Abstract of dissertation entitled

"An evidence-based self-management education program for Chinese older adults with osteoarthritis of knee"

submitted by

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With ageing population in Hong Kong, the prevalence of osteoarthritis is expected to be increasing. The most common type of osteoarthritis is osteoarthritis of knee. Osteoarthritis adversely affects physical activities, social activities and quality of life. It causes socioeconomic burdens and has become a more prominent public health issue in Hong Kong.

Self-management of this irreversible health problem in the daily living is crucial to those elders suffering from osteoarthritis. However, no evidence-based guidelines on self-management education for elders with knee osteoarthritis have been formed. The objectives of this paper are to review literatures on the effectiveness of self-management program and to formulate evidence-based
guidelines on self-management education for Chinese older adults with knee osteoarthritis.

The literature review showed that self-management program was an effective measure to improve self-efficacy for self-management and to reduce pain among the elders with knee osteoarthritis.

The assessment on the implementation potential of the self-management program showed that self-management program could be transferred to the community-dwelling Chinese elders with knee osteoarthritis and was found to be feasible for implementation in Elderly Health Centers in Hong Kong. The benefits of self-management program outweigh the costs for the implementation of such a program.

The proposed self-management program would mainly provide the elders with the self-management skills, osteoarthritis related information and exercise practice in group sessions. There would also be follow-up telephone coaching. Guidelines for implementing the proposed self-management program are shown in this thesis.

Implementation plan was formulated to propose communication strategies to initiate and sustain the implementation of the proposed self-management program. Pilot test was designed to test the feasibility of the program. Evaluation plan was
developed to evaluate the effectiveness of the program in improving self-efficacy for self-management and reducing osteoarthritis pain for Chinese older adults with knee osteoarthritis.

In sum, self-management program was found to be effective in improving self-efficacy for self-management and reducing pain among the elders with knee osteoarthritis. The guidelines on the proposed self-management program could support the evidence-based self-management education for Chinese older adults with knee osteoarthritis in Hong Kong.
An evidence-based self-management education program for Chinese older adults with osteoarthritis of knee

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Declaration

I declare that this dissertation 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 ____________________________________

Ip Sik Yung
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CHAPTER 1: INTRODUCTION

In this chapter, the trend and the impact of osteoarthritis in Hong Kong and the need of self-management program for older adults with osteoarthritis of knee are discussed. Research question of the proposed study and the objectives of the study are listed.

1.1 Background

1.1.1 Osteoarthritis

Osteoarthritis is a degenerative joint condition, characterized by the loss of articular cartilage of the joint, changes of bone margins and formation of osteophytes. The most common type of osteoarthritis is osteoarthritis of knee. The signs and symptoms of osteoarthritis include pain, crepitus, swelling, stiffness, weakness of joint, occasional local inflammation, deformity and reduced range of joint motion (CHP, 2009). Severity of the symptoms varies depending on the degree of joint damages. Pain is the most prominent symptom of osteoarthritis. The study by Chan and Chan (2011) in Hong Kong found that eighty percent of those with knee osteoarthritis reported pain precipitated by weight-bearing and knee movement (mechanical pain) and exacerbated by prolonged walking and minor sprain (inflammatory pain, with swollen and hot joint). Osteoarthritis
adversely affects physical activities, social activities and causes mental distress.

The study on the impact of osteoarthritis in Hong Kong Chinese population showed that those with osteoarthritis had lower quality of life (Woo et al., 2004).

1.2 Affirming the Need and Significance

1.2.1 Prevalence and Impact of Osteoarthritis

World Health Organization estimated that 9.6% of men and 18% of women aged 60 years or above had osteoarthritis in 2000 globally (Woolf & Pfleger, 2003). In United States, osteoarthritis affected 33.6% of adults aged 65 years or above in 2005 (Lawrence et al., 2008). In Hong Kong, 47% of 38,000 elders aged 65 years or above who attended the Elderly Health Centers of the Elderly Health Service in 2008 had osteoarthritis. More females (52.9%) suffered from osteoarthritis than males (36.6%). The prevalence of osteoarthritis increased with age, from 42.2% for elders aged 65-69 years to 52.7% for those aged 85 years or above (CHP, 2009).

The rate of discharges and deaths due to knee osteoarthritis for in-patient aged 65 years or above in public and private hospitals in Hong Kong in 2007 was 234.1 per 100,000 patients (CHP, 2009). The number of total knee arthroplasty case for primary knee osteoarthritis in Hong Kong had increased from 721 in
2000 to 1229 in 2009 (Yan, Chiu & Ng, 2011). The proportion of knee arthroplasty for those older than 80 years had increased from 4.8% in 2000 to 2004 to 13.8% in 2005 to 2009 (Yan et al., 2011). Osteoarthritis brings socioeconomic burden to Hong Kong. The direct cost arisen from osteoarthritis was HK$11,690 to HK$40,180 per person per year (for utilization of hospitals and other medical services) while the indirect cost was HK$3,300 to HK$6,640 per person per year (for the loss of productivity of those individuals and their carers) (Woo et al., 2003).

In Hong Kong, the proportion of elders aged 60 years or above increased from 14.9% in 2001 to 19.1% in 2011 (CSD, 2011). With the ageing population, the prevalence of osteoarthritis is expected to be increasing. Therefore, osteoarthritis of knee, the most common type of osteoarthritis, has become an increasingly important public health issue. As osteoarthritis is an irreversible health problem, self-management of this chronic health problem in the daily living is crucial to those suffering from osteoarthritis.

1.2.2 Self-management and Self-efficacy

Self-management is defined as the ability of managing the physical and psychological consequences and the lifestyle change in living with a chronic
disease. It involves the skills of an individual to live well with the chronic conditions (Brady, 2012; Glasgow, Davis, Funnell & Beck, 2003). The abilities of goal-setting, action-planning, problem-solving, decision-making, utilizing resources and self-monitoring are the essential skills of self-management (Bodenheimer, Lorig, Holman & Grumbach, 2002; Battersby et al., 2010; Lorig & Holman, 2003).

The study on Chinese population with diverse chronic conditions showed that those who could perform self-management would report a better self-rated health, with less hospital stays, health distress and pain (Dongbo et al., 2003). The study on population with pain condition such as arthritis and back pain found that those who could self-manage their health problems would have fewer complaints of pain and incurred less health care utilization (Lorig & Holman, 2003; Sobel, Lorig & Hobbs, 2002).

Self-efficacy is the belief in one's capabilities to execute and sustain a behavior change especially in face of obstacles. It is a crucial determinant of the adoption and maintenance of a change in self-management behavior (Bandura, 2005; Rothman, Baldwin, Hertel & Fuglestad, 2011).

Prior and Bond's study (2004) supported that self-efficacy was associated with self-management behaviors. Individuals with arthritis who had higher level
of self-efficacy would engage in more active self-management such as participating in gentle activity and range of motion exercises whereas those who had lower level of self-efficacy would have more passive self-management such as avoidance of using joint for activity and reliance on medication. Harrison's study (2004) on community dwelling women with osteoarthritis of knee showed that pain and self-efficacy were important factors affecting performance of physical function. The study on older adults with arthritis by James, Miller, Brown and Weaver (2005) also leaned support to the conclusion that self-efficacy was inversely associated with pain disability and psychological distress. Those with lower self-efficacy had the perceptions of worse overall health and greater pain disability. The study on the physical performance of the elderly with osteoarthritis of knee in Elderly Health Service in Hong Kong found that 33.7% of them reported a self-rated health status worse than that in the past (Siu, 2008). This indicates the poorer perception of the health status of the elderly with osteoarthritis.

1.2.3 Self-management Education

Strategies for health education vary from conveying information to using behavioral methods to reinforce coping strategies and disease management.
Traditional health education usually focuses on giving disease-specific information and technical skills training only. The content is determined solely by nurses and the education process is by one-way communication from nurses to patients. The traditional method of health education can only impart information to the receivers. It enhances neither self-efficacy nor behavioral change for self-management (Brady, 2012). Currently, there is no guideline on self-management education for the elders with osteoarthritis of knee. Therefore, there is a need to review the evidence on the effectiveness of self-management program and to formulate guidelines on self-management education.

1.3 Research Question and Objectives of Dissertation

1.3.1 Research Question

The research question is "Among Chinese older adults with osteoarthritis of knee, would self-management program be more effective in improving self-efficacy for self-management and reducing pain when compared to usual care?"
1.3.2 Objectives of the Study

The objectives of the study are:


2. To assess the implementation potential of self-management program in Elderly Health Centers in Hong Kong.

3. To formulate evidence-based guidelines on self-management program for Chinese older adults with osteoarthritis of knee.

4. To propose a method to evaluate the effectiveness of self-management program in self-efficacy for self-management and pain reduction.
CHAPTER 2: CRITICAL APPRAISAL

2.1 Search and Appraisal Strategies

2.1.1 Search Keywords

Keywords relating to the research question were used to search the research evidence. The first theme of keywords concerned the target population, namely, older adults, elders and aged. The second theme of keywords concerned the condition of the population, namely, osteoarthritis knee, knee pain and OA knee. The third theme of keywords concerned the intervention, namely, self-management program, self-management education, self-management training, self-management workshop, self-management support, self-care program, self-care education, self-care training, self-care workshop, self-care support, self-help education, self-help training, self-help program, self-help workshop and coping skills training. The synonyms in the same theme were linked up with "or" whilst the key themes were linked up with "and". The same group of keywords and linkage were used when conducting the search of research evidence in different databases.

2.1.2 Searching Engines

The search for research evidence was performed by electronic and manual
strategies from 2nd March, 2012 to 3rd April, 2012. Three electronic databases were searched, namely, PubMed, CINAHL Plus and British Nursing Index. Manual search by reviewing the reference lists of the retrieved studies was done for any additional studies relevant to the research question.

2.1.3 Study Selection Criteria

The inclusion criteria for screening on the relevant studies were that the study participants had to be community-dwelling older adults with osteoarthritis of knee and the study design was either a randomized controlled trial or a quasi-experimental study. The studies had to be published between 2002 and 2012, written in English and in full text. As there are various types of arthritis that differ in etiology and management, exclusion criteria were set to exclude studies which included other types of arthritis such as rheumatic arthritis or those patients had undergone knee replacement surgery. Results of the search are shown in the Appendix A.

2.1.4 Search Result

The search strategies identified 285 papers (103 papers from CINAHL Plus, 179 papers from PubMed and 3 papers from British Nursing Index). The 285
identified papers were screened on the titles and the abstracts against the inclusion and exclusion criteria. Of the 285 papers, 11 papers fulfilled the inclusion criteria. As two papers from CINAHL Plus and one paper from British Nursing Index were replicates of those found in PubMed, eight papers were finally retrieved for review. No additional papers could be found by manual search of the reference lists of the eight selected papers.

2.1.5 Data Extraction

The data from the reviewed studies was extracted. The study type, level of evidence, subject characteristics, intervention, comparison, length of follow up, outcome measures and effect size were put in the table of evidence (Appendix B).

