IJM

Indonesian Journal of Medicine (2025), 10(01): 316-330
Masters Program in Public Health, Universitas Sebelas Maret

Research
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Health Belief Model Application in Bone Fracture Treatment-Seeking Behavior: Preferences for Traditional Bone-Setting Treatment versus Orthopedic Surgery

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Received: 31 August 2025; Accepted: 28 September 2025; Available online: 10 October 2025

ABSTRACT

Background: Bone fractures are a significant public health issue, with 178 million new cases globally in 2019 and a prevalence of 5.5% in Indonesia. The Indonesian community tends to choose traditional treatment such as herbal medicine or surgical treatment for fractures, influenced by sociodemographic factors, culture, and individual perceptions. This study aims to analyze the Health Belief Model (HBM) factors that affect the choice of bonr fracture treatment services in the community.

Subjects and Method: This cross-sectional study was conducted in Surakarta during April–May 2025, involving 200 participants, comprising 100 users of traditional bone-setting treatment and 100 users of orthopedic care. Data were collected using an online questionnaire covering demographic characteristics and HBM constructs. The data were analyzed using univariate methods, bivariate analysis with simple logistic regression, and multivariate analysis employing path analysis.

Results: The decision to choose type bone fracture treatment care was directly influenced by perceived susceptibility (b = -2.30; 95% CI: -3.09 to -1.50; p < 0.00), benefits (b = 1.80; 95% CI: 0.89 to 2.72; p < 0.00), self-efficacy (b = 1.36; 95% CI: 0.51 to 2.22; p < 0.00), and action cues (b = 3.80; 95% CI: 1.70 to 5.90; p < 0.00), while the perception of barriers indirectly lowers self-efficacy (b = -0.65; 95% CI: -1.29 to -0.02; p < 0.04).

Conclusion: The HBM constructs, especially perceived vulnerability, benefits, self-efficacy, and action cues, significantly influence the choice of treatment for fractures. Educational interventions are recommended to enhance the perception of the benefits of medical services and strengthen the self-efficacy of the community.

Keywords: Health Belief Model, fractures, limb amputation, bone surgery, health behavior

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Cite this as:
Miswanto, Murti B, Rahardjo SS, Sulaeman ES, Mulyani S (2025). Health Belief Model Application in Bone Fracture Treatment-Seeking Behavior: Preferences for Traditional Bone-Setting Treatment versus Orthopedic Surgery. Indones J Med. 10(01): 316-330. https://doi.org/10.26911/theijmed.2025.885.

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BACKGROUND

Bone fractures represent a significant global public health issue, impacting quality of life, productivity, and the economic burden on healthcare systems (GBD 2019 Fracture Collaborators, 2021). According to the Global Burden of Disease Study (GBD) 2019, there were approximately 178 million

new fracture cases worldwide, representing a 33.4% increase since 1990, and resulting in 25.8 million years lived with disability due to fractures (GBD 2019 Fracture Collaborators, 2021). In Asia, this burden has risen alongside population aging and urbanization. The China National Fracture Study (2014) reported an incidence of traumatic fractures of 3.21 per 1,000 population, with higher rates observed in men (Huang et al., 2023). Data from 2020 published in Frontiers in Endocrinology indicated that 2,025,169 patients were hospitalized for fractures in China, with a median cost per patient of approximately USD 3,056 (Huang et al., 2023).

In Indonesia, the 2023 Health Survey reported a fracture prevalence of 0.7%, with accidents being the leading cause of mobility impairment (25.5%) (Ministry of Health of the Republic of Indonesia, 2018). The population primarily utilizes two types of care services: traditional treatment through sangkal putung (traditional orthopaedic care) and medical treatment by orthopedic specialists. Traditional sangkal putung is often preferred due to cultural practices and lower cost (Sumirat et al., 2019).

