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# Application of the Information-Motivation-Behavioral Skills Model to Tertiary Preventive Behavior in Osteoarthritis

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## ABSTRACT

**Background:** Osteoarthritis (OA) is a type of degenerative disease in which chronic joint inflammation occurs that can occur in the elderly. People with osteoarthritis will feel pain and experience functional limitations. Physiotherapy helps prevent and minimize further joint damage. The success of the rehabilitation program depends on the patient's skills in doing exercises, lifestyle changes, such as maintaining weight and avoiding activities that improve the joints. This study aims to analyze the influence of the Application of the Information Motivation Behavioral Skills Model (IMB) on the tertiary preventive behavior in osteoarthritis patients.
**Subjects and Method:** This was a cross sectional study conducted at a physiotherapy clinic in Surakarta, in January 2025. A sample of 210 osteoarthritis patients was selected using the fixed diseases sampling. The dependent variable was the tertiary preventive behavior. Independent variables were information, motivation, and behavioral skill. The data were collected using questionnaire and analyzed using a path analysis.
**Results:** Tertiary preventive behaviors in OA patients increased with behavioral skills (b= 0.45; 95% CI= 0.34 to 0.55; p<0.001) and motivation (b= 0.44; 95% CI= 0.34 to 0.53; p<0.001). Behavioral skill increased with information (b= 0.47; 95% CI= 0.37 to 0.57; p<0.001) and motivation (b= 0.35; 95% CI= 0.25 to 0.46; p<0.001). The goodness of fit indices were p= 0.285; RMSEA= 0.026 (<0.050); CFI= 1.0 (≥0.90); TLI= 0.99 (≥0.90); and SRMR= 0.01 (<0.050).
**Conclusion:** Tertiary preventive behaviors in OA patients increases with behavioral skill and motivation. Behavioral skill increases with information and motivation.

**Keywords:** information, motivation, behavioral skill, tertiary preventive behavior, osteoarthritis

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## BACKGROUND

Osteoarthritis (OA) is a type of degenerative disease in which chronic joint inflammation occurs that can occur in the elderly (Fatati et al., 2020). The prevalence of osteoarthritis in Indonesia at the age of 40-60 years reaches 30% and at the age of >61 years it reaches 65%. Osteoarthritis can occur in

various joints but is more common in joints that support body weight such as the knees (Hudaya, 2015; Pratama, 2019). Osteoarthritis sufferers will feel different pain according to the severity and experience different functional limitations according to the load of daily activities (Suriani and Lesmana, 2013). The existence of pain and functional limitations will cause mobility disorders so that there is a decrease in the quality of life of people with osteoarthritis. Physiotherapy helps prevent and minimize further joint damage. By reducing pain and inflammation, increasing muscle strength and joint mobility, and educating and motivating patients to diligently carry out the therapy and rehabilitation programs that have been given (Rahman and Anugerah, 2021).

Information Motivation Behavioral Skills (IMB) is a basic theory about behavior change. This theory concludes that the important elements in behavior development are information, motivation and behavioral skills. Healthy behavior and the success of health efforts should be based on information or knowledge about a disease, the individual's positive thoughts and motivation to maintain existing positive behaviors (Fassier et al., 2019). The IMB model application is suitable for use in osteoarthritis because it helps to change health behaviors so as to provide the right information, build motivation and develop the skills needed. So that the combination of physiotherapy and the application of the IMB model can support patients in understanding the condition, managing symptoms, improving mobility, and adhering to rehabilitation programs in an ongoing manner. This study aims to analyze the Information Motivation and Behavioral Skills (IMB) model in osteoarthritis preventive behavior. This study aims to analyze the application of the Information Motivation and Behavioral Skills on the tertiary preventive behavior of osteoarthritis.

## SUBJECTS AND METHOD

### 1. Study Design

This was a cross sectional study conducted at 4 physiotherapy clinics in Surakarta, Central Java, Indonesia, in January 2025.

### 2. Population and Sample

The study population was osteoarthritis patients. A sample of 210 osteoarthritis patients was selected using fixed disease sampling.

