

**Proposing an Evaluation of Multiple Sensory Therapies and Develop Assistive
Devices for the Elderly with Dementia**

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ABSTRACT

Due to the fast increasing trend of aging population development, in 2016, aging population is reaching 15.13% in Pingtung, which is the top 3 in Taiwan. For improving the quality of living for elderly and dementia people in long-term care institutions, multisensory therapy is one of the popular complementary therapies. The aim of the multisensory therapy is to stimulate sense organ and cognitive function system, in order to re-balance the spirits of body. Therefore, the study is going to evaluate multisensory therapy activities and develop an assistive device toward to the dementia people in long-term care institutions. General survey will apply to describe the whole demand and ongoing experience of multisensory therapy in Pingtung long-term care institutions in the first sub-project. Second sub-project will exam the relative items and the functions of multisensory therapy, in which course module design included. The last sub-project will cooperate with Pingtung government and related enterprises to development assistive device and multisensory therapy resources network platform, which may support the care givers to improve the quality of life for residents in long-term care institutions. This study is not only expected to conduct a three-year continuity survey and effectiveness assessment of the aids and course modules through the current inventory, field practice and industry alliance, but also to increase the use and effectiveness of multivariate sensory-assisted activities and course modules in the clinical care of professional workers in Pingtung.

Keywords: The elderly, Dementia, Multisensory therapy, Course module design, Assistive devices, Resources network platform

1. BACKGROUND

The elderly population grows fast currently in Taiwan, until December 2016, according to the statistical data of Ministry of the Interior, which has accounted for 13.13% of the total population. Especially in Pingtung, until November 2016, the elderly population has accounted for 15.13%, which has exceeded the national average, and became one of the most aged counties in Taiwan (Ministry of the Interior, 2010a).

Due to the rapid growth trend of aging in all the counties, the Legislature department has been considered and passed the Long Service Act in June 2015, and fully implemented in 2017. There are four main purposes:

- A. For establishing the basis of a universal and localized long-term care, and to accelerate the development of long-term care service resources, and to increase the manpower for long-term care.
- B. For training a community-based long-term care team to offer diversified and continuous integrated long-term care services, and to achieve the goal of aging locally.
- C. To set up cross-sectoral group to promote and complete the development of long-term care fund.
- D. Actively expanding the community as a unit of multiple-care-service model, conducting resource inventory, and combining with civil forces to meet the needs of the aging society.

2. DEMENTIA CURRENT DEVELOPMENT IN TAIWAN

The dementia is the most special disease in the long-term care. Due to the deterioration of symptom, the patients and family may produce a variety of cognitive, mood or emotional expression, the relative policies of long-term care always suggest diverse activities for promoting health, both for patients and their families, to delay the onset of symptoms.

Until September 2016, according to the calculation of Taiwan Dementia Association, the dementia population of 65 years age above is 243,430, and the dementia population of 30-63 years age is 12,658, which means the total dementia population were 256,088. The 256,088 is 1.09% for the total population in Taiwan in 2016, and according to the report of National Development Board population projections, the dementia population will be more than 260,000 people by the end of 2017, which imply that one of every 100 people in Taiwan is a dementia person.

In August 2016, the Taiwan Society for the Dementia, in accordance with the National Population Council, announced that in the next 45 years the number

of Taiwan's dementia people will increase by an average of 36 people per day, and by the speed of 1 dementia person per 40 minutes (Ministry of the Interior, 2010b). The anticipated conditions will be as the followings:

- A. There will be 2 dementia persons per 100 persons, and the total population is 460,000 in 2031.
- B. There will be exceeded 3 dementia persons per 100 persons, and the total population is 660,000 in 2041.
- C. There will be 4 dementia persons per 100 persons, and the total population is 810,000 in 2051.
- D. There will be almost 5 dementia persons per 100 persons, and the total population is 685,000 in 2061.

Therefore, the government and popular should prepare early for long-term care and face the situation of dementia surge. For the rapid aging, the government should enhance the ability and support for the environment of promoting health and well-being of aging, and actively plan the direction of care policy.