Social, economic, and cultural factors influence people's choice to use traditional treatments such as sangkal putung (Arifin et al., 2020). The application of the Health Belief Model (HBM) highlights that perceived benefits, self-efficacy, and perceived barriers play a key role in determining an individual's treatment preferences (Mohebi et al., 2013). In many communities, alternative treatments are preferred due to low perceived severity of illness and high barriers to accessing formal medical care (Putri et al., 2024). Social support from family and the surrounding community also influences patients' decisions (Devy and Aji, 2013). Additionally, cues to action such as advice from healthcare providers or family experiences serve as motivating factors (Umboh et al., 2021). Previous qualitative and quantitative studies have provided insights into the factors shaping patients' decisions regarding fracture treatment (Herdiana & Winarti, 2023). However, most studies remain descriptive and have yet to analyze the relationships among HBM constructs in depth (Suwarni et al., 2023).

The Health Belief Model (HBM) approach has shown that communication barriers play a critical role in treatment decision-making for conditions such as osteoporosis (Fernandes et al., 2023). Among patients with diabetes, perceptions of benefits, barriers, and self-efficacy have been demonstrated to influence self-care practices (Mohebi et al., 2013). In the context of fracture treatment, qualitative research has identified factors that encourage patients to transition from traditional sangkal putung treatments to modern medical services (Herdiana & Winarti, 2023).

However, other findings indicate that low perceived disease severity and high barriers to accessing medical care lead many individuals to continue preferring traditional treatments (Putri et al., 2024). Cultural factors and personal beliefs further reinforce the preference for alternative treatment methods (Arifin et al., 2020). These observations highlight the need for a deeper understanding of the factors influencing treatment choices. Therefore, the HBM provides a relevant framework for comprehensively analyzing patients' healthcare decision-making (Bretherton et al., 2024).

Seid et al. (2025) found that socioeconomic factors, family experiences, perceived benefits, perceived barriers, and self-efficacy significantly influenced patients'

decisions to seek treatment from *sangkal putung*. However, most previous studies were limited by descriptive or cross-sectional designs with relatively small sample sizes, making it difficult to draw strong causal conclusions (Dong et al., 2022). To address these limitations, the present study employs the HBM combined with structural equation modeling (SEM) and path analysis (Fu et al., 2022).

This approach allows for systematic testing of causal relationships among variables. The study focuses on understanding the factors influencing patients' choices of fracture treatment services (Utomo et al., 2020), analyzing both those who select traditional sangkal putung care and those who opt for modern medical services provided by orthopedic specialists (Fu et al., 2022).

This study aimed to provide a comprehensive understanding of the factors affecting treatment preferences and their implications for healthcare planning. Sociodemographic factors, particularly education level and income, are considered as background determinants influencing treatment decisions. Additionally, individuals' perceptions of susceptibility to complications are assessed as an important determinant of treatment choice. Perceived severity is examined to understand its role in motivating patients to choose between traditional or modern medical care.

Perceived benefits and barriers are analyzed to evaluate patients' beliefs regarding the effectiveness and accessibility of health services. Cues to action, such as encouragement from family members or healthcare providers' recommendations, are also investigated. Finally, self-efficacy is examined as a key factor that, together with other variables, provides deeper insight into the determinants of treatment choice. The findings are expected to inform strategies that enhance healthcare accessibility and service quality in line with the needs of the Indonesian population.

SUBJECTS METHOD

1. Study design

This was a cross-sectional study carried out in Surakarta, Central Java, Indonesia, from April to May 2025.

2. Population and sample

The source population in this study consisted of individuals with a history of fractures who had previously utilized either traditional sangkal putung treatment or orthopedic medical services in the Surakarta Residency area. The study sample comprised 200 respondents selected using a fixed disease sampling technique, including 100 users of traditional alternative treatment and 100 users of orthopedic surgical services. Random sampling was conducted using the Google Random Number Generator application to ensure equal opportunity for all members of the population.

3. Study variables

The dependent variables was decision to choose traditional bone setting service "sangkal putung". The independent variables were perceived susceptibility, perceived severity, perceived benefit, perceived barrier, cues to action, and self-efficacy.

4. Operational definition of variables

Decision to choose traditional bone-setting service (sangkal putung) refers to an individual's action in selecting between traditional sangkal putung care and medical services provided by orthopedic specialists.

Perceived susceptibility is the belief regarding the likelihood of experiencing complications from a fracture if appropriate treatment is not received.