2.1.6 Appraisal and Rating Scheme

The quality of the reviewed studies was appraised by using the appraisal checklist for randomized controlled trials adopted from Scottish Intercollegiate Guidelines Network (SIGN, 2011a). The studies were assessed in terms of different aspects of methodology such as the extent of clarity of research question, randomization, allocation concealment, blinding, characteristics of the study groups, treatment under investigation, outcome measures, attrition, method of data
analysis and generalizability of study.

The rating of the quality of the selected studies was based on SIGN coding system (SIGN, 2011b) (Appendix C). Levels of evidence were assigned: "1++" for high quality meta-analyses, systematic reviews of randomized controlled trails ("RCTs"), or RCTs with a very low risk of bias, "1+" for well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias, "1-" for meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias.

2.2 Quality Appraisal of the Reviewed Studies

Results of appraisal and level of evidence of the reviewed studies are shown in the Appendix D.

2.2.1 Research Question

No research questions in PICO format were clearly stated in the eight reviewed studies. However, all the eight studies had adequately addressed their respective objectives, with the population (sufferers of osteoarthritis of knee), intervention (self-management program/ intervention) and arthritis-related outcomes (arthritis self-efficacy, quality of life, pain and fatigue level) clearly stated.
2.2.2 Method of Randomization

Five of the reviewed studies adopted simple randomization including by using random number table (Yip et al., 2007a; Yip et al., 2007b; Yip, Sit, Wong, Chong & Chung, 2008), drawing pre-made cards in sealed envelopes from a box (Coleman et al., 2012) and using computer-generated random list (Heuts et al., 2005). Two studies out of the eight reviewed studies used computer-generated randomization, stratified by race (Allen et al., 2010) and by practice area (Buszewicz et al., 2006).

Randomization could eliminate allocation bias in the treatment assignment. Stratified randomization by race could ensure that the numbers of participants in each treatment group were closely balanced in race and therefore avoid racial differences in osteoarthritis-related pain and function. The study of Buszewicz et al. (2006) used randomization stratified by practice area and minimization to achieve a balance for the practice area, age and sex of participants in each treatment group. In the quasi-experimental study (Wu, Kao, Wu, Tsai & Chang, 2011), no randomization procedure was done. Therefore, the possibility of allocation bias was not eliminated in that study.
2.2.3 Allocation Concealment

Three of the reviewed studies had adopted adequate allocation concealment to minimize the risk of allocation bias. The concealment methods used included using an independent centralized computerized system (Buszewicz et al., 2006; Heuts et al., 2005) and using sealed envelopes drawn from a box by an independent person (Coleman et al., 2012). The other five reviewed studies had no allocation concealment to reduce the risk of allocation bias (Allen et al., 2010; Wu et al., 2011; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008).

2.2.4 Blinding

Four reviewed studies did not mention blinding process that may result in subjective bias (Wu et al., 2011; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008). Various levels of blinding were carried out to reduce possible subjective bias in other four reviewed studies, namely blinding the assessors only (Allen et al., 2010; Heuts et al., 2005), blinding both the assessors and the statisticians (Coleman et al., 2012) and blinding the research team members except the trial manager (Buszewicz et al., 2006). In all the reviewed studies, the study subjects were not blinded to the treatment allocation as it was difficult to have such blinding in an education program. Thus, there was possible bias resulted from
Hawthorn effect.

### 2.2.5 Characteristics of Study Subjects

In all the reviewed studies, the demographic characteristics of the subjects (i.e. age, sex, race, education level, socioeconomic status and duration of osteoarthritis problem) and outcome variables of the intervention and control groups were measured at baseline and compared. No significant differences in the demographic characteristics and outcome measures at baseline between the intervention and control groups were found in four of the reviewed studies (Buszewicz et al., 2006; Heuts et al., 2005; Yip et al., 2007a; Yip et al., 2007b). In other three studies, higher current pain rating ($p = 0.002$) and more unplanned arthritis related medical consultation ($p = 0.04$) were shown in the intervention group than the control group (Yip et al., 2008); more pain day ($p = 0.006$) and more use of health food products ($p = 0.002$) were shown in the control group than the intervention group (Wu et al., 2011) and differences in pain level ($p<0.05$) between intervention and control groups (Coleman et al., 2012) were also found. Baseline values in the study of Coleman et al. (2012) were used as covariates in its analyses which had the effect of the pre-intervention values being the same at baseline in both intervention and control groups. One study (Allen et al., 2010)
had no description of any significant differences in the demographic characteristics and baseline outcome measures between the intervention and control groups. There were insufficient details to assess whether the intervention and control groups were at a similar status at the beginning of the trial. The possible confounding effect of the characteristics of the groups may reduce the validity of the study.

2.2.6 Treatment Under Investigation

In all the reviewed studies, the only difference between the intervention and control groups was the treatment under investigation. Various measures were used to maintain the fidelity of treatment and the validity of the studies. Facilitators' manual for program delivery was used to maintain the consistency and accuracy of the information delivered (Coleman et al., 2012). Standardized scripts for intervention delivery and instruction for health educator were provided to avoid discussing any osteoarthritis related issues with participants in the control group (Allen et al., 2010). The intervention and control groups living in different districts were separated to avoid cross-contamination (Wu et al., 2011).
2.2.7 Outcome Measures

Outcomes were clearly categorized as primary and secondary outcomes in four studies (Allen et al., 2010; Buszewicz et al., 2006; Coleman et al., 2012; Heuts et al., 2005). In all the eight reviewed studies, outcomes were measured in a standard and reliable way in the intervention group and the control group. The psychometric properties of the instruments used such as Arthritis Self-efficacy Scale ("ASES"), Survey of Pain Attitudes ("SOPA"), Short-Form Health Survey ("SF-36"), Visual Analog Scale for Pain ("VAS Pain") and Arthritis Impact Measurement Scales ("AIMS2") were clearly stated and referenced in those reviewed studies. Four studies had panels of expert in musculoskeletal field to verify the content validity of the measuring instruments used (Wu et al., 2011; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008).

2.2.8 Attrition

Conventionally, 20% dropout rate is acceptable (SIGN, 2011a). Three of the studies had a low dropout rate ranging from 6.9% to 10% (Allen et al., 2010; Coleman et al., 2012; Heuts et al., 2005). The dropout rates of other five studies were 20.9% (Wu et al., 2011), 24% (Buszewicz et al., 2006), 34% (Yip et al., 2007a; Yip et al., 2007b) and 44.2 % (Yip et al., 2008). Only five studies clearly
stated the reasons of dropout such as loss of contact, being busy, not willing to answer questionnaires, passing away, difficulty with access to the sites and not satisfied with the randomization result (Buszewicz et al., 2006; Heuts et al., 2005; Wu et al., 2011; Yip et al., 2007a; Yip et al., 2007b). As stated in Yip et al. (2007a) study, one of the reasons of dropout was that participants were encouraged to have minimal visit to hospital or clinic during the study period between December, 2002 and May, 2003 and at that period of time, the outbreak of Severe Acute Respiratory Syndrome occurred. Comparison between the demographic characteristics, the outcome variables of the participants and that of the dropouts found no significant differences in Wu et al. (2011) and Yip et al. (2008) studies whilst higher arthritis pain rating in the dropouts than the participants was reported in Yip et al. (2007a) and Yip et al. (2007b) studies. The reasons of dropout, the comparison between the demographics, outcome variables of the participants and that of the dropouts were not mentioned in the studies of Allen et al. (2010) and Coleman et al. (2012). Thus, it cannot rule out the possible association of dropout reasons and the treatment outcomes in those two studies.

2.2.9 Method of Data Analysis

Seven of the reviewed studies (Allen et al., 2010; Buszewicz et al., 2006;
Coleman et al., 2012; Heuts et al., 2005; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008) had the data analysis based on intention-to-treat. Intention-to-treat can maintain the comparability of groups through randomization and minimize the bias of study (SIGN, 2011a). Results of the Buszewicz et al. (2006) are more reliable as similar results were obtained by using the intention-to-treat approach and per protocol approach. Missing values were handled by the methods such as last observation carried forward (Coleman et al., 2012; Yip et al., 2008) and imputation (Buszewicz et al., 2006) whereas the method of handling missing values was not stated in the other four studies (Allen et al., 2010; Heuts et al., 2005; Yip et al., 2007a; Yip et al., 2007b). Only one reviewed study (Wu et al., 2011) did not mention whether or not the data analysis was based on intention-to-treat principle.

2.2.10 Generalizability of Study

Five of the reviewed studies (Buszewicz et al.,2006; Wu et al., 2011; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008) were multi-site studies. However, the effects of site difference on the outcomes were not investigated. The generalizability of those five studies was thus reduced.
2.2.11 Level of Evidence

According to the quality assessment, two studies (Buszewicz et al., 2006; Heuts et al., 2005) were graded as 1++ as most of the criteria of the quality appraisal were fulfilled. The other six studies were graded as 1+ of the SIGN (2011b) as the criteria that were not fully addressed were unlikely to alter the conclusions of the studies (Appendix D).

2.3 Summary and Synthesis

2.3.1 Summary of the Characteristics of the Reviewed Studies

The eight reviewed studies included 7 randomized controlled trials (Allen et al., 2010; Buszewicz et al., 2006; Coleman et al., 2012; Heuts et al., 2005; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008) and one quasi-experimental study (Wu et al., 2011). Three of the studies were done in Hong Kong (Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008). One study was done in Taipei (Wu et al., 2011). The other four studies were done in Western countries. The intervention in one study (Allen et al., 2010) was telephone-based self-management program while all the other studies had their self-management interventions in form of course program. Five studies included both the self-efficacy and osteoarthritis pain as the outcome measures (Allen et al., 2010; Heuts et al., 2005; Wu et al., 2011; Yip et
al., 2007b; Yip et al., 2008) while the other three studies had either self-efficacy (Buszewicz et al., 2006) or osteoarthritis pain (Coleman et al., 2012; Yip et al., 2007a) as one of the outcome measures. The characteristics of the eight studies were summarized in the table of evidence (Appendix B).

2.3.2 Effectiveness of the Reviewed Self-management Programs

In this review, six of the eight studies had compared the effect of the self-management programs on self-efficacy for self-management with that of the routine care. Four studies suggested that self-management programs had better effectiveness in improving self-efficacy for self-management of pain and other symptoms than routine care (Buszewicz et al., 2006; Wu et al., 2011; Yip et al., 2007b; Yip et al., 2008). In Allen et al. (2010) study, the telephone-based self-management program was found to be significantly more effective in improving self-efficacy for self-management than the attention control group (education on general health screening) but no significant difference was found when compared with usual care group. The study of Heuts et al. (2005) found no significant difference between self-management program and usual care in improving self-efficacy. In this study (Heuts et al., 2005), sample size calculation was not based on self-efficacy which was categorized as secondary outcome.
Therefore, type II error was possible. Moreover, Yip et al. (2008) study supported that self-management group showed better improvement in self-rated health than usual care group. It was consistent with the significant effect of self-management program on improving self-efficacy in this study.

