Living with Knee Osteoarthritis and its Influence on Daily Life in Middle Aged Individuals

The Knee Project; a Sub Study

Johanna Kronholm

Examensarbete i biomedicin inriktning fysisk träning
The Knee Project; a Sub Study

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Abstract

**Background:** Osteoarthritis (OA) is a long-term chronic joint disease which afflicts and wear down the cartilage in joints, and creating stiffness, pain, and impaired movement. This study will focus on Symptomatic Knee Osteoarthritis. There is no cure for OA, only ways to create a better present condition for the affected. Therefore, there is a big need to grow a bigger understanding and knowledge of the disease, to improve risk factors and provide it to increase among the population. **Aim:** The aim of this study is to investigate if muscle strength and knee pain related symptoms associate with the psychological well-being in middle aged individuals with symptomatic knee osteoarthritis. **Methods:** The study included 13 participants, which blood pressure and hand grip strength were measured at one occasion. Knee related problems were measured with the questionnaire KOOS, and anxiety and depression were measured with the questionnaire HAD. **Results:** This study showed a significant difference between those who indicated in a better and a worse QOL. Those who did indicate in a worse QOL also showed a higher result of the variables of KOOS; pain, symptoms and sport/rec. **Conclusion:** Knee pain related symptoms associate and affect the psychological well-being and the quality of life in a negative way. Individuals who experience a worse quality of life also tend to experience a high level of pain, a high level of knee pain related symptoms and lower ability to perform sports and recreation.

**Keywords:** Osteoarthritis, Hospital Anxiety and Depression Scale (HAD), Knee Injury and Osteoarthritic Outcome Score (KOOS), quality of life, psychological well-being
Abstrakt

**Bakgrund:** Artros (OA) är en långsiktig kronisk sjukdom som påverkar och sliter på brosket i leder, vilket orsakar stelhet, smärta och nedsatt rörlighet. Den här studien kommer fokusera på *symtomatisk knäartros*. Det finns inget botemedel mot OA, bara tillvägagångssätt att skapa en bättre livssituation för den drabbade, vilket är den främsta anledningen till varför det behövs göras mer forskning kring området. Att öka förståelse och kunskaper kring sjukdomen kan vara nödvändigt för att minska riskfaktorer och minska ökningen hos populationen. **Syfte:** Syftet med studien är att studera om muskelstyrka och knärelaterade symtom associerar med det psykologiska välmåendet hos individer i medelåldern med symtomatisk knäartros. **Metod:** Studien inkluderade 13 testpersoner vars blodtryck och handstyrka testades vid ett tillfälle. Knärelaterade problem mättes genom frågeformuläret KOOS och oro/ängest och depression mättes med frågeformuläret HAD. **Resultat:** Studien visade en signifikant skillnad mellan de som upplevde en bättre och sämre QOL. De som indikerade i att de upplevde en värre QOL uppgav också ett högre resultat av KOOS variabler; smärta, symtom och sport/rec. **Slutsats:** Knärelaterade symtom associerar med och påverkar det psykologiska välmåendet och livskvalitén på ett negativt sätt. individer som upplever en värre QOL tenderar även till att uppleva mer smärta, knärelaterade symtom och en mindre förmåga att utföra sporter och aktiviteter.

**Nyckelord:** Artros, Hospital Anxiety and Depression Scale (HAD), Knee Injury and Osteoarthritis Outcome Score (KOOS), livskvalité, psykologiskt välmående
## Abbreviation list

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADL</td>
<td>Function in Daily Living</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
</tr>
<tr>
<td>HAD</td>
<td>Hospital Anxiety and Depression Scale</td>
</tr>
<tr>
<td>KOOS</td>
<td>Knee Injury and Osteoarthritis Outcome Score</td>
</tr>
<tr>
<td>OA</td>
<td>Osteoarthritis</td>
</tr>
<tr>
<td>QOL</td>
<td>Quality of Life</td>
</tr>
<tr>
<td>Sport/Rec</td>
<td>Sports and Recreation</td>
</tr>
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</table>
1. Background

1.1. Osteoarthritis

Osteoarthritis (OA) is a long-term chronic joint disease which affects and wear down the cartilage in joints, and creating stiffness, pain, and impaired movement (Petersson & Jacobsson, 2002). The definition of symptomatic OA is that the individual is experiencing knee pain related symptoms and the main reason why the person seeks medical help (Matsuse, Hashida, Takano, Omoto; Nago, Bekki & Shiba, 2017). OA can appear in different degrees and body parts, such as knees, hands, feet, spine, shoulders, and hips, though it is most common in knees (Petersson & Jacobsson, 2002), which will be observed in this study. Symptoms of OA can be very similar to symptoms of rheumatic inflammation, and therefore is a blood test that can exclude rheumatic inflammation necessary (Bramlage et al., 2016).


OA is the single most common cause of disability in older adults and it is estimated that 10% to 15% of all adults over 60 years have some sort of OA (Petersson & Jacobsson, 2002). OA is increasing among the population. Ageing and factors as obesity and lack of activity is the most common factors. Also, it mostly afflicts older women. It has been estimated that by the year of 2050 that 20% of the world’s population will suffer from OA, which would be 130 million people (World Health Organization, 2013).

