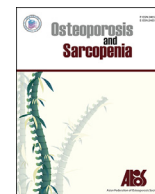




Contents lists available at ScienceDirect

Osteoporosis and Sarcopenia

journal homepage: <http://www.elsevier.com/locate/afos>

Review article

The development of Taiwan Fracture Liaison Service network

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ARTICLE INFO

Article history:

Received 17 April 2018

Received in revised form

11 May 2018

Accepted 3 June 2018

Available online xxx

Keywords:

Asia-Pacific region

Taiwan

Fracture Liaison Service

Best Practice Framework

Osteoporosis

ABSTRACT

Osteoporosis and its associated fragility fractures are becoming a severe burden in the healthcare system globally. In the Asian-Pacific (AP) region, the rapidly increasing in aging population is the main reason accounting for the burden. Moreover, the paucity of quality care for osteoporosis continues to be an ongoing challenge. The Fracture Liaison Service (FLS) is a program promoted by International Osteoporosis Foundation (IOF) with a goal to improve quality of postfracture care and prevention of secondary fractures. In this review article, we would like to introduce the Taiwan FLS network. The first 2 programs were initiated in 2014 at the National Taiwan University Hospital and its affiliated Bei-Hu branch. Since then, the Taiwan FLS program has continued to grow exponentially. Through FLS workshops promoted by the Taiwanese Osteoporosis Association (TOA), program mentors have been able to share their valuable knowledge and clinical experience in order to promote establishments of additional programs. With 22 FLS sites including 11 successfully accredited on the best practice map, Taiwan remains as one of the highest FLS coverage countries in the AP region, and was also granted the IOF Best Secondary Fracture Prevention Promotion award in 2017. Despite challenges faced by the TOA, we strive to promote more FLS sites in Taiwan with a main goal of ameliorating further health burden in managing osteoporotic patients.

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Peer review under responsibility of The Korean Society of Osteoporosis.

<https://doi.org/10.1016/j.afos.2018.06.001>

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Please cite this article in press as: Chang L-Y, et al., The development of Taiwan Fracture Liaison Service network, Osteoporosis and Sarcopenia (2018), <https://doi.org/10.1016/j.afos.2018.06.001>

1. Introduction

Osteoporosis remains one of the most common bone disease encountered worldwide. It is primarily characterized by bone mass reduction and bone quality deterioration, and increased risks bone fragility and/or fracture [1]. The aging population is being recognized widely as a serious health burden in the 21st century, especially in the Asian-Pacific (AP) region due to the enormous population base [2]. In 2004, the World Health Organization estimated that osteoporosis would cause approximately 9 million fracture incidents worldwide, with 2.5 millions & 1.6 millions in the Western Pacific and Southeast Asia, respectively [2]. In fact, it is projected about half of the hip fracture occurring worldwide will be further identified in Asia [3,4].

Although osteoporosis and its associated fragility fractures continue to pose a heavy health care burden, their lack of quality care remains prominent in the AP region. Previous study demonstrated that only less than one-third of the patients with fragility fracture worldwide received a comprehensive osteoporotic evaluation and the proper treatments [5].

The lifetime fracture risks in either vertebrate, hip, or waist are 33% and 20% for female and male in Taiwan, respectively [6,7]. The hip fracture year-incidence rate in Taiwan is being recognized as one of the highest in the world, being 392/100,000 and 196/100,000 in female and male, respectively [6]. In fact, the 1-year mortality rate after a hip fracture was found to be 15% in female, and 22% in male in 2002 [6]. These figures somewhat improved in 2009 to 11% in female, and 18% in male [8]. The Asia-gap study conducted in 2007 showed that in hip fractures, while 70% of the patients themselves were aware that they had osteoporosis, only 25% were evaluated with a bone mineral density (BMD), and 30% received the proper medications to treat osteoporosis [9].

In 2013, as an effort to provide better care for osteoporosis, the International Osteoporosis Foundation (IOF) advocated Capture the Fracture campaign in order to raise awareness on secondary fracture prevention [5]. Fracture Liaison Service (FLS) is promoted as a coordinated, multidisciplinary program that not only helps identify but also treat fracture patients systematically [5]; In addition, the IOF also constructed the Best Practice Framework (BPF) with thirteen specific standards providing reference guidance for institutions to follow and implement in their individualized FLS programs [5]. These FLS programs have shown be cost-effective [10], and to improve both secondary fracture incidence [11] and mortality rates [11].