Out of the eight reviewed studies, seven studies compared the effects of self-management programs on pain reduction with that of usual care. Self-management programs were found to be significantly more effective in pain reduction than usual care (Allen et al., 2010; Coleman et al., 2012; Heuts et al., 2005; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008). Yip et al. (2008) study claimed that when compared to usual care, self-management program led to greater decreases in current pain, pain at night and pain during walking but not during changing position which imposes more physical strain. In Allen et al. (2010) study, both AIMS2 and VAS Pain were used to measure the level of pain. However, significant difference in osteoarthritis pain reduction between self-management and usual care groups was found only when using VAS Pain as the measurement. The inconsistency of the results in this study may be related to the different characteristics of the two instruments. VAS Pain is a one-dimensional measure of pain intensity whereas AIMS2 pain subscale is a multidimensional measurement that pain intensity, pain frequency, extent of joints affected, morning
stiffness and sleep affected by pain are considered. Another study (Wu et al., 2011) found no significant difference in the reduction of pain days between self-management and usual care groups but it supported that self-management program led more improvement in pain beliefs (belief of capability of pain control) than usual care. The improvement in pain belief was consistent with the significant effect on improving self-efficacy in this study.

Besides, self-management programs were found to be more effective in increasing exercise practice than usual care (Yip et al., 2007a; Yip et al., 2007b). There were no significant differences in quality of life (physical function and mental health) between self-management and usual care groups (Buszewicz et al., 2006; Heuts et al., 2005). In contrast, significant difference in quality of life (physical function) was found in Coleman et al. (2012) study. Similarly, inconsistent results in change of fatigue rating were found. When compared with usual care, self-management program was found to be more effective in reducing fatigue rating in Yip et al. (2007a) study but not in Yip et al. (2008) study.

In summary, the review of studies supported that self-management program was more effective in improving self-efficacy for self-management and reducing osteoarthritis pain when compared to usual care (Appendix E). Self-management program also had significant effect on increasing exercise practice.


### 2.3.3 Context and Characteristics of Participants

The reviewed studies targeted at community-dwelling elders recruited from primary health care settings. The respective mean age of the participants of the reviewed studies ranged from 60 to 68 years. The majority of them were female except that majority of the participants were male in Allen et al. (2010) study and the participants were younger with mean age of 51 years in Heuts et al. (2005) study. The duration of osteoarthritis of the participants ranged from 6 to 16 years.

In this review, it was demonstrated that self-management programs were effective for both male and female community-dwelling elders with different duration of osteoarthritis.

### 2.3.4 Key Components of the Reviewed Self-management Programs

The self-management program in Buszewicz et al. (2006) study was designed according to Arthritis Care and Arthritis Research Campaign but the components of the program were not mentioned. The self-management programs of the other seven reviewed studies shared some common program components including self-management skills, information on osteoarthritis and exercise. Goal setting, action planning, problem solving, modelling, positive thinking,
self-diagnostic skills, evaluation and feedback were the main components of self-management skills. The information on osteoarthritis included joint protection and care, medication, treatment options, pain management strategies, stress management and relaxation. Various aspects of exercise covered were principles of safe exercise, stretching exercise, strengthening exercise, walking exercise and Tai Chi types of movement.

Some other topics such as nutrition (Coleman et al., 2012; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008), communication skills (Allen et al., 2010; Heuts et al., 2005; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008), weight management (Allen et al., 2010; Coleman et al., 2012), fall prevention (Coleman et al., 2012), sleep management (Allen et al., 2010) and assistive devices (Heuts et al., 2005) were included in some of the self-management programs (Appendix F).

To conclude, the evidence showed that self-management skills, information on osteoarthritis and exercise are the essential components of a self-management program for patients with osteoarthritis.

2.3.5 Mode of Delivery of the Reviewed Self-management Programs

Most of the self-management programs were delivered in courses with
various number and duration of sessions, for example, six sessions with unknown duration (Buszewicz et al., 2006), six weekly sessions of 2.5-hour each (Coleman et al., 2012), four weekly sessions of 80-minute each (Wu et al., 2011), six 2-hour sessions (Heuts et al., 2005) and six weekly sessions of 2-hour each (Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008). The self-management program in Allen et al. (2010) study was a telephone-based program which education was delivered in form of monthly telephone follow up for 12 months. In five of the studies, the self-management programs were supplemented with written or video/audio materials about osteoarthritis and self-management such as handbook, instruction sheet and video-disc (Allen et al., 2010; Buszewicz et al., 2006; Coleman et al., 2012; Heuts et al., 2005; Wu et al., 2011). It was noted that the self-management programs could be telephone-based or in form of courses, accompanied with supplementary materials. There is no standardized number and duration of sessions for self-management course (Appendix F).

2.3.6 Personnel for Conducting the Reviewed Self-management Programs

Seven of the reviewed studies had well-trained personnel to conduct the self-management programs. The programs in the studies were conducted by
registered nurses (Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008), health educator (Allen et al., 2010), health care professionals who had received education of osteoarthritis (Coleman et al., 2012), physiotherapist (Heuts et al., 2005) and research assistant with training in self-management principles (Wu et al., 2011). One study (Buszewicz et al., 2006) had no description of the personnel conducting the program. Although there was no evidence showing the relationship between the qualification of the intervention personnel and the effectiveness of the program, it was appropriate to provide training to the intervention personnel.

2.3.7 Length of Follow Up

The length of follow up of the reviewed studies are 12 weeks (Wu et al., 2011), 16 weeks (Yip et al., 2007a; Yip et al., 2007b), 6 months (Coleman et al., 2012), 12 months (Allen et al., 2010; Buszewicz et al., 2006; Yip et al., 2008) and 21 months (Heuts et al., 2005) respectively. It was noted that the effectiveness of self-management program in improving self-efficacy and reducing osteoarthritis pain could be evaluated in short-term and long-term.

In conclusion, self-management is important to the elders who are facing the problems caused by osteoarthritis. The reviewed studies supported that self-management program was a more effective measure to improve self-efficacy
for self-management and reduce osteoarthritis pain of the elders with osteoarthritis of knee when compared with the usual care. It is worthwhile to adopt self-management program for Chinese elders with knee osteoarthritis in local setting. The details of self-management programs identified from this review such as outcome effectiveness, the key components, the mode of delivery and the personnel for program delivery has provided insight for the development of a self-management program protocol.
CHAPTER 3: TRANSLATION AND APPLICATION

In this chapter, the implementation potential of self-management program is discussed in terms of transferability of the findings of the reviewed studies, feasibility and cost/benefit ratio of the proposed self-management program. Evidence-based clinical guidelines will be developed for the practice of the proposed self-management program.

3.1 Implementation Potential

3.1.1 Transferability of the Findings

3.1.1.1 Target Setting and Target Audience

The self-management program is proposed to be implemented in Elderly Health Centers in Hong Kong. The Elderly Health Centers are primary health care settings which provide health assessments, physical check-ups, counselling and health education programs for the elders aged 65 years or above who had enrolled as members. Most of the elders who attended the Elderly Health Centers are community-dwelling. 17,860 of them (47%) had osteoarthritis in 2008 (CHP, 2009). The proposed self-management program is intended for Chinese elders aged 65 years or above who are living at home and have knee osteoarthritis.
3.1.1.2 Comparability of Target Group and Setting

The self-management programs from all the reviewed studies were conducted under community-based, primary health care setting. The population of the reviewed studies was community-dwelling elders, aged from 60 to 68 years with knee osteoarthritis of a duration from 6 to 16 years. The population of three reviewed studies was Chinese elders with knee osteoarthritis in Hong Kong (Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008). The setting and the characteristics of the population of the reviewed studies are similar to the setting and target patients of the Elderly Health Centers.

3.1.1.3 Philosophy of Care

The mission of Elderly Health Service is to provide quality, client-oriented and evidence-based primary health care service for the elderly in order to improve their self-care ability, to minimize disability and to promote their health (EHS, 2012). Self-management program is an evidence-based practice that can improve self-efficacy for self-management (Allen et al., 2010; Buszewicz et al., 2006; Wu et al., 2011; Yip et al., 2007b; Yip et al., 2008) and can reduce osteoarthritis knee pain (Allen et al., 2010; Coleman et al., 2012; Heuts et al., 2005; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008). The proposed self-management program
coincides with the mission of Elderly Health Service.

3.1.1.4 Number of Elders Benefited from the Program

According to Wu et al. (2011) study, sample size of 134 for the intervention group had shown a significant improvement in self-efficacy for self-management. 47% of 38,000 elders who attended the Elderly Health Centers in 2008 had osteoarthritis (CHP, 2009); it was estimated that 17,860 elders had osteoarthritis in eighteen Elderly Health Centers (CHP, 2009). The self-management program is proposed to be conducted in three Elderly Health Centers. Three programs can be run concurrently in each of the three centers. 17 elders with knee osteoarthritis will be served at one time per program. Totally, 153 elders could benefit from the self-management program.

3.1.1.5 Timeframe for Implementation

Self-management program in Allen et al. (2010) study was delivered in form of monthly telephone coaching whilst the self-management programs in other reviewed studies were conducted in form of courses with varying number and duration of weekly sessions. The self-management program for the target setting is proposed to include four 2-hour weekly group sessions and then a monthly
15-minute follow-up telephone coaching to the participants for five months. The entire program will last for six months. The development and implementation of the whole proposed program will be completed in 15 months, including 1 month for communication with stakeholders including administrators (assistant directors and senior nursing officers) and frontline staff (medical officers, nursing officers and registered nurses), 1 month for review of guidelines and preparation of materials by the program proposer (registered nurse with Baccalaureate), 1 month for training, 3 months for pilot study and process evaluation in a Elderly Health Center, 6 months for full implementation of the self-management programs in three Elderly Health Centers and 3 months for evaluation of outcomes. The timeframe is reasonable for the implementation and evaluation of the proposed self-management program.

3.1.2 Feasibility of the Proposed Self-management Program

3.1.2.1 Support from Administrators and Frontline Staff

At administrative level, there is consensus to provide evidence-based practice as it is consistent with the missions of Elderly Health Service to provide professional, evidence-based service and to improve the self-care ability of the elderly (EHS, 2012). The administrators (assistant directors and senior nursing
officers) who are responsible for budget and manpower management may worry the possible impact of the proposed self-management program such as additional workforce and economic burden. To gain approval and support from administrators, a written proposal will be worked out to emphasize the prevalence of osteoarthritis of the elders and the effectiveness of self-management education program supported by the research evidence. The cost-benefit ratio has been calculated (Appendix G & H) to show that the costs could be offset by the saving in expense on osteoarthritis-related medical consultation and the increase in positive health outcomes such as improved self-efficacy for self-management and reduction of the severity of osteoarthritis pain.

At frontline level, the general duties of medical officers are to provide health assessment, medical consultation and health advices while those of nursing officers and registered nurses are to conduct health counselling and education programs. Negative attitudes of the frontline staff towards the proposed self-management program are expected as they may worry about workload and lack of resources support. They may also have the misconceptions that evidence-based practice is time-consuming and is not feasible in clinical settings. To ease their concern and to boost their motivation, meetings for experience sharing with steering committee will be arranged. Training workshops will also be
provided for the frontline staff to get familiar with the content of the proposed
self-management program and equip them with the necessary skills to run the
program.