One well-used and valid method to measure the affected individuals own opinions about OA is to use the questionnaire KOOS (Knee Injury and Osteoarthritis Outcome Score). KOOS includes questions referred to pain and other symptoms, activities of daily living, sport and
recreation function and knee related quality of life and is simple, global accessible and translated into more than 45 languages (Collins, Prinsen, Christensen, Bartels, Terwee & Roos, 2016).

Since OA is a progressive disease and there is no cure there is a big need to develop a bigger understanding to reduce risk factors. Though there is no cure, there are strategies and treatments that could reduce the risk factors; as physical activity, weight management, stretching, pain and anti-inflammatory medications, physical and occupational therapy, assistive devices, surgery and positive attitude.

1.2. Physical Activity and Obesity
One protective factor that could reduce the risk of OA is exercise (Hunter & Ecksten, 2009). Exercises that involves range of motion, aerobic and strength training improve and maintain the ability to move and function (Arthritis Foundation, n.d). Lack of physical activity has previously been related to OA in several studies (Hunter et al., 2009; Lo, McAlindon, Hawker, Driban, Price; Song, Eaton, Hochberg, Jackson, Kwoh, Nevitt & Dunlop, 2015; Liu, Waring, Eaton & Lapane, 2015). According to World Health Organization (2010) the criteria for physical activity among adults between 18 to 64 years is 150 minutes of moderate-intensity physical activity or 75 minutes of vigorous-intensity physical activity throughout the week.

It has been shown that obesity increases the risk of OA because of the weight that adds additional stress to weight-bearing joints (Arthritis Foundation, n.d; Liu et al., 2015). Metabolic syndrome, which prevalence rises with increasing body mass index (BMI), obesity, high blood pressure and a bigger waist circumference, has also been associated with OA (Osher & Stern, 2009; Engström, de Verdier, Rollof, Nilsson & Lohmander, 2009). A high blood pressure is often caused by obesity and lack of exercise and can result in headache and tiredness (1177, 2017). A high blood pressure is valued at 140/90 mmHg (Mmillimeter of Mercury), which stands for systolic and diastolic blood pressure (1177, 2017).

For individuals with OA exercise would give a positive direct effect to the disease by keeping the joints healthier. It would also have an indirect effect because of its possibilities of weight loss that reduces joint loads, BMI, and blood pressure (Hunter & Ecksten, 2009).

1.3. Overall Body Strength and Handgrip Strength
Thigh muscle weakness, especially weakness of the quadriceps and hamstrings, is associated with knee OA (Peeler, Christian, Cooper, Leiter & MacDonald, 2015). The stiffness that is caused by OA in the joint leads to loss of the thigh muscle strength which for example can make
it difficult for the individual to walk, walk up and down stairs and squatting (Peeler et al., 2015). Resistance training that improves the thigh muscles is essential for OA afflicted individuals, because it improves the function of the knee and reducing knee pain (Alnadi, Zeni & Snyder-Mackler, 2012).

According to Foo (2007), handgrip can be comparable with overall muscular strength and could be a good alternative to test the muscular strength of an individual with OA (Koley, Kaur & Sandhu, 2009). In this study will the hand grip test be used to represent the participants overall strength.

1.4. Quality of Life and Psychological Well-Being

According to Snaith (2003) quality of life is a broad term without exact definition and it depends on many factors; support from friends and relatives, ability to work, interest in one’s occupations, accommodation and health and disabilities. Psychological well-being can be distinguished in three different aspects; evaluative well-being or life satisfaction, hedonic wellbeing like feelings of happiness, and eudemonic wellbeing which could be described as feeling sense of purpose and meaning of life (Steptoe, Deaton & Stone, 2015). In other words, both quality of life and psychological well-being are ambiguous terms that could be measured and studied in many ways.

OA causes stiffness, disability and pain which can be a complication for the individuals with knee osteoarthritis. Exercise can be very painful but it is also an important factor and the only non-pharmacological approach to moderate OA pain (Perrot, 2015). OA is a disease that appears in episodes and could cause difficulties in daily life, as in everyday work and/or as worse psychological well-being, because of pain and physical limitations (Wise, Niu, Shang, Wang, Jordan, Choy & Hunter, 2010).

To deal with pain every day could be frustrating and affect the psychological well-being in a negative way, and sometimes cause depression (Rosemann, Backenstrass, Joest, Rosemann, Szecsenyi and Laux, 2007; Sharma, Kudesia, Shi and Gandhi, 2016), which could create a vicious circle. It is hard to define what a positive attitude really is and could have a different meaning among individuals, but according to White et al. (2012) it may help to deal with the pain and help the affected individuals to maintain activated and motivated (Snaith, 2003). According to Acree et al. (2006), it has also been proven that physical activity is related to an improved quality of life in older adults, which is another reason exercise is important for individuals with OA.
One method to measure individuals grade of anxiety and depression is to use the questionnaire 
HAD (Hospital Anxiety and Depression Scale) (Stern, 2014). The questionnaire consists of 14 
questions based on anxiety and depression and is according to Snaith (2003) an useful 
instrument in areas of clinical practice and easy for the patients to understand. HAD has 
previously been used to measure well-being among individuals affected by OA (Askin, Özkan, 
Tosun, Demirdal & Isnac, 2017) and other diseases that causes pain (Turk, Dworkin, Trudeau, 
Benson, Biondi, Katz & Kim, 2015).