Due to the location, Pingtung county, which is located in the southernmost tip of Taiwan, is the second fast of aging county while facing the dual impact of population aging and less childhood. For a long time in Pingtung, Meihu University is the important and influential educational institution, and offers the manpower and human resources for long-term care; therefore the faculty of Meihu University takes the responsibility together with Pingtung government to build a friendly aging-city. The above is the main reason and goal for conducting this proposal and to execute it as a big project.

3. LITERATURE REVIEW

3.1 Multisensory environment Treatment

The origin of multisensory environment is around 1980s, and started from Holland. The treatment focuses mainly on the use of sound, light, taste, food and other stimuli to awaken the visual, auditory, olfactory, taste and touch of severe disability and multiple disabilities, and to stimulate a variety of sensory and learning motivation. The treatment room of multisensory environment needs special design with no pressure, relax, soft music, light color, fragrant and others pleased sensory experiences to let the patients feel trust, positive, energetic, communicative, and so on. The purposes for building the treatment room of multisensory environment are to reduce the pressure of caregivers, establish regular sleep, reduce the use of drugs, increase pain control, improve the behavioral correction, improve cognitive function, improve quality of life, and other functions.

Cox, Burns and Savage have been studies the multisensory environment to promote the well-being of residents in nursing homes and dementia for several years, and observed and interviewed both residents and caregivers to know their feelings and preferences, separately indoors and outdoors (Cox, Burns, & Savage, 2004). Their studies are very important basis of designing the nursing home environment. The first similar study of Taiwan was around 2011, which adopt the semi-Experimental design with Mini-Mental State Examination (MMSE) and Neuropsychiatric Inventory (NPI). A total of 20 persons with mental illness were tested and got a significant improvement in psychiatric symptoms. The result showed that multiple sensory environmental treatments indeed helped improve the behavior and emotional symptoms of the dementia, and can improve their quality of life, thereby reducing the burden of caregivers (Wang et al., 2011).

3.2 Adjuvant therapy and aids

The reason of multisensory environment became one of the adjuvant therapy for long-term care and dementia is that it can stimulate reactions of cognition and emotion and so as to achieve the balance the body and mind (Liang, 2009). In Taiwan, the government mostly focused on the financial subsidies and institutional accommodation care costs, and there were many cultural and recreational activities within the organizations; therefore, the assistive therapy to assist with severe disability patients is less (Deng, 2014).

The most accepted definition is [a group of medical services that are not Western orthodox medicine which included a wide range of medical and health care systems, practices and products], and this definition was announced by National Center for Complementary and Alternative Medicine (NCCAM) of America, which was established in 1998. However, the WHO (World Health Organization) has put forward the global strategy of traditional and alternative medicine in 2002, and looked forward to establishing the proper status for both traditional and alternative medicine. The WHO (2003) also referred the adjuvant and alternative medicine as to the approach, practice, knowledge, and belief, and which may apply to medical, psychotherapy, operation techniques and exercise by adopting plants, animals, minerals.

There are so many types of auxiliary and alternative medicine around the world, therefore, the NCCAM has divided them into five categories and increased funding for related research:

A. Alternative medicine systems:

It refers to a complete theoretical basis and clinical practice, such as Chinese medicine, homeopathic medicine and Indian medicine.

- B. Mind-body intervention:
It refers to the promotion of spiritual ability therapy, such as artistic therapy and prayer.
 - C. Biologically based therapies:
It refers to the use of natural substances, such as herbs and healthy food.
 - D. Manipulative and Body-based methods:
It refers to the operation of hand or mobile body treatment, such as chiropractic and massage.
 - E. Energy therapies:
It was divided into two types, one is Bio-field therapy, which refers to the use of energy to treat, such as qigong and aura (Reiki); the other is *Bio-electro-magnetic-based therapy*, which refers to the use of electromagnetic energy to treat, such as magnetic therapy.
- From 1993 to 2000, Doctor McLennan (MacLennan et al., 2002)found the use of assisted and alternative therapies increased from 48.5% to 52.1%, and the overall cost was from \$ 980 million to \$ 2.3 billion (Australian dollar) with growth more than twice. The above studies shows a trend of prevalence and universality of adjuvant and alternative medical care.