### 3. Study Variables

The dependent variable was the tertiary preventive behavior. The independent variables were information, motivation, and behavioral skills.

### 4. Operational Definition of Variables

**Tertiary Preventive Behavior Osteoarthritis** is an action taken to prevent or reduce the risk of osteoarthritis that can be done with an exercise program and maintaining weight.

**Information** is what people with osteoarthritis know about osteoarthritis and how to manage it.

**Motivation** is the enthusiasm or encouragement of osteoarthritis sufferers in carrying out behaviors to reduce the symptoms of osteoarthritis.

**Behavioral Skills** are the ability of osteoarthritis sufferers to manage osteoarthritis such as undergoing therapy, managing pain, increasing muscle strength and maintaining daily activities to reduce osteoarthritis symptoms.

### 5. Study Instruments

The study instrument used for data collection is using a questionnaire.

### 6. Data analysis

Univariate analysis aims to explain and describe the characteristics of each study variable. Bivariate analysis in this study

using the test Chi-Square and multivariate analysis using path analysis.

### 7. Research Ethics

This study has received an ethical feasibility certificate from the hospital. DR. Moewardi, Surakarta, Indonesia2, 742/XII/HREC/-2024, on November 14, 2024.

## RESULTS

### 1. Sample Characteristics

The characteristics of the sample in this study were divided into 4 characters, namely age, gender, last education and occupation. The characteristics of the sample are shown in see Table 1. Table 1 shows that of the 210 respondents, 144 people (68.57%) were dominated. Most of the respondents studied higher education as many as 104 people (49.52%), followed by high school as many as 70 people (33.33%), elementary school as many as 19 people (9.05%), and junior high school as many as 17 people (8.1%). The respondents' jobs were dominated by 83 people (39.52%), followed by 58 people who were not working (27.62%), 38 people in the private sector (18.10%), and as many as 31 civil servants (14.76%). The average age of respondents suffering from osteoarthritis was 54 years old with the youngest age being 35 years old and the oldest being 79 years old.

**Table 1. Sample characteristics (categorical data)**

| Variable | Frequency (n) | Present (%) |
|---|---|---|
| **Gender** | | |
| Man | 66 | 31.43 |
| Woman | 144 | 68.57 |
| **Final Education** | | |
| SD | 19 | 9.05 |
| Junior High School | 17 | 8.1 |
| Seniro High School | 70 | 33.33 |
| College | 104 | 49.52 |
| **Work** | | |
| Not Working | 58 | 27.62 |
| Self employed | 83 | 39.52 |
| Private | 38 | 18.10 |
| Government employees | 31 | 14.76 |

### 2. Biavariate Analysis

Table 3 shows that good behavioral skills (b= 0.88; 95% CI= 0.76 to 1.00; p<0.001), high information exposure (b= 0.91; 95% CI= 0.77 to 1.05; p<0.001), and strong motivation (b= 0.80; 95% CI= 0.66 to 0.95; p<0.001) increased the likelihood of tertiary preventive behavior in osteoarthritis patients.

**Table 3. Bivariate analysis of variables influencing tertiary preventive behavior**

| Variable | Path coefficient (p) | 95% CI | | p |
|---|---|---|---|---|
| | | Lower limit | Upper limit | |
| Behavioural skills | 0.88 | 0.76 | 1.00 | 0.001 |
| Information | 0.91 | 0.77 | 1.05 | 0.001 |
| Motivation | 0.80 | 0.66 | 0.95 | <0.001 |