1.5. Rationale
OA is progressive disease without any cure and is a growing disease among the population. 
Therefore, there is a big need to grow a bigger comprehension and knowledge of the disease to 
improve risk factors. It is also important to study and develop a bigger understanding how the 
disease affects the individual’s everyday life and psychological well-being, to improve the 
treatments.

1.6. The Knee Project
The Knee Project is a cohort study which overall aim is to study the early development of OA. 
The study will include individuals who all have symptomatic OA, without signs of 
inflammatory rheumatic disease or knee trauma, who has been seeking medical care at primary 
health care in southern part of Halland, Sweden. The participants are aged up to 60 years, which 
has established to exclude age-related osteoarthritis. The participants will be followed over five 
years with structured follow-ups. The study began in autumn 2016 and the last follow-up is 
planned to take place in autumn 2021.

OA is often described as an age-related disease and is a normal consequence of a lifelong 
attrition of the joint cartilage (Shane Anderson & Loeser, 2010). Other factors that could affect 
the joints is joint injury, obesity, genetics and joint mechanics (Shane Anderson & Loeser, 
2010). Though, other than previously named factors, there is lack of evidence and known 
factors why it does afflict younger generations. The purpose of the knee project is to look at 
middle aged individuals who suffers from symptomatic OA (not age-related OA) and why it 
does occur.

1.7. Purpose and Research Question
The aim of this study is to investigate if muscle strength and knee pain related symptoms 
associate to psychological well-being in middle aged individuals with symptomatic knee 
osteoarthritis.
• How does muscle strength and knee related symptoms associate to psychological well-being in middle aged individuals with symptomatic knee osteoarthritis?

2. Methods

This is a sub study of the bigger the study The Knee Project, and included some of its clinical examinations and questionnaires. This study is a cohort study and included a total of 13 individuals who also participated in The Knee project.

2.1. Participants

The included participants voluntarily attended in this study. The recruitment was made through individuals who had sought medical care at primary health care for symptomatic knee pain, in southern part of Halland, Sweden, and sought to attend in the study through an advertisement in the local newspaper Hallandsposten.

This study did include 13 participants, five males and eight females, who all had symptomatic OA. The inclusion criteria were that they should not have any signs of knee trauma or inflammatory rheumatic disease, because it is an inflammatory disease in the joints and can have similar symptoms to OA. They should have symptomatic knee OA and should had experienced knee pain for at least the three last months. The participants should neither be over 60 years old, which had been established to exclude age-related osteoarthritis.

Clinical Examination

The clinical examination did include a test with a handgrip dynamometer to determine hand strength. The participants were instructed to sit down on a chair without armrests, with the lowest rib level with the edge of the table, place the forearm on the arm guide, keep the shoulders in neutral position, elbow in flexed position (90-110 degrees) and squeeze the handgrip as hard as possible for 10 seconds. The test was first performed on the right hand and then the left hand. Variables as max strength, average strength and final strength was documented.

Blood pressure was measured with a blood pressure monitor right after the hand test. To get a reliable test as possible the participants was instructed to sit down and rest for 5 minutes before the test. As the hand strength-test was performed while the participants were sitting down this can be counted as rest, therefore was a timer started right before the handgrip test to measure the 5 minutes (Pickering et al., 2016). The test leader performed the blood pressure test and registered the systolic, diastolic and pulse values.
To determine the participant’s BMI, weight and height was measured with a weight scale, a height-measuring scale.

2.2. KOOS
The participants physical activity and knee related problems were measured by their own opinions with a questionnaire which includes KOOS. KOOS stands for Knee Injury and Osteoarthritis Outcome Score and is a developed instrument that is used to assess the patients opinion about their knee and associated problems (Roos et al., 1998). A test takes about 10 minutes to complete and is self-explanatory. It is for example used for research in clinical trials, it can be used to assess groups and to monitor individuals (Roos et al., 1998). It was first released in 1998 and has been used in more than 20 studies from all over the world. KOOS consists of 5 subscales: pain, other symptoms, function in daily living (ADL), function in sport and recreation (Sport/Rec) and knee related quality of life (QOL) (Roos et al., 1998).

KOOS is measured in two directions predicted from a scale based on the summarized points from the answers of the questionnaire (Koos, 2016). The scale has an interval between 0-100. 0 means that the patients do not suffer from any difficulties, and 100 indicates that they have extreme difficulties (Koos, 2016). The questionnaire has previously been used in several studies and countries and is clarified as valid and reliable to measure pain and other symptoms, activities of daily living, sport and recreation and function and knee related quality of life in people with knee pain (Salavati, Akhbari, Mohammadi, Mazaheri & Khorrami, 2011; Gonçalves, Cabrit, Pinheiro, Ferreial & Gil, 2010; Gul, Yilmas & Bodur, 2013)

2.3. HAD
HAD stands for Hospital Anxiety and Depression Scale. The scale was used to measure the participant’s own opinions about their anxiety and depression. The scale is a useful substitute to measure anxiety and depression because it excludes questions about physical symptoms, which creates a better perspective of only the individuals mental well-being (Stern, 2014). HAD consists of seven questions for anxiety and seven questions for depression and the answers result in points between 0-3. The questions of anxiety and depression is scored separately. The scale has an interval between 8-21, where 8-10 is mild, 11-14 is moderate and 15-21 is severe. Results lower than 8 indicates that the patient does not suffer from either anxiety or depression (Stern, 2014).

