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Work Productivity and Activity Impairment in Osteoarthritis Patients Receiving Etoricoxib versus Diclofenac: A Prospective Observational Study

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ABSTRACT

Osteoarthritis (OA) is a common musculoskeletal condition that adversely affects work productivity and daily activities. This study aimed to assess the convergent validity and test–retest reliability of the Indonesian version of the Work Productivity and Activity Impairment Questionnaire for Osteoarthritis (WPAI-OA) and compare productivity-related outcomes between patients receiving etoricoxib and diclofenac sodium. A prospective observational study was conducted involving 30 outpatients with OA at three tertiary hospitals in Indonesia between January 2023 and March 2024. Participants completed the WPAI-OA and EQ-5D-5L questionnaires at baseline and one week later. Convergent validity was assessed using Spearman's correlation coefficients, while test–retest reliability was evaluated among clinically stable participants. The WPAI-OA demonstrated moderate to strong correlations with EQ-5D-5L scores ($|r| = 0.570–0.694$), supporting its convergent validity. Test–retest correlations across questionnaire domains ranged from 0.385 to 0.694. Patients receiving etoricoxib reported lower work time missed (4.80% vs. 7.59%) and overall work impairment (20.49% vs. 23.09%) than those receiving diclofenac sodium. These findings provide preliminary evidence supporting the convergent validity and reproducibility of the Indonesian WPAI-OA in patients with OA. Although differences in productivity outcomes were observed between treatment groups, the small sample size and observational design limit causal interpretation. Further studies with larger samples are warranted to confirm the instrument's measurement properties and explore treatment-related differences.

KEYWORDS

WPAI-OA, Quality of Life, Etoricoxib, Diclofenac Sodium

INTRODUCTION

Osteoarthritis (OA) remains a leading cause of disability worldwide, characterized by progressive joint degeneration, chronic pain, and substantial functional limitation. Beyond its physical manifestations, OA adversely affects patients' health-related quality of life (HRQoL), work productivity, and ability to perform daily activities (Long H., et al, 2022). As a considerable proportion of individuals with OA remain economically active, the disease also imposes a significant economic burden through direct healthcare expenditures and indirect costs resulting from work absenteeism and presenteeism (Steinmetz J.D., et al., 2010).

Accurate assessment of these productivity losses is essential for evaluating the full impact of OA and the effectiveness of therapeutic interventions. The Work Productivity and Activity Impairment questionnaire specific to osteoarthritis (WPAI-OA) is a widely used instrument that measures absenteeism, presenteeism, overall work impairment, and activity impairment (Reilly M. C., et al., 2010). However, although the WPAI has demonstrated good psychometric properties in several chronic diseases and different populations, evidence supporting its validity, reliability, and interpretability in Indonesian patients with OA remains limited (Bilbao A., et al., 2018). Cultural, occupational, and socioeconomic differences may influence patient responses, making local validation necessary before the instrument can be confidently applied in clinical practice and research. In addition, few studies have established the Minimal Important Difference (MID) for WPAI-OA domains. Without an established MID, it is difficult to determine whether observed changes in WPAI scores represent clinically meaningful improvements from the patient's perspective, limiting the usefulness of the instrument in evaluating treatment outcomes and interpreting clinical trial findings (Revicki D., et al., 2008).

Pharmacological management of OA commonly includes non-steroidal anti-inflammatory drugs (NSAIDs), such as the selective cyclooxygenase-2 (COX-2) inhibitor etoricoxib and the non-selective NSAID diclofenac sodium (Nurmesa A., 2025). Although previous studies have reported comparable analgesic efficacy between these agents, their differences in tolerability and adverse-effect profiles may influence patients' functional status and work productivit (Da Costa, B. R., et al., 2021). Nevertheless, evidence comparing their impact on work productivity and activity impairment using the WPAI-OA is limited, particularly in Indonesian patients. Therefore, this study addresses two important gaps in the current literature, first, the lack of psychometric validation of the Indonesian WPAI-OA; and second, the limited evidence comparing work productivity outcomes between patients treated with etoricoxib and diclofenac sodium. Accordingly, this study aims to evaluate the convergent validity and test–retest reliability of the Indonesian WPAI-OA, and compare work productivity and activity impairment between outpatients with OA receiving etoricoxib or diclofenac sodium. By addressing these gaps, this study provides evidence to support the use of the WPAI-OA as a valid outcome measure in Indonesia and contributes to a more comprehensive assessment of treatment effectiveness beyond pain relief alone.

