QUALITY OF LIFE AND ITS ASSOCIATED FACTORS AMONG KNEE OSTEOARTHRITIS PATIENTS

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ABBREVIATIONS

BMI	Body mass index
COX-2 Inhibitor	Cycloxygenase-2 inhibitor (Example: Celecoxib and Etoricoxib)
CRF	Case report form
DM	Diabetes Mellitus
HUSM	Universiti Sains Malaysia Hospital
HPT	Hypertension
KOOS	Knee injury and osteoarthritis outcome score
KRK	Klinik Rawatan Keluarga
NSAIDs	Non-steroidal anti-inflammatory drugs
OA	Osteoarthritis
OAKHQOL	Osteoarthritis Knee and Hip Quality of Life
PCM	Paracetamol
QOL	Quality of life
SD	Standard deviation
SF-36	Short Form 36 Health Survey
SLR	Simple linear regression
USM	Universiti Sains Malaysia
WOMAC	Western Ontario and Mcmaster Universities Arthritis Index

ABSTRACT

Title: Quality of life and its associated factors among knee osteoarthritis patients.

Introduction: Osteoarthritis is the most common form of arthritis around the globe. The aim of knee osteoarthritis treatment is to alleviate pain, delay progression of osteoarthritis, improvement in mobility, walking as well as improvement in the quality of life. Despite the clear goal of treatment mentioned, quality of life is the least considered or often neglected aspect in the overall management of patients with knee osteoarthritis.

Objectives: To determine the quality of life and its associated factors among knee osteoarthritis patients.

Methodology: A cross-sectional study was conducted from 1st June 2014 until 30th October 2014 at the orthopaedic clinic in Universiti Sains Malaysia Hospital (HUSM). Systematic random sampling was applied based on attendance list in orthopaedic clinic, HUSM. A set of questionnaires which includes case report form and the Malay version of Osteoarthritis Knee and Hip Quality of Life (OAKHQOL) questionnaire was given to patients before determining their body mass index (BMI) and reviewing their latest knee radiograph. Data analysis was done using SPSS Version 22. The overall quality of life among knee osteoarthritis were expressed by using mean OAKHQOL score for each domain while the associated factors that affecting the quality of life were analysed by using general linear regression analysis.

Result: The mean quality of life among patient with knee osteoarthritis were average. The worse domain was a social functioning domain with a mean score

of 59.1 (SD 26.31) and the least affected domain was mental health domain with the mean score of 35.7 (SD 22.42). Increasing BMI was consistently associated with worsening of almost all domains of OAKHQOL which include physical activity (CI 0.50, 1.68), mental health (CI 0.17, 1.49), pain (CI 0.24, 1.58) and professional activity (CI 0.34, 1.94) except for social support which showed an improvement with increasing BMI (CI -2.39, -0.63). Social functioning was not associated with any studied variables. An ever-used glucosamine associated with worsening score on physical activity (CI 1.51, 14.99), mental health (CI 1.79, 17.17) and pain (CI 2.98, 18.68) domains. Longer duration of knee osteoarthritis and bilateral involvement of knee were both associated with worse sexual activity (CI 0.42, 2.59); (CI 3.68, 20.37) and relationship item score (CI 0.28, 2.48); (CI 2.83, 19.79). Higher education status appears to have a better score in mental health (CI -33.24, -7.42) and pain (CI -32.11, -5.75). domain. An ever used NSAIDs was associated with poorer score in sexual activity item (CI 0.20, 17.11). Higher grade of knee osteoarthritis by Kellgren Lawrence grading of knee osteoarthritis have worse professional activity item score (CI 0.03, 24.49).

Conclusion: The quality of life among patients with knee osteoarthritis in this study was average. Increasing BMI was consistently associated with worsening of almost all domains of OAKHQOL, except for social functioning. Social functioning was not associated with any studied variables. Variables that had an association with at least one domain of OAKHQOL were education status, grade of knee osteoarthritis, medication usage (glucosamine or NSAIDs), duration of knee pain and knee involvement (unilateral or bilateral).

ABSTRAK

Tajuk: Kualiti hidup dan faktor-faktor yang mempengaruhinya di kalangan pesakit osteoartritis lutut.

Pengenalan: Osteoartritis adalah jenis artritis yang paling kerap dilaporkan berbanding jenis-jenis artritis yang lain di dunia ini. Sasaran dalam merawat osteoartritis lutut adalah untuk mengurangkan kesakitan, melambatkan kecenderungan dari menjadi lebih teruk, meningkatkan kebolehan untuk bergerak, membolehkan pesakit berjalan dan meningkatkan kualiti hidup pesakit. Walaupun digariskan secara jelas, namun sasaran yang terakhir iaitu peningkatan kualiti hidup sering kali dilupakan.

Objektif: Untuk menentukan kualiti hidup dan faktor-faktor yang mempengaruhinya di kalangan pesakit osteoartritis lutut.