HAD has been validated in many countries. It is a recommended tool for diagnosis of depression and anxiety by National Institute for Health and Care Excellence (NICE) (Stern, 2014).
According to Bjelland, Dahl, Haug and Neckelmann (2002) can HAD be applied to the general population as psychiatric patients, and is a trustworthy method for diagnosis of anxiety and depression. HAD has previously been used and validated to measure individuals anxiety and depression in patients with low back pain (Turk et al., 2015). The questionnaire has previously been used by Aseri, Suriya, Hassan, Hasan, Sheikh, Tamimi, Alshathri and Khalid (2015) and Haugan and Drageset (2014) and is a reliable method to measure anxiety and depression.

2.4 Ethical and Social Considerations
The study follows the declaration of Helsinki which is used in all studies that is performed on humans (World Medical Association, 2013). The declaration consists general principles, risks, burdens and benefits, vulnerable groups and individuals, scientific requirements and research protocols, research ethics committees, privacy and confidentiality, informed consent, use of placebo, post-trial provisions, research registration and publication of results, unproven interventions in clinical practice and article information (World Medical Association, 2013).

OA is progressive disease without any cure and is a growing disease among the population. Therefore, there is a big need to grow a bigger comprehension and knowledge of the disease to improve risk factors. It is also important to study and develop a bigger understanding how the disease affects the individuals everyday life and phycological well-being, to improve the treatments.

There are no risks with either the clinical examination or the questionnaires. The equipment is reliable and only needs light effort during the handgrip test. The participants can take part of the result and are able to get a general understanding about their knee pain and health. Their personal information is anonymous and is only handled by the test leader. The participants participation is voluntarily and they can choose to quit whenever they want to.

2.5 Statistics Analyses
The statistical analyses were done in SPSS (IBM SPSS Statistics, Version 2). The variables included quantitative data and fell under interval scale and nominal scale. The data was tested in Shapiro-Wilk and was defined as normally distributed, and therefore could mean value and standard deviation be used. A correlation between the variables KOOS, hand strength and blood pressure were made to see if there was any significance between them. The subscale QOL were split into two groups; better QOL and worse QOL, and were tested in a t-test to see if they were significant to any of the other variables. Lastly, was the result of HAD correlated to the
subscales; better QOL and worse QOL. The tables and figures were done in Microsoft Office Word 2016 and Microsoft Office Excel 2016.

3. Results

The study included a total of 13 participants of KP. The lack of participants depended on that few individuals had been seeking care for symptomatic OA at primary health care in southern part of Halland, Sweden. After an advertisement of The Knee Project in Hallandsposten more individuals applied to participate in the study. Unfortunate due to the time frame of the study, only a total of 13 got included.

The participants age, blood pressure and the descriptives of their hand strength and KOOS are shown in Table 1. The participants blood pressure showed a result of 127±15 (systolic) and 84±10 (diastolic), which are healthy values (1177, 2017). The result of the maximum hand strength was 377±173 (left hand) and 386±147 (right hand). The result of KOOS and its mean values and standard deviations are shown in table 1 and figure 1. The correlation between blood pressure and KOOS showed a p-value of >0.3. The correlation between hand strength and KOOS did also show a p-value of >0.3.
Table 1. The table shows the descriptives of the variables; age, blood pressure (systolic & diastolic), maximum hand strength (left & right), mean hand strength (left & right) & the 5 subscales of KOOS: pain, symptoms, function in daily living (ADL), function in sport & recreation (Sport/Rec) & quality of life (QOL). It also includes the variables result of the normality test Shapiro-Wilk.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean Value (Standard Deviation)</th>
<th>Test of Normality: Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>50±8</td>
<td>0,10</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>127±15</td>
<td>0,53</td>
</tr>
<tr>
<td>Diastolic blood pressure</td>
<td>84±10</td>
<td>0,28</td>
</tr>
<tr>
<td>Maximum left hand strenght</td>
<td>377±173</td>
<td>0,03</td>
</tr>
<tr>
<td>Maximum right hand strenght</td>
<td>386±147</td>
<td>0,75</td>
</tr>
<tr>
<td>KOOS Pain</td>
<td>75±19</td>
<td>0,35</td>
</tr>
<tr>
<td>KOOS Symptoms</td>
<td>78±15</td>
<td>0,90</td>
</tr>
<tr>
<td>KOOS ADL</td>
<td>92±11</td>
<td>0,03</td>
</tr>
<tr>
<td>KOOS Sport/Rec</td>
<td>61±18</td>
<td>0,67</td>
</tr>
<tr>
<td>KOOS QOL</td>
<td>55±18</td>
<td>0,04</td>
</tr>
</tbody>
</table>

Figure 1. The figure shows the mean value & the standard deviation of KOOS different subscales.
Table 2 shows the result of HAD described by noncases & probable cases of anxiety & depression & the percentage of these (13 participants). A correlation between probable cases of anxiety and those who indicated to experience a worse QOL (subscale of KOOS) showed that just one of the individuals who suffered from anxiety experienced a bad QOL. Therefore, no further analyses were done with HAD.

