢ subsyndromal SAD n=12  
  ➢ 21-item HRDS  
  12.9-6.1=6.8  
  ➢ 8-item SIGH-SAD  
  12.2-6=6.2  
  ➢ 29-item total score on SIGH-SAD  
  25.1-12.1=13  | seasonal pattern.  
  ➢ Optimal duration, for the light therapy is likely 45–60 min daily.  
  ➢ LT administered in the early morning showed a better relative efficacy than late morning (F=4.576; p=0.012)  |
**IN DEMENTIA PATIENTS RESIDING IN LONG-TERM CARE**

*CONSTANTINE et al, 1999*

- **4th wks**: 8.1hrs

- **Improvement between baseline and 4 weeks was statistically significant p<0.05**

- **control condition**: None of the changes across time in the control condition were statistically significant (p >0.05).

- **Behave-AD + CSDD** were not statistically significant (in all cases, p >0.05)

- However, it may be a useful means of improving or stabilizing sleep disturbances.

| **Bright light treatment as mono-therapy of non-seasonal depression for 28 adolescents** (HELMUT et al 2012) | **RCT** | + |  
|---|---|---|---|---|---|---|---|---|
| **BDI scores improved significantly during BL>DL P=.017** | **Treatment group improved significantly but not placebo group** | **Beck depression** | **25.6-14.1=11.5 (P=0.02)** | **SCL 90R** | **2.72-1.44=1.28 (p=0.01)** | **Antidepressant response to bright light treatment in this age group was statistically superior to placebo.** |

<p>| <strong>EFFECTS OF LIGHT THERAPY ON SLEEP, MOOD, AND TEMPERATURE IN WOMEN WITH NONSEASONAL MAJOR DEPRESSION</strong> | <strong>RCT</strong> | + |<br />
|---|---|---|---|---|---|---|---|---|
| <strong>Treatment group improved significantly but not placebo group</strong> | <strong>Beck depression</strong> | <strong>25.6-14.1=11.5 (P=0.02)</strong> | <strong>SCL 90R</strong> | <strong>2.72-1.44=1.28 (p=0.01)</strong> | <strong>Light therapy yielded significant improvement in depression when compared with placebo intervention and core temperature mesor returned to normal.</strong> |</p>
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Control</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Geoffry et al, 2005)</td>
<td></td>
<td></td>
<td>Perception of energy</td>
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<td>- 39.64-65.22= -25.58 (p=0.02)</td>
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<td>Temperature</td>
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<td>- 37.3-36.8=0.5 (p=0.036)</td>
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<td>Wake in 1st 3rd of night</td>
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<td>- 26.2-13.9=12.3 (p=0.31) (insig)</td>
</tr>
<tr>
<td>The effects of light therapy on depressed elders (Yun et al 2004)</td>
<td>RCT</td>
<td>+</td>
<td>At pre-test</td>
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<tr>
<td></td>
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<td>- the average GDS scores TX =18.0 (SD¼4.3)</td>
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<td>- control=16.9 (SD¼5.2)</td>
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<td></td>
<td>- no significant differences between them (t¼0.9, df¼58, p¼0.38).</td>
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<td>In the post-test</td>
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<td>- TX = 13.2 (SD¼3.5)</td>
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<td>- control= 16.6 (SD¼4.7)</td>
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<td></td>
<td>Univariate Analysis of Variance test</td>
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<td>- showed that there was a significant difference between them (F¼26.4, df¼59, p¼0.000).</td>
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<tr>
<td></td>
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<td></td>
<td>Light therapy is shown to have a significant impact on reducing elderly patients’ depressive symptoms. Therefore, this non-pharmacological therapy can be considered as a possible treatment to decrease these patients’ depressive symptoms.</td>
</tr>
<tr>
<td>Study Title</td>
<td>Design</td>
<td>Effect Size</td>
<td>Findings</td>
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</tbody>
</table>
| **Scheduled Bright Light for Treatment of Insomnia in Older Adults** | RCT | + | Bright morning  
- Total sleep time $p<0.05$  
- Wake after sleep onset $p<0.05$  
- Sleep efficiency $p<0.001$  
- Time in bed, minutes $p<0.01$  
- Spielman $p<0.001$  
- Epworth Sleepiness Scale $p<0.05$  
- Sleep Hygiene Questionnaire $p<0.001$  
- Sleep Satisfaction Scale $p<0.01$  
- Mental Component score $p<0.01$  
- Physical Component score NS  
Bright evening  
- Total sleep time $p<0.01$  
- Wake after sleep onset $p<0.001$  
- Sleep efficiency $p<0.01$  
- Time in bed, minutes $p<0.05$  
- Spielman $p<0.05$  
- Epworth Sleepiness Scale $p<0.05$  | Within-group changes for subjective sleep measures  
- After morning or evening bright light were not significantly different from those observed after exposure to scheduled dim light. Objective sleep changes (actigraphy, polysomnography) after treatment were not significantly different between the bright and dim light groups. Scheduled bright exposure was able to shift the circadian phase predictably but was unrelated to changes in objective or subjective sleep measures. |
| **Bright Light Treatment Decreases Depression in Institutionalized Older Adults: A Placebo-Controlled Crossover** | RCT | + | GDS post-pre of LT  
14.9-11.3=3.6  
($r=0.62$ $p<0.05$)  
GDS for placebo 15.4-14.7=0.7 (n.s)  | BLT may be effective among institutionalized older adults as nonpharmacological intervention in treating depression. |
<table>
<thead>
<tr>
<th>Study</th>
<th>RCT</th>
<th>+</th>
<th>BDI from day 0 day 7 day 14 all 3 groups improved significantly (p&lt;0.05) but n.s for day 21</th>
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<tr>
<td>Bright light therapy and/or imipramine for inpatients with</td>
<td></td>
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<td>HAMD day 7 all 3 groups improved significantly (p&lt;0.05) but n.s for day 0, 14, 21</td>
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<td>recurrent non-seasonal depression.</td>
<td></td>
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<td>CGI day 0 day 7 all 3 groups improved significantly (p&lt;0.05) but n.s for day 14 and 21</td>
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<tr>
<td>(Jan et al 2002)</td>
<td></td>
<td></td>
<td>MADRS day 0 day 7 all 3 groups improved significantly (p&lt;0.05) but n.s for day 14 and 21</td>
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<td>Bright light therapy can be effective in the treatment of non-seasonal major depressive disorder.</td>
</tr>
</tbody>
</table>
Appendix F-- Kogan’s Old People’s Scale (KOPS)