3.1.2.2 Interference With the Current Function

To avoid interfering the routine operation of the Elderly Health Centers, two
training workshops are scheduled to be held in the in-service training sessions of
Elderly Health Service. Usually, there are twelve sessions of health education
activities each month in each Elderly Health Center. In order to fit the parameters
of the manpower, workload and the routine operation, the implementation of the
proposed self-management program is streamlined so that the program can be
conducted in the sessions routinely scheduled for education activities.

3.1.2.3 Resources Needed for the Proposed Program

Personnel, room facilities, self-management and osteoarthritis-related
educational materials are required for the implementation of the proposed
self-management program. One registered nurse is required to conduct the group
sessions and telephone coaching for each center. Registered nurses ("RN") in the
Elderly Health Centers are suitable to administer the program as they are
knowledgeable about osteoarthritis, skills of facilitating group process and coaching health education. Room, computer and projector for health education activities are available in Elderly Health Centers. Education materials related to self-management and osteoarthritis can be produced by the program proposer (RN with Baccalaureate) and provided to trainees (RN with Baccalaureate) during the training workshop.

### 3.1.3 Cost/ Benefit Ratio of the Proposed Self-management Program

#### 3.1.3.1 Potential Benefit of the Proposed Self-management Program

The reviewed studies supported that self-management program was more effective in improving self-efficacy for self-management and osteoarthritis pain reduction than the usual care (Yip et al., 2007b; Yip et al., 2008). Older adults with knee osteoarthritis in self-management program showed better self-rated health (Yip et al., 2008) and more improvement in pain belief than those in usual care group (Wu et al., 2011). Self-management program was effective in increasing exercise practice of older adults with knee osteoarthritis (Yip et al., 2007a; Yip et al., 2007b). Implementation of the proposed evidence-based
program in Elderly Health Centers can improve the quality of care and enhance the professionalism of Elderly Health Service.

3.1.3.2 Potential Risks of the Proposed Self-management Program

There were no specific risks of self-management program stated in the reviewed studies. However, to ensure safety of participants during exercise in self-management program, the principles of safe exercise should be included in the program (Allen et al., 2010).

3.1.3.3 Cost-benefit Ratio of the Proposed Self-management Program

By reference to the mid-point salary ($30,025 for 200 working hours each month), the cost for one registered nurse is $150 per hour. The staffing cost for 15 hours used by the trainer (RN) to prepare training workshops and staff manuals will be $2,250. The staffing cost for 6 hours used for running training workshops (two sessions of 3-hour training workshop including one RN trainer and three RN trainees) will be $3,600. The total staffing cost for training workshop will be $5,850. The cost for three staff manuals is $60. The material cost and total staffing cost for the training is therefore $5,910.
One registered nurse has to work for 37.25 hours for conducting one program, in particular, 8 hours for preparation before conducting the program, 8 hours for running the group sessions (four 2-hour sessions) and 21.25 hours for telephone coaching (monthly 15-minute per individual telephone coaching for 5 months for 17 participants). The total staffing cost for running 9 programs in three centers will be $50,288. Seventeen sets of handout are needed for distribution to participants in one program. The total cost of handout is $3,060 ($20 for one set).

The material cost and staffing cost for running 9 programs in three centers amount to $53,348. The total cost including training and running the programs is $59,258. Average cost for each participant is $387. The training cost is one-time fixed cost. Thus, the cost for implementing the program will be lower in long run (Appendix G).

The potential benefit of running self-management program is a reduction in osteoarthritis related expense. In Hong Kong, the direct cost for utilization of hospitals and medical services was $11,690 to $40,180 per person per year while indirect cost for loss of productivity of individuals and their carers was $3,300 to $6,640 per person per year (Woo et al., 2003). The minimum osteoarthritis-related expense was $14,990 per person per year. The cost-to-benefit ratio of self-management program is $387 ÷ $ 14,990 = 0.026 (Appendix H). The benefit
of implementing self-management program outweighs the cost of running the program.

In sum, self-management program is transferable to the target population in Elderly Health Centers and is feasible for implementation. The benefit of the program outweighs the cost for implementation.

3.2 Clinical Guideline for the Proposed Self-management Program

The title of the guideline is self-management program for Chinese older adults with knee osteoarthritis.

3.2.1 Objective of the Guideline

The objective of the guideline is to provide evidence-based recommendations for the practice of self-management program.

3.2.2 Target Group

The intended users of the guideline are registered nurses with Baccalaureate in Elderly Health Centers. The target (patients) audience are community-dwelling Chinese elders aged 65 years or above with knee osteoarthritis for 6 to 16 years.
3.2.3 Rating Scheme for the Strength of Recommendations

The levels of evidence and the grades of guideline recommendations were graded according to the Rating Scheme of Scottish Intercollegiate Guidelines Network (SIGN, 2011b) (Appendix I).

3.2.4 Clinical Guideline

Recommendation 1.0

Before recruitment of elders, screening of medical records and physical examination by medical officer should be done to confirm the diagnosis of knee osteoarthritis (Grade A).

Scientific evidence:

Various procedures such as reference to medical history, physical examination and physician diagnosis to confirm the status of osteoarthritis could ensure appropriate participants are identified (Allen et al., 2010; Wu et al., 2011; Yip et al., 2007a; Yip et al., 2008) (1+).
**Recommendation 2.0**

The self-management program should include the following core components:

1. self-management skills;
2. osteoarthritis related information;
3. exercise (Grade A).

**Scientific evidence:**

The successful self-management programs in the reviewed studies shared common core program components, namely 1) self-management skills such as goal setting, action plans, problem solving, modelling, positive thinking, self-diagnostic skills, evaluation and feedback, 2) osteoarthritis related information such as joint protection, medication, treatment options, pain management strategies, stress management and relaxation, and 3) exercise such as principles of safe exercise, stretching exercise, strengthening exercise, walking exercise and Tai Chi types of movement (Allen et al., 2010 (1+); Coleman et al., 2012 (1+); Heuts et al., 2005 (1++); Wu et al., 2011 (1+); Yip et al., 2007a (1+); Yip et al., 2007b (1+); Yip et al., 2008 (1+)).
**Recommendation 3.0**

Four 2-hour group sessions of the self-management program should be held at weekly interval (Grade A).

**Scientific evidence:**

The number of group sessions of the programs in the reviewed studies ranged from 4 to 6 sessions. The duration of each group session varied from 1.3 to 2.5 hours. Moreover, most of the successful programs were held at weekly interval (Coleman et al., 2012; Wu et al., 2011; Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008) (1+).

**Recommendation 4.0**

Participants with knee osteoarthritis should be supported to set self-directed SMART goals and action plans for behavioural change on self-management. (SMART goal refers to "specific, measurable, achievable, realistic and time-framed" goal) (Grade A).

**Scientific evidence:**

Self-directed goal setting could act as self-incentives and motivators to optimize self-care behaviours (Heuts et al., 2005) (1++).

Setting SMART goals and practice of self-care skills could gradually build
up the ability of self-care so that sense of mastery and self-efficacy for self-management could be improved (Wu et al., 2011) (1+).

Success in meeting the goals increases self-efficacy and enhance maintenance of physical activity behaviours over the long term (Coleman et al., 2012) (1+).

**Recommendation 5.0**

After the 4th group session of the self-management program, a monthly 15-minute telephone coaching should be given to individual participant to follow up the progress of goal achievement for 5 months (Grade B).

**Scientific evidence:**

Telephone coaching is a feasible way to carry out follow up and allow individualized ongoing interaction with participants (Allen et al., 2010) (1+).

**Recommendation 6.0**

The self-management program should be conducted by well-trained personnel who have the knowledge about osteoarthritis and self-management principles (Grade A).
Scientific evidence:

Self-management programs in the reviewed studies could be administered by well trained personnel including registered nurses (Yip et al., 2007a; Yip et al., 2007b; Yip et al., 2008) (1+), health educator (Allen et al., 2010) (1+), health care professionals with background education about osteoarthritis (Coleman et al., 2012) (1+), research assistant with training in self-management principles (Wu et al., 2011) (1+) and physiotherapist (Heuts et al., 2005) (1++). There is no evidence which type of personnel works best in the self-management program. However, well-trained personnel with relevant knowledge and skills could ensure accurate presentation of information and accurate response to complex questions (Coleman et al., 2012) (1+).

The flow of the proposed self-management program is shown in Appendix J.

In conclusion, the proposed self-management program is transferable to Chinese elders with knee osteoarthritis in Elderly Health Centers and is feasible for implementation. The benefits of the program outweigh the costs of implementation. The guideline can provide evidence-based recommendations for the practice of the program.
CHAPTER 4: IMPLEMENTATION PLAN

In this chapter, the communication plan is established. It will also discuss the stakeholder identification, communication strategies to initiate and sustain the implementation of the proposed self-management program in three Elderly Health Centers. Pilot test is planned to try out the guideline.

4.1 Communication Plan

4.1.1 Stakeholder Identification

At administrative level, Assistant Directors and Senior Nursing Officers of the Elderly Health Service are responsible for planning the service development and the manpower and budget management. At frontline level in Elderly Health Centers, Medical Officers are responsible for providing health assessment, medical consultation and health advices to the elders. Nursing officers and registered nurses conduct health counselling and health education programs. Nursing officers also act as coordinators in Elderly Health Centers.

Community-dwelling elders aged 65 years or above with knee osteoarthritis of 6 to 16 years duration are the target population of the proposed self-management program. Therefore, the stakeholders identified are the Assistant Directors, Senior Nursing Officers, Medical Officers, Nursing Officers, Registered Nurses and the
elders aged 65 years or above with knee osteoarthritis.

4.1.2 Communication Strategies to Initiate and Guide the Change

4.1.2.1 Formation of Steering Committee

In order to gain support from one medical officer and one nursing officer in one of the three Elderly Health Centers, a meeting will be arranged to introduce the prevalence of osteoarthritis in the elderly, the effectiveness of the self-management program supported by research evidence and the protocol of the proposed self-management program. It should be emphasized that the implementation of the proposed self-management program would be streamlined to avoid disturbance to the usual operation of the Elderly Health Centers. After gaining their support, a steering committee which comprises of one medical officer, one nursing officer and the program proposer will be set up. The role of the steering committee is to communicate with different stakeholders, monitor the program implementation and conduct evaluation as scheduled in the timeframe of the program development (Appendix K).

4.1.2.2 Communication with Administrators

To gain the approval and resources support, the medical officer and the
nursing officer of the steering committee will communicate with the administrators (the Assistant Directors and the Senior Nursing Officers). A written proposal and a presentation which stress on the program rationale, the prevalence of osteoarthritis of the elders, the effectiveness of the self-management program and research evidence in support will be prepared. It should be emphasized that the proposed self-management program is consistent with the Elderly Health Service's missions "to provide evidence-based service" and "to improve the self-care ability of the elders" (EHS, 2012). To ease the administrators' concern on the possible impact of the proposed self-management program on resources allocation, cost-benefit ratio will be presented to show that the benefits of the program outweigh the costs of implementation.