Table 2. Results of HAD by frequency and percent of probable cases an noncases of anxiety and depression.

<table>
<thead>
<tr>
<th>Statistics of HAD</th>
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<tbody>
<tr>
<td><strong>Variable</strong></td>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td>Noncases of Anxiety</td>
<td>10/13</td>
</tr>
<tr>
<td>Probable Cases of Anxiety</td>
<td>3/13</td>
</tr>
<tr>
<td>Noncases of Depression</td>
<td>11/13</td>
</tr>
<tr>
<td>Probable Cases of Depression</td>
<td>1/13</td>
</tr>
</tbody>
</table>

Table 3 shows a split of the variable KOOS QOL as a continuous independent variable. KOOS QOL shows the number of participants who experienced a worse QOL and a better QOL. These variables were compared with the remaining variables of KOOS; Pain, Symptom, ADL & Sport/Rec. The result from the T-test showed a significant difference between those who indicated in a better (6 participants) and a worse (7 participants) QOL. Those who did indicate in a worse QOL also showed a higher result of the variables of KOOS; pain (87±9), P= 0.001, symptoms (87±13), P=0.024, and sport/rec (63±16), P= 0.007. The only subscale from KOOS that did not show any significant result was ADL (92±5), P= 0.066.

Table 3. The table shows a correlation and the result of a t-test between KOOS QOL as a continuous independent variable (better and worse) and the variables of KOOS; Pain, Symptom, ADL & Sport/Rec and blood pressure and hand strength.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of participants</th>
<th>Mean Value (Standard Deviation)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>KOOS Pain</td>
<td>A Better QOL</td>
<td>6/13</td>
<td>59±14</td>
</tr>
<tr>
<td></td>
<td>A Worse QOL</td>
<td>7/13</td>
<td>87±9</td>
</tr>
<tr>
<td>KOOS Symptoms</td>
<td>A Better QOL</td>
<td>6/13</td>
<td>70±12</td>
</tr>
<tr>
<td></td>
<td>A Worse QOL</td>
<td>7/13</td>
<td>87±13</td>
</tr>
<tr>
<td>KOOS ADL</td>
<td>A Better QOL</td>
<td>6/13</td>
<td>80±13</td>
</tr>
<tr>
<td></td>
<td>A Worse QOL</td>
<td>7/13</td>
<td>92±5</td>
</tr>
</tbody>
</table>
KOOS
Sport/Rec
A Better QOL 6/13 39±11 0.007
A Worse QOL 7/13 63±16

Systolic blood pressure
A Better QOL 6/13 126±16 0.865
A Worse QOL 7/13 128±15

Diastolic blood pressure
A Better QOL 6/13 84±11 0.801
A Worse QOL 7/13 85±10

Maximum left hand strenght
A Better QOL 6/13 399±248 0.690
A Worse QOL 7/13 358±88

Maximum right hand strenght
A Better QOL 6/13 397±202 0.814
A Worse QOL 7/13 376±97

4. Discussion

The study which was a sub study of KP, included a total of 13 participants of KP. The lack of participants relied on that few individuals had been seeking care for symptomatic OA at primary health care in southern part of Halland, Sweden. Noticeable was that the interest among the population and the participants increased after an advertisement of KP in Hallandsposten. Could this mean that there are individuals that suffer from symptomatic knee pain who do not seek medical care for their condition, and if so, does this create a number of unknown cases? What is the cause of this? Is it that they do not trust the medical care, or that the medical care is too expensive or do they ignore their symptoms? This would be interesting to study further in future investigations.

4.1. Result

The result of the study showed that those who suffered from symptomatic knee osteoarthritis and experience a high level of pain, a high level of knee related symptoms, lower ability to perform sports, recreation and activities of daily living, affected the quality of life in middle aged individuals.

Sweden got a population of circa 1.7 million individuals at the age of 45-64, where 34% claim that they experience moderate or severe anxiety and depression (Folkhälsomyndigheten, 2017). In comparison with this study of only 13 participants, there is a big possibility that these existing groups of depression and anxiety are missing out. Yet, the result of probable cases of anxiety
in this study is 23%, which is not so different to Sweden's 34%. The 23% would maybe be greater if the study had included one or two more individuals. The test result of probable cases of anxiety could therefore be representative for the population.

Interesting is that even though very few showed a result of experience anxiety and depression, did more than 50% of the individuals in this study experience a worse QOL. It could be that HAD only register those who suffer from severe mental illness and not reliable to measure the well-being for individuals who suffer from OA. KOOS on the other hand do more specifically register those who feel bad in their daily life caused by their knee pain.