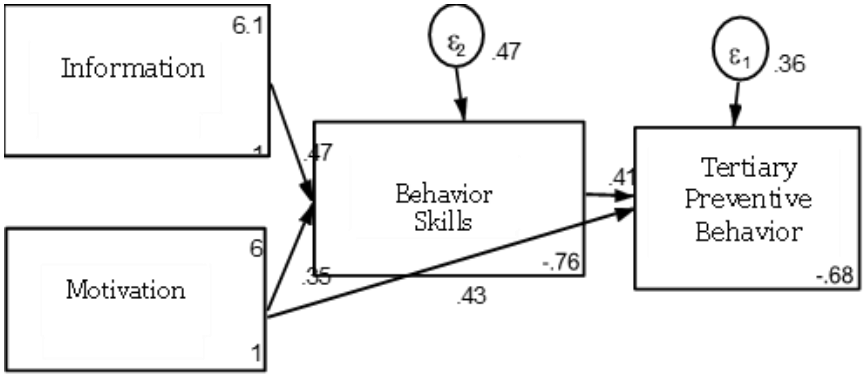


**Figure 1. A Path diagram of determinants of tertiary osteoarthritis prevention behaviors using an information-motivation-behavioral skills model.**

### 3. Path Analysis

Figure 1 shows that the tertiary preventive behavior of osteoarthritis is directly influenced by behavioral skills and motivation. Meanwhile, behavioral skills are influenced by information and motivation.

Table 4 shows that tertiary preventive behavior directly increased with motivation (b= 0.44; 95% CI= 0.34 to 0.53; p= 0.001) and behavioral skill (b= 0.45; 95% CI= 0.37 to 0.57; p= 0.001). Behavioral skill increased with strong motivation (b= 0.35; 95% CI= 0.25 to 0.46; p= 0.001) and high information exposure (b= 0.47; 95% CI= 0.34 to 0.55; p= 0.001).

This path analysis model shows good fit (p= 0.285 ≥0.05; RMSEA= 0.026 <0.05; CFI= 1.0 ≥0.90; TLI= 0.99 ≥0.90; and SRMR= 0.01 <0.05).

**Table 4. Results of the analysis of the Information-Motivation-Behavioral Skills Model pathway that affects tertiary preventive behavior of osteoarthritis**

| Dependent variable | Independent variables | Path coefficient (b) | 95% CI | | p |
|---|---|---|---|---|---|
| | | | Lower limit | Upper limit | |
| **Direct effect** | | | | | |
| Tertiary Preventive Behavior | ← Behavioral skill | 0.45 | 0.34 | 0.55 | 0.001 |
| | ← Motivation | 0.44 | 0.34 | 0.53 | 0.001 |
| **Direct effect** | | | | | |
| Behavioral skill | ← Information | 0.47 | 0.37 | 0.57 | 0.001 |
| | ← Motivation | 0.35 | 0.25 | 0.46 | 0.001 |
| Log likelihood= 1.142 | | | | | |
| Chi square p= 0.285 | | | | | |
| RMSEA= 0.026 | | | | | |
| CFI=1.0 | | | | | |
| TLI=0.99 | | | | | |
| SRMR= 0.01 | | | | | |

## DISCUSSION

### 1. The Influence of Information on Behavioral Skills

Individuals who get the right information are better able to understand and implement precautions effectively. This information is then internalized into positive beliefs and attitudes, where individuals who understand the risk of a disease will tend to apply management and self-management behaviors consistently (Fisher and Fisher,

2023). Education should be specific about osteoarthritis focusing on diagnosis, etiology, risk factors, symptoms, treatment, and self-help (Skou *et al,* 2012).

Providing education about osteoarthritis can adopt a relational approach in OA education and consider how attractive the education is to the individual in the short and long term, the extent to which the individual is able to live the education provided, and the extent to which the education empowers the individual to make and sustain meaningful positive change. These considerations need to be made at the individual, interpersonal, and community and organizational levels to achieve full impact (Simick *et al,* 2024).

The results of this study are in accordance with the study of Khairiyyah *et al.* (2024) The information aspect in the IMB model is described as key to improving patients' understanding of type 2 diabetes and how to manage it. Accurate information helps patients understand their illness, improve their attitudes toward health management, and improve self-care skills. With enough knowledge, patients feel more confident and in control in managing their condition, which in turn encourages better preventive behavior changes.