4.1.2.3 Communication with Frontline Staff

To deeper the understanding of the benefits of the proposed self-management program, focused groups with the steering committee members for experience sharing will be arranged. Appreciation letters as a recognition of the effort paid to the program will be awarded to the staff. To avoid over-work of the frontline staff and the interference of the routine operation of the Elderly Health Centers, the program will be streamlined and conducted in the sessions routinely scheduled for
educational activities.

As three registered nurses with Baccalaureate are required to conduct the program in three Elderly Health Centers, two 3-hour training workshops will be conducted by the program proposer to equip them with the program content and the skills of conducting the program. To avoid interference of the routine operation, the training workshops will be held in the in-service training sessions of the Elderly Health Service. Manuals of the proposed self-management program and pocket-size booklets of the program recommendations will be provided to the frontline staff for reference. Full-text articles related to self-management for osteoarthritis will be disseminated to the Elderly Health Centers for reference. Posters which include the outline of the program will be posted in the Elderly Health Centers to increase the frontline staff's awareness of the program.

4.1.2.4 Communication with the Elders

Promotion posters which introduce the effectiveness, the content and the schedule of the proposed self-management program will be posted in the eye-catching areas of the Elderly Health Centers. The program will also be introduced and promoted in the Elderly Health Service Newsletters. The medical officers and nurses in the Centers will invite the eligible community-dwelling
elders to join the program.

### 4.1.3 Communication Strategies to Sustain Change Process

To monitor and sustain the change process, reminders to keep compliance with the guideline of the proposed self-management program will be sent to the Elderly Health Centers monthly. Monthly on-site audit will be done by the steering committee members. Records of the progress will be kept for yearly review. Two-way communication is maintained between the frontline staff and the steering committee. Discussion about the obstacles encountered in the implementation of the program and feedback of the frontline staff are encouraged during monthly on-site audit.

### 4.2 Pilot Study Plan

The aim of the pilot test is to test the feasibility of the proposed self-management program and try out the guideline before the full implementation in three Elderly Health Centers.

#### 4.2.1 Recruitment of Participants

The pilot test will be conducted in one Elderly Health Center. Ten
community-dwelling elders aged 65 years or above with 6 to 16 years knee osteoarthritis will be recruited. As stated in the exclusion criteria in the reviewed studies (Allen et al., 2010; Heuts et al., 2005; Wu et al., 2011; Yip et al., 2007b), the elders who have other types of arthritis such as rheumatic arthritis or who have knee replacement done will be excluded. Before recruitment, registered nurses will screen the medical records of the elders to identify eligible subjects and invite them to participate in the program. For those elders who consent to participate in the program, physical examination will be done by the medical officer to confirm their knee osteoarthritis status.

4.2.2 Program Protocol

The proposed self-management program includes four 2-hour weekly group sessions and a 15-minute monthly telephone coaching for five months. The core components covered in the group sessions are self-management skills, osteoarthritis related information and exercise. The whole program lasts for 6 months. Post-intervention assessment will be scheduled 3 months after the completion of the program (Appendix L). To test the feasibility of the program, a pilot test which includes four 2-hour weekly group sessions and a 15-minute monthly telephone coaching for two months will be carried out. The
post-intervention assessment will be carried out one week after the 2nd telephone coaching. The pilot test will be completed in three months.

**4.2.3 Evaluation of the Pilot Test**

After the pilot test, debriefing session with the frontline staff including the medical officer, nursing officer and the registered nurse will be held by the steering committee members to explore the difficulties encountered in the program and get their feedback on the logistics, the program guideline and outcome measurements. Focused group meeting with the ten elder participants will be held to get their comments on the content, duration and the schedule of the program. The protocol will be revised according to the findings of the pilot test.
CHAPTER 5: EVALUATION PLAN

In this chapter, evaluation plan is developed to examine the outcomes, nature and number of participants involved, method of outcome measurement, method of data analysis and the basis for adopting and modifying the proposed self-management program.

5.1 Outcomes to Be Achieved

Two patient outcomes will be evaluated: the self-efficacy for self-management (primary outcome) and the intensity of osteoarthritis knee pain (secondary outcome). As the proposed self-management program is newly implemented in Elderly Health Centers, the job satisfaction of registered nurses and nursing officers (secondary outcome) will also be evaluated.

The self-efficacy for self-management will be measured by using Arthritis Self-efficacy Scale ("ASES") (Appendix M). ASES is a self-administered questionnaire measuring the strength of a person's confidence in his/her ability to handle different aspects of arthritis. It consists of two subscales: pain subscale and other symptoms subscale. The pain subscale has five items which measure the control over improving function, reducing inflammation and pain. The other symptoms subscale has 6 items which measure the control over enjoyment, the
frustration and the fatigue. Each item is scored on Likert scale ranging from 1 (very uncertain) to 10 (very certain). The total score of the 5-item pain subscale indicates the self-efficacy for pain management whilst the total score of the 6-item other symptoms subscale indicates the self-efficacy for other symptoms management. According to the reviewed studies (Wu et al., 2011; Yip et al., 2007a; Yip et al., 2008), the psychometric properties of Chinese Version of ASES was validated in Chinese population. The test-retest reliability ranged from 0.85 to 0.90. The Cronbach's $\alpha$ ranged from 0.81 to 0.91. The content validity index was 0.89.

In the reviewed studies, Visual Analog Scale for Pain ("VAS Pain") was used to measure osteoarthritis pain intensity. VAS Pain is a continuous scale comprised of a horizontal line of 100 mm in length, anchored by "no pain" (score of 0) and "pain as bad as it could be" (score of 100) (Appendix N). Respondents are required to draw a vertical line on the VAS horizontal line to indicate their current osteoarthritis knee pain intensity. VAS Pain has good test-retest reliability, ranging from 0.71 to 0.94 (Hawker, Mian, Kendzerska & French, 2011).

The job satisfaction of registered nurses and nursing officers will be evaluated by using Minnesota Satisfaction Questionnaire-Short Form (MSQ). MSQ-Short Form is a self-administered questionnaire, measuring satisfaction with
various aspects of work and work environments. It consists of 20 items, anchored on 5-point Likert scale with responses ranging from 1 (very dissatisfied) to 5 (very satisfied). Sum of all item responses measures general job satisfaction. The psychometric properties of MSQ-Short Form was validated in studies of nursing job satisfaction (test-retest reliability of 0.89 & internal consistency $\alpha$ ranging from 0.87 to 0.92) (Lamarche & Tullai-McGuiness, 2009; Weiss, Dawis, England & Lofquist, 1967). As MSQ-Short Form is copyrighted, written application for permission to use MSQ-Short Form will be sent to Vocational Psychology Research, University of Minnesota.

5.2 Nature and Number of Participants

Participants will be recruited by convenient sampling. Community-dwelling elders aged 65 years or above with at least 5 years of knee osteoarthritis will be recruited. Those elders who have other types of arthritis such as rheumatic arthritis or who have knee replacement done will be excluded. Before recruitment, screening of the elders' medical records will be carried out by registered nurses and physical examination will be done by medical officers to confirm the elders' status of knee osteoarthritis.

The computer software Java applets for power and sample size (Lenth, 2012)
is used to calculate the sample size. According to the reviewed study of Wu et al. (2011), the effect size of self-management intervention on improving self-efficacy for pain management was 2.25 and the standard deviation was 8.9. In order to have 80% power to detect 2.25 units increase in self-efficacy with 2-tailed significance level of 0.05 by one-sample paired t-test analysis, sample size of 125 is estimated. Assuming 20% dropout rate, 150 participants should be recruited. As the nine self-management programs to be held in three Elderly Health Centers can include 153 participants (17 participants for each program), the number of participants are sufficient to detect significant increase in self-efficacy.

5.3 Outcome Measurement

The length of follow up of the reviewed studies varied from 12 weeks (Wu et al., 2011) to 21 months (Heuts et al., 2005). For practical reason, the follow up assessment of the patient outcomes will be done 3 months after the completion of the whole program. The participants will be required to complete the pre-and post-intervention ASES and VAS Pain at baseline (during recruitment) and 3 months after program termination respectively.

To evaluate the job satisfaction of registered nurses and nursing officers, they will be asked to complete the Minnesota Satisfaction Questionnaire (Short Form)
before the start and after the completion of the program.

5.4 Data Analysis

The data will be analyzed by using the Statistical Package for Social Sciences version 20. Demographic data of the participants such as age, sex, education level and duration (years) of knee osteoarthritis collected at baseline will be summarized by using descriptive statistics (mean, standard deviation and frequency). The proposed self-management program is one sample pretest-posttest design. The objective of evaluation is to determine whether there are an increase in self-efficacy for self-management, a decrease in osteoarthritis knee pain intensity of the participants and a change in job satisfaction of nurses after the program. The three outcomes are parametric in nature. Therefore, data analysis will be performed by using a two-tailed paired t-test with level of significance set as 0.05 and based on intention-to-treat principle.

5.5 Basis for Adopting and Modifying the Self-management Program

The primary objective of the proposed self-management program is to improve self-efficacy for self-management (primary outcome) of the elders with
knee osteoarthritis. According to the reviewed studies, self-efficacy would be improved after self-management intervention. The increase of self-efficacy for pain management ranged from 2.25 (Wu et al., 2011) to 10.27 (Yip et al., 2008) whilst the increase of self-efficacy for other symptoms management ranged from 2.05 (Wu et al, 2011) to 12.92 (Yip et al., 2008). Thus, the program will be considered as effective if self-efficacy for pain management increases at least by 2.25 and self-efficacy for other symptoms management increases at least by 2.05.
CHAPTER 6: CONCLUSION

6.1 Conclusion

Knee osteoarthritis is an irreversible health problem. It adversely affects the physical activities and social activities of the elders. Self-management of this chronic health problem is important to the elders. Thus, there is a need for evidence-based self-management program for the elders with knee osteoarthritis. The reviewed studies showed that self-management program was effective in improving self-efficacy for self-management and reducing pain among community-dwelling elders with knee osteoarthritis.

The transferability of the findings of the reviewed studies, the feasibility and the cost/benefit ratio of the proposed self-management program were assessed. After the assessment of the implementation potential, self-management program was found to be transferable to the targeted elders in Elderly Health Centers and was found to be feasible for implementation in Hong Kong. The benefits of the proposed self-management program outweigh the costs of implementation. The proposed self-management program would mainly provide the elders with the self-management skills, osteoarthritis related information and exercise practice in group sessions. There would also be follow-up telephone coaching. Guidelines were formed to provide evidence-based recommendations for practice.
Implementation plan was developed to initiate and sustain the adoption of the proposed self-management program. Pilot test was designed to test the feasibility of the proposed program. Evaluation plan was developed to exam the effectiveness of the proposed self-management program in improving self-efficacy for self-management and reducing pain for the elders with knee osteoarthritis. Self-efficacy for self-management is the primary outcome to ascertain the effectiveness of the proposed program.