1) It would probably be better if most old people lived in residential units with people their own age.

2) It would probably be better if most people lived in residential units with younger people.

3) There is something different about most people; it’s hard to find out what makes them

4) Most old people are really no different from anybody else; they’re as easy to understand as younger people.

5) Most old people get set in their ways and are unable to change.

6) Most old people are capable of new adjustments when the situation demands it.

7) Most old people tend to let their homes become shabby and unattractive.

8) Most old people can generally be counted on to maintain a clean, attractive home.

9) It is foolish to claim that wisdom comes with age.

10) People grown wiser with the coming of old age.

11) Most old people make one feel ill at ease.

12) Most old people are very relaxing to be with.

13) Most old people bore others by their insistence on talking “about the good old days”.

14) One of the most interesting and entertaining qualities of most old people is their accounts of their past experiences.

15) In order to maintain a nice residential neighborhood, it would be best if too many old people did not live in it.

16) You can count on finding a nice residential neighborhood when there is a sizeable number of old people living in it.

17) There are a few exceptions, but in general most old people are pretty much alike.
18) It is evident that most old people are very different from one another.

19) Most old people should be more concerned with their personal appearance; they’re too untidy.

20) Most old people seem quite clean and neat in their personal appearance.

21) Most old people are irritable, grouchy, and unpleasant.

22) Most old people are cheerful, agreeable, and good humored.

23) Most old people are constantly complaining about the behavior of the younger generation. 24) One seldom hears old people complaining about the behavior of the younger generation. 25) Most old people make excessive demands for love and reassurance than anyone else.

26) Most old people need no more love and reassurance than anyone else.
Appendix G--Palmore’s Facts of Ageing Quiz

T F 1. The majority of old people (past 65 years) have Alzheimer's disease.

T F 2. As people grow older, their intelligence declines significantly.

T F 3. It is very difficult for older adults to learn new things.

T F 4. Personality changes with age.

T F 5. Memory loss is a normal part of aging.

T F 6. As adults grow older, reaction time increases.

T F 7. Clinical depression occurs more frequently in older than younger people.

T F 8. Older adults are at risk for HIV/AIDS.

T F 9. Alcoholism and alcohol abuse are significantly greater problems in the adult population over age 65 than that under age 65.

T F 10. Older adults have more trouble sleeping than younger adults do.

T F 11. Older adults have the highest suicide rate of any age group.

T F 12. High blood pressure increases with age.

T F 13. Older people perspire less, so they are more likely to suffer from hyperthermia.

T F 14. All women develop osteoporosis as they age.

T F 15. A person’s height tends to decline in old age.


T F 17. Most old people lose interest in and capacity for sexual relations.

T F 18. Bladder capacity decreases with age, which leads to frequent urination.

T F 19. Kidney function is not affected by age.

T F 20. Constipation increases in more people as they get older.

T F 21. All five senses tend to decline with age.

T F 22. As people live longer, they face fewer acute conditions and more chronic health conditions.
T  F  23. Retirement is often detrimental to health—i.e., people frequently seem to become ill or die soon after retirement.

T  F  24. Older adults are less anxious about death than are younger and middle-aged adults.

T  F  25. People 65 years of age and older make up about 20 percent of the U.S. population.

T  F  26. Most older people are living in nursing homes.

T  F  27. The modern family no longer takes care of its elderly.

T  F  28. The life expectancy of men at age 65 is about the same as that of women.

T  F  29. Remaining life expectancy of blacks at age 85 is about the same as whites.

T  F  30. Social Security benefits automatically increase with inflation.

T  F  31. Living below or near the poverty level is no longer a significant problem for most older Americans.

T  F  32. Most older drivers are quite capable of safely operating a motor vehicle.

T  F  33. Older workers cannot work as effectively as younger workers.

T  F  34. Most old people are set in their ways and unable to change.

T  F  35. The majority of old people are bored.

T  F  36. In general, most old people are pretty much alike.

T  F  37. Older adults (65+) have higher rates of criminal victimization than adults under 62 do.

T  F  38. Older people tend to become more religious as they grow older.

T  F  39. Older adults (65+) are more fearful of crime than are persons under 65.

T  F  40. Older people do not adapt as well as younger age groups when they relocate to a new environment.

T  F  41. Participation in voluntary organizations (churches and clubs) tends to decline among older adults.

T  F  42. Older people are much happier if they are allowed to disengage from society.

T  F  43. Geriatrics is a specialty in American medicine.
44. All medical schools now require students to take courses in geriatrics and gerontology.

45. Abuse of older adults is not a significant problem in the U.S.

46. Grandparents today take less responsibility for rearing grandchildren than ever before.

47. Older persons take longer to recover from physical and psychological stress.

48. Most older adults consider their health to be good.

49. Older females exhibit better health care practices than older males.

50. Research has shown that old age truly begins at 65.