The first 2 FLS programs in Taiwan were established at the National Taiwan University Hospital Healthcare System in 2014. Subsequently, the number FLS programs providing care for osteoporotic patients continued to increase rapidly nationwide. As of March 2018, there were a total 22 FLSs in Taiwan with 11 being accredited on the Map of Best Practice. More details regarding these FLS sites can be found on the Capture the Fracture website (<http://capturethefracture.org/map-of-best-practice>). This review article focuses on the development of FLS network in Taiwan.

2. The National Taiwan University Hospital Healthcare System fracture liaison program

Established in 2014, the first FLS program Taiwan was developed by the National Taiwan University Hospital (NTUH) with its model being served as the primary framework for many other similar fracture caring programs which later ensued. The FLS initially operated as a research project at both NTUH and its affiliated branch in Bei-Hu. Clinical cases were evaluated from both inpatient and outpatient settings at our main branch. Bei-Hu branch, on the other hand, employed the same study protocol but only involved

recruitments from outpatient setting because it lacks an Emergency Department or orthopedic/trauma ward. The flow-chart from the NTUH FLS model is demonstrated in Fig. 1.

The NTUH model consists of patients from 3 groups: Those newly diagnosed hip fractures from orthopedic ward (group A), previously unrecognized vertebral compression fractures from the geriatrics ward (group B), and clinical vertebral compression fractures without previous treatment from the outpatient clinic setting (group C).

Evaluation is based on the Taiwanese Guidelines for the Prevention and Treatment of Osteoporosis published by the Health Promotion Administration and The Taiwanese Osteoporosis Association (TOA) [6]. According to the guideline, fragility fracture patients should receive multifaceted evaluation within eight weeks after identification. They include the following: Estimation of 10-year fracture risk by FRAX (fracture risk assessment tool), BMD, evaluation of life style behaviors (amount of supplemental calcium and vitamin D₃ intake, protein intake, exercise, smoking, and alcohol, etc.), fall risk assessment & prevention, and blood test to screen for possible underlying secondary endocrine causes osteoporosis. If the patient has received prior treatment for osteoporosis, evaluation of the medication dosage, side effects, compliance, and contraindications were also carefully analyzed. Case coordinators would also provide a comprehensive education on the disease of osteoporosis, its treatment involving medications or other non-pharmacological management options to participants of our program when indicated.

Telephone conversations and outpatient interviews were conducted at 4th, 8th, and 12th months from enrollment. Case managers involve interactions with the patient to provide education regarding osteoporosis as well as review of medication dosage, side effects, adherence, and monitoring for possible new falls, fractures, if applicable. Upon completion of the twelfth month interview, subsequent long-term osteoporosis follow-up process is implemented. The follow-up period then extends to every 6 months in the second year then annually up to a total of ten years. The FLS database is then meticulously collected for further analysis.

3. The development of FLS network in Taiwan

In 2015, both programs were accredited by IOF on the Map of Best Practice (NTUH main branch awarded Gold, and the Bei-hu branch awarded Silver). Subsequently, several other medical centers in Taiwan have cooperated with NTUH with similar protocol and flowchart in hopes of establishing mutual database. The National Yang-Ming University Hospital, on the other hand, has designed their own protocol but is collaborating with NTUH programs by sharing of their clinical experience.

In 2016, the TOA started hosting serial workshops with a primary goal to promote further FLS expansion in Taiwan. The first workshop was held in September 2016, where experts from the 2014–2015 programs were invited to act as clinical instructors and coordinators to share their experience with corresponding mentee institutes. After this meeting, 12 additional institutions started to develop their own FLS programs (n = 18, Fig. 2). TOA at that time also encouraged all established programs to aim for the best practice recognition whenever possible. The second workshop was later held in January 2017. All new programs were invited to discuss their interim progress along with comments provided by experienced mentors. Obstacles and challenges encountered were also discussed. Consequently, a new program (Taichung Veterans General Hospital) joined (n = 19, Fig. 2). Efforts of TOA were well recognized by IOF at the 2017 World Congress for Osteoporosis, Osteoarthritis and Musculoskeletal Diseases held in Florence and granted the Best Secondary Fracture Prevention Promotion award.

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