In sum, the proposed self-management program could promote evidence-based self-management education for Chinese older adults with knee osteoarthritis in Hong Kong.
## Appendix A

Table A1

Result of the Search for Studies on Self-management Program for Older Adults With Osteoarthritis of Knee

<table>
<thead>
<tr>
<th>Search terms</th>
<th>Databases searched</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CINAHL Plus</td>
<td>PubMed</td>
<td>British Nursing Index</td>
</tr>
<tr>
<td>1) Older adults OR elders OR the aged.</td>
<td>76667</td>
<td>1201867</td>
<td>3696</td>
</tr>
<tr>
<td>2) Osteoarthritis knee OR knee pain OR OA knee.</td>
<td>632</td>
<td>7019</td>
<td>109</td>
</tr>
<tr>
<td>3) Self-management: program, education, training, workshop, support; OR Self-care: program, education, training, workshop, support; OR Self-help: education, training, program, workshop; OR Coping skills training.</td>
<td>538</td>
<td>1156</td>
<td>1303</td>
</tr>
<tr>
<td>Combined theme 1, 2 and 3.</td>
<td>103</td>
<td>179</td>
<td>3</td>
</tr>
<tr>
<td>Screening according to the inclusion &amp; exclusion criteria, full-text requirement.</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>(These two are replicates of those found in PubMed)</td>
<td></td>
<td></td>
<td>(one is replicate of that found in PubMed)</td>
</tr>
<tr>
<td>Final no. of literature can be used:</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### Appendix B


<table>
<thead>
<tr>
<th>Study type (Evidence level)</th>
<th>Subject Characteristics</th>
<th>Intervention (n = no. of subjects)</th>
<th>Comparison (n= no. of subjects)</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized control trial (I+)</td>
<td><strong>Intervention group:</strong> Mean age: 64.8 years (10.6) Female: 88.9% Male: 11.1% Duration of OA knee: 8.04 years (5.92) Education level: Form 3/ below: 88.9% Above form 3: 11.1%</td>
<td>Adopted ASMP with added exercise components, including: 1) 6 (2-hour) classes weekly led by registered nurses; 2) focused on: goal setting, action planning on self-management; 3) goal-directed action plan for exercise (stretching, walking exercise &amp; Tai Chi types of movement); &amp; routine conventional treatment. (n = 45)</td>
<td>Routine conventional treatment (same as intervention group).</td>
<td>1 year</td>
<td>1) Arthritis self-efficacy (ASES: pain &amp; other symptoms management) 2) Arthritis pain &amp; fatigue rating (VAS) 3) Self-rated health</td>
<td>Between groups differences: 1) ↑ASES pain: 0.58 (p=0.02) ↑ASES other symptoms: 0.64 (p=0.01) 2) ↓ current pain rating: 0.89 (p=0.0001) ↓pain rating at night: 0.74 (p=0.001) ↓ pain rating during walking: 0.53 (p=0.013) ↓ pain rating when changing position: 0.28 (p=0.15) ↓ fatigue rating: 0.25 (p=0.22) 3) ↑Self-rated health: 0.49 (p=0.04)</td>
</tr>
<tr>
<td><strong>Control group:</strong> Mean age: 63.4 years (10.7) Female: 82.0% Male: 18.0% Duration of OA knee: 6.72 years (6.02) Education level: Form 3/ below: 86.0% Above form 3: 14.0%</td>
<td></td>
<td></td>
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</table>


Table B2


<table>
<thead>
<tr>
<th>Study type (Evidence level)</th>
<th>Subject Characteristics</th>
<th>Intervention (n = no. of subjects)</th>
<th>Comparison (n = no. of subjects)</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
</table>
| Randomized control trial (1+) | **Intervention group**: (SE)  
1) Mean age: 65.6 years (1.03)  
2) Male: 15.9%  
Female: 84.1%  
3) Education level  
Form 3/ below: 87.5%  
Above form 3: 12.5%  
4) Duration of arthritis: 8.31 years (0.78)  
**Control group**: (SE)  
1) Mean age: 64.02 years (1.06)  
2) Male: 16%  
Female: 84.1%  
3) Education level  
Form 3/ below: 87.2%  
Above form 3: 12.8%  
4) Duration of arthritis: 7.85 years (0.65) | Adopted ASMP with added exercise components, including:  
1) 6 (2-hour) classes weekly led by registered nurses;  
2) focused on: goal setting, action planning, coping & managing OA knee consequences;  
3) topics covered: self-management principles, medical options of pain management, joint protection, physical activity, managing stress, nutrition, communication skills;  
4) goal-setting exercise (stretching, walking exercise & Tai Chi types of movement);  
& conventional orthopedic treatment. (n = 94) | Conventional orthopedic treatment. (n = 94) | 16 weeks | 1) Arthritis pain & fatigue intensity (VAS)  
2) Duration of practice of light exercise (hours per week) | Between groups differences:  
1) ↓ pain  
(p=0.0001)  
2) ↑ Practice of exercise  
(p=0.0001) | 0.613  
0.337 |
Table B3

<table>
<thead>
<tr>
<th>Study type (Evidence level)</th>
<th>Subject Characteristics</th>
<th>Intervention (n = no. of subjects)</th>
<th>Comparison (n= no. of subjects)</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
</table>
| Randomized control trial (I+) | 1) Mean age: 65 years  
2) Female: 75%  
Male: 25%  
3) History of OA knee: 8 years (average) | Adopted ASMP intervention with added goal-directed exercise component, including:  
1) six 2-hour classes per week, led by registered nurses, focused on teaching how to cope with and manage OA knee consequences;  
2) action plan using 3 types of exercise (walking, stretching exercise, Tai Chi types of movement) reinforced weekly during the program;  
& routine conventional treatment. (n = 88) | Routine conventional treatment. (n=94) | 16 weeks | 1. Arthritis self-efficacy  
(ASES: pain & other symptoms management)  
2. Practice of light Exercise  
(hours per week)  
3. Arthritis pain (VAS Pain) | Between groups differences:  
1. ↑ASES pain  
0.534 (p=0.0001)  
↑ ASES other symptoms  
0.509 (p=0.0001)  
2.↑Practice of exercise  
0.566 (p=0.0001)  
3. ↓Pain rating  
0.613 (p=0.0001) | 

Appendix B

Table B4


<table>
<thead>
<tr>
<th>Study type (Evidence level)</th>
<th>Subject Characteristics</th>
<th>Intervention (n = no. of subjects)</th>
<th>Comparison (n= no. of subjects)</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
</table>
| Randomized control trial (I+) | Intervention group: (SD) | Osteoarthritis (OA) self-management- 1) 6 weekly sessions of 2.5 hours each; 2) aspects of care covered—OA, self-management skills (goal-setting, problem-solving, modeling, positive thinking and improving self-efficacy), medications, pain management strategies, fitness & exercise, joint protection, nutrition & weight control, fall prevention, environmental risks and coping with negative emotions; 3) supplemented with printed information relevant to the course component. (n = 71) | Those in 6-month waiting period. (n = 75) | Six months | Primary outcome: 1) Quality of life (SF-36) | Between groups differences: | Primary outcome: 1) Quality of life 5.67 (p<0.05) 95% CI (0.40, 10.93) 
Improved mental health 3.85 (p>0.05) 95% CI (-0.21, 7.91) | Secondary outcome: 1) Pain (VAS Pain) |
|                             | Control group: (SD)     |                                   |                               |                   |                 |            |            |
|                             | 1) Mean age: 65 years (7.9) |                                   |                               |                   |                 |            |            |
|                             | 2) Female: 80.3% Male: 19.7% |                                   |                               |                   |                 |            |            |
|                             | 1) Mean age: 65 years (8.7) |                                   |                               |                   |                 |            |            |
|                             | 2) Female: 69.3% Male: 30.7% |                                   |                               |                   |                 |            |            |
### Table B5


<table>
<thead>
<tr>
<th>Study type (Evidence level)</th>
<th>Subject Characteristics</th>
<th>Intervention (n = no. of subjects)</th>
<th>Comparison (n= no. of subjects)</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized control trial (I+)</td>
<td>Intervention group: (SD) Mean age: 60.3 (10.3) Men: 91% High school education/less: 33% OA duration: 16.5 years (12.7)</td>
<td>Telephone-based Self-management support intervention- 1) written &amp; audio version of self-management educational materials (osteoarthritis information, self-management concept, exercise, healthy eating, weight management, joint protection, medications); 2) developing goals &amp; action plans related to osteoarthritis management; 3) monthly telephone follow up for 12 months. (n = 172)</td>
<td>2 control groups: 1) attention control group- education involved non-osteoarthritis materials &amp; 12 monthly phone calls related to general health screening topics; (n =172) 2) usual care control group- (usual care for osteoarthritis but no other intervention). (n =171)</td>
<td>12 months</td>
<td>Primary outcome: 1) Pain (Pain subscale of AIMS2) (VAS Pain)</td>
<td>Between groups: Vs attention control: 1) ↓AIMS2 pain -0.6 (p =0.007) 95% CI (-1.0 to -0.2) ↓VAS Pain -1.0 (p &lt;0.001) 95% CI (-1.5 to -0.5) 2) ↑ self-efficacy 0.4 (p = 0.043) 95% CI (0.0 to 0.8) Vs usual care control: 1) ↓AIMS2 pain -0.4 (p = 0.105) 95% CI (-0.8 to 0.1) ↓VAS Pain -1.1 (p &lt;0.001) 95% CI (-1.6 to -0.6) 2) ↑ self-efficacy 0.4 (p = 0.066) 95% CI (0.0 to 0.7)</td>
</tr>
</tbody>
</table>
Table B6


<table>
<thead>
<tr>
<th>Study type (Evidence level)</th>
<th>Subject Characteristics</th>
<th>Intervention (n = no. of subjects)</th>
<th>Comparison (n= no. of subjects)</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized control trial (I++)</td>
<td>Intervention group: Mean age: 51.0 years (5.0) Male: 40.9% Female: 59.1% Education level: Low: 32.3% Middle: 43.4% High: 24.2%</td>
<td>Self-management intervention- 1) six 2-hour sessions, led by physiotherapist; 2) topics covered: -OA introduction, self-help principles, exercise, relaxation, emotion &amp; communication, problem-solving, treatment options, assistive devices, action plan, feedback &amp; evaluation; 3) focused on: goal setting, self-diagnostic skills, problem-solving, self-incentives; 4) supplemented with OA handbook &amp; booklets; &amp; usual care.</td>
<td>Care-as-usual. (n=148)</td>
<td>21-months</td>
<td>Primary outcome: 1) Pain (VAS Pain)</td>
<td>Between groups differences: 1) ↓ knee pain 0.39 (p=0.004)</td>
</tr>
<tr>
<td>Care-as-usual control group: Mean age: 52.2 years (5.1) Male: 39.7% Female: 60.3% Education level: Low: 35.2% Middle: 36.1% High: 28.7%</td>
<td></td>
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</table>
### Appendix B