3.3 Aging Locally

There are regional characteristics in the development of long-term care system, therefore, the government or educational institutes must be based on the characteristics of urban and rural development to plan for the general public needs of long-term care services. The concept of aging locally not only emphasizes on care in the community and care by the community, but also implies the connotation of cultural community belongs (Meredith, 1995; Easterbrook, 2002) . The reason comes from the importance of elderly's self-awareness, self-esteem and social-identity. The is also main connotation of social health, which emphasizes that older persons who are remained in the familiar and dependent environment are able to feel the extent of family care and social support and have a significant impact on their health (Bowling, 1997).

In view of this, considering the regional characteristics as a starting point will be effective facilities for establishment of long - term care resource integration and management mechanism. In this way, not only can effectively use resources and saving social costs, but also easily choose appropriate care, placement, and getting a better quality of life, for the people with long-term care needs.

4. RESEARCH DESIGN

Based on the above reasons, the research team conducted three sub-projects with different missions to achieve anticipated goals:

A. The 1st sub-project:

With the mission of assessing the benefits of multisensory environment therapies for the elderly with dementia.

B. The 2nd sub-project:

With the mission of developing a cross-disciplinary curriculum for the elderly with dementia.

C. The 3rd sub-project:

With the mission of developing the auxiliary equipment or rehabilitation resources for the elderly with dementia.

4.1 1st sub-project

With the mission of assessing the benefits of multisensory environment therapies for the elderly with dementia, the team of the 1st sub-project, first of all, is to understand the use and distribution of multisensory therapies in Pingtung County via (1) visiting actually long-term care institutions, and (2) interviewing the main responsible executors of multisensory therapies. Secondly, by adopting participatory observation approach to evaluate the multisensory therapy in the actual field of clinical efficacy assessment, and also adopting Quality of Life Scale, Melancholy Scale and Simple Intelligence Scale (MMSE) to measure dementia patients. Thirdly, knowing the differences of demand for dementia in the field before performing suitable adjuvant therapy.

4.2 2nd sub-project

The planning direction of the sub-project is a highly innovative approach to promote the reform of college curriculum by considering the actual needs of society. The sub-project is going to through the community to learn, so that college to assist the local long-term care development, and so that students learn in life and in practice to grow as practical potential learners in long-term care industries.

This sub-project will adopt Delphi approach to verify whether the curriculum design is consistent with the needs of teachers and students, whether the program is effective for long-term care center and whether achieve the targets of the whole project. However, the evaluative ways of executing curriculum still need the stakeholders, such as community, institutions, alumni, teachers and students, outside peers and relative industries, to execute the external reviewing procedures.

4.3 3rd sub-project

This sub-project focuses on validating and evaluating the use of multisensory environment therapies in order to develop corresponding aid tools for the dementia. Therefore, this sub-project needs the cooperation of the students in 2nd sub-project, first of all to understand the nature of long - term care and the principle of multisensory adjuvant therapy; secondly, to practice in the real institution and collect relative information of dementia patients participating in activities; then, they are able to carry out the research and development of aid tools.

On the top of that, the sub-project expects to share the results the multisensory rehabilitation into the resource query system of Pingtung County, and to present the real situation using multisensory therapy within institutions. All of the results and some advice are free providing to the long-term care participants.

5. PURPOSES

The project team will work with local governments, long-term care institutions, and well-being technology companies to evaluate and develop appropriate courses for potential learners of long-term care through the combing results of the three sub-projects, and hope to develop or with appropriate accessory to assist healthy elderly and elderly people with mental illness. The main purpose for the whole project is to slow down the rate of dementia, and to reduce the care cost. The framework of the whole project shows as the following figure.