Perceived severity represents an individual's assessment of the seriousness of the fracture and its impact on daily life.

Perceived benefits reflect the belief in the advantages gained from choosing a particular type of treatment.

Perceived barriers encompass perceptions of obstacles or difficulties that hinder the pursuit of treatment.

Cues to action are external factors that motivate individuals to make treatment decisions, such as family advice or information from media sources.

Self-efficacy is the level of confidence in one's ability to undergo and manage the treatment process according to their chosen approach..

5. Studi instrument

The research instrument was a structured questionnaire based on the Health Belief Model (HBM), designed to measure demographic characteristics and HBM constructs (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy) using a Likert scale. Data were collected online from respondents who had utilized either sangkal putung fracture treatment or orthopedic surgical services.

6. Data analysis

Data obtained from the questionnaire were processed through an editing stage to ensure completeness and consistency, followed by scoring and coding to convert the data into a numerical format suitable for statistical analysis. The data analysis included univariate analysis to describe respondent characteristics and variable distributions, bivariate analysis to examine relationships between independent and dependent variables using chi-square tests or simple logistic regression, and multivariate analysis using path analysis through Structural Equation Modeling (SEM). This approach allowed for the simultaneous testing of causal relationships among variables and the estimation of both direct and indirect effects of Health Belief Model constructs on fracture treatment choice behavior.

6. Ethical consideration

This study adhered to ethical principles, including informed consent, anonymity, and data confidentiality, and obtained ethical approval from the Ethics Committee of General Hospital of Moewardi, Surakarta, Central Java, Indonesia (Approval number: 1.611/VII/HREC/2025, dated 21 July 2025).

RESULTS

1. Sample characteristics

Table 1 shows that the respondents' average income was IDR 2,680,500, with a mean age of 33.47 years. The respondents' perceived susceptibility had an average score of 4.94, while perceived severity reached 8.67. The average perceived benefits score was 7.43, and perceived barriers averaged 9.21. Respondents' self-efficacy was measured at a mean value of 5.66, and cues to action showed an average score of 4.03.

Table 1. Sample characteristics of continous variables

Study variables	N	Mean	SD	Minimum	Maximum
Income (Rupiah)	200	2,680,500	2,015,959	0	1,8000,000
Age (years old)	200	33.47	10.81	15	66
Perceived susceptibility	200	4.94	1.47	2	8
Perceived severity	200	8.67	1.13	4	10

Study variables	N	Mean	SD	Minimum	Maximum
Perceived benefit	200	7.43	3.77	3	14
Perceived barier	200	9.21	3.19	3	14
Self-efficay	200	5.66	1.31	2	10
Cues to action	200	4.03	0.72	2	5

Based on Table 2, the categories with the highest number of respondents for both sangkal putung and orthopedic surgical treatment were 100 individuals each (50%). Regarding gender, the distribution was equal, with 100 males and 100 females (50.0% each). The majority of respondents had completed senior high school, totaling 104 individuals (52.0%). Most respondents were civil servants or private employees, also numbering 104 individuals (52.0%). Regarding insurance ownership, the majority held Indonesian health insurance, with 177 respondents (88.5%).

Table 2. Sample characteristics of categorical data

Sample characteristics	Category	n	%
Decision to use bone setting treatment service	Traditional bone setting treatment service “sangkal putung”	100	50
	Orthopedic	100	50
Sex	Male	100	50
	Female	100	50
Education level	Not attend school	1	0.50
	Elementary school	2	1
	Junior high school	7	3.50
	Senior high school	104	52
	Diploma	35	17.50
	College	49	24.50
	Postgraduate	2	1
Employment status	Students	23	11.50
	Civil servants / private employee	104	52
	Entrepreneur	53	26.50
	Unemployed	14	7
	Others	6	3
Health insurance ownership	None	21	10.50
	National health insurance	177	88.50
	Private health insurance	2	1

2. Bivariate analysis

Perceived susceptibility (OR= 0.04; 95% CI= 0.05–0.22; p < 0.001), perceived benefits (OR = 2.87; 95% CI= 1.48–5.55; p= 0.002), perceived barriers (OR= 0.51; 95% CI= 0.27–0.94; p = 0.032), self-efficacy (OR= 2.40; 95% CI = 1.34–4.26; p= 0.003), and cues to action (OR= 44.47; 95% CI= 5.93–3.33; p < 0.001) were significantly associated with the decision to choose sangkal putung. Conversely, perceived severity did not have a significant effect on the choice of sangkal putung (OR= 1.09; 95% CI= 0.62–1.91; p= 0.774).