The only subscale that did not show any significance to a worse QOL was ADL. This is a bit strange because ADL and QOL could be very much alike. Could it be that the individuals with a worse QOL feel bad about their situation, but still, though the pain, manage to do their daily work/chore?

The hand strength test did not show any significant values. If the test had included a test that measured the leg strength, like Peeler et al. (2015), there probably would have been a bigger chance of a significant value to correlate with OA. There is also a possibility that the values could have been different if the results of males and females were split and looked at separately. This is because of the hand grip strength could differ between genders and the males is often stronger than the females (Turesheva, Frolova & Degryse, 2017).

The correlation between the hand strength and the subscales of KOOS did not show any significant results. This could be because of, as mentioned above, that the hand grip strength test itself did not show any significant results. The question is, even if the hand grip strength had shown a significant result, would there be a correlation with the subscales of KOOS according to the few participants?

Although OA is associated with overweight and a high blood pressure, there still are individuals without this these afflictions. Due to the few participants these groups may have been missing out.

4.2. Method

There are a few factors in the method that could have been adjusted to create a better result. The biggest factor was that there were too few participants in the study. A study by Rosemann et al. (2007), has showed that depression was highly prevalent among individuals with OA. The study included more than 1000 submitted questionnaires, where 391±39 were classified as
moderate, 151±15 as moderately severe and 45±4 as severe cases of depression. The comparison of 13 questionnaires compared to 1000 is not representative.

Both the clinical tests and the questionnaires are reliable, valid and performed correctly and should therefore not afflicted the result negative. One factor that could have been done differently to improve the result is to complement the hand strength test. According to Peeler et al. (2015), muscle weakness in the thigh muscles (hamstring and quadriceps) is associated with knee OA. For a better result the handgrip strength could be complimented with a strength test of the thigh muscles to see if these individuals had weak leg muscles.

5. Conclusion

In summary, the majority of the results show, regarding to the lack of participants, that those who experience knee related symptoms associate with and affect middle aged individuals psychological well-being and their quality of life in a negative way. Individuals who experience a worse quality of life also tend to experience a high level of pain, a high level of knee related symptoms, lower ability to perform sports, recreation and activities of daily living.
References


Appendix 1

Informerat samtycke

Bakgrund och syfte

Knäartros är en kronisk sjukdom som påverkar knäledens brosk och orsakar stelhet, smärta och nedsatt rörlighet. Det finns inget botemedel mot artros, endast tillvägagångssätt att förbättra det aktuella tillståndet för den drabbade. Gällande svåra fall kan operation vara en nödvändighet. Fysisk aktivitet som innefattar flexibilitet, promenader och styrketräning är vad som främst rekommenderas för att förbättra knäkontroll och muskelstyrka i benen, vilket i sin tur kan minska symtom som artrosen orsakar.

Eftersom knäartros är en progressiv sjukdom som inte har något botemedel är det en stor nödvändighet att utveckla en större förståelse för sjukdomen och hur den påverkar den drabbade. Detta för att minska att folk hamnar i riskzonen och för att förbättra behandlingen för drabbade individer.

Syftet med studien är att studera om det finns en korrelation mellan fysisk aktivitet, blodtryck och handstyrka relaterat till KOOS samt hur dessa faktorer påverkar psykologiskt välmående och livskvalitén hos kvinnor och män med symtom för knäartros i medelåldern.

Förfrågan om deltagande
Vi vänder oss till dig som har varit på besök på vårdcentral och har besvär med smärta i knäna.

Hur går studien till?
Studien kommer att innebära att du kallas till en undersökning vid ett tillfälle, som beräknas att ta ungefär 2 timmar. Följande tester kommer utföras vid testtillfället:

- Under testtillfället kommer ett blodtryck tas för att kunna stämma av Ditt fysiologiska hälsotillstånd.
- Din handstyrka kommer mätas i form av ett Handgrip-test. Avsikten med testet av handstyrka är att få en uppskattning av Din generella kroppsstyrka.
- Du kommer få svara på ett frågeformulärinnehållande bl.a. frågor om smärta, livsstilsfaktorer, fysisk aktivitet och psykologiskt välmående.

Vilka är riskerna?
Det finns inga risker med att delta. Testerna som utförs är tillförlitliga, utsätter ej testpersonen för några risker och kräver endast en lättare form av ansträngning under Handgrip-testet.

Finns det några fördelar?
Du kommer att få ta del av dina resultat från samtliga tester och få möjligheten till en mer översiktlig förståelse för dina knäsmärta och ditt hälsotillstånd.

Hantering av data och sekretess
Dina personuppgifter kommer endast behandlas av studiedledarna och kommer ej publiceras och du förblir anonym. Efter studiens genomförande kommer dessa uppgifter att förstöras.

Hur får jag information om studiens resultat?
Kunskapen från studieresultatet kommer att resultera i vetenskapliga artiklar, som kommer publiceras på Diva (Digitala Vetenskapliga Arkivet) som är en söktjänst för forskningspublikationer och studentuppsatser. Artiklarna kommer även tilldelas de deltagande via mejl.