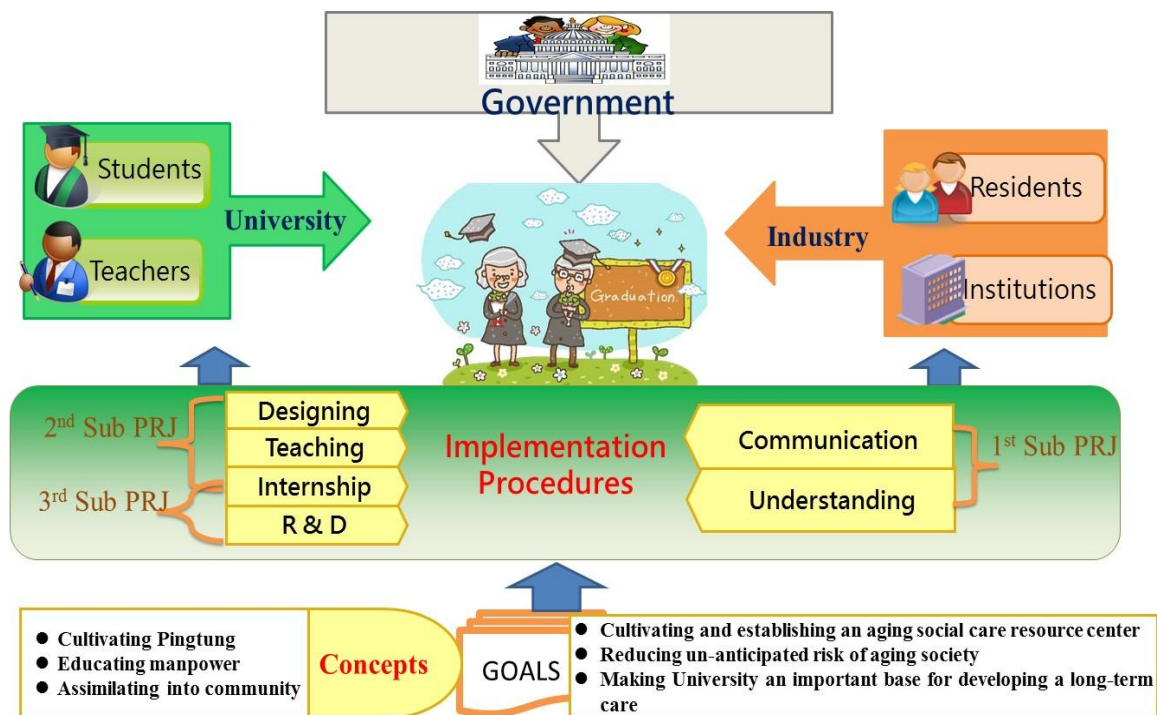


Figure. Framework of the Whole Project

There are four clear and kind wishes for the whole project showed as the followings.

- A. Plowing the manpower of human and industry services for taking care and assisting the accessible and safe environment for aging society in Pingtung.
- B. Assisting the Pingtung government to build aging friendly city through well-design curriculum to cultivate the manpower or the potential learners of long-term care.
- C. Due to the limited manpower and less children in Taiwan, the aid tools, which are carried out by the 3rd sub-project, will share to all the nation for helping the patients and caregivers of long-term care.
- D. Not only the manpower is needed of the long-term care, but also relative industries, such as elderly dining, traveling, mental-caring, and creative talent, are derivative areas which welcome to all types of talent input.

6. ANTICIPATED GOALS

6.1 Contribution to overall national development and other applications

After executing the whole project, there are two types of benefits are anticipated. According the 3 goals and 3 concepts, the Meiho University can establish a basis of the aging locally with well welfare policy, friendly and technological industry, and a pragmatic education system.

6.2 Contributions to Academic and Curriculum

- A. Community manpower training programs of long-term care will be included in the existing internship programs or school societies
- B. The programs and activities of the whole project will be as much as possible into the community
- C. The reward or bonus mechanism of designing curriculum will be a routine for encouraging faculty through the project.
- D. Completing a rich products of interactive multimedia e-book of training materials, and of editing digital teaching recording.
- E. Constructing the integrated platform of local long-term care agency and aid or adjuvant therapy and other resources, which the databased of investigated archives and accessible and friendly guided maps.

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