# An Overview about the impact of Primary knee and Hip Osteoarthritis on Work Status and Quality of Life.

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**Abstract**

**Background:** OA is one of the leading causes of chronic pain and mobility limitations and is the fastest-growing cause of disability worldwide and functional restrictions. The onset of OA starts at an age when people are still working and it has been shown that OA is strongly associated with reduced productivity and increased healthcare resource utilization among workforce participants. OA symptoms such as pain, disturbance of sleep and stiffness may impair occupational performance not only among those with physically demanding jobs but also in non-manual office workers. While the majority of studies investigated the association of OA and employment using cross-sectional data, few recent studies have examined the specific association of OA and work loss using longitudinal data . In a population-based cohort study, working age individuals with knee OA had almost twice the rate of (long-term) sick leave compared with the general population. While effective interventions for prevention of work loss due to disability have been recognized in diseases such as lower back pain and SLE , the association of OA and work loss is a relatively new research area and there is a paucity in the OA literature in terms of work loss prevention programmes . Identifying which groups are at high risk of work loss due to OA is an important first step in developing such programmes. Questions about pain's interference with function and workplace support could be used to identify OA patients at risk of work loss. Most patients with OA are assessed and treated within primary care settings, but there seems to be a discrepancy between how doctors and patient define the importance of an illness. As OA and other rheumatic conditions seldom cause death, but have a major impact on health, health-related quality of life measures are better indicators of their impact than related mortality rates.

**Keywords:** Work Disability, Quality of Life, knee and Hip Osteoarthritis

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## Introduction

Osteoarthritis is the most common type of joint disease, affecting more than 30 million individuals in the United States alone . It represents a heterogeneous group of conditions resulting in common histopathologic and radiologic changes. It has been thought of as a degenerative disorder arising from biochemical breakdown of articular (hyaline) cartilage in the synovial joints. However, the current view holds that osteoarthritis involves not only the articular cartilage but also the entire joint organ, including the subchondral bone and synovium. Osteoarthritis predominantly involves the weight-bearing joints, including the knees, hips, cervical and lumbosacral spine, and feet. Other commonly affected joints include the distal interphalangeal (DIP), proximal interphalangeal (PIP), and carpometacarpal (CMC) joints.. **(1).**

Although osteoarthritis was previously thought to be caused largely by excessive wear and tear, increasing evidence points to the contributions of abnormal mechanics and inflammation. In addition, some invasive procedures (eg, arthroscopic meniscectomy) can result in rapid progression to osteoarthritis in the knee joint. Therefore, the term degenerative joint disease is no longer appropriate in referring to osteoarthritis. **(1).**

Historically, osteoarthritis has been divided into primary and secondary forms, though this division is somewhat artificial. Secondary osteoarthritis is conceptually easier to understand: It refers to disease of the synovial joints that results from some predisposing condition that has adversely altered the joint tissues (eg, trauma to articular cartilage or subchondral bone). Secondary osteoarthritis can occur in relatively younger individuals . The definition of primary osteoarthritis is more nebulous. Although this form of osteoarthritis is related to the aging process and typically occurs in older individuals, it is, in the broadest sense of the term, an idiopathic phenomenon, occurring in previously intact joints and having no apparent initiating factor. Some clinicians limit the term primary osteoarthritis to the joints of the hands (specifically, the DIP and PIP joints and the joints at the base of the thumb). Others include the knees, hips, and spine (apophyseal articulations) as well. **(2).**

As underlying causes of osteoarthritis are discovered, the term primary, or idiopathic, osteoarthritis may become obsolete. For instance, many investigators believe that most cases of primary osteoarthritis of the hip may, in fact, be due to subtle or even unrecognizable congenital or developmental defects. No specific laboratory abnormalities are associated with osteoarthritis. Rather, it is typically diagnosed on the basis of clinical findings, with or without radiographic studies . **(3).**