**Försäkring, ersättning**
Patientskadeförsäkring gäller, ingen ersättning för förlorad arbetsinkomst eller andra utgifter kopplade till projektet kommer att kunna utbetalas.

**Frivillighet**
Deltagandet i studien är frivilligt och om Du som deltagare under något tillfälle trots allt skulle uppleva obehag har Du rätt att avbryta medverkan och dra tillbaka Ditt samtycke när Du själv vill. Ett avbrytande av studien behöver inte ha någon specifik anledning. Avbrytande medverkan meddelas antingen muntligt eller skriftligt till forskningshuvudman.

**Ansvariga**
Forskningshuvudman
Maria Andersson, BMA, Forskare vid FoU Spenshult
E-post: maria.andersson@spenshult.se, 0735-187043

**Kontaktperson**
Johanna Kronholm
Tel.nr: 0768712587
Epost: johkro14@student.hh.se
Samtyckeblankett

Jag har fått information om studien, dess syfte och fått möjlighet att ställa frågor. Jag deltar frivilligt i studien och kan när som helst avbryta medverkan.

Ort och datum: ____________________________________________________________

Underskrift av deltagande: ________________________________________________

Namnförtydligande: _________________________________________________________

Telefonnummer: __________________________________________________________

E-post: ________________________________________________________________
Appendix 2

KOOS

Frågeformulär för knäpatienter


Symtom
Tänk på de symptom Du haft från ditt knä under den senaste veckan när Du besvarar dessa frågor.

S1. Har knät varit svullet?
   Aldrig □ Sällan □ Ibland □ Ofta □ Alltid □

S2. Har Du känt att det märkt i knät eller hur Du klickande eller andra ljud från knät?
   Aldrig □ Sällan □ Ibland □ Ofta □ Alltid □

S3. Har knät hakat upp sig eller låst sig?
   Aldrig □ Sällan □ Ibland □ Ofta □ Alltid □

S4. Har Du kunnat sträcka knät helt?
   Alltid □ Ofta □ Ibland □ Sällan □ Aldrig □

S5. Har Du kunnat böja knät helt?
   Alltid □ Ofta □ Ibland □ Sällan □ Aldrig □

Stelhet
Följande frågor rör ledstelhet. Ledstelhet innebär svårighet att komma igång eller ökat motstånd då Du böjer eller sträcker i knät. Markera graden av ledstelhet Du har upplevt i ditt knä den senaste veckan.

S6. Hur stelt har ditt knä varit när Du just har vaknat på morgonen?
   Inte alls □ Något □ Måttligt □ Mycket □ Extremt □

S7. Hur stelt har ditt knä varit efter att Du har suttit eller legat och vilat senare under dagen?
   Inte alls □ Något □ Måttligt □ Mycket □ Extremt □
Smärta
P1. Hur ofta har Du ont i knät?
   Aldrig         Varje månad         Varje vecka          Varje dag         Alltid
   □              □                  □                    □              □

Vilken grad av smärta har Du känt i ditt knä den senaste veckan under följande aktiviteter:

P2. Smurra/vrida på belastat knä
   Ingen          Lätt           Måttlig          Svår           Mycket svår
   □              □               □                  □              □

P3. Sträcka knät helt
   Ingen          Lätt           Måttlig          Svår           Mycket svår
   □              □               □                  □              □

P4. Böja knät helt
   Ingen          Lätt           Måttlig          Svår           Mycket svår
   □              □               □                  □              □

P5. Gå på jämmt underlag
   Ingen          Lätt           Måttlig          Svår           Mycket svår
   □              □               □                  □              □

P6. Gå upp eller ner för trappor
   Ingen          Lätt           Måttlig          Svår           Mycket svår
   □              □               □                  □              □

P7. Under natten i sånglade (smärta som stor sömnen)
   Ingen          Lätt           Måttlig          Svår           Mycket svår
   □              □               □                  □              □

P8. Sittande eller ligande
   Ingen          Lätt           Måttlig          Svår           Mycket svår
   □              □               □                  □              □

P9. Stående
   Ingen          Lätt           Måttlig          Svår           Mycket svår
   □              □               □                  □              □

Funktion, dagliga livet
Följande frågor rör Din fysiska förmåga. Ange graden av svårighet Du upplevt den senaste veckan vid följande aktiviteter på grund av dina knäbesvärt.

A1. Gå nerför trappor
   Ingen          Lätt           Måttlig          Stor          Mycket stor
   □              □               □                  □              □

A2. Gå uppför trappor
   Ingen          Lätt           Måttlig          Stor          Mycket stor
   □              □               □                  □              □

A3. Resa dig upp från sittande
   Ingen          Lätt           Måttlig          Stor          Mycket stor
   □              □               □                  □              □
Ange graden av svårighet Du upplevt med varje aktivitet den senaste veckan.

