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Comparative analysis of EQ-5D-L and SF-6D instruments to measure quality of life of osteoarthritis outpatient patients at Dr. Efram Harsana Air Force Hospital, Madiun

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***Abstract*---**The purpose of this study was to compare EQ-5D-5L and SF-6D as instruments to measure the quality of life of OA patients at RSAU dr. Efram Harsana Madiun. This study used a descriptive study using a cross-sectional design. Data collection was carried out by distributing the EQ-5D-5L and SF-6D instruments, then scoring was carried out. The EQ-5D-5L questionnaire contains 5 domains with 5 levels each, namely walking ability, self-care, usual activities, pain and anxiety. The SF-6D questionnaire contains 6 domains, namely physical function, role limitations, social function, pain, mental health and vitality. The description of the quality of life of OA patients based

on EQ-5D-5L shows that the main problem of patients is pain (100%) which has an impact on inhibiting walking ability (77.8%), while based on SF-6D the quality of life of OA patients also has a main problem in the form of pain (100%), which has an impact on physical function (67.8%), and role function (47.8%). The utility value of OA patients using EQ-5D-5L was 0.722 while SF-6D was 0.835. Sociodemographic factors that affect quality of life based on the EQ-5D-5L and SF-6D questionnaires are age, gender, location of OA, and comorbidities (p=<0.05).

***Keywords*---**Osteoarthritis, Quality of Life, Instruments EQ-5D-5L and SF-6D.

Introduction

Osteoarthritis (OA) is the most common type of arthritis. OA is a clinical syndrome resulting from changes in the structure of joint cartilage and surrounding tissue which is characterized by progressive thinning of the cartilage accompanied by the formation of new bone in the subchrondal trabeculae and the formation of new bone at the edges of the joints (osteophytes). In general, osteoarthritis affects weight-bearing joints such as the vertebrae, hip joints, knees and ankles. The decrease in quality of life that occurs in osteoarthritis patients is largely related to the pain that attacks them, which limits the patient's movement, reduces the patient's ability to work, increases the patient's emotions, and often can even cause depression and decline in mental health (Kontodimopoulos et al., 2022). In more severe cases, pain can be felt continuously, thus seriously disrupting the patient's mobility (Abdin et al., 2019).

International Association for the Study of Pain(IASP) defines pain as an unpleasant sensory and emotional experience resulting from actual or potential tissue damage (Ye et al., 2019). According to data from the Royal Taruma Hospital Jakarta conducted in the period January - June 2018, data was obtained from the medical records of 80 patients with OA genu who came during that period. Among the 80 subjects, 56 (70%) subjects, consisting of 63 women and 17 men with an age range of 25 – 93 years, experienced mild pain, and 34 (42.5%) subjects had grade KL 3 genu OA. This study concluded that the majority of patients experienced mild pain, but had Kellgren-Lawrence grade 3-4 genu OA (Budiman & Widjaja, 2020). The joints that often experience osteoarthritis are the joints in the knees, hips, spine and hands. A person with OA pain will experience joint and muscle dysfunction so they will experience limited movement, decreased muscle strength and balance. As a result, as many as 80% experience limitations in movement and 25% of them cannot even carry out daily activities (Andayani et al., 2022).

Indonesia has implemented the National Health Insurance program since 2014. The purpose of the program is to ensure that the basic needs of a decent life are met in the form of health care and protection benefits for every Indonesian citizen. The advancement of increasingly sophisticated and expensive medical technology absorbs huge funds, while the available funds are very limited. Therefore, it is

necessary to conduct a study of health technology, including cost-utility analysis (CUA). CUA is a method of health economic analysis that is carried out by comparing the costs and outcomes of health interventions, as a consideration to determine whether the health technology can be included in the benefit package (Zhao et al., 2019).

The prevalence of joint disease in Indonesia is also quite high, amounting to 24.7%. At ages 45-54 the prevalence was 37.2%, at ages 55-64 it was 45.0%, at ages 65-74 it was 51.9% and at ages over 75 it was 54.8%. Specifically, the prevalence of osteoarthritis in Indonesia is 5% at age < 40 years, 30% at age 40-60 years and 65% at age > 61 years (Haywood et al., 2018). For East Java province, the prevalence of this disease is 26.9%, East Java is included in 15 provinces that have a prevalence of joint disease above the national percentage of 26.9%. Based on data from RISKESDAS 2018, the prevalence of joint disease in Indonesia was recorded at around 7.3% and OA or arthritis is a common joint disease. Although often associated with increasing age, or known as a degenerative disease, joint disease has occurred in people in the age range of 15-24 years (prevalence rate of around 1.3%), the prevalence rate continues to increase in the age range of 24-35 years (3.1%) and the age range of 35-44 years (6.3%). The prevalence of joint disease in Madiun in 2018 was 6.89%, higher than the prevalence data for East Java province of 6.72% (RISKESDAS, 2018).

The measurement of utility value using indirect measurement method is done by mapping the respondents' choices on the utility scale indirectly through a measuring instrument in the form of a quality of life questionnaire filled out by the respondents. The responses to the questionnaire are converted into utility values using population values. Quality of life questionnaires that can be used to measure utility values include the Short Form 6-Dimensions (SF-6D) (Haywood et al., 2018), Health Utilities Index (HUI) (Poder et al., 2020), and Euro Quality of Life (EQ-5D) (Seow et al., 2023).

Instruments for assessing outcome parameters in a single health index (utility index) are increasingly being used. Instruments that have been widely used include the EQ-5D and SF-6D3. These instruments differ in scoring algorithms and descriptive systems of health states, so that utility index score results may vary based on the instrument chosen (Muthoharoh et al., 2022). In addition, some evidence shows that there are differences in the level of agreement between the two instruments regarding the range of health status of a disease, thus potentially causing differences in estimates of utility index values (Andayani TM et al., 2020).

*Short Form*6-Dimensions (SF-6D) is a quality of life instrument that refers to the Medical Outcomes Study (MOS) 36-Item Short Form (SF-36). The SF-6D instrument is the result of reclassifying 8 dimensions of the SF-36 instrument into 6 dimensions (SF-6D) so that the question items and response levels of the SF-6D instrument are fewer than those of the SF-36 instrument (Sarrel et al., 2024). The SF-6D instrument has 4 to 6 levels of response so that this instrument can define as many as 18,000 different health statuses. The dimensions contained in the SF-6D instrument consist of physical function, role limitations, social function, pain, mental health, and vitality. The data collected from

respondents are converted into utility values using the SF-6D utility algorithm (Yuriah et al., 2024).

Euro Quality of Life(EQ-5D) is a general instrument that has been widely used to measure the health status of a population. EQ-5D consists of two parts, namely the EQ-5D descriptive system and the EQ-5D Visual Analogue Scale (VAS). The EQ-5D descriptive system measures a person's health status using 5 domains consisting of mobility, self-care, usual activity, pain/discomfort, and anxiety/depression. The EQ-5D VAS records respondents' assessments of their health using a vertical visual analogue scale with a scale of 0-100. Scale 0 indicates the worst health status while scale 100 indicates the best health status. There are two versions of the EQ-5D instrument currently available, namely the EQ-5D-3L which has 3 response level categories and the EQ-5D-5L which is the latest version of the EQ-5D instrument which has 5 response level categories (Sepriani et al., 2024). The EQ-5D instrument can be used to measure quality of life both in the general population and in populations with special conditions such as the osteoarthritis patient population.

The quality of life of OA patients can be measured directly using instruments such as the Visual Analogue Scale (VAS) or indirectly using instruments such as WHO Quality of Life 100 (WHOQOL-100), Health Utilities Index (HUI), Euro Quality of Life (EQ-5D) or Short Form 6-Dimensions (SF-6D) (a conversion of SF-36). EQ-5D is a measurement of current conditions, while SF-6D is a measurement of conditions one week and 4 weeks previously. Another difference is the different range of scores on the two questionnaires (Yuriah et al., 2023). The difference in the score range is also stated as the main difference between these two questionnaires, so further research is needed on other population groups with other comparative instruments (Kontodimopoulos et al., 2022).

There were 1,353 cases at Dr. Mohamad Soewandhie Hospital Surabaya who were registered as OA patients from January to December 2017 (Male = 33.5%, Female = 66.4%). There were 705 patients involved in this study, 22.1% were men and 77.9% were women. Based on the age factor, 38.8% were aged 61-70 years (average = 61.8), 77.9% were women, 50.9% were obese (BMI = 26.9 kg/m2), 10, 4% had a history of trauma, 2% had hereditary factors, 20.1% had diabetes mellitus (DM). As many as 15.9% of OA patients suffer from hypercholesterolemia, 4% hyperuricemia, 0.7% rheumatoid arthritis, 0.1% gout arthritis, and 87% of female patients have experienced menopause. The dominant factor in OA sufferers at RSUD dr. M. Soewandhie is a patient who is > 50 years old, female, especially menopausal and obese (Sasono et al., 2020).

In another study, the EQ-5D-5L and SF-6D questionnaires were given to 470 respondents to measure utility index scores. Differences in utility index scores based on demographic characteristics were tested using Mann Whitney and Kruskal Wallis, while the correlation between EQ-5D and SF-6D domains with utility scores used Pearson Correlation. Limits of agreement are depicted with the Bland and Altman Plot. The results showed that the utility scores measured using the EQ-5D-5L, EQ-VAS, and SF-6D were 0.944 (SD=0.093), 0.829 (SD=0.089), and 0.915 (SD=0.081), respectively. EQ-5D-5L and EQ-VAS can differentiate utility values based on age. There is a strong correlation (>0.700) between the

mobility and pain domains and the EQ-5D-5L utility index, as well as the physical function and pain domains with the SF-6D utility index. Ceilling effect on the EQ-5D-5L (59%) is greater than on the SF-6D (22.4%). Bland and Altman plot shows the difference in utility scores between the EQ-5D-5L and SF-6D, SF-6D and EQ-VAS, and EQ-5D-5L and VAS, respectively at the limit of agreement of 92.98%, 96 .38%, and 95.74%. EQ-5D-5L can differentiate utility scores based on age, but shows a higher ceiling effect. Both the EQ-5D-5L and SF-6D show a strong correlation between the mobility/physical function and pain domains with utility scores (Andayani et al., 2020).

This research conducted by Maharani measured the quality of life of osteoarthritis patients using the EQ-5D-3L and EQ-5D-5L instruments and compared the EQ-5D-3L with the EQ-5D-5L which is most suitable for use in the osteoarthritis patient population in Yogyakarta City and Sleman Regency. A total of 110 samples of osteoarthritis patients were taken using convenience sampling techniques. The domains with the most problems among respondents were the pain/discomfort domain (3L=90.0%, 5L=93.6%) and the ability to walk/move domain (3L=46.4%, 5L=51.8%). Compared with EQ-5D-3L, EQ-5D-5L showed better agreement (ICC 0.404 versus 0.375), better internal consistency (Cronbach's alpha 0.538 versus 0.421), lower ceiling effect (2.7% versus 5 .5%), and better convergent validity (rho 0.327 versus 0.318) so that the EQ-5D-5L instrument is more suitable for measuring quality of life in the osteoarthritis patient population in Yogyakarta City and Sleman Regency (Zhao et al., 2019).

Research comparing the EQ-5D-5L with the SF-6D is very rarely conducted in outpatients osteoarthritis in Indonesia, especially Magetan and Madiun districts, It can be identified which instrument is more appropriate for measuring health status in outpatients with osteoarthritis, especially in RSAU dr. Efram Harsana Mthank you, which is expected to provide an overview of the most suitable EQ-5D-5L with SF-6DFormeasuring quality of life in outpatients with osteoarthritis in Indonesia. Comparison of the EQ-5D-5L instrument with the SF-6D can be done through psychometric property analysis. The psychometric property analysis is intended to produce a measuring instrument that is valid, precise and can be trusted as a measuring instrument. Measurement of health status in each country can show different results because it is influenced by different demographic and socio-cultural factors. Based on the problems above, the purpose of this study is to find out the comparison, utility and instrument values, as well as socio-demographic factors that influence OA patients as seen from the instrumentEQ-5D-5L and SF-6D as instruments to measure the quality of life of OA patients at dr. Air Force Hospital. Efram Harsana Madiun.

Method

This research is a descriptive study with a cross-sectional research design. The data used is taken from a perspective by conducting field observations to obtain data.qualityliving population of outpatients with osteoarthritisat RSAUDr. Efram HarsanaMadiun. The data collection method by distributing the EQ-5D-5L and SF-6D instruments was observed to see how the differences between these instruments describe the quality of life of the OA patient population.

The sample in this study were outpatients with LBP and OA patients who came to theOrthopedic Polyclinic and Physiotherapy Polyclinic RSAUDr. Efram HarsanaMadiunin periodMay - July 2021 who meet the criteria. Sampling of 96 patients was carried out using convenience sampling techniques with a minimum sample calculation using the following formula (Sepriani et al., 2024).

Inclusion criteria. Patients aged over 18 years are undergoing outpatient treatment at the Orthopedic Polyclinic and Physiotherapy Polyclinic at RSAUDr. Efram HarsanaMadiun, the patient was diagnosed with osteoarthritis, the patient was willing to be involved in the research, filled out the questionnaire completely, and lived in the Magetan and Madiun areas. To 90 respondents residing in the Magetan and Madiun areas, with various demographic characteristics, they were given the complete EQ-5D-5L questionnaire and SF-6D questionnaire, as well as questions related to socio-demographics (gender, age, education level, worker status, and location of OA). Exclusion criteria. Patients who have undergone joint replacement, fracture patients, RA patients, patients who cannot communicate and patients who are unwilling to fill out the questionnaire.

The materials used in this study were obtained from the results of the EQ-5D-5L and SF-6D questionnaires obtained from OA patients. The tool used in this research is the respondent information sheet (The data consists of respondent name, gender, age, education level, occupation, location of OA and comorbidities Euro Quality of Life (EQ-5D).

Analysis was carried out to determine validity and reliability using Statistical Package for the Social Sciences (SPSS) software. *Internal consistency reliability* assessed using Cronbach's alpha coefficient. Data processing uses the SPSS program by entering the value of each questionnaire item to obtain the Cronbach's Alpha value. The accepted Cronbach's alpha value is >0.5. The higher the Cronbach's alpha value obtained, the better the level of reliability for each question item in the questionnaire in the research.

Internal construct validity measured among others: 1) Convergent validity using Spearman's rank correlation, 2) Known Group Validity using the Mann-Whitney U test for dichotomous variables and Kruskal-Wallis, 3) Floor and Ceiling Effect using Floor and Ceiling effects. Descriptive data analysis, in this study the analysis of socio-demographic characteristics of each respondent uses descriptive statistics where the analysis can describe the entire personal data of the respondents.

Results and Discussion

Characteristics of Osteoarthritis Patients

Data taken from outpatient Osteoarthritis patients at the Medical Rehabilitation/Physiotherapy and Orthopedic Polyclinic at RSAU Dr Efram Harsana Madiun. The number of respondents obtained during the research was 90 people. Characteristics of outpatient OA patients at RSAU Dr Efram Harsana Madiun on 14 May – 14 July 2021 are seen in table 1.

Table 1. Socio-demographic characteristics of outpatient osteoarthritis patients at RSAU Dr Efram Harsana Madiun

Patient characteristics	N	%
Age		
45-59 years old	36	40.0%
60-74 years old	47	52.2%
75-90 years	7	7.8%
Gender		
Man	25	27.8%
Woman	65	72.2%
Educational background		
SD	54	60.0%
Junior High School	13	14.4%
Junior High School	23	25.6%
Work		
Housewife	32	35.6%
Self-employed	13	14.4%
Farmer	29	32.2%
Laborer	4	4.4%
Retired	10	11.1%
Indonesian National Armed Forces	2	2.2%
Location of OA		
Knee	48	53.3%
Knees and hands	1	1.1%
Knees and spine	41	45.6%

Source: Processed Raw Data, 2021

Viewed in terms of age, WHO divides several age criteria for OA patients, namely middle age, 45-59 years; elderly (elderly age) 60-74 years; and the elderly (old age) 75-90 years. Table 3 shows that the highest percentage of OA is in the 45-59 year age group (40%), followed by the 60-74 year age group (52.2%), and the 75-90 year age group (7.8%). This suggests that osteoarthritis is more common in older people, although it also affects a number of people in younger age groups. According to (Yuriah et al., 2022) the resilience and repair capacity of cartilage decreases in old age due to reduced anabolic growth factor response, loss of chondrocytes, and thinning of the cartilage layer. These changes cause a decrease in the flexibility of the cartilage (Andayani et al., 2022).

Table 1 shows that in this study the majority of OA patients were women, 65 patients (72.20%) with the educational level of OA sufferers. The majority of patients had a low level of education with 54 patients (60%) having elementary school education, 14.40% having junior high school education, and 25.60% had a high school education. These data suggest that low levels of education may be associated with osteoarthritis risk. With most of their employment status as housewives, 32 patients (35.60%), were treated outpatient at RSAU Dr Efram Harsana Madiun on 14 May-14 July 2021. The data shows that many cases of OA generally occur in women aged between 64- 74 years old, at this age the woman has experienced several pregnancies. During pregnancy, women experience an

increase in body weight which causes an accumulation of burden on the joints, especially the hips and knees (Ismail, 2019). According to (Yuriah et al., 2024) women have a thinner knee cartilage volume than men (even after taking into account differences in height, weight, and bone size), women also experience knee cartilage loss more rapidly than men.

Comorbids are diseases that accompany a certain disease. The distribution of OA comorbidities in outpatients at RSAU Dr. Efram Harsana Madiun can be seen in table 2.

Table 2. Distribution of Concomitant Diseases (Comorbidities) in Outpatient Otheoarthritis RSAU dr. Efram Harsana Madiun

Comorbid	**N**	**%**
Low Back Pain (LPB)	46	65.71%
Hypertension	11	15.71%
Diabetes Mellitus	10	14.29%
Vertigo	1	1.43%
Abnormal Uterine Bleeding (AUB)	1	1.43%
Scoliosis	1	1.43%
Amount	70	100%

Source: Processed raw data, 2021

Table 3. Descriptive Statistical Test of Distribution of Comorbidities in Outpatient Osteoarthritis RSAU dr. Efram Harsana Madiun

Comorbid	**N**	**%**
Low Back Pain (LPB)	46	65.71%
Hypertension	11	15.71%
Diabetes Mellitus	10	14.29%
Vertigo	1	1.43%
Abnormal Uterine Bleeding (AUB)	1	1.43%
Scoliosis	1	1.43%
Amount	70	100%

Source: Processed raw data, 2021

In table 2, the percentage of comorbidities that occurred the most at RSAU dr. Efram Harsana Madiun on May 14-July 14, 2021 was Low Back Pain (LBP) as many as 46 patients (65.71%), the data is in line with the results of the statistical test carried out in table 3, the results of LBP were 46 patients (65.71%). LPB can be related to osteoarthritis, because this condition can cause inflammation and degeneration of the joints and spine which ultimately causes pain. According to Nurdiati et al., (2015) LBP or lower back pain is a clinical syndrome characterized by the main symptom of unpleasant pain in the lower spine. LBP is caused by various diseases and poor body activities, the pain felt by LBP patients originates from the spinal area (lower back), muscles and nerves around the area. In the study, the higher the percentage of LBP, the higher the severity of OA.

Then, the second largest comorbid disease, namely hypertension, was 11 patients (15.71%), this is also in line with the statistical tests carried out which can be seen from table 5 for hypertension with 11 patients (15.71%). Hypertension is high blood pressure, which can be a risk factor for osteoarthritis. Hypertension can cause impaired blood flow to the joints, which contributes to damage to cartilage and joints. In fact, there is no direct link between hypertension and osteoarthritis. However, this is related to OA sufferers who are generally older, the elasticity of blood vessels decreases so that total peripheral resistance increases, resulting in an increase in blood pressure (Poder et al., 2020). In research conducted by (Sarrel et al., 2024) in OA patients usually experience stressors from the pain complaints of OA suffered. The relationship between stress and primary hypertension is suspected by sympathetic nerve activity through catecholamines and renin which increase intermittent blood pressure. If stress becomes prolonged it can result in high blood pressure.

Patient Quality of Life
EQ-5D-5L Quality of Life Assessment

The purpose of filling out this questionnaire is to find out problems related to the patient's health, namely the ability to walk, self-care, usual activities, pain and anxiety, where the patient's health can be seen in table 4.

Table 4. Description of EQ-5D-5L of osteoarthritis patients at RSAU dr. Efram Harsana Madiun

	Walking ability (%)	Personal Care (%)	Typical activities (%)	Pain (%)	Anxiety (%)
No problem	22.2	74.4	54.4	0	87.8
A little problematic	62.2	23.4	44.5	60.0	7.8
Quite problematic	15.6	1.1	1.1	35.6	4.4
Troubled	0	1.1	0	4.4	0
Very problematic	0	0	0	0	0
Total number of problematic patients	77.8	25.6	45.6	100	12.2

Source: Processed raw data, 2021

In table 4. it can be seen that the majority of patients experience some problems in relation to OA, especially in terms of pain and walking ability. Some patients also face difficulties in performing self-care and daily activities. OA patients have problems with pain or discomfort (100%) with the highest presentation at the slightly problematic level, which is (60.0%). Joint pain in OA is often complained of as deep pain, localized in the affected joint. In some patients, this pain may be caused by stretching of the nerve endings in the periosteum covering the osteophytes. In other patients, pain may arise from microfractures in the subchondoral bone or medullary hypertension caused by impaired blood flow due to thickening of the subchondoral trabeculae. Muscle spasm and joint instability causing stretching of the joint capsule can also be a source of pain (Poder et al., 2020).

The next problem is the ability to walk as much as 77.8% with the highest percentage at a slightly problematic level of 62.2%. OA patients often complain of constant pain when doing work so that it greatly interferes with mobility in the patient's daily activities. A person with OA pain will experience pain and muscle dysfunction so that they will experience limited movement, decreased strength and muscle balance. The results of this study stated that most OA locations are in the knees which cause pain in most patients to occur in the knees. Pain that occurs in the knee causes limited ability to walk (Seow et al., 2023).

Problems with activities usually done by OA patients also experienced problems as many as 45.6% of patients with the highest percentage at a slightly problematic level of 44.5%. Some problems that arise, such as pain and impaired mobility, of course this also interferes with patients in carrying out their usual activities. Basically, the problems that arise depend on which joints experience OA and the abnormalities, location and direction of the abnormalities. These problems can be caused by various pathologies. Some of them are synovial effusion, osteophytes and degeneration of tissue around the joint, where all of these problems can interfere with OA patients in carrying out their usual activities. Activities that are usually done physically using joints, for example, squatting and kneeling, lifting heavy loads regularly, tend to contribute to the worsening of OA symptoms (Seow et al., 2023).

Self-care problems were found in 25.6% of OA patients with the highest percentage at a slightly problematic level of 23.4%. Mobility disorders also affect the patient's ability to perform self-care. Osteoarthritis is the most common chronic arthritis disease with various risk factors. In advanced stages, joints are prone to damage characterized by fibrillation, fissures and deep ulcerations on the joint surface (Ismail, 2019). Various damage or damage that occurs to the joints is what causes patients to find it difficult to perform self-care.

SF-6D Quality of Life Assessment

The SF-6D instrument has 6 dimensions including physical function, role function, social function, pain, mental health, and vitality. SF-6D calculations from 90 osteoarthritis patients can be seen in table 5.

Table 5. SF-6D description of osteoarthritis patients at RSAU dr. Efram Harsana Madiun

	n	%
Physical function		
Unlimited	29	32.2
Slightly limit strenuous activities	25	27.8
Slightly limits moderate activity	35	38.9
Just limit moderate activities	1	1.1
Slightly restrict light activity	0	0
Just limit light activities	0	0
Role function		
No problem	47	52.2
Limited	42	46.7

	n	%
Work target not achieved	1	1.1
Limited and target not achieved	0	0
Social function		
No limits	48	53.3
A little limiting	39	43.4
Sometimes limiting	2	2,2
Often restrictive	1	1.1
Always limit	0	0
Pain		
Don't feel pain	0	0
Feeling sick does not interfere with work	51	56.7
A little bit disturbing to work	27	30.0
Feeling sick is a bit disruptive to work	12	13.3
Feeling quite the pain	0	0
Feeling very sick	0	0
Mental health		
Never despair and sad	80	88.9
Rarely feel hopeless and sad	8	8.9
Sometimes I feel hopeless and sad	2	2,2
Often feel hopeless and sad	0	0
Always feel hopeless and sad	0	0
Vitality		
Always have a zest for life	87	96.7
Often has a zest for life	3	3.3
Sometimes have a zest for life	0	0
Rarely have enthusiasm for life	0	0
Have no zest for life	0	0

Source: Processed raw data, 2021

The quality of life of OA patients measured using the SF-6D instrument shows that the main problem with the quality of life of OA patients who are most affected by this disease occurs in the pain domain, where the majority of patients or almost all patients, namely 90 (100%) of patients experience pain. . It cannot be denied that OA is closely associated with pain, especially in the joints. Pain or tenderness in the knee results in decreased function in the extremities. Pain in OA patients is not only a symptom of ongoing mechanisms of central or peripheral joint changes, but there is a process of increasing fibrinogenic activity and decreasing fibrinolytic activity. This process causes the accumulation of thrombi and lipid complexes in subchondral blood vessels, causing ischemia and tissue necrosis. This results in the release of chemical mediators such as prostaglandins and interleukins which can transmit pain. Pain or soreness occurs due to the release of chemical mediators such as quinine which can cause stretching of tendons, ligaments and muscle spasms. Pain is also caused by the presence of esteophytes that press on the periosteum and nerve damage originating from the spinal cord as well as an increase in intramedullary venous pressure due to venous stasis in the trabecular and subchondriacal remodeling process (Abdin et al., 2019).

The pain or pain experienced also has an impact on the physical function of OA patients which in this study occurred in 61 patients (67.8%). OA disease causes pain and disability in sufferers, thus disrupting daily activities. Along with joint damage, OA can also cause pathophysiological changes in the associated ligaments and neuromuscular. Limitations of physical function in OA patients arise from a combination of mechanisms, as follows: Periosteal elevation Osteophytic, vascular congestion subchondral bone, which causes increased intraosseous pressure synovitis with activation of synovial nociceptors membrane fatigue in muscles that cross the joint (Ye et al., 2019).

Physical function limitations and pain experienced by OA patients can directly cause role function limitations. In this study, role function limitations occurred in 43 (47.8%). OA patients experienced degradation in carrying out their roles in daily activities, in adult male OA patients who should be responsible for earning a living for their families can be disturbed in carrying out their duties due to OA pain. The severity of OA symptoms causes limitations in role function and depressive symptoms, and that OA patients who experience physical limitations due to OA ultimately limit their participation in social roles and activities. The limitations experienced can be caused by the fact that social roles and daily activities including this role function, are more complex which in turn causes limitations in the ability or desire to take part in social roles and activities.

Utility Index Assessment

Health Status is defined by the EQ-5D-5L and SF-6D descriptive systems and then converted into an index value. The index values are expressed in a value set which facilitates the calculation of the utility index so that from 90 outpatient OA patients at the Orthopedic Polyclinic and Physiotherapy Polyclinic at RSAU Dr Efram Harsana Madiun which are presented in table 6 as follows:

Table 6. Assessment of utility index for outpatient osteoarthritis at RSAU Dr Efram Harsana Madiun

Questionnaire	Average Utility Index	SD
EQ-5D-5L	0.722	0.1546
SF-6D	0.835	0.0816

Source: Processed raw data, 2021

From the data above, the average EQ-5D-5L utility index is 0.722, this shows that on average the respondents in the research sample have a fairly good quality of life. The standard deviation measures the extent to which the data is spread from its average value. The higher the standard deviation, the greater the variation in the data. In this case, a fairly large standard deviation indicates a fairly large variation in the assessment of health-related quality of life among respondents. The average SF-6D utility value is 0.835, indicating that the average respondent in the research sample has a fairly high quality of life. While the standard deviation of 0.082 is relatively low, indicating that the data has little variation. In this case, it shows that the value of health-related quality of life tends to be consistent among respondents in the sample.

The results of calculating the average utility index value for outpatient OA patients at RSAU Dr Efram Harsana Madiun after carrying out descriptive statistical analysis showed that the EQ-5D-5L instrument was 0.722 (0.1546) and the SF-6D was 0.835 (0.0816). Based on the results of the table, the SF-6D instrument has a greater average utility index value compared to the EQ-5D-5L instrument.

Table 7. Utility value of outpatient osteoarthritis patients at RSAU Dr. Efram Harsana Madiun

Variables	EQ-5D-5L			SF-6D		
	n	Average	SD	n	Average	SD
Age						
45-59 years old	36	0.809	0.110	36	0.859	0.074
60-74 years old	47	0.680	0.136	47	0.826	0.079
75-90 years	7	0.557	0.225	7	0.783	0.108
Gender						
Man	25	0.826	0.106	25	0.870	0.070
Woman	65	0.682	0.152	65	0.822	0.083
Educational background	54	0.769	0.121	54	0.849	0.077
SD	13	0.675	0.192	13	0.825	0.074
Junior High School high school	23	0.629	0.155	23	0.809	0.082
Work						
Housewife	32	0.824	0.115	32	0.872	0.067
Self-employed	13	0.687	0.125	13	0.796	0.059
Farmer	29	0.674	0.133	29	0.821	0.083
Laborer	4	0.632	0.149	4	0.835	0.061
Retired	10	0.683	0.176	10	0.837	0.089
Indonesian National Armed Forces	2	0.385	0.007	2	0.710	0.184
Location of OA						
Knee	48	0.775	0.147	48	0.860	0.076
Knees and hands	1	0.390	0,000	1	0.790	0,000
Knees and spine	41	0.668	0.136	41	0.808	0.081

Source: Processed raw data, 2021

Based on age, the highest utility value for OA patients aged 45-59 years was 36 patients with an average utility value of 0.809 for the EQ-5D-5L instrument. Meanwhile, the SF-6D instrument shows an average utility value of 0.859. Comparison of the EQ-5D-5L and SF-6D instruments also shows similar results when used to measure the utility index based on patient age. The results of this study are in line with research conducted at Pandan Arang Boyolali Hospital with a total of 96 cases of osteoarthritis showing that in the 45-59 year age group there were 29 people (30.21%), in the 60-74 year age group there were 61 people (63, 54%), and 75-90 years old were 6 people (6.25%) (Ismail, 2019). From the data in table 14 based on 3 age groups from EQ-5D-5L and SF-6D it can be concluded

that the age groups 45-59 and 60-74 represent the entirety of OA patients who come as an outpatient at the orthopedic and physiotherapy clinic at RSAU Dr. Efram Harsana Madiun.

Based on the table above, the gender of OA patients shows the results of the utility value using the EQ-5D-5L instrument in line with the results using the SF-6D instrument, which shows the utility value of female OA patients is higher than that of men. A total of 65 female patients have an average utility value of 0.682 on the EQ-5D-5L instrument and on the SF-6D instrument have a utility value of 0.822. This can be caused by many factors including cartilage degradation in women 4 times faster in the tibia and 3 times faster in the patella. Differences are also seen in terms of the movement of the musculoskeletal system of women and men, women show greater friction, extension and valgus forces than men. This can increase the risk of OA (Zhao et al., 2019). Physical activity in the form of routine movements can strengthen muscles to support joints and can improve sleep quality. Good muscle strength and good sleep quality can control symptoms of osteoarthritis or joint pain so that it can increase the value of utility (Poder et al., 2020).

Based on the location of OA, the utility value of OA patients shows similar results. A comparison between the EQ-5D-5L and SF-6D shows that OA patients have the highest utility for the EQ-5D-5L instrument, namely in the OA category located in the knee with an average utility index of 0.775. Meanwhile, on the SF-6D instrument, OA patients have the highest utility index, namely in the knee OA category with an average utility index of 0.860. The more locations of OA experienced, the higher the pain burden experienced by OA patients. Pain that occurs in several parts of the body will hinder the mobility of OA patients more than patients who only experience OA in one part. The accumulation of pain due to OA that occurs in several parts of the body, for example the knees, spine, pelvis and hands, can cause impaired mobility. Patients with advanced stages of OA have more constant pain, with unpredictable pain episodes (Kontodimopoulos et al., 2022).

Based on the comparison of the utility value index using the EQ-5D-5L and SF-6D instruments, it can be concluded that if the utility index measurement is carried out using the SF-6D instrument of 0.838, it will provide a higher utility index value compared to the utility index value using the EQ-5D-5L instrument of 0.728.

Factors Affecting the Utility of Osteoarthritis Patients

Several factors influence the utility of OA patients, namely age, gender, educational history, employment, location of OA, and comorbidities. Factors influencing the utility assessment of OA patients at RSAU Dr Efram Harsana Madiun using correlation analysis tests using the EQ-5D-5L and SF-6D instruments. The correlation test discusses the degree of closeness of the relationship between variables which is expressed by the correlation coefficient. The basis for decision making is that if the significant value is <0.05 then there is a correlation between the variables, conversely if the significant value is >0.05

then there is no correlation. The results of the correlation test can be seen in table 16.

Table 8. Statistical test results of bivariate correlation analysis of factors influencing the utility index based on the EQ-5D-5L and SF-6D instruments in osteoarthritis patients at RSAU dr.Efram Harsana Madiun

Factor	**n**	**EQ-5D-5L**		**SF-6D**	
		r	**p**	**r**	**p**
Age	90	-0.505	0,000	-0.269	0.010
Gender		-0.420	0,000	-0.261	0.041
Educational background		-0.373	0,000	-0.216	0.020
Work		-0.474	0,000	-0.246	0.002
Location of OA		-0.348	0.001	-0.317	0.006

Note: P (significance), r (correlation)
Source: Processed Raw Data, 2021

Interpretation can be categorized as follows; range 0.00 (no correlation); 0.01-0.09 (less than significant correlation); 0.10-0.29 (weak correlation); 0.30-0.49 (moderate correlation); 0.50-0.69 (strong correlation); 0.70-0.89 (very strong correlation); >0.90 (near perfect correlation) (Zhao et al., 2019).The range of values ranges from -1.00 to +1.00, where the "+" sign indicates a positive correlation and the "-" sign indicates a negative correlation. The results of the statistical analysis show that the age of patients at RSAU dr. Efram Harsana Madiun has a negative correlation with the utility value. This means that the older the age, the utility index value tends to decrease.

Based on this research, there are two instruments used to measure patient quality of life. First, the EQ-5D-5L instrument shows a strong correlation with age, because the high and negative r value indicates an inverse relationship. In addition, a very low p value (<0.05) indicates a significant correlation between age and patient quality of life. This means that the older the patient, the possibility that their quality of life will decrease. Then the SF-6D instrument shows a weak correlation with age because the r value is lower. Although there is a correlation, it is not as strong as the relationship seen in the EQ-5D-5L instrument. This is also indicated by the p value which is still significant (<0.05), indicating that there is an influence of age on the patient's quality of life, but the impact is not as big as that of the EQ-5D-5L instrument. This means that as you get older, muscle fibers tend to shrink, causing muscle strength to decrease, and as a result physical activity also decreases. This condition ultimately reduces the patient's quality of life, especially for people suffering from OA. The prevalence of OA tends to increase with age. Therefore, the correlation between age and decreased utility in OA patients can be explained by the negative impact of the aging process on their physical condition and health (Seow et al., 2023).

For the gender factor, it can be seen that the correlation results in table 16 show the results of r= -0.473, p=0.000 on the EQ-5D-5L instrument and on the SF-6D instrument the value is r= -0.251, p=0.014. Based on the results of correlation analysis on two health instruments, namely the EQ-5D-5L and SF-6D, it was

found that gender had an effect on the utility value of patients with OA at Dr. Efram Harsana Madiun Hospital. The correlation on instrument suitability shows a negative relationship, which means there is an inverse relationship between gender and the patient's utility level. In patients under 45 years of age, the frequency of OA in men and women is almost the same. However, after the age of 50 years, especially after menopause, the frequency of OA is higher in women than in men. This suggests a hormonal role in the pathogenesis of OA (Andayani et al., 2022). Thus, it can be concluded that gender has an influence on the utility level of OA patients, and this difference can be associated with hormonal factors in women after a certain age.

The results of the statistical analysis of the correlation test show a negative value, meaning that the location of OA in OA patients at RSAU Dr. Efram Harsana Madiun is inversely proportional to utility, which means that patients who experience osteoarthritis in more parts of the body will cause a decrease in their utility index. On the other hand, OA patients who experience OA in one part of the body will have a better utility index. Pain due to OA that occurs in several parts of the body will further hinder the mobility of OA patients. What occurs in several parts of the body will further hinder the mobility of OA patients (Seow et al., 2023). The results of this study indicate that the OA location factor for the EQ-5D-5L instrument has a value of r = -0.384 and a value of P = 0.000 and the SD-6D instrument with a value of r = -0.314 and a value of P = 0.002. Thus, this study provides an understanding that the location of OA on the patient's body is related to a decrease in the level of utility and the impact on patient mobility.

Conclusion

From the research conducted, the following conclusions were obtained, a description of the quality of life of OA patients at RSAU dr. Efram Harsana Madiun as seen in the EQ-5D-5L shows that the main problem of patients is discomfort or pain (100%) which affects the ability to walk (77.8%), while based on the SF-6D, the quality of life of OA patients also has a major problem in pain or pain (100%), which has an impact on physical function (67.8%), and role function (47.8%). The value of the utility of OA patients at RSAU dr. Efram Harsana Madiun in 2021 using the EQ-5D-5L was 0.722 while using the SF-6D it was 0.835 which has been tested for reliability and validity based on psychometric property parameters, and instruments that can be used are seen from the utility value obtained, namely the SF-6D. Factors that influence the quality of life of OA patients with the EQ-5D-5L and SF-6D questionnaires are age, gender, educational history and location of OA with a value ($P < 0.05$).

The results of the study affect the quality of life, so further examination is needed on patients from the complications that occur in OA patients that are completely recorded in the medical records that will be carried out as a strategy and monitoring. It is expected that health services in hospitals will examine the severity of patients and record them in medical records as monitoring of patient therapy.

Conflict of interest statement
The authors declared that they have no competing interests.

Statement of authorship
The authors have a responsibility for the conception and design of the study. The authors have approved the final article.

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