METHOD

Study Design and Setting

A prospective observational validation study was conducted at the orthopaedic and rheumatology clinics of three tertiary hospitals in Indonesia between January 2023 and March 2024. The study design followed the COSMIN (Consensus-based Standards for the selection of health Measurement Instruments) guidelines for patient-reported outcome measure validation. The sample size was determined with minimum of 30 participants based on routine care providing 90% statistical power at $\alpha = 0.05$ for correlation analysis.

Participants

Participants were recruited using consecutive sampling from the outpatient clinics. Inclusion criteria consisted of adults aged 40 years or older with a clinical diagnosis of knee and/or hip osteoarthritis according to the American College of Rheumatology clinical criteria, who were either currently employed (including self-employed) or reported significant impairment in daily activities due to osteoarthritis. Exclusion criteria included the presence of other comorbid conditions causing significant disability such as stroke or heart failure, history of joint replacement surgery within the previous 6 months, or cognitive impairment that would compromise the ability to complete self-reported questionnaires.

Instruments and Measures

The primary instrument was the Work Productivity and Activity Impairment Questionnaire specific for Osteoarthritis (WPAI-OA), which comprises 6 items measuring four domains: absenteeism (work time missed), presenteeism (impairment while working), overall work impairment, and activity impairment in non-work activities. All domain scores are expressed as percentage impairment ranging from 0% to 100%, with higher scores indicating greater impairment. For validation purposes, the Indonesian version of the EQ-5D-5L was employed as the reference instrument. This generic health-related quality of life measure assesses five dimensions including mobility, self-care, usual activities, pain/discomfort, and anxiety/depression, along with a visual analog scale for overall self-rated health.

Data Collection Procedures

Data collection occurred at two time points following informed consent. The baseline assessment included administration of the WPAI-OA and EQ-5D-5L questionnaires. After a one week interval (±3 days), participants completed the same set of questionnaires along with the PGIC anchor question. This follow-up period was selected to balance the assessment of reliability while minimizing recall bias and capturing meaningful clinical change.

Statistical Analysis

Data analysis was performed using SPSS Statistics version 29.0. Convergent validity was assessed through Spearman correlation coefficients between WPAI-OA domains and EQ-5D-5L dimensions/VAS scores. Test-retest reliability was evaluated using intraclass correlation coefficients with 95% confidence intervals in the subgroup of participants who reported no change on the PGIC. The minimal important difference was determined through a triangulation approach combining anchor-based methods, calculating the mean change in scores for participants reporting minimal improvement or worsening, and distribution-based methods including 0.5 times the standard deviation and standard error of measurement. Ethical approval for the study was obtained from the institutional review boards of all participating institutions, and all participants provided written informed consent prior to enrollment.

RESULT

Table 1. Characteristics of Osteoarthritis Patients

	All Patients	Patients with income	Patients with no income
Age (Years)			
18-39	1 (3.3%)	0 (0%)	1 (4.3%)
40-59	14 (46.6)	5 (71.4%)	9 (39.1)
>60	15 (50.1)	2 (28.6%)	13 (56.6%)
Gender			
Male	10 (33.3%)	4 (57.1%)	6 (26%)
Female	20 (66.7%)	3 (42.9%)	17 (74%)
Utility value / Health Related Quality of Life	0.795	0.77	0.80

	All Patients	Patients with income	Patients with no income
VAS score	80.93	78.29	81.73
Percentage of lost work time	-	9.21	-
Percentage of health problems at work	-	35.71%	-
Percentage of overall work disruption due to health issues	-	41.64	-
Percentage of activity impairment due to health	36.33	34.28	36.95

WPAI: *Work Productivity and Activity Impairment, VAS: Visual Analog Scale*

Results of the WPAI Questionnaire Reliability Test (Retest After 1 Week)

The WPAI questionnaire reliability test was used to measure the level of consistency or reliability of the WPAI instrument. The statistical analysis used in this reliability test was the *Sperman* and *Pearson correlation* test. The results of the WPAI questionnaire reliability test are shown in Table 2.