The high prevalence of osteoarthritis entails significant costs to society. Direct costs include clinician visits, medications, therapeutic modalities, and surgical intervention. Indirect costs include time lost from work. Costs associated with osteoarthritis can be particularly significant for elderly persons, who face potential loss of social interactions and independence, leading to a need for help with activities of daily living. As populations of developed nations age over the coming decades, the need for better understanding of osteoarthritis and for improved therapeutic alternatives will continue to grow. **(4).**

Osteoarthritis is typically diagnosed on the basis of clinical and radiographic evidence. No specific laboratory abnormalities are associated with osteoarthritis. Researchers have investigated the use of monoclonal antibodies, synovial fluid markers, and urinary pyridinium cross-links (ie, breakdown products of cartilage) as osteoarthritic indicators. No single biomarker has proved reliable for diagnosis and monitoring, but combinations of cartilage-derived and bone-derived biomarkers have been used to identify osteoarthritis subtypes, with possible impact on treatment. Levels of acute-phase reactants are typically within the reference range in patients with osteoarthritis. The erythrocyte sedimentation rate (ESR) is not usually elevated, though it may be slightly so in cases of erosive inflammatory arthritis. The synovial fluid analysis usually shows a white blood cell (WBC) count below 2000/µL, with a mononuclear predominance. **(5).**

**Work Disability and Quality of Life assessment**

**A. work disability.**

Work disability occurs when a person's abilities become limited by a health condition, preventing them from meeting the requirements of their job, and resulting in costly short or long term unemployment . The costs for the worker can include financial hardship, pain, and limitations in what they are able to do , which can impact their family as well. For the employer, the disability can cause costs related to disability pensions, productivity rates, training replacement workers and administrative expenses to rise . For society, work disability costs from the World Bank and the World Health Organization have been reported to have exceeded one trillion dollars (US) . These costs, in addition to beliefs about the connection between work and health, have fueled a push towards more effective management of work disability. (**6**).

Because work roles have a central part in the lives of most adults in industrialized nations, and function as the engine of the national economy, work disability is an important public health and social policy issue . However, reducing OA related work disability in the population will depend in part on improving the measurement technologies we have available for assessing patient outcomes. OA studies have assessed work disability using indicators such as employment status and number of work absences . These indicators provide important information about the work

impact of OA. Several available health status questionnaires measure a related concept, social role disability . Social role disability scales usually are comprised of a small set of global, "generic" role level indicators, which enable the user to measure disability in both paid and unpaid work roles. The items, however, produce relatively coarse scores, which may not detect clinically and/or socially important variations in disability levels. Additionally, scale items capture few specifics about the types of disabilities patients are experiencing on the job, although more descriptive information could help to better manage the disease and reduce its impact. **(6).**

A scoping review of existing productivity loss measurement instruments reported in various systematic reviews identified a total of 24 instruments. The most commonly reported were the Work Limitations Questionnaire (WLQ), the Health and Work Performance Questionnaire (HPQ), the Work Productivity and Activity Impairment (WPAI) Questionnaire, the Health and Labour Questionnaire (HLQ), and the Health and Work Questionnaire (HWQ). These instruments differ in the ways that presenteeism is measured and valued. Inevitably, this will have an impact on comparability between studies that use different instruments **(7).**

In an analysis of four measures of presenteeism (the Health and Labor Questionnaire [HLQ]; the Work Limitations Questionnaire [WLQ]; the World Health Organization's Health and Work Performance Questionnaire [HPQ]; and the Work Productivity and Activity Impairment Questionnaire [WPAI]), **Zhang et al.** observed a significant association between pain and the risk of presenteeism, but only weak associations between pain severity and hours lost **(8).**

Work productivity was assessed using the Work Productivity and Activity Impairment (WPAI) questionnaire . The WPAI is a self-reported questionnaire consisting of four subscales that evaluate absenteeism, presenteeism, overall work impairment, and activity impairment during the previous seven days, generated in the form of percentages, with higher values indicating greater impairment **(9).**

The construct validity of a quantitative work productivity and activity impairment (WPAI) measure of health outcomes was tested for use in clinical trials, along with its reproducibility when administered by 2 different methods. 106 employed individuals affected by a health problem were randomised to receive either 2 self-administered questionnaires (self administration) or one self-administered questionnaire followed by a telephone interview (interviewer administration). Construct validity of the WPAI measures of time missed from work, impairment of work and regular activities due to overall health and symptoms, were assessed relative to measures of general health perceptions, role (physical), role (emotional), pain, symptom severity and global measures of work and interference with regular activity. Data generated by interviewer-administration of the WPAI had higher construct validity and fewer omissions than that obtained by self-administration of the instrument. All measures of work productivity and activity impairment were positively correlated with measures which had proven construct validity Overall work productivity (health and symptom) was significantly related to general health perceptions and the global measures of interference with regular activity **(9).**

The WPAI outcomes are expressed as impairment percentages, with higher numbers indicating greater impairment and less productivity, i.e. worse outcomes,as follows :

Questions:

1=Currently employed

2=Hours missed due to health problems

3=Hours missed other reasons

4=Hours actually worked

5=Degree health affected productivity while working

6=Degree health affected regular activities

Score:

Multiply score by 100 to express in percentages. Percent overall work impairment due to health:

$Q2/(Q2 + Q4) + ((1 - (Q2/(Q2 + Q4)) \times (Q5/10))$ **(8).**

Two functional status assessment instruments widely used in clinical and observational trials for assessing physical function are the disease-specific Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and the more generic Health Assessment Questionnaire (HAQ) . Both are patient-centered, self-assessment tools that measure

multiple dimensions of health status and take 5–10 minutes to complete. The WOMAC is designed specifically for patients with osteoarthritis of the knee and/or hip joints and evaluates 3 dimensions: physical function, pain, and stiffness . The HAQ, although initially developed and validated in patients with rheumatoid arthritis , has been broadly and extensively used and validated in widely diverse populations, including patients with OA **(8).**

Among the several disease specific instruments used to assess functional impairment in OA, the Western Ontario and McMaster Universities osteoarthritis index (WOMAC) function sub- scale is the most widely used in clinical trials **(8).**

The WOMAC is a self-administered, disease-specific questionnaire used to assess patients with OA of the hip and/or knee. It consists of 24 separate questions distributed among three subscales. the pain subscale includes 5 questions, the stiffness subscale includes 2 questions, and the physical function subscale includes 17 questions, all of which can be completed and scored within 5 minutes. The Likert-scaled version allows patients to respond using 5-point scales (0, 1, 2, 3, 4) . higher scores on the WOMAC indicate greater pain and stiffness and greater difficulty in performing selected functional activities.**(2).**

**B .Quality of Life Questionnaires**

Osteoarthritis (OA) of the knee and hip are the most prevalent musculoskeletal complaints worldwide, affecting 7.5–40% of the population by the age of 65 years . They are a major cause of pain and disability among the elderly and pose a significant economic burden on the community . Individuals with knee or hip OA suffer progressive loss of function, displaying increasing dependency in walking, stair climbing and other lower extremity tasks , and risk of cardiovascular comorbidity . The goal of contemporary management of knee and/ or hip OA is, therefore, control of pain and improvement in function and health-related quality of life (HRQL).It is necessary to identify valid and acceptable outcome measures in order to correctly evaluate the effectiveness of the therapy in OA **(10).**

The concept of quality of life broadly encompasses how an individual measures the 'goodness' of multiple aspects of their life. These evaluations include one's emotional reactions to life occurrences, disposition, sense of life fulfilment and satisfaction, and satisfaction with work and personal relationships **(10).**

Quality of life has been defined as "an overall general well-being that comprises objective descriptors and subjective evaluations of physical, material, social, and emotional well-being together with the extent of personal development and purposeful activity, all weighted by a personal set of values"**(11)**

At the current time, there are in excess of 1000 instruments designed specifically for the measurement of quality life. Some of these are generic, for use in the general population and can be applied to a number of conditions, others are disease specific, pertaining to a particular pathology **(11).**

Since osteoarthritis is a chronic and age-dependent disease, comorbidities are not rare. There may be many confounding factors contributing to the QoL, when the whole body is evaluated with a non-specific HRQoL instrument. Additionally, treatment modalities and approach should be different among the body sites of involvement. Thus, a site and disease specific QoL instrument can provide a more reliable approach. Moreover, there is a lack of an evaluation system concerning the social support dimension, which is a crucial component of HRQoL instruments. As a result, a comprehensive, disease specific, and site specific instrument may improve the ability to clinically characterize HRQoL in patients with knee and/or hip osteoarthritis. It may provide a high capacity to assess changes of HRQoL over time in these patients. **(10).**

Arguably the most important and frequently used generic HRQoL assessment is the 36-Item Short Form Health Survey (SF-36) . This multi-purpose, short-form health survey is comprised of 36 questions which provide an 8-scale profile of functional health and well-being scores (physical function, role function, bodily pain, general health, vitality, social functioning, emotional well-being and mental health) as well as composite physical and mental health summary measures **(12).**

For each subject and for each of the eight dimensions of the SF-36 we obtained a score upon applying a measurement scale with values from zero (which corresponds to the worst health status) to 100 (best health status).13 SF-36 was applied in the form of a structured interview, the questions were read by the interviewer seeking maximum exemption in obtaining the answers **(12).**

QoL in OA patients was assessed also using the OAKHQOL questionnaire, which includes 43 items in five domains: physical activities (16 items), mental health (13 items), pain (4 items), social support (4 items), social functioning (3 items), and three independent items. Each item is scored on a scale from 0 to 10. The OAKHQOL questionnaire assessment is by the Likert response scales. The items range from 0 (worst) to 10 (best). In each domain, the mean score of the items is calculated, yielding a score for each domain. The score is then standardized on a scale from 0 (worst quality of life) to 100 (best quality of life) **(12).**

The 20-item Mini-Osteoarthritis Knee and Hip Quality of Life (Mini-OAKHQoL) scale was derived from the original OAKHQoL questionnaire, which was developed to assess HRQoL in patients with knee and/or hip osteoarthritis. Its good psychometric properties have recently been shown and validation studies have been done in several populations. It is a short form and offers decreased patientrefilling time and data-entry time **(12).**

The mini-OAKHQOL contains 20 items in five dimensions: pain, physical activity, mental health, social support, and social functioning, as well as three independent items dealing with sex life, work life, and fear of being dependent. It uses a numerical rating scale from 0 to 10 to score items and the mean item score for dimensions **(12).**

The Mini-OAKHQOL, has been developed and this has shown to have strong properties of validity and reproducibility . Shorter versions of questionnaires would decrease the time it takes to fill in them. This could make the questionnaire more suitable to measure HRQoL several times in longitudinal stud ies. A reduced version minimizes the burden of patient **(13).**

Translation-back translation methodology was applied and cross-cultural adaptation of the Mini-OAKHQOL into Turkish was done. Face and content validities were evaluated by cognitive information interviews with patients and expert committee **(13).**

**Work Disability and Quality of Life among Working Patients with Primary knee and Hip Osteoarthritis**

OA is one of the leading causes of chronic pain and mobility limitations and is the fastest-growing cause of disability worldwide and functional restrictions. The onset of OA starts at an age when people are still working and it has been shown that OA is strongly associated with reduced productivity and increased healthcare resource utilization among workforce participants. OA symptoms such as pain, disturbance of sleep and stiffness may impair occupational performance not only among those with physically demanding jobs but also in non-manual office workers. **(14).**

In addition to the structural and functional limitations caused by OA, pain and disability from OA also affect social connectedness, relationships and emotional well-being; subsequently, reducing quality of life . The goal of treatment has traditionally focused on reducing pain and improving function, yet healthcare providers are increasingly realizing the importance of ensuring implementation of psychosocial support to improve the health and overall wellbeing of OA patients. Assessing QoL is an imperative first step in evaluating wellbeing, disease progression and intervention efficacy **(15).**

While the effect of OA on productivity loss at work and short-term sick leave has been established, the association between OA and work loss is not as clear. Work loss due to illness or disability can be manifested as long-term sick leave leading to unemployment . Those OA patients who become unemployed may find new jobs, or it can eventually lead them to move out of the workforce. **Harris and Coggon** described several studies that reported work loss among end-stage hip OA patients. In addition, among 688 OA patients who were selected from the administrative data registry in British Columbia, Canada, 32% had ceased employment due to OA. There is wide variation among current estimates of the effect of OA on work loss, as the majority of previous studies lacked appropriate non-OA controls or did not control for potential confounding factors . **(16**).

While the majority of studies investigated the association of OA and employment using cross-sectional data, few recent studies have examined the specific association of OA and work loss using longitudinal data . In a population-based cohort study, working age individuals with knee OA had almost twice the rate of (long-term) sick leave compared with the general population **(16).**

In another cohort study, **Wilkie *et al***. indicated a significant difference among those who were off work due to sickness**(17).**

However, none of these studies established OA as an independent risk factor for work loss, and it is not clear if the higher rates between OA and non-OA individuals are due to the differences in sociodemographic, health status or other possible confounders. **(18).**

Using the last six cycles of The Canadian National Population Health Survey (NPHS) from 2000 to 2010, we performed a population-based cohort analysis to estimate the Hazard ratios (HR) of work loss due to illness or disability among initially employed OA cases and non-OA individuals. According to our results, for each 2 years of follow-up, OA cases had a 90% higher HR [1.9 (95% CI 1.36, 3.23)] of work loss due to illness or disability compared with age- and sex-matched non-OA individuals after adjusting for other covariates. **(19).**

In a 2011 systematic review, OA could not be proven to be a strong reason for leaving the workforce through sick leave, as the majority of examined studies were cross-sectional and did not use appropriate controls. However, recent studies using longitudinal cohort settings have investigated the effect of OA on work loss, including disability pensioning, long-term sick leave and work loss in general, and reported a strong association between OA and work loss **(20).**

While effective interventions for prevention of work loss due to disability have been recognized in diseases such as lower back pain and SLE , the association of OA and work loss is a relatively new research area and there is a paucity in the OA literature in terms of work loss prevention programmes . Identifying which groups are at high risk of work loss due to OA is an important first step in developing such programmes. Questions about pain's interference with function and workplace support could be used to identify OA patients at risk of work loss. **(21).**

Osteoarthritis (OA) is a degenerative joint disorder and the most common form of arthritis in adults. It is characterized by pain and functional impairment, which may lead to disability, including work restriction . In many western countries the population is ageing due to increasing longevity and falling birth rates. Portugal, for instance, is amongst the oldest countries in the world, and has one of the highest old-age dependency ratios, further aggravated by the fact that currently unemployment and overall premature work withdrawal are still high. Numerous factors, including health-related problems, may contribute to the high rate of exit from the workforce that persists at a global level . In fact, several studies have already shown that ill-health is a risk factor for early exit from work, including retirement and unemployment . A deeper understanding of these factors is crucial to support policies for increasing productivity and postponing exit from work. **(22).**

As expected , OA patients are mostly ageing females when compared with the non-OA population. They have lower levels of education, lower household income, poorer self-reported quality of life, and a higher number of comorbidities. These characteristics may themselves influence labour force participation. In fact, we observed an association between premature work loss and lower levels of education, marital status (married or widowed), neurological diseases, and lower household income. Nevertheless, the association we found between clinically confirmed OA and premature work withdrawal is robust and independent of other influencing factors, which is consistent with previously published data . **(23).**

Health-related quality of life is increasingly being acknowledged as a valid health indicator in many diseases. It encompasses emotional, physical, social, and subjective feelings of well-being that reflect an individual's subjective evaluation and reaction to his/her illness **(24).**

Most patients with OA are assessed and treated within primary care settings, but there seems to be a discrepancy between how doctors and patient define the importance of an illness. As OA and other rheumatic conditions seldom cause death, but have a major impact on health, health-related quality of life measures are better indicators of their impact than related mortality rates **(25).**

Conclusions

In the primary care setting, patients with knee or hip OA have similar, high disability levels and substantially low HRQoL. Patients' disability could play a central role in GPs' opinion of the need for their patients with either type of OA to undergo prosthetic replacement.

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