Table 3 Simple logistic regression analysis of the influence of psychological factors on the decision to choose traditional bone setting treatment service "sangkal putung" in cases of bone fracture

Independent variables	OR	95% CI		p
		Lower limit	Upper limit	
Perceived susceptibility	0.04	0.05	0.22	<0.001
Perceived severity	1.09	0.62	1.91	0.774
Perceived benefit	2.87	1.48	5.55	0.002
Perceived barier	0.51	0.27	0.94	0.032
Self efficacy	2.40	1.34	4.26	<0.003
Cues to action	44.47	5.93	333	<0.001

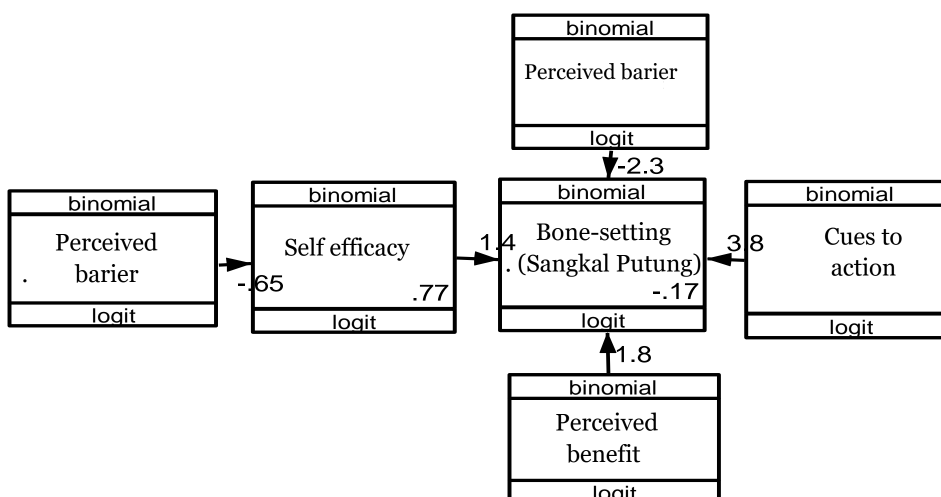

Figure 1. Path diagram illustrating psychological factors in the Health Belief Model (HBM) influencing the decision to choose traditional bone-setting ("Sangkal Putung") for bone fracture cases

3. Path analysis

The structural model resulting from the model specification and identification of this path analysis is illustrated in Figure 1. It depicts the pattern of relationships between the exogenous and endogenous variables in the study. Model fit was assessed prior to estimating the parameters to test the research hypotheses.

The results of the standardized path coefficients are described in Table 4. The decision to choose "sangkal putung" (traditional bone-setting) treatment was directly, positively, and significantly influenced by perceived susceptibility (b= -2.30; 95% CI= -3.09 to -1.50; p < 0.001), with a negative relationship, as well as by perceived benefits (b= 1.80; 95% CI= 0.89 to 2.72; p < 0.001), self-efficacy (b= 1.36; 95% CI = 0.51 to 2.22; p= 0.002), and cues to action (b= 3.80; 95% CI= 1.70 to 5.90; p < 0.001). Perceived barriers had an indirect effect by reducing self-efficacy (b = -0.65; 95% CI= -1.29 to -0.02; p = 0.044), which in turn influenced the decision to choose "sangkal putung". The final model demonstrated good fit, with an AIC of 455.6 and a BIC of 478.7.