#### Table B7

<table>
<thead>
<tr>
<th>Study type (Evidence level)</th>
<th>Subject Characteristics</th>
<th>Intervention (n = no. of subjects)</th>
<th>Comparison (n= no. of subjects)</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized control trial with repeated measures (I++)</td>
<td>Intervention group (SD)</td>
<td>Mean age: 68.4 years (8.2)</td>
<td>Self-management program- 1) with six sessions; 2) education booklet incorporated information from Arthritis Care and the Arthritis Research Campaign. (n = 406)</td>
<td>Education booklet about standard primary care. (n = 406)</td>
<td>12 months</td>
<td>Primary outcome: 1) Quality of life (SF-36) 2) Arthritis self-efficacy (ASES)</td>
</tr>
</tbody>
</table>
|                             | Control group (SD)      | Mean age: 68.7 years (8.6) | Male: 37%  
Female: 63%  
Age left school:  
<16 years: 64%  
16 to 18 years: 36%  
Higher education level:  
No: 72% Vs. Yes: 28% | Male: 37%  
Female: 63%  
Age left school:  
<16 years: 68%  
16 to 18 years: 32%  
Higher education level:  
No: 73% Vs Yes: 27% | 12 months |
### Appendix B


<table>
<thead>
<tr>
<th>Study type (Evidence level)</th>
<th>Subject Characteristics</th>
<th>Intervention (n = no. of subjects)</th>
<th>Comparison (n= no. of subjects)</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quasi-Experimental (Clinical trial without randomization) (I+)</td>
<td><strong>Intervention group: (SD)</strong> Mean age: 62.27 years (10.05) Male: 19.3% Female: 80.7% Education level: Primary: 41.2% High school: 28.1% Above college: 30.7%</td>
<td>Tai Pei OA program, TOAP-1) 4 (80-min.) weekly sessions; 2) covered: ● anatomy, pathology &amp; treatment; ● joint protection, pain reduction; ● exercise, muscle strengthening &amp; stretching; ● coping skills, problem solving, goal setting; 3) supplemented with self-care booklet, exercise instruction sheet &amp; DVD; &amp; normal routine care. (n =125)</td>
<td>Normal routine care. (n=125)</td>
<td>8 weeks post-intervention (at 12th week)</td>
<td>1) Arthritis self-efficacy (ASES) 0.81 ( P &lt; 0.001 )</td>
<td>Between groups differences: 1) ↑ASES for pain 0.81 ( P &lt; 0.001 ) 2) Pain belief (SOPA 35) 0.51 ( P = 0.033 ) 3) Number of pain days in last 1 week 0.43 ( P = 0.160 )</td>
</tr>
<tr>
<td></td>
<td><strong>Control group: (SD)</strong> Mean age: 68.18 years (11.21) Male: 28.6% Female: 71.4% Education level: Primary: 49.5% High school: 34.1% Above college: 16.5%</td>
<td>Normal routine care. (n=134)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Table C1
Rating Scheme for Levels of Evidence (Scottish Intercollegiate Guidelines Network, 2011)

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1++</td>
<td>High quality meta-analyses, systematic reviews of randomized controlled trials (RCTs), or RCTs with a very low risk of bias.</td>
</tr>
<tr>
<td>1+</td>
<td>Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias.</td>
</tr>
<tr>
<td>1-</td>
<td>Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias.</td>
</tr>
<tr>
<td>2++</td>
<td>High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal.</td>
</tr>
<tr>
<td>2+</td>
<td>Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal.</td>
</tr>
<tr>
<td>2-</td>
<td>Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal.</td>
</tr>
<tr>
<td>3</td>
<td>Non-analytic studies, e.g. case reports, case series.</td>
</tr>
<tr>
<td>4</td>
<td>Expert opinion.</td>
</tr>
</tbody>
</table>
### Appendix D

Table D1

<table>
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<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The study addresses an appropriate and clearly focused question.</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Adequately</td>
</tr>
<tr>
<td></td>
<td>addressed</td>
<td>addressed</td>
<td>addressed</td>
<td>addressed</td>
</tr>
<tr>
<td>2. The assignment of subjects to treatment groups randomized.</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Adequately</td>
</tr>
<tr>
<td></td>
<td>addressed</td>
<td>addressed</td>
<td>addressed</td>
<td>addressed</td>
</tr>
<tr>
<td>3. An adequate concealment method is used.</td>
<td>Not addressed</td>
<td>Not addressed</td>
<td>Not addressed</td>
<td>Well covered</td>
</tr>
<tr>
<td>4. Subjects and investigators are kept blind to treatment allocation.</td>
<td>Not addressed</td>
<td>Not addressed</td>
<td>Not addressed</td>
<td>Well covered</td>
</tr>
<tr>
<td>5. The treatment and control groups were similar at the start of the trial.</td>
<td>Well covered</td>
<td>Well covered</td>
<td>Well covered</td>
<td>Well covered</td>
</tr>
<tr>
<td>6. The only difference between the groups is the treatment under investigation.</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Well covered</td>
</tr>
<tr>
<td></td>
<td>addressed</td>
<td>addressed</td>
<td>addressed</td>
<td>covered</td>
</tr>
<tr>
<td>7. All relevant outcomes measured in a standard, valid and reliable way.</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Adequately</td>
</tr>
<tr>
<td></td>
<td>addressed</td>
<td>addressed</td>
<td>addressed</td>
<td>addressed</td>
</tr>
<tr>
<td>8. What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>Adequately</td>
<td>Well covered</td>
<td>Well covered</td>
<td>Poorly addressed</td>
</tr>
<tr>
<td></td>
<td>addressed</td>
<td>covered</td>
<td>covered</td>
<td>addressed</td>
</tr>
<tr>
<td>9. All the subjects are analyzed in the groups to which they were randomly allocated (intention to treat analysis).</td>
<td>Well covered</td>
<td>Adequately</td>
<td>Adequately</td>
<td>Well covered</td>
</tr>
<tr>
<td></td>
<td>covered</td>
<td>addressed</td>
<td>addressed</td>
<td>covered</td>
</tr>
<tr>
<td>10. Result are comparable for all sites.</td>
<td>Not addressed</td>
<td>Not addressed</td>
<td>Not addressed</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>1+</td>
<td>1+</td>
<td>1+</td>
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(Continued)
Table D1
Results of Appraisal and Level of Evidence of the Reviewed Studies

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<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. The study addresses an appropriate and clearly focused question.</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
</tr>
<tr>
<td>2. The assignment of subjects to treatment groups randomized.</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Well covered</td>
<td>Not applicable</td>
</tr>
<tr>
<td>3. An adequate concealment method is used.</td>
<td>Not addressed</td>
<td>Well covered</td>
<td>Well covered</td>
<td>Not addressed</td>
</tr>
<tr>
<td>4. Subjects and investigators are kept blind to treatment allocation.</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Well covered</td>
<td>Not addressed</td>
</tr>
<tr>
<td>5. The treatment and control groups were similar at the start of the trial.</td>
<td>Not reported</td>
<td>Adequately addressed</td>
<td>Well covered</td>
<td>Well covered</td>
</tr>
<tr>
<td>6. The only difference between the groups is the treatment under investigation.</td>
<td>Well covered</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Well covered</td>
</tr>
<tr>
<td>7. All relevant outcomes measured in a standard, valid and reliable way.</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
</tr>
<tr>
<td>8. What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>Poorly addressed</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Well covered</td>
</tr>
<tr>
<td>9. All the subjects are analyzed in the groups to which they were randomly allocated (intention to treat analysis).</td>
<td>Adequately addressed</td>
<td>Adequately addressed</td>
<td>Well covered</td>
<td>Not addressed</td>
</tr>
<tr>
<td>10. Result are comparable for all sites.</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not addressed</td>
<td>Not addressed</td>
</tr>
</tbody>
</table>

Level of evidence

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1+</td>
<td>1++</td>
<td>1++</td>
<td>1+</td>
</tr>
</tbody>
</table>
Table E1
Intervention Effectiveness: Between Groups Differences of the Research Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Improving self-efficacy for self-management</th>
<th>Reducing osteoarthritis knee pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Significant</td>
<td>Not significant</td>
</tr>
<tr>
<td>Yip et al. (2008)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Buszewicz et al. (2006)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Wu et al. (2011)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Heuts et al. (2005)</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Yip et al. (2007b)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Allen et al. (2010):</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>compared with attention control group</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>usual care control group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yip et al. (2007a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coleman et al. (2012)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Gray area means outcome not measured in the studies.
## Appendix F

### Table F1

Key Components and Structure of Self-management Programs of the Reviewed Studies

<table>
<thead>
<tr>
<th>Program</th>
<th>Key components</th>
<th>Structure</th>
</tr>
</thead>
</table>
| Telephone-based self-management intervention (Allen et al., 2010)       | 1) Written and audio versions of osteoarthritis self-management educational materials given to participants, including:  
  ▪ basic information on osteoarthritis and self-management concepts;  
  ▪ exercise (benefits of exercise, principles of safe exercise, managing pain during exercise);  
  ▪ healthy eating and weight management;  
  ▪ medications;  
  ▪ joint care and protection (i.e. incorporating joint protection into daily activities);  
  ▪ communication with health care providers;  
  ▪ stress management and relaxation;  
  ▪ strategies for improving sleep.  
  2) Focus on-  
  ▪ development of goals, action plans related to osteoarthritis self-management. | Mode of delivery-  
  ● monthly telephone follow up by health educator for goal-setting and action plans for 12 months. |
| Osteoarthritis of knee program (OAK program) (Coleman et al., 2012)      | 1) Components including-  
  ▪ osteoarthritis self-management skills (goal-setting, problem-solving, modeling, positive thinking and improving self-efficacy);  
  ▪ medications, pain management strategies, fitness & exercise, joint protection, nutrition & weight control, fall prevention, environmental risks and coping with negative emotions.  
  2) Supplemented with printed information relevant to the course component. | Mode of delivery-  
  ● six weekly- sessions of 2.5 hours each;  
  ● led by health care professionals who have background musculoskeletal education about knee osteoarthritis. |
| Arthritis self-management course (Buszewicz et al., 2006)               | 1) Arthritis self-management course.  
  2) Supplemented with education booklet, incorporated information from Arthritis Care and the Arthritis Research Campaign (Detailed content is not mentioned in the study). | Mode of delivery  
  ● six- session course. |
### Table F1

Key Components and Structure of Self-management Programs of the Reviewed Studies

<table>
<thead>
<tr>
<th>Program</th>
<th>Key components</th>
<th>Structure</th>
</tr>
</thead>
</table>
| Self-management intervention (Heuts et al., 2005) | 1) Topics covered-  
   - self-help principles, exercise, relaxation, 
   problem-solving, communication, emotion management, treatment options, assistive devices & introduction of osteoarthritis (OA).  
2) Focus on-  
   - goal setting, action planning, problem solving, self-incentive, self-diagnostic skills, evaluation and feedback.  
3) Supplemented with booklet and short handbook on OA and self-management. | Mode of delivery-  
   - six highly structured 2-hour sessions;  
   - led by physiotherapists |
| ASMP with added exercise component (Yip et al., 2007a) | Adopted Arthritis Self-management Program (ASMP) with added exercise component:  
1) focus on-  
   - goal setting, action planning, coping & managing OA knee consequences;  
2) topics including-  
   - self-management principles, medical options of pain management, joint protection, physical activity, managing stress, nutrition, communication skills;  
3) goal-setting exercise (stretching, walking exercise & Tai Chi types of movement). | Mode of delivery-  
   - six weekly sessions of 2-hour each;  
   - led by registered nurses |
| ASMP with added exercise component (Yip et al., 2007b) | Adopted Arthritis Self-management Program (ASMP) with added exercise component:  
1) focus on-  
   - goal setting, action planning, coping & managing OA knee consequences;  
2) topics including-  
   - self-management principles, medical options of pain management, joint protection, physical activity, managing stress, nutrition, communication skills;  
3) goal-setting exercise (stretching, walking exercise & Tai Chi types of movement). | Mode of delivery-  
   - six weekly sessions of 2-hour each;  
   - led by registered nurses. |

(Continued)
Appendix F

Table F1
Key Components and Structure of Self-management Programs of the Reviewed Studies

<table>
<thead>
<tr>
<th>Program</th>
<th>Key components</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASMP intervention</td>
<td>Adopted Arthritis Self-management Program (ASMP) and added exercise component:</td>
<td></td>
</tr>
<tr>
<td>(Yip et al., 2008)</td>
<td>1) focus on-goal setting, action planning, coping &amp; managing consequences of knee osteoarthritis (OA);</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) topics including- self-management principles, medical options of pain management, joint protection, physical activity, managing stress, nutrition, communication skills;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) goal-setting exercise (stretching, walking exercise &amp; Tai Chi types of movement)</td>
<td>Mode of delivery-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• six weekly sessions of 2-hour each, with 10-15 participants;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• led by registered nurses.</td>
</tr>
<tr>
<td>TOAP Program</td>
<td>Tai Pei OA Program (TOAP), topics including- 1) anatomy, pathology, common treatment, joint protection, pain reduction strategies, muscle stretching &amp; strengthening exercise;</td>
<td></td>
</tr>
<tr>
<td>(Wu et al., 2011)</td>
<td>2) relieving the pressures from disability &amp; how to cope with OA, coping skills for OA, problem-solving skills &amp; skills of enhancing self-efficacy;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) supplemented with DVD, OA self-care booklet &amp; exercise instruction sheets.</td>
<td>Mode of delivery-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• four weekly sessions of 80-min each;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• led by research assistant trained in basic principles of self-management.</td>
</tr>
</tbody>
</table>
## Appendix G

### Table G1
The Budget for the Implementation of Self-management Program

<table>
<thead>
<tr>
<th>Training workshops</th>
<th>6 hours (two 3-hour workshops)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>include 1 trainer (Registered nurse, RN) + 3 trainees (RN)</td>
</tr>
<tr>
<td></td>
<td>time used for preparation of workshops and manuals: 15 hours</td>
</tr>
</tbody>
</table>

| Staffing cost for training workshops    | RN salary: $30,025 ÷ 200 = $150/ hour (mid-point salary $30,025 for 200 working hours per month)  |
|                                         | cost for workshops:  |
|                                         | = (15 x $150) + (6 x 4 x $150)  |
|                                         | = $2,250 + $3,600  |
|                                         | = $5,850.  |

| Material cost                          | staff manual: $20 x 3 = $60 (20/ manual)  |

| Total cost                             | Material cost + staffing cost for training:  |
|                                         | = $60 + $5,850 = $5,910.  |

| Cost for running self-management programs in 3 Elderly Health Centers (3 programs concurrently being run in each center) | Each program includes:  |
|                                                                 | 17 participants and 1 RN.  |
|                                                                 | 8 hours (four 2-hour weekly sessions) + 21.25 hours (monthly 15-min. telephone coaching for 5 months for 17 participants)  |
| Time used in preparation for four group sessions in each program: 8 hours | 8 hours  |

| Staffing cost for running 9 programs in 3 centers | RN salary: $150 / hour  |
|                                                   | (8 hours + 21.25 hours + 8 hours) x $150 x 9  |
|                                                   | = $50,288.  |

| Material cost                          | handout ($20 /each)  |
|                                       | $20 x 17 x 9 = $3,060.  |

| Total cost                              | staffing cost + material cost  |
|                                         | = $50,288 + $3,060  |
|                                         | = $53,348.  |

| Total cost                             | cost for training workshops + cost for running 9 programs in 3 centers  |
|                                         | = $5,910 + $53,348  |
|                                         | = $59,258.  |

| Average cost for each participant       | $59,258 ÷ 9 ÷ 17  |
|                                        | = $387.  |
### Table H1
The Potential Benefit of Implementing Self-management Program

<table>
<thead>
<tr>
<th>Reduction in osteoarthritis related expense</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Direct cost for utilization of hospitals and medical services per person per year in Hong Kong (Woo et al., 2003)</td>
<td>$11,690 to $40,180.</td>
</tr>
<tr>
<td>2. Indirect cost for loss of productivity of individuals and their carers per person per year in Hong Kong (Woo et al., 2003)</td>
<td>$3,300 to $6,640.</td>
</tr>
<tr>
<td>Total (per person per year)</td>
<td>$14,990 to $46,820.</td>
</tr>
</tbody>
</table>

Note:
Cost-benefit ratio of self-management program: $387 ÷ $14,990 = 0.026
Appendix I

Table I
Rating Scheme for Levels of Evidence and Grades of Recommendations
(Scottish Intercollegiate Guidelines Network, 2011)

<table>
<thead>
<tr>
<th>Levels of evidence</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1++</td>
<td>High quality meta-analyses, systematic reviews of randomized controlled trials (RCTs), or RCTs with a very low risk of bias.</td>
</tr>
<tr>
<td>1+</td>
<td>Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias.</td>
</tr>
<tr>
<td>1-</td>
<td>Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias</td>
</tr>
<tr>
<td>2++</td>
<td>High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal.</td>
</tr>
<tr>
<td>2+</td>
<td>Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal.</td>
</tr>
<tr>
<td>2-</td>
<td>Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal.</td>
</tr>
<tr>
<td>3</td>
<td>Non-analytic studies, e.g. case reports, case series.</td>
</tr>
<tr>
<td>4</td>
<td>Expert opinion.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grades of recommendations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>At least one meta-analysis, systematic review, or RCT rated as 1++ and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population and demonstrating overall consistency of results.</td>
</tr>
<tr>
<td>B</td>
<td>A body of evidence including studies rated as 2++, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+.</td>
</tr>
<tr>
<td>C</td>
<td>A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++.</td>
</tr>
<tr>
<td>D</td>
<td>Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+.</td>
</tr>
</tbody>
</table>

Good practice points ✓ Recommended best practice based on the clinical experience of the guideline development group.
Appendix J

Table J1
Flow Chart of the Proposed Self-management Program in Elderly Health Centers

<table>
<thead>
<tr>
<th>Screen to confirm knee osteoarthritis status:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Screening medical records</td>
</tr>
<tr>
<td>2. Physical examination by medical officer</td>
</tr>
</tbody>
</table>

Recruitment to self-management program

Participation in four group sessions (2-hour weekly session):
Topics including:
1. self-management skills (self-monitoring skills, goal-setting & action plans, problem-solving & feedback, sharing with peers);
2. exercise (principle of safe exercise, stretching & strengthening exercise);
3. osteoarthritis related information (anatomy & pathology of osteoarthritis, treatment options, medication, joint protection & care, pain management strategies, stress management & relaxation).

after completion of the 4th group session

Monthly 15-min. telephone coaching to individual participant for 5 months

3 months after completion of the whole program

Post-intervention assessment during follow up appointment in Elderly Health Centers
### Timeframe of the Development and Implementation of the Proposed Self-management Program

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time (Month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication with stakeholders (Administrators &amp; frontline staff)</td>
<td>1</td>
</tr>
<tr>
<td>Review of guidelines</td>
<td>2</td>
</tr>
<tr>
<td>Preparation of materials</td>
<td>3</td>
</tr>
<tr>
<td>Training sessions for staff</td>
<td>4</td>
</tr>
<tr>
<td>Pilot test in one center &amp; process evaluation</td>
<td>5, 6, 7</td>
</tr>
<tr>
<td>Full implementation of the program in 3 centers</td>
<td>8, 9, 10, 11</td>
</tr>
<tr>
<td>Evaluation of outcomes</td>
<td>12, 13, 14, 15</td>
</tr>
</tbody>
</table>
# Appendix L

Table L1
Program Protocol of the Proposed Self-management Program

<table>
<thead>
<tr>
<th>Topics per session</th>
<th>Group session (2-hour weekly session)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-management skills:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal-setting &amp; action plans</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Problem-solving and feedback</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Sharing with peers</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Self-monitoring skills</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Osteoarthritis related information:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anatomy &amp; pathology of osteoarthritis</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment options</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint protection and care</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain management strategies</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress management and relaxation</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exercise:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principles of safe exercise</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stretching exercise</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Strengthening exercise</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

After the 4th session: monthly 15-minute telephone coaching to individual participant for 5 months

3 months after completion of the intervention: follow up appointment to Elderly Health Centers for post-intervention assessment.

Note: ● means topics covered in the self-management sessions.
### Self-efficacy pain subscale

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Minimum</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Very certain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>How certain are you that you can decrease your pain quite a bit?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>How certain are you that you can continue most of your daily activities?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>How certain are you that you can keep arthritis pain from interfering with your sleep?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>How certain are you that you can make a small-to-moderate reduction in your arthritis pain by using methods other than taking extra medication?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>How certain are you that you can make a large reduction in your arthritis pain by using methods other than taking extra medication?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

### Self-efficacy other symptoms subscale

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Minimum</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Very certain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>How certain are you that you can control your fatigue?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>How certain are you that you can regulate your activity so as to be active without aggravating your arthritis?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>How certain are you that you can do something to help yourself feel better if you are feeling blue?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>4</td>
<td>As compared with other people with arthritis like yours, how certain are you that you can manage arthritis pain during your daily activities?</td>
<td>Very uncertain</td>
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<tr>
<td>5</td>
<td>How certain are you that you can manage your arthritis symptoms so that you can do the things you enjoy doing?</td>
<td>Very uncertain</td>
<td></td>
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<td>6</td>
<td>How certain are you that you can deal with the frustration of arthritis?</td>
<td>Very uncertain</td>
<td></td>
<td>1</td>
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</tbody>
</table>
Appendix N

Table N1
Visual Analog Scale for Pain (VAS Pain)

Please place a vertical line on the following VAS horizontal line to indicate your current osteoarthritis knee pain intensity.
Reference


1-year follow-up of an experimental study of a self-management arthritis

programme with an added exercise component of clients with osteoarthritis of