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<thead>
<tr>
<th></th>
<th>Ingen</th>
<th>Lätt</th>
<th>Måttlig</th>
<th>Stor</th>
<th>Mycket stor</th>
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<tbody>
<tr>
<td>A4. Stå stilla</td>
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<td>A5. Böja Dig, t ex för att plocka upp ett föremål från golvet</td>
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<td>A6. Gå på jämnt underlag</td>
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<td>A7. Stiga i/ur bil</td>
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<td>A8. Handla/göra inköp</td>
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<td>A9. Ta på strumpor</td>
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<td>A10. Stiga ur sängen</td>
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<td>A11. Ta av strumpor</td>
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<td>A12. Ligga i sängen (vända dig, hålla knät i samma läge under lång tid)</td>
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<td>A13. Stiga i och ur badkar/dusch</td>
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<td>A14. Sitta</td>
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<td>A15. Sätta dig och resa dig från toalettstol</td>
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<tr>
<td>A16. Utföra tungt hushållarbete (mönsterning, golvvätt, dammansugning etc)</td>
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<tr>
<td>A17. Utföra lätt hushållarbete (matlagning, damning etc)</td>
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</tr>
</tbody>
</table>
Funktion, fritid och idrott
Följande frågor rör Din fysiska förmåga. Ange graden av svårighet Du upplevt den senaste veckan vid följande aktiviteter på grund av dina knäbesvär.

SP1. Sitta på huk
   Ingen [ ] Lätt [ ] Måttlig [ ] Stor [ ] Mycket stor [ ]

SP2. Springa
   Ingen [ ] Lätt [ ] Måttlig [ ] Stor [ ] Mycket stor [ ]

SP3. Hoppa
   Ingen [ ] Lätt [ ] Måttlig [ ] Stor [ ] Mycket stor [ ]

SP4. Vrida/smurra på belastat knä
   Ingen [ ] Lätt [ ] Måttlig [ ] Stor [ ] Mycket stor [ ]

SP5. Ligga på knä
   Ingen [ ] Lätt [ ] Måttlig [ ] Stor [ ] Mycket stor [ ]

Livskvalité

Q1. Hur ofta gör sig Ditt knä påmint?
   Aldrig [ ] Varje månad [ ] Varje vecka [ ] Varje dag [ ] Alltid [ ]

Q2. Har Du förändrat Ditt sätt att leva för att undvika att påfresta knät?
   Inte alls [ ] Något [ ] Måttligt [ ] I stor utsträckning [ ] Totalt [ ]

Q3. I hur stor utsträckning kan Du lixa på Ditt knä?
   Helt och hållet [ ] I stor utsträckning [ ] Måttligt [ ] Till viss del [ ] Inte alls [ ]

Q4. Hur stora problem har Du med knät generellt sett?
   Inga [ ] Små [ ] Måttliga [ ] Stora [ ] Mycket stora [ ]
Appendix 3

Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week.
Don't take too long over your replies: your immediate is best.

<table>
<thead>
<tr>
<th>D</th>
<th>A</th>
<th>D</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>I feel tense or 'wound up':</td>
<td>3</td>
<td>I feel as if I am slowed down:</td>
</tr>
<tr>
<td>2</td>
<td>Most of the time</td>
<td>Nearly all the time</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>A lot of the time</td>
<td>Very often</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>From time to time, occasionally</td>
<td>Sometimes</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Not at all</td>
<td>Not at all</td>
<td></td>
</tr>
</tbody>
</table>

| 0 | I still enjoy the things I used to enjoy: | 0 | I get a sort of frightened feeling like 'butterflies' in the stomach: |
| 1 | Definitely as much | Not at all |
| 2 | Not quite so much | Occasionally |
| 3 | Only a little | Quite Often |
| 3 | Hardly at all | Very Often |

| 3 | I get a sort of frightened feeling as if something awful is about to happen: | 3 | I have lost interest in my appearance: |
| 2 | Very definitely and quite badly | Definitely |
| 1 | Yes, but not too badly | I don't take as much care as I should |
| 0 | A little, but it doesn't worry me | I may not take quite as much care |
| 0 | Not at all | I take just as much care as ever |

| 0 | I can laugh and see the funny side of things: | 3 | I feel restless as I have to be on the move: |
| 1 | As much as I always could | Very much indeed |
| 2 | Not quite so much now | Quite a lot |
| 3 | Definitely not so much now | Not very much |
| 3 | Not at all | Not at all |

| 3 | Worrying thoughts go through my mind: | 0 | I look forward with enjoyment to things: |
| 2 | A great deal of the time | As much as I ever did |
| 1 | A lot of the time | Rather less than I used to |
| 0 | From time to time, but not too often | Definitely less than I used to |
| 0 | Only occasionally | Hardly at all |

| 3 | I feel cheerful: | 3 | I get sudden feelings of panic: |
| 2 | Not at all | Very often indeed |
| 1 | Not often | Quite often |
| 0 | Sometimes | Not very often |
| 0 | Most of the time | Not at all |

| 3 | I can sit at ease and feel relaxed: | 3 | I can enjoy a good book or radio or TV program: |
| 2 | Definitely | Often |
| 1 | Usually | Sometimes |
| 0 | Not Often | Not often |
| 0 | Not at all | Very seldom |

Please check you have answered all the questions.

**Scoring:**

- **Total score:** Depression (D) _________  Anxiety (A) _________
- **0-7** = Normal
- **8-10** = Borderline abnormal (borderline case)
- **11-21** = Abnormal (case)
Johanna Kronholm