Table 4. Path analysis of health belief model constructs influencing the decision to choose "sangkal putung" (traditional bone-setting) for fracture cases

Dependent variables	Independent variables	Path coef. (b)	95% CI Lower limit	95% CI Upper limit	p
Direct effect					
Decision to use traditional bone setting service ("sangkal putung")	← Perceived susceptibility	-2.30	-3.09	-1.50	<0.001
	← Perceived benefit	1.80	0.89	2.72	<0.001
	← Self-efficacy	1.36	0.51	2.22	0.002
	← Cues to action	3.80	1.70	5.90	<0.001
Indirect effect					
Self-efficacy	← persepsi hambatan	-0.65	-1.29	-0.02	0.044

n observation= 200
log likelihood= 220.8
AIC= 455.6
BIC= 478.7

DISCUSSION

1. Direct effect of perceived susceptibility on the decision to use traditional bone-setting treatment "sangkal putung"

Path analysis indicated that the decision to choose sangkal putung decreased with perceived susceptibility, showing a negative and statistically significant relationship. These findings suggest that the lower a patient's perception of potential risks or complications associated with a fracture, the more likely they are to select non-medical alternative treatments such as sangkal putung rather than formal health-care services like hospitals or orthopedic clinics.

From the perspective of the Health Belief Model (HBM), perceived susceptibility refers to an individual's belief about the likelihood of experiencing a health problem or complication (Putri et al., 2024). In this context, patients who perceive themselves as not vulnerable to complications such as nerve damage, infection, or long-term disability may consider traditional treatments like sangkal putung to be sufficiently safe and adequate for addressing their condition (Putri et al., 2024). Conversely, individuals who perceive fractures as serious conditions with potential risks if not treated medically are more likely to seek care at credible healthcare facilities (Putri et al., 2024)

Umboh et al. (2021) support these findings. Their study reported that most patients who chose sangkal putung perceived fractures as conditions that could heal naturally and viewed modern medical treatment as overly aggressive or misaligned with local cultural norms. Qualitative interviews further revealed that many respondents were not overly concerned about fracture-related risks, provided they did not experience severe pain or paralysis (Umboh et al., 2021).

Similarly, Dong et al. (2022), using a Knowledge – Attitude – Belief – Practice approach, found that low perceived susceptibility and misperceptions of injury severity were key barriers to evidence-based medical decision-making. Participants who considered themselves physically strong or rarely experiencing complications tended to delay or refuse medical interventions, even when at high risk (Dong et al., 2022). This suggests that low perceived susceptibility is not merely a lack of

information but may also reflect a defensive cognition, in which individuals downplay risks to avoid fear or perceived medical costs (Dong et al., 2022).

In the Indonesian cultural context, sangkal putung is not only an alternative medical practice but also deeply embedded in traditional beliefs and values (Sumirat et al., 2019). Therefore, perceived susceptibility is a crucial factor in bridging traditional values with modern health-based decisions. Sumirat et al. (2019) reported that some community members consider modern medical treatment too complex, expensive, and slow, whereas sangkal putung is perceived as more spiritually connected and practical. However, the study also indicated that as awareness of potential permanent damage from improper treatment increases, the likelihood of choosing traditional methods decreases (Sumirat et al., 2019).

Field observations in the present study similarly revealed that low perceived susceptibility contributes to the normalization of sangkal putung use, even in serious fractures that ideally require modern medical intervention (Sumirat et al., 2019). This underscores that medical knowledge alone is insufficient to change behavior if perceived risk remains low. Such perceptions are shaped by personal experience, community narratives, and long-standing cultural values (Putri et al., 2024).

Consistent with clinical research, Ibrahim et al. (2018) highlighted a fundamental contrast between public perceptions and scientific evidence. Their study demonstrated the effectiveness of synthetic bone grafts combined with BMP-2 in accelerating the healing of tibial and femoral fractures with bone defects. Evidence was reflected in a significant reduction in defect size based on FDA-standardized radiological evaluations and improved lower-extremity function measured using the LEFS scale over a six-month period. BMP-2 exhibits strong osteoinductive properties by stimulating the differentiation of mesenchymal progenitor cells into osteoblasts, achieving healing outcomes comparable to or exceeding those of conventional autografts.