Metodologi: Kajian keratan rentas telah dijalankan di antara 1 Jun 2014 hingga 30 Oktober 2014 di klinik ortopedik, HUSM. Pengambilan sampel secara rawak bersistematik telah dilakukan di kalangan pesakit osteoartritis lutut yang menghadiri klinik ortopedik di Hospital Universiti Sains Malaysia (HUSM). Satu set soalan yang terdiri daripada borang laporan kes dan siri soalan Kualiti Hidup Osteoartritis Lutut dan Pinggul (OAKHQOL) versi Bahasa Malaysia diberikan kepada pesakit sebelum pengambilan indeks jisim tubuh dilakukan dan X-Ray lutut yang terkini dilihat. Analisis data dilakukan menggunakan program SPSS versi 22. Kualiti hidup pesakit osteoatritis lutut dinyakan dalam bentuk min markah OAKHQOL untuk setiap domain manakala bagi mengkaji faktor-faktor

yang mempengaruhi kualiti hidup dikalangan pesakit osteoartritis lutut analisis menggunakan ‘general linear regression’ digunakan.

Keputusan: Jumlah min umur di kalangan peserta adalah 52.2 tahun dengan majoriti daripada mereka adalah wanita (67.1%), berbangsa melayu (96.9%) dan berkahwin (96.9%). Kebanyakan daripada mereka mempunyai tahap pendidikan di peringkat sekolah menengah (72.1%) diikuti peringkat kolej atau universiti (14.9%) dan sekolah rendah (13%). Jumlah min kualiti hidup pesakit osteoartritis lutut secara keseluruhannya adalah di peringkat pertengahan. Bahagian yang paling teruk terjejas adalah kebolehan bersosial dengan jumlah min sebanyak 59.1 (Sisihan Piawai 26.31) manakala bahagian yang paling kurang terjejas adalah kesihatan mental dengan jumlah min sebanyak 35.7 (Sisihan piawai 22.42). Peningkatan jisim tubuh dicatatkan mempunyai skor semakin teruk dengan hampir semua domain utama di dalam OAKHQOL termasuk aktiviti fizikal (CI 0.50, 1.68), kesihatan mental (CI 0.17, 1.49), sakit (CI 0.24, 1.58) dan aktiviti profesional (CI 0.34, 1.94); namun domain sokongan sosial menunjukkan jumlah skor yang makin baik dengan peningkatan indeks jisim tubuh (CI -2.39, -0.63). Fungsi sosial dilihat tidak berkait dengan sebarang pembolehubah yang dikaji di dalam kajian ini. Pernah menggunakan glukosamin dilihat berkait dengan skor yang semakin teruk bagi domain aktiviti fizikal (CI 1.51, 14.99), kesihatan mental (CI 1.79, 17.17) dan sakit (CI 2.98, 18.68). Semakin lama seseorang pesakit menghidapi osteoartritis lutut dan penglibatan kedua belah lutut menunjukkan skor aktiviti seksual (CI 0.42, 2.59); (CI 3.68, 20.37) dan skor hubungan (CI 0.28, 2.48); (CI 2.83, 19.79) yang semakin teruk. Taraf pendidikan yang semakin tinggi dilihat mempunyai skor yang makin baik bagi domain kesihatan mental (CI -33.24, -7.42) dan domain sakit (CI -32.11, -5.75). Pernah mengunakan ubat

tahan sakit seperti NSAIDs mempunyai skor yang semakin teruk bagi item seksual aktiviti (CI 0.20, 17.11). Gred osteoartritis lutut oleh Kellgren Lawrence yang lebih teruk mempunyai skor item professional activiti yang semakin teruk (CI 0.03, 24.49).

Kesimpulan: Kualiti hidup di kalangan pesakit osteoartritis lutut dalam kajian ini adalah di peringkat pertengahan. Peningkatan indeks jisim tubuh dicatatkan mempunyai kaitan yang bermakna dengan hampir semua domain di dalam OAKHQOL kecuali bagi kebolehan bersosial. Kebolehan bersosial dilaporkan tidak mempunyai sebarang kaitan bermakna dengan mana-mana pembolehubah yang dikaji. Pembolehubah yang mempunyai kaitan bermakna dengan sekurang-kurangnya salah satu bahagian di dalam OAKHQOL adalah status pendidikan, gred osteoartritis lutut, pengggunaan ubat (samada ubat glukosamin atau ubat tahan sakit NSAIDs), tempoh sakit lutut dan bahagian lutut yang sakit (samada sebelah atau kedua-dua belah).

CHAPTER 1

INTRODUCTION

1.1 Osteoarthritis

Osteoarthritis is a combination of Greek words of bone, joint and inflammation. Osteoarthritis is also known as a degenerative joint disease characterized by gradual loss of cartilage and development of subchondral sclerosis causing the development of bony spur and cyst (1, 2).

Osteoarthritis is not referred to a single disease entity however it may refer to a complex disease. The main cause of osteoarthritis is due to gradual loss of cartilage with several risk factors causing that to happen. Genetic factor, constitutional factor and biomechanical factor are the three known big groups of factors that may involve in the development of osteoarthritis (3). In a study by Spector et al., it is estimated about 50% heritability in osteoarthritis with osteoarthritis of the spine has the highest influence of genetic factor compared to osteoarthritis of knee, hand and hip (4). The constitutional factor may include aging, female gender and obesity. Obesity is an independent risk factor for knee osteoarthritis. It is well described in a small study by Cooper et al. as it has a stronger relation with medial tibiofemoral joint disease (5). There was only a little knowledge about immunological response towards biomechanical effect towards joint however quadriceps muscle weakness, joint laxity and mal-alignment is

thought to be a responsible factor towards the development of knee osteoarthritis (6).

Early and accurate diagnosis of osteoarthritis is necessary so that appropriate treatment option can be considered. History, physical examination aided with radiological imaging remain the tools for diagnosis of osteoarthritis (7). Since there is a high prevalence of osteoarthritis among elderly, it is frequently referred as a disease of elderly. Insidious onset of pain, stiffness of the joint and limitation of function are the frequent complaint of osteoarthritis. However, early osteoarthritis rarely present to general practitioner as mostly will be asymptomatic unless complicated by joint effusion (8).

The diagnostic criteria have long been developed by the American college of Rheumatology. There is an easier way in diagnosing osteoarthritis of the hip, knee and hand based on classification tree format. Hip pain with femoral and acetabular osteophyte or with joint space narrowing and an Erythrocyte Sedimentation Rate (ESR) of less than 20mm per hour are required in diagnosing osteoarthritis of the hip (9, 10). For diagnosing osteoarthritis of the knee, a symptom of knee pain with osteophyte or with age of more than 50 years old and morning stiffness for at least 30 minutes are required (9, 10). It is rather complicated for osteoarthritis of the hand since many criteria should be meet to diagnose patient with osteoarthritis of the hand. Hand pain with hard tissue enlargement of two or more of 10 selected joints with fewer than three swollen metacarpophalangeal joints with hard tissue enlargement of two or more distal interphalangeal joints or deformity of two or more of 10 selected joints are the criteria for osteoarthritis of the hand (9, 10).

1.2 Managing Knee Osteoarthritis (The integration of care)

The latest 'Management of Osteoarthritis, Second Edition, 2011' did not state where is the location for each component of management listed should be done. Whether at primary healthcare (Klinik Kesihatan) or at hospital (11). It is however clearly stated in the algorithm in the guideline that initial management for symptomatic knee osteoarthritis would be pharmacological treatment which include paracetamol and / or non-steroidal anti-inflammatory drugs with an additional education, weight loss, exercise and physical therapy (11). This initial management are known widely available in our primary healthcare setting in which made it as a suitable place for the care of patient since it has a good accessibility for patients. This practise were consistently with a recommendation by Evaniew et al. which suggest a plan of care for knee osteoarthritis in primary care in the beginning of care (12).

Our resources were limited since primary care is not trained for further intervention in knee osteoarthritis if the condition is not improving with initial therapy including weak opioid. Therefore, a referral is needed if there is no satisfactory improvement in pain, stability and function despite adequate initial pharmacological and non-pharmacological intervention. This is when the care of patient transfer from primary care to hospital based care where wide range of intervention including surgical intervention and alternative treatments are available (11, 12).

Another reason for referral to specialist care is for glucosamine prescription. Having an establish evidence in glucosamine use, our guideline had proposed a glucosamine use among patient with knee osteoarthritis which mainly aiming for pain reduction (11-14). Despite of its clinical benefit, unfortunately it is not available either in primary care or hospital dispensary (15). The medication is only available as over the counter medication which patient need to buy by themselves. Considering its clinical benefit, our government had offer to their pensioner to supply financially under 'e-mass ORATIS' programme which need a prescription from orthopaedic surgeon (16). Because of this, there are also patient who will be referred during early part of the disease for this glucosamine prescription.

1.3 Justification to conduct the study

Robust management of osteoarthritis patients, a lot of improvement nowadays were seen in managing patients particularly in both pharmacological and non-pharmacological treatment. Despite of having new modalities of treatment related to knee osteoarthritis, a subsequent assessment on the effect of treatment were frequently been ignored. Usually, an improvement of function after certain treatment modalities will be considered a success. However, it has come to our mind, whether our treatment is adequate or not and what do the patients feel after treatment. To ensure this holistic care of patient, this is when a measurement of quality of life comes in with a physical function as part of it. Despite the clear goal of treatment mentioned, quality of life is the least considered or often neglected aspect in the overall management of patients with knee osteoarthritis.

There are many ways to measure a quality of life and mostly by using a questionnaire. There are many types of questionnaires available. The newest tools that is used in this study known as ‘Osteoarthritis knee and hip quality of life’ (OAKHQOL) questionnaire which was found to truly reflect the quality of life in knee and hip osteoarthritis patient (17). Most of the studies measuring quality of life use generic quality of life tools in their study (18-21). Our study will add an additional knowledge on quality of life among knee osteoarthritis patients by providing the quality of life from a disease specific tool which is OAKHQOL. Compared to other questionnaire this questionnaire cover most of the element in quality of life involving physical activity, mental health, pain, social support and social functioning. In addition to that, this questionnaire also has added on value in measuring relationship, sexual activity as well as professional life (17). Therefore, it is the perfect tool to be used in this study.

Findings from this study is hope to become an eye opener to the general practitioner in objectively measuring patient perception in dealing with their disease particularly knee osteoarthritis and the list of associated factors which may play a main role significantly in altering the quality of life among them. Apart from that, by presenting the result in this study, it is also hoped to trigger the researcher to produce a preferably a bigger study which may represent the Malaysian population in the future.

CHAPTER 2

LITERATURE REVIEW

2.1 Knee osteoarthritis

2.1.1 Definition or diagnosis

Most of the studies available are still using old diagnostic criteria of knee osteoarthritis which had been developed and recommended by American Rheumatological Association since 1986. The knee osteoarthritis diagnosis can be made by 3 methods which are either by clinical alone or clinical with radiological or clinical with laboratory findings (22). The most sensitive method for diagnosing knee osteoarthritis between three were by clinical (95%) followed by clinical and laboratory (92%) and clinical and radiological (91%) while the most specific method in diagnosing knee osteoarthritis will be by clinical and radiological (86%) followed by clinical and laboratory (75%) and clinical alone (79%) (22). The diagnostic criteria were best explained in Table 2.1.

Table 2.1 : Diagnostic criteria for knee osteoarthritis (22).

Clinical & Laboratory	Clinical & Radiological	Clinical
Knee pain		
	Osteophyte on radiograph	
With at least 5 from below	With at least 1 from below	With at least 3 from below
Age more than 50 years old	Age more than 50 years old	Age more than 50 years old
Stiffness less than 30 minutes	Stiffness less than 30 minutes	Stiffness less than 30 minutes
Crepitus	Crepitus	Crepitus
Bony tenderness		Bony tenderness
Bony enlargement		Bony enlargement
No palpable warmth		No palpable warmth
*ESR < 40 mmHr		
*RF < 1 : 40		
*SF OA		

* ESR = erythrocyte sedimentation rate (Westergren); RF = rheumatoid factor; SF OA = synovial fluid signs of OA (clear, viscous, or white blood cell count <2,000/mm3).

2.1.2 Prevalence of knee osteoarthritis

Osteoarthritis is a common disease among elderly patients. Globally it is estimated around 250 million people had knee osteoarthritis. By the age of 70, about 27.4% of population will have radiographic finding of osteoarthritis although only 7% of them will be symptomatic (23). Osteoarthritis is one of the major cause of disability in elderly as described by Peat et al. which found about quarter of patient above 55 years old with osteoarthritis will have disability (24). Other than disability, there is also significant economic burden to the patient especially when the management involve joint replacement (25).

In Asia, the situation is not much different since the risk associated with obesity which is on the rise. In 2040, it is estimated that the population above 65 years old in Asia will be doubled. This will reflect the prevalence of osteoarthritis since we already know there is a high prevalence of osteoarthritis among elderly above 65 years old (26). Socioeconomic factor reflecting the severity of the disease was described by Woo et al. in studying socioeconomic impact of hip and knee osteoarthritis in Hong Kong. In her study, low education and socioeconomic class were associated with more severe disease (27).

There are only few studies available in Malaysia which report the prevalence of osteoarthritis knee and back pain as the main rheumatic complaint in Malaysia (28). More than half of the patients had radiological evidence of osteoarthritis (28). Knee osteoarthritis remain the main type of osteoarthritis among Malaysian population with the incidence climb up in elderly aged more than 65 years old (28). There is no study done measuring socioeconomic burden of osteoarthritis in Malaysia however we postulate that it may not differ from other country in Asia as described before.

2.1.3 Assessment and grading

Until now, there is no standardized method measuring disease severity in knee osteoarthritis patient. Measuring disease severity may help in managing osteoarthritis objectively. There are several methods found in measuring osteoarthritis severity.

There was a method describe by Koshino et al. in their study which use radiographic modalities in determining severity of osteoarthritis. The study was done among 31 patients comparing femoral and tibial condylar in the medial compartment of knee. The smaller the ratio indicate the severe the disease (29).

Another method was developed by Ross et al., when they develop a “Knee injury and osteoarthritis outcome score (KOOS)”. It is a 42-item questionnaire measuring a severity in osteoarthritis. This questionnaire was originally developed to access short and long term patient outcome following knee injury. The questionnaire is patient administered answer which include five domains. The domains include pain, symptoms, activity of daily living (ADL) function, sport and recreation function, and quality of life. The answering method is using a Likert scale with five possible answer options. The lower score reflecting the extreme knee problem while the other end reflecting no knee problem (30).

Grading system for knee osteoarthritis has been long established by J.H Kellgren and J.S Lawrence since 1957. The grade was describe based on anterior-posterior view of knee x-ray. The grading were as follows (31) :

a. Grade 0: No narrowing of knee joint
b. Grade 1: Doubtful narrowing of knee joint space or possible osteophyte
c. Grade 2: Presence of osteophyte and possible knee joint space narrowing
d. Grade 3: Multiple osteophytes, definite knee joint space narrowing and subchondral sclerosis with possible bony deformity

e. Grade 4 : Large osteophyte, marked joint space narrowing, severe sclerosis and definite bony deformity (31).

2.1.4 Impact and burden of knee osteoarthritis

Most of patient with knee osteoarthritis are diagnosed, assessed and managed in the primary care setting (18). Although osteoarthritis is a disease of the joint, impact of the disease may place a considerable burden on the patient, family and community at large.

An affected patient and family with osteoarthritis may face a significant financial burden. A study done by Bitton et al. among Canadian people is a good example to demonstrate disease burden. The study was done to determine the cost involve in managing knee and hip osteoarthritis. The result shows that older patients must spend more money in managing their disease. The medical cost for osteoarthritis patients found to be two times higher than non-osteoarthritis patient and surprisingly; despite high cost, a joint replacement surgery including total knee replacement and total hip replacement is found to be extremely cost effective treatment intervention (25).

With increasing risk of disability in knee osteoarthritis patient (24), it may warrant family support. A family member must sacrifice other commitment such as work, their own family, friends and others. A responsibility to take care of the elder must be placed as the top priority among other commitment. Other than

supporting financially, a social support to osteoarthritis patient may jeopardize their own work and family.

2.1.5 Goal of treatment

The goals of treatment in knee osteoarthritis include pain relief, delay progression of osteoarthritis and improvement in mobility, walking as well as the quality of life. Although there is no known cure for knee osteoarthritis, current treatment aimed at educating the patient, temperature modalities, weight loss, exercise, physical therapy, occupational therapy and quadriceps muscle strengthening can improve joint mobility and limit functional impairment. Intra-articular pharmacologic therapy includes corticosteroid injection and visco-supplementation may provide pain relief and anti-inflammatory effect on the affected joint. When these modalities fail to limit pain and disability which further disrupts the patient's life, joint surgery is an option (32). Primary prevention is an important strategy by altering the risk factor for knee osteoarthritis such as adjustment to ideal body weight and so on (32).

2.2 Quality of life

2.2.1 Definition

Traditionally, an objective assessment to determine the severity of the disease are based on the medical outcome alone however nowadays trend has changed since patient's perspective has been taken into consideration. Therefore, a measurement of quality of life in a patient experiencing certain

disease is measured and a lot of questionnaires were developed to make it an objective assessment.

There are many terms used other than the quality of life such as health-related quality of life and health status. The quality of life is not only focusing on health status alone but also looks on another perspective such as environment and others. The quality of life is believed to reflex the effect of the disease to the patient, therefore it would be the best tool in measuring disease severity (33).

Health-related quality of life is a broad and multi-dimension concept that has been used since 1980's. It is defined as subjective perception impact of the health status on physical, psychological and social functioning well-being (33). It has become an important component of health surveillance and is generally considered as a valid indicator of the need of service and the outcome of the intervention.

2.2.2 Quality of life in knee osteoarthritis

Mentioning the aim in managing knee osteoarthritis has been described by Michael et al., one of the aims is improving the quality of life (32). The quality of life is now accepted as the indicator to monitor response to treatment particularly in a patient requiring joint arthroplasty (34-37). With the availability of method or tools in measuring the quality of life particularly in knee osteoarthritis patient, this measurement can be an objective assessment of the quality of life to determine the severity and the impact of the disease on the patient.

2.2.3 The importance of measuring quality of life

Other than the reason to monitor disease activity, this quality of life also can be used to measure objectively regarding the impact of the disease on a person or community. This indicator act as a measurable index that can be used in the different study in detecting as well as measuring the impact of disease on a person (38). Usage of this indicator will make the clinician across the globe communicate with the same language when talking about the impact of the disease on a person.

Measuring quality of life also helps the clinicians' better understanding the disease towards a different group of patients. The same disease with the same stage may have a different impact towards a different type of patient. For example, a person with the same disease will be able to function as usual while another person with the same disease and stage will act differently in term of functional status (33).

2.2.4 Assessment quality of life in knee osteoarthritis

Until now, there are many ways in measuring quality of life particularly in knee osteoarthritis patient. Most methods in measuring quality of life are use patient administered questionnaires and among the popular and most widely used are the "Western Ontario and McMaster Universities Arthritis Index (WOMAC)", "Short Form 36 Health Survey (SF-36)", "Knee Injury and

Osteoarthritis Outcome Score (KOOS)" and the most recent one that was used in this study is "Osteoarthritis Knee and Hip Quality of Life (OAKHQOL)".

Generally, all these questionnaires can be divided into generic quality of life tools and disease-specific (knee osteoarthritis) quality of life tools. The generic quality of life tools includes SF-36 and HRQOL questionnaire while the disease-specific (Knee osteoarthritis) tools were include WOMAC, KOOS and OAKHQOL. Generic quality of life tool is commonly used to compare outcome in different type of intervention or population as well as to measure cost effectiveness of certain intervention. On the other hand, disease specific quality of life tool is able to detect any small changes in quality of life which might be important to both practitioner and patient (39).

Each of this questionnaire has an advantage and disadvantage. There were only limited study comparing head to head between questionnaires. The advantage of a generic quality of life score is it can discriminate the focus group of patients from the control in a certain study and it also have a certain area or domain which is not assessed in the other questionnaires. As for disadvantage, it however fails to recognize slight changes that happen after treatment or intervention (40-43). Disease specific quality of life questionnaire has the advantage of able to recognize even the slightest changes and it does cover and measure other area and domain in generic quality of life tools. It might not be a suitable tool in measuring quality of life in wide group of patients as it can't discriminate a focus group of patients from control (34-37).

Among all questionnaires listed, WOMAC is the oldest questionnaire developed and had undergone several revision and modification. It was developed in 1982 at Western Ontario and McMaster Universities. It has been used to access many types of arthritis which including back pain, rheumatoid arthritis, osteoarthritis, systemic lupus erythematous and fibromyalgia. It is a 24-items questionnaire which access three main domains in it including pain, stiffness and limitation of function. It has been used in almost 1500 published study until June 2012. WOMAC is available in almost 64 languages around the globe and there is also telephone and online survey available. The pain domain is found to have good reliability however the assessment of stiffness has been showed to have low test-retest reliability (44-48).

Another well-known questionnaire used is SF-36. The latest version is a second version which develops around 1990's. From its acronym, it consists of 36- items questions which cover eight sections including vitality, physical functioning, bodily pain, general health perception, physical role perception, emotional role perception, social role functioning and mental health. From the section covered, this questionnaire is a universal questionnaire that can be used in most of the disease other than osteoarthritis. It is documented that almost 4000 publications were using SF-36 for over 200 different diseases. It is used in researching cost effectiveness of a treatment and monitoring disease burden. There is limitation of this questionnaire since this questionnaire have low response rate in population more than 65 years of age (48-50).

As describe before, there is another questionnaire which develop by Ross et al. known as “Knee Injury and Osteoarthritis Outcome Score” (KOOS). It is 42-items questionnaires which developed around 1990’s to be an instrument in accessing patient perception of their knee and associated problem. This KOOS is available in public domain unlike the other two tools describe before and it is free of charge. It claimed to have high test-retest reliability (30, 51). It can be used for knee injury patient as well as osteoarthritis patient which explain its name.

Osteoarthritis knee and hip quality of life (OAKHQOL) questionnaire

Now, there is new tool available in measuring quality of life among patient with knee and hip osteoarthritis. It was a list of questionnaires develops by Rat et al. which known as ‘Osteoarthritis Knee and Hip Quality of Life’ (OAKHQOL). This questionnaire first develops in 2005 and is available in 4 different language including France, English, Moroccan Arabs and the latest one, Malays. This is a new tool to measure quality of life in a patient with knee and hip osteoarthritis which consist of 5 domains and 3 independent items. Sum up 5 domains with 3 independent item, there are 43 items in this questionnaire. The domain includes physical activity, pain, mental health, social functioning and social support. The other 3 independent item which were rarely included in quality of life tools were sexual activity, relationship as well as professional life. The item is assessed on a 10 point Likert scale ranging from 0 = not at all to 10 = a great deal. With the satisfactory result for validity, reproducibility as well as sensitivity to change, it is extremely satisfactory to be used in patient with knee and hip osteoarthritis (17, 37, 52).

There are other questionnaires available measuring quality of life in knee osteoarthritis patient other described above. All the questionnaires above available in Malay version, however each of it have its own weakness. Despite having high prevalence of knee osteoarthritis among elderly Malaysian population of more than 65 years old, SF-36 have disadvantage since it has poor response rate in this type of population. Having a good reliability in both WOMAC and KOOS is not an advantage for these questionnaires since it is not specific for knee osteoarthritis for WOMAC and it is mainly for secondary knee osteoarthritis for KOOS. As for OAKHQOL, it is a specific questionnaire used in knee osteoarthritis which will be further explained in the next chapter. In addition to that, the adaptation and validation study was done among similar Kelantan population which expected to have same culture and background profile with our study population (53). Considering this factor as well as study population; therefore, OAKHQOL questionnaire was selected to be used in this study.

2.2.5 Quality of life and it associated factors

As been explained in the paragraph above, the same disease can affect differently in a different person; therefore, this is a time when these associated factors play the role. Assessment of associated factor will help clinician for better understanding of the disease not by biological aspect only but also by looking to another perspective which sometimes outside from a person with the disease itself. It will highlight how the same disease will affect differently in various type of patient.

Despite of its importance, there are only few studies done determining the associated factors involved in quality of life of patient with knee osteoarthritis. It is important detecting significant associated factors which may interact with quality of life of patient with knee osteoarthritis since clinicians may alter or manage associated factors to improve quality of life in these patients. There are several associated factors involved including age, gender, formal education status, marital status, comorbid condition, obesity, duration of knee pain, use of medication and joint arthroplasty. Many studies have been done proved an associated factor affecting the main domain in OAKHQOL; however, there were only limited or even no study reported to have association with some of the domain and independent item in OAKHQOL (5, 13, 17, 18, 20, 21, 30, 35, 54-56).

Age and Gender

As in most of other disease, age and gender remains significant associated factors affecting health related quality of life. There are a lot of studies mentions regarding association between age and gender with quality of life in knee osteoarthritis patient (18, 20, 21).

There is a study done by Dominick et al. among Pennsylvanian people which found that a respondent of more than 85 years old and male with arthritis have poorer quality of life. However, arthritis in this study consists of patient with osteoarthritis and rheumatoid arthritis. This study also found other significant

associated factors including married, low income and more co morbid illnesses (21).

In other part of the globe, a study was done in United States by Creamer et al. found a female gender and older age with knee osteoarthritis have poorer score for quality of life. Using WOMAC as a tool, this study also measured disability experienced by patient. In this study, they also reported that anxiety, BMI, disease duration and radiographic severity were contributor to disability in osteoarthritis patient (20).

Another recent study by Zakaria et al. which is done among population in Selangor have a similar correlation which noted that female gender and older age have poorer quality of life score. This study using SF-36 as a measurement tool and suggest that there should be a standardized tools in measuring quality of life in osteoarthritis patient and a family physician should focus more on female and older population in managing osteoarthritis (18).

Formal Education Status

There are only few studies mentions regarding relation of education status with quality of life in osteoarthritis patient. Creamer et al. reported that a cumulative formal education (years) have an inverse correlation with quality of life and disability in osteoarthritis patient (20).

In another study done in our region which focussed more on quality of life mentioning it was found that a higher education level was associated with lower

score for quality of life in certain domains, however on further analysis, the correlation was not significant after adjustment was made for confounding factors (18).

Marital status

A few studies mentioning marital status is a significant associated factor affecting certain domain in quality of life. Both a study by Kawano et al. and Dominick et al. mentioning that marital status are significant associated factor towards physical activity domain only and not mental health domain (21, 57). A study by Dailiana et al. however use a marital status as part of an indicator to determine social support in reporting quality of life among patient who had undergone knee arthroplasty (56).

Comorbid condition

A number of comorbid condition in relation to quality of life in knee osteoarthritis patient were studied in few studies (18, 21, 55). The result however only Dominick L et al. report consistent significant association with physical activity, mental health and pain domain in quality of life tools (21). A local study by Zakaria et al. did not find any association between any domain in quality of life (18).

Obesity

Obesity is a well-known risk factor for osteoarthritis (5, 18). It is also an associated factor that makes osteoarthritis become worse by affecting the quality

of life. This fact is proven by a few studies either locally or internationally (18, 20). Obesity cause loss of function or increase disability in patient with knee osteoarthritis (20). Quadriceps muscle weakness is proven responsible for this disability which has been reported by Slemenda et al. (58).

Duration and degree of knee osteoarthritis

Rosemann et al. found that duration of disease or knee pain were associated with change in physical activity as well as pain score in quality of life domains (54, 55). Creamer et al. and Zakaria et al. were both reported that the duration of illness have no association with any quality of life domain among knee osteoarthritis patient (18, 20).

Only Kawano et al. reported that the degree of knee osteoarthritis was significantly associated with physical activity domain. However, they found no significant association between other domains such as functional limitation, pain, general health status, vitality, social aspects, emotional aspects and mental health (57).

Use of medication

In determining the effect of glucosamine consumption among patients with knee osteoarthritis, Beaumont et al. has demonstrate the good effect of improvement in physical activity score in patient taking glucosamine arm (13). The result however contradicted with other study by Rosemann et al. which found

no significant correlation between glucosamine consumption and score in physical activity and pain domain in quality of life (55).

Joint Arthroplasty

There is only limited study considered patient who has undergone joint arthroplasty. Oliver et al. have conducted a systematic review comparing a quality of life in patient with osteoarthritis before and after undergone arthroplasty procedure. He found that, there is a greater improvement in quality of life after the procedure. In this review, they also mention that age is not an obstacle to an effective surgery. This finding may alter the traditional management of osteoarthritis in deciding early intervention of joint arthroplasty (59).

2.3 Conceptual framework

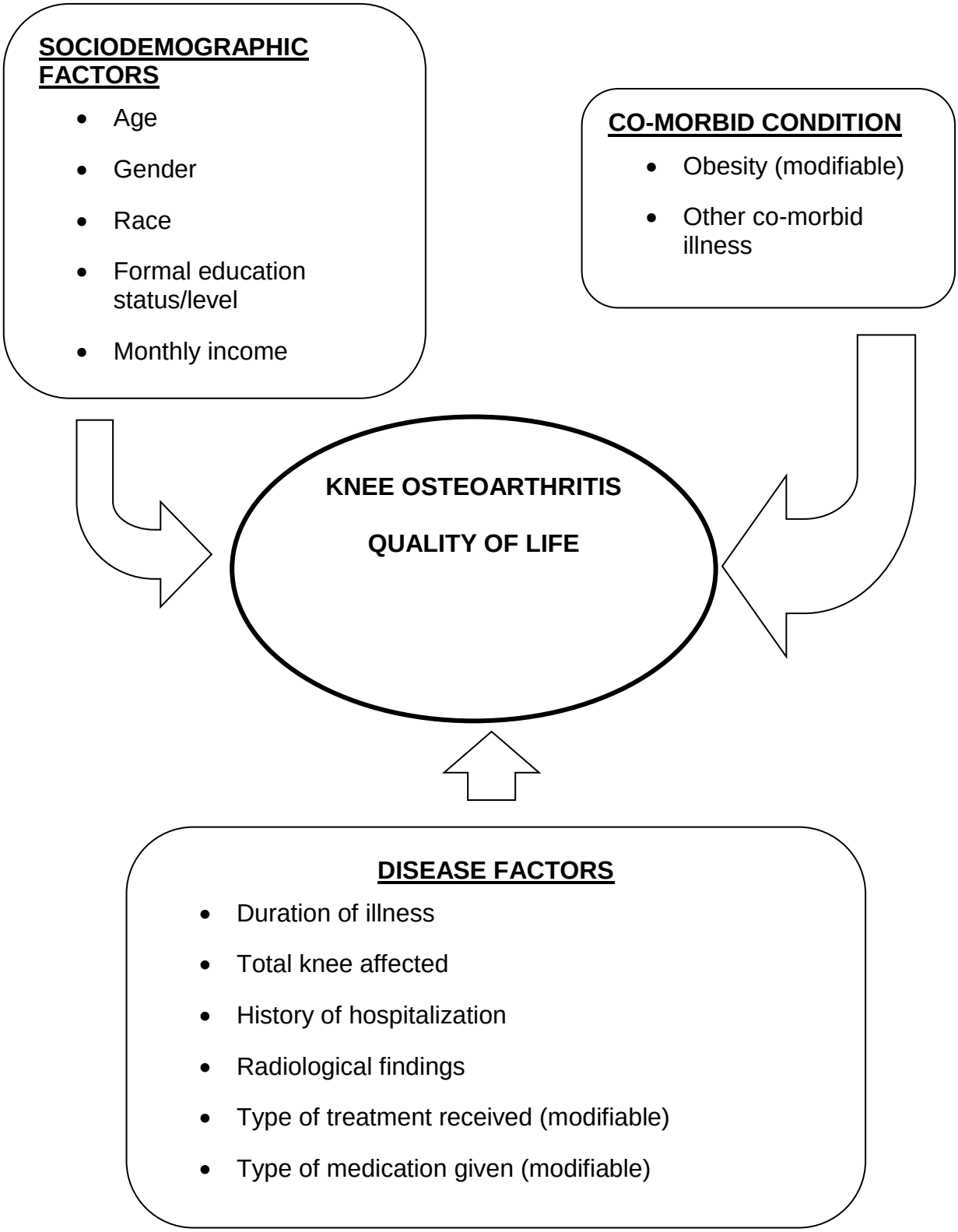

Figure 2.1 : Conceptual framework of the study

2.4 Objectives

2.4.1 General Objective

To determine the quality of life and its associated factors among knee osteoarthritis patients.

2.4.2 Specific objectives

1. To determine the quality of life of patient with knee osteoarthritis using OAKHQOL questionnaire.
2. To determine the associated factors affecting the quality of life in knee osteoarthritis patient which involve sociodemographic factor (Age, gender, race, formal education status and monthly income), comorbid condition (Obesity, diabetes and hypertension) and disease factors (Duration of illness, total knee affected, radiological findings or grading, type of treatment and medication received).

2.4.3 Research hypothesis

Sociodemographic factor, comorbid condition and disease factors are significant associated factors affecting quality of life among knee osteoarthritis patients.