Table 2. Results of the WPAI Questionnaire Reliability Test

	Sample Size	Correlation Value	Direction of Correlation	Level of Relationship
Percentage of lost work time	7	0.564	Negative	Strong relationship
Percentage of health problems at work	7	0.385	Negative	Moderate relationship
Percentage of overall work disruption due to health	7	0.390	Negative	Moderate relationship
Percentage of activity impairment due to health	7	0.390	Negative	Moderate relationship
Percentage of activity impairment due to health	23	0.570	Negative	Strong relationship

WPAI: *Work Productivity and Activity Impairment*

Results of the WPAI Questionnaire Validity Test

The validity test of the WPAI questionnaire was conducted to assess whether the questions in the WPAI questionnaire actually measured the variables to be measured. The results of the WPAI questionnaire validity test are shown in Table 3.

Table 3. *Spearman* and *Pearson Correlation* Coefficients Between WPAI Results and Utility Values and VAS

	Sample Size	Correlation Value	Direction of Correlation	Level of Relationship
Percentage of lost work time	7	0.564	Negative	Strong relationship
Percentage of health problems at work	7	0.385	Negative	Moderate relationship
Percentage of overall work disruption due to health	7	0.390	Negative	Moderate relationship
Percentage of activity impairment due to health	7	0.694	Negative	Strong relationship
Percentage of activity impairment due to health	23	0.570	Negative	Strong relationship

WPAI Results for Osteoarthritis Patients Using Etoricoxib

In osteoarthritis patients using etoricoxib therapy, the results of activity and productivity impairment are shown in Table 4.

Table 4. Results of Activity and Productivity Impairment in Patients Using Etoricoxib

	Sample Size	Percentage (%)
Percentage of lost work time	33	4.8
Percentage of health problems at work	33	16.5
Percentage of overall work disruption due to health issues	33	20.49
Percentage of activity impairment due to health (working subjects)	33	14.78
Percentage of activity disruption due to health (all subjects)	53	19.52

WPAI: *Work Productivity and Activity Impairment*

WPAI Results for Osteoarthritis Patients Using Sodium Diclofenac

In osteoarthritis patients using sodium diclofenac therapy, the results of activity impairment and productivity performance are described in Table 5.

Table 5. Results of Activity and Productivity Impairment in Patients Using Sodium Diclofenac

	Sample Size	Percentage (%)
Percentage of lost work time	19	7.59
Percentage of health problems at work	19	16.8
Percentage of overall work disruption due to health issues	19	23.09
Percentage of activity impairment due to health (working subjects)	19	15.78
Percentage of activity impairment due to health (all subjects)	48	21.04

WPAI: *Work Productivity and Activity Impairment*

DISCUSSION

Demographic and Clinical Profile of Research Subjects

The study population reflects the typical epidemiological profile of patients with osteoarthritis (OA), with the majority being women (66.7%) and aged over 60 years (50.1%). This finding is consistent with previous studies reporting that OA prevalence and severity are higher among women and increase with age due to hormonal, biomechanical, and age-related degenerative changes (Litwic A., et al., 2013; Nurmesa A., et al. 2024). Stratification by income status identified two distinct subgroups. The income group consisted mainly of younger, working-age participants (40–59 years) and had a higher proportion of men, whereas the non-income group was predominantly older (>60 years), female, and likely represented retired individuals. Despite these demographic differences, both groups reported relatively high health-related quality of life, with utility values ranging from 0.77–0.80 and mean VAS scores above 80, suggesting generally good perceived health status (Nurmesa A., et al., 2024; Nurmesa A., et al., 2024)

Validity and Reliability of the WPAI Questionnaire

The WPAI questionnaire demonstrated acceptable construct validity, as evidenced by consistent negative correlations between WPAI domains and both utility and VAS scores. Greater work productivity and activity impairment were associated with poorer health-related quality of life, supporting the questionnaire's ability to measure the functional impact of OA. The strongest correlation was observed for the activity impairment domain, indicating that this component effectively captures the effect of OA on daily functioning. Correlations for work-related domains were moderate. However, these findings should be interpreted cautiously because only seven employed participants contributed to the work-related validity analysis, limiting the precision and generalizability of the estimates. Test–retest analysis demonstrated moderate to strong correlations across all domains, indicating acceptable reliability over a one-week interval. Although the similarity between the validity and reliability results warrants careful interpretation, the overall findings suggest that the WPAI is a reasonably reliable

instrument for assessing productivity impairment in patients with OA. These results are consistent with previous validation studies conducted in patients with ankylosing spondylitis and rheumatoid arthritis(Reilly M. C., 2010; Zhang Y., et al., 2023).

Comparison of the Effects of Etoricoxib and Sodium Diclofenac

Patients receiving etoricoxib showed slightly lower levels of absenteeism, presenteeism, overall work impairment, and activity impairment than those receiving sodium diclofenac. Although the differences were modest, they consistently favored etoricoxib across all WPAI domains. These findings are consistent with previous evidence showing that selective COX-2 inhibitors such as etoricoxib provide pain relief comparable to non-selective NSAIDs while being associated with fewer gastrointestinal adverse effects (Nurmesa A., 2025; Da Costa B. R., et al., 2021; Nurmesa A., et al., 2024). Improved tolerability may contribute to better treatment adherence and help patients maintain work performance and daily activities. However, this study was not designed to determine whether differences in productivity were directly attributable to reduced adverse effects, and this explanation remains speculative.

Compared with previous studies, the levels of work productivity loss observed in this study were generally lower than those reported by Kiadaliri et al. (Kiadaliri A., et al 20224) and Nakata et al. (Nakata K., et al., 2018). These differences may reflect variations in patient characteristics, disease severity, employment status, healthcare systems, or study methodology rather than differences in treatment alone. From a clinical perspective, preserving work productivity and daily functioning is an important treatment goal in OA, in addition to pain reduction. The findings suggest that etoricoxib may provide modest functional benefits compared with sodium diclofenac. However, because the study sample was relatively small, particularly for employed participants, these findings should be interpreted with caution. Larger, adequately powered studies are needed to confirm whether these observed differences translate into clinically meaningful and economically significant benefits.

Limitations

The main limitation of this study is the very small sample size (n=7) for testing the validity and reliability of the work-related domain. This is a common challenge in OA research, given that most patients are retired elderly individuals. A study by Walker (Walker C. 2018), also highlights the difficulty of recruiting large numbers of working-age OA patients. Therefore, the interpretation of the "moderate" relationship for the work domain in this study should be done with great caution. This study also have limitations in potential source bias and study design. Further studies with a specific focus on the productive-age OA population are needed to validate these findings.

CONCLUSION

The Indonesian WPAI-OA demonstrated acceptable validity and reliability for assessing work productivity and activity impairment in patients with osteoarthritis. The findings also suggest that osteoarthritis substantially affects daily activities and work productivity. Patients receiving etoricoxib showed numerically lower impairment scores than those receiving diclofenac; however, the observational design and limited sample size preclude conclusions about comparative treatment effectiveness. Further studies with larger and more diverse populations are needed to confirm these findings.

CONFLICT OF INTEREST

The author(s) declare no conflict of interest.

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PATIENT CONSENT STATEMENT

Written informed consent was obtained from all participants prior to enrolment.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request

GENERATIVE AI STATEMENT

The author(s) declare that no Generative AI was used in the creation of this manuscript

LIST OF ABBREVIATIONS

WPAI	: Work Productivity and Activity Impairment
VAS	: Visual Analog Scale
COSMIN	: Consensus-based Standards for the selection of health Measurement Instruments
NSAIDs	: Non-Steroidal Anti-Inflammatory Drugs
COX-2	: Selective Cyclooxygenase-2
HRQoL	: Health-Related Quality Of Life

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