**2. The Effect of Motivation on Behavioral Skills**

Motivation can be interpreted as a driver of behavior to achieve goals, which is an important element in the way we interact with the world and others. By activating brain areas related to decision-making, emotion regulation, and planning, motivation is able to influence behavioral skills. Motivated individuals tend to be more focused, try harder, and more easily develop new skills because they are better prepared to practice and take on challenges (Simpson and Balsam, 2016).

Motivation is obtained from various aspects ranging from self-efficacy and social support, such as encouragement from family and peers. Motivation helps to strengthen behavior change and maintain behavior in the long term. A factor directly related to motivation is self-efficacy. People with osteoarthritis with a high level of self-efficacy will be more motivated to perform rehabilitation exercises, avoid worsening behaviors, and maintain independence in daily activities (Sahrin *et al*., 2023).

The results of this study are in line with the study of Chaharmahali *et al* (2023) which showed that motivational interview techniques can increase the motivation of osteoarthritis patients. This model focuses on creating a supportive environment, where patients feel listened to and understood. By using this approach, patients are more motivated to actively manage their condition, improve adherence to the treatment program, and ultimately improve physical function, reduce pain, and increase strength. It can therefore be concluded that every medical professional needs to take an empathetic and persuasive approach by listening to patients' concerns, providing clear explanations, and involving them in decision-making, so as to increase the motivation of osteoarthritis patients.

**3. The Effect of Behavioral Skills on Tertiary Preventive Behavior**

The Information Motivation Behavioral Skills Model (IMB) explains that behavioral skills play an important role in driving behavior change. Behavioral skills are the ability of individuals to perform necessary tasks related to compliance as well as their perception of self-efficacy of those tasks. Tasks related to compliance include dosage instructions, strategies to minimize side effects, and self-reinforcement to maintain compliance over time and in a variety of situations (Fisher *et al,* 2006). Even if a

person has the knowledge and motivation to take preventive measures, without adequate skills, they may have difficulty implementing healthy behaviors effectively.

Osteoarthritis behavioral skills include the individual's ability to manage pain, perform appropriate physical exercises, as well as implement self-care strategies to prevent the worsening of the condition which ultimately helps maintain the physical function and quality of life of people with OA. The Willet *et al* (2019) study shows that various behavior change techniques in physiotherapy interventions can significantly improve patient adherence to physical activity or exercise programs, which are important components in the management of osteoarthritis. Physiotherapists can help improve behavioral skills by defining exercises, this step helps patients to establish realistic and measurable exercises, which increases their motivation to continue participating in physical exercise. Clear and structured goal setting has proven to be very effective in maintaining patient involvement in rehabilitation programs. Providing direct feedback on patients' progress in physical exercise helps them stay focused and motivated.

**4. The Effect of Motivation on Tertiary Preventive Behavior**

This high motivation encourages patients to be more active in following therapy programs to reduce symptoms and prevent the worsening of osteoarthritis conditions. Good motivation arising from within the patient and from the environment plays a major role in the preventive behavior of osteoarthritis, which ultimately affects the effectiveness of therapy and disease management (Fa'izah and Lestari, 2017). The results of this study are in line with the study of Wang *et al* (2023) which found that factors such as resilience and disease treatment management are significantly related to the quality of life of gout patients. This supports the statement that in IMB theory, motivational aspects play a crucial role in encouraging tertiary preventive behaviors in people with osteoarthritis (OA).

Personal motivation, such as belief in the benefits of managing OA and expectations to maintain quality of life, as well as social motivation, including support from family, friends, or medical personnel, can increase adherence to preventive measures. With strong motivation, people with OA are more likely to consistently implement tertiary preventive strategies, such as avoiding activities that exacerbate joint pain, using assistive devices regularly, or undergoing physiotherapy as recommended. Therefore, motivation not only increases awareness of the importance of managing OA, but also strengthens the commitment and consistency of sufferers in implementing tertiary preventive behavior.

## AUTHOR CONTRIBUTION

Nisrina Nafisa is the principal investigator in this study who determined the topic, conducted the study and collected data. Setyo Sri Rahardjo and Bhisma Murti were the principal research assistants in this study.

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## CONFLICT OF INTEREST

There were no conflicts of interest in this study.

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