Despite this, low perceived risk leads patients to choose alternative treatments, whereas clinical data support the use of modern therapies that are safer and more effective for long-term recovery. Therefore, modifying patient behavior to prioritize evidence-based treatment requires a comprehensive educational approach that not only communicates clinical benefits but also accommodates cultural values and psychological factors. Such integration is essential to align patient risk perception with current clinical evidence, thereby enabling treatment decisions that optimize both quality of life and functional outcomes (Ibrahim et al., 2018).

2. Direct effect of perceived benefit on the decision to use traditional bone-setting treatment “sangkal putung”

The decision to choose traditional bone-setting (“Sangkal Putung”) increases with perceived benefits and is statistically significant. This study indicates that perceived benefits positively and significantly influence patients’ decisions to select *Sangkal Putung* for fracture treatment. Patients who believe that Sangkal Putung provides tangible benefits—such as faster healing, lower costs, or a process considered natural and minimally invasive—are more likely to opt for this method over conventional medical services. These findings align with the Health Belief Model, which identifies perceived benefits

as a key cognitive determinant in health decision-making (Suwarni et al., 2023).

When an individual believes that a health action will result in desired outcomes such as rapid recovery or avoiding invasive procedures—they are more likely to adopt that action. In this context, Sangkal Putung is perceived as providing real benefits, particularly because it is rooted in local tradition, considered more natural, and accessible without hospital bureaucracy (Suwarni et al., 2023).

Supporting evidence comes from Putri et al. (2024), who found that 88% of patients in Sukosewu who chose Sangkal Putung reported high perceived benefits. These patients believed that the traditional treatment was effective, fast, and consistent with community norms and experiences. Even when perceptions of susceptibility and severity of fractures were low, perceived benefits emerged as the primary driver of treatment decisions.

Similarly, Herdiana and Winarti (2023) reported that patients selected *Sangkal Putung* due to its affordability, convenience, and the absence of complex medical procedures. Comfort in accessing care without waiting, high costs, or unfamiliar procedures was interpreted as a tangible benefit, reinforcing the intention to choose this treatment. Additionally, intergenerational trust and personal or familial experiences of recovery through Sangkal Putung further strengthened perceived benefits.

Bretherton et al. (2024) noted that formal medical rehabilitation for fractures often causes confusion regarding procedures, waiting times, and care standards. Patients may perceive modern treatment as lacking immediate, tangible benefits, particularly in post-trauma contexts. In contrast, Sangkal Putung provides rapid, individualized care and emotional support, which patients consider more perceptible and effective.

From a socio-cultural perspective, perceived benefits of traditional treatment are reinforced by community norms and oral transmission of success stories, creating social reinforcement that strengthens the belief that *Sangkal Putung* is beneficial—even sometimes superior to medical care in certain cases (Devy & Aji, 2013). In many instances, patients who previously experienced limited improvement with modern medicine shift to *Sangkal Putung* and report positive outcomes, reinforcing the perception of its effectiveness despite the absence of scientific evidence.

Thus, perceived benefits play a critical role in patient decision-making and serve as a strong determinant in the choice of non-medical treatment. This underscores the need for educational approaches that not only communicate the risks of traditional treatment but also clearly and contextually convey the benefits of medical treatment, allowing it to compete psychologically with the perceived advantages of traditional methods (Devy & Aji, 2013).

3. Direct effect of cues to action on the decision to use traditional bone-setting treatment “sangkal putung”

The decision to choose traditional bone-setting (“Sangkal Putung”) increases significantly with cues to action. Cues to action play a crucial role as triggers within the Health Belief Model, where health decisions are influenced not only by perceived risks and benefits but also by external stimuli that motivate concrete actions.

In this context, the effect of cues to action is particularly evident in collective social environments, such as rural communities or tradition-based societies.

Field findings indicate that many patients chose *Sangkal Putung* following direct recommendations from family members, neighbors, or community leaders. Some reported that they initially did not intend to seek traditional treatment but were persuaded after hearing positive testimonials from others who had recovered through the same treatment (Putri et al., 2024).

Cues to action also function as social reinforcement, especially when coming from authoritative figures within the community, such as religious leaders, traditional elders, or the bone-setter himself. In local cultural systems, trust in informal authorities often outweighs medical authority. Social support from family and community leaders serves as a primary motivator for choosing non-medical treatment, as patients feel safer and more confident when their actions align with established community practices. This illustrates that cues to action are not merely informative but carry symbolic and emotional significance (Umboh et al., 2021).

Moreover, cues to action enhance the perceived benefits of traditional treatment. In many cases, testimonials of successful recovery validate the effectiveness of the treatment, sometimes perceived as more tangible than outcomes from formal medical procedures. Previous study demonstrates that external interventions based on direct experience or education can accelerate behavior change and increase confidence in specific methods, including pain management and orthopedic trauma care (Dong et al., 2022).

Interviews revealed that most patients chose Sangkal Putung after hearing recovery stories from relatives or directly from practitioners. They expressed greater confidence in this approach because it was perceived as non-threatening, free from chemical drugs, and producing rapid results (Putri et al., 2024). This suggests that treatment decisions are not always rational or medically based but are strongly influenced by social and cultural factors (Umboh et al., 2021). Cues to action, such as social support and experiential narratives, effectively shape attitudes and beliefs regarding treatment (Dong et al., 2022).

Therefore, promoting evidence-based medical services through community leaders, former patients, and local media is critical to encouraging individuals in traditional, collective societies to seek medical care. Approaches sensitive to social and cultural values can counterbalance the dominant influence of cues that lead patients to choose alternative treatments like Sangkal Putung (Putri et al., 2024). By involving community figures and sharing positive experiences from former patients, communities can better understand the benefits of modern medical treatment without disregarding their cultural values (Dong et al., 2022).

These findings align with clinical evidence demonstrating the effectiveness of modern bone graft alternatives, such as sterile, osteoconductive bovine bone grafts (BBG), as a safe and effective option alongside iliac crest bone grafts (ICBG) for closing bone defects in patients with cleft lip. Both approaches achieve high defect closure rates without significant differences in complications, making BBG a practical solution, especially considering donor limitations and ICBG-related risks (Bahtiar et al., 2018).

Overall, integrating socio-cultural insights regarding the influence of cues to action with clinical evidence on bone graft efficacy provides a comprehensive understanding of fracture management and congenital bone defects. Evidence-based

medical approaches must be communicated effectively while respecting patients' social and cultural contexts to encourage safe, effective, and culturally congruent treatment decisions (Putri et al., 2024; Umboh et al., 2021; Dong et al., 2022; Bahtiar et al., 2018).

4. Indirect effect of self-efficacy on the decision to use traditional bone-setting treatment "sangkal putung"

The choice of traditional bone-setting ("Sangkal Putung") increases with self-efficacy and is statistically significant, showing a positive relationship. In the Health Belief Model, self-efficacy refers to an individual's confidence in their ability to take the necessary health actions. When self-efficacy is low, patients tend to choose actions that feel more controllable, even if these options are objectively less safe. Research in Sukosewu demonstrated that most fracture patients who opted for Sangkal Putung exhibited low self-efficacy. Although they were aware of the risks associated with non-medical treatment, they still preferred traditional practices because these were perceived as faster in healing and did not require surgical intervention (Putri et al., 2024).

This finding aligns with the study by Fu et al. (2022), which investigated elderly patients following hip fracture surgery. The study found that low self-efficacy was associated with excessive fear, non-adherence to rehabilitation exercises, and negative emotions that slowed recovery. After interventions involving education, verbal motivation, and social modeling, patients' self-efficacy increased significantly, positively affecting compliance and rehabilitation outcomes.

Local studies also support these findings. Wirayuni et al. (2021) reported that nursing interventions emphasizing self-efficacy enhancement facilitate independent rehabilitation in fracture patients. Strategies included mastery experiences, vicarious experiences, verbal persuasion, and emotion regulation (Putu & Yona, 2021). In the context of choosing Sangkal Putung, low self-efficacy drives patients to prioritize psychological comfort and cultural congruence over clinical effectiveness. Patients feel more capable of managing the situation when receiving care from Sangkal Putung practitioners because the procedures are simple, familiar, and associated with minimal anxiety. Umboh (2021) further emphasizes that perceptions of effectiveness, ease of access, and closeness to traditional practices are primary reasons patients avoid hospital-based treatment.

Thus, self-efficacy proves to be a critical determinant in both medical and non-medical decision-making. Low self-efficacy encourages patients to select pathways perceived as emotionally safer, even if clinically risky. Consequently, educational and motivational interventions that foster self-efficacy should be strengthened in formal healthcare settings to increase patient confidence in evidence-based medical treatment. Enhancing self-efficacy is therefore a key component of promotive and preventive interventions, helping communities to utilize medically-based healthcare services more confidently. Community-based education programs, counseling by patients who have successfully undergone medical treatment, and intensive psychosocial support from healthcare professionals are strongly recommended to reinforce self-efficacy and reduce dependence on traditional treatments that lack scientific validation.

5. Indirect effect of perceived barrier on the decision to use traditional bone-setting treatment "sangkal putung" through self-efficacy

Self-efficacy decreases in the presence of

perceived barriers and this effect is statistically significant. Self-efficacy, defined as an individual's belief in their ability to control and successfully perform health-related actions, becomes vulnerable when facing barriers perceived as difficult to overcome. These barriers may include not only physical or logistical challenges but also psychological factors, such as fear, anxiety, or negative perceptions of the healthcare system (Mohebi et al., 2013). When these barriers are perceived as overwhelming, patients may lose confidence in their ability to follow through with treatment and consequently avoid medical options that seem complex or require active participation (Mohebi et al., 2013).

These findings are consistent with Fu et al. (2022), who evaluated the impact of evidence-based interventions on patients' self-efficacy following hip fracture surgery. Before the intervention, patients exhibited low self-efficacy due to fear of pain, confusion regarding rehabilitation protocols, and doubt in their ability to complete the recovery process. Following structured education, psychological support, and guided assistance, patients' self-efficacy increased significantly (Fu et al., 2022). This improvement also contributed to higher adherence to rehabilitation exercises and more optimal clinical outcomes (Fu et al., 2022).

A study by Fu et al. (2023) confirmed that perceived barriers are a primary determinant in reducing self-efficacy, particularly in the context of lower extremity fracture rehabilitation. The most frequently reported barriers included fear of re-injury, lack of confidence in performing physical exercises, and limited access to healthcare facilities (Fu et al., 2023). This decline in self-efficacy negatively affects patients' engagement in the recovery process, potentially leading to long-term reductions in mobility function (Fu et al., 2023).

However, previous study demonstrates that barriers are not necessarily fixed. Using motivationally based interventions—such as verbal persuasion from healthcare providers, role modeling by other patients, and the removal of physical obstacles—patients' self-efficacy can be consistently enhanced. This evidence shows that perceived barriers are dynamic and can be addressed through effective communication strategies. When patients begin to perceive barriers as challenges that can be overcome, they gradually rebuild confidence in their ability to actively and independently engage in the treatment process (Fu et al., 2023).

Other study by Huang et al. (2023) further supports these findings. Their study highlighted the effectiveness of a health-promotion-based self-efficacy enhancement program for patients following long bone fracture surgery. The program, which combined health education with gradual training, was shown to increase patients' motivation and confidence (Huang et al., 2023). Patients who had previously viewed barriers as reasons for passivity in rehabilitation began to demonstrate greater engagement in the recovery process, indicating that the relationship between perceived barriers and self-efficacy is reciprocal and modifiable through appropriate interventions (Huang et al., 2023).

In addition, a study by Utomo et al. (2023) demonstrated that intrafracture administration of PDGF-BB accelerates fracture healing through biological mechanisms, including enhanced fibroblast proliferation, angiogenesis, and the production of type I and III collagen, which are critical for bone regeneration and callus formation.

This therapy shows strong potential in addressing clinical complications such as delayed union and non-union, which significantly impede patients' physical recovery

(Utomo et al., 2023). Integrating biological approaches such as PDGF-BB therapy with psychosocial interventions that enhance self-efficacy and reduce perceived barriers is essential for supporting optimal recovery (Utomo et al., 2023).

High self-efficacy motivates patients to actively participate in treatment and rehabilitation, while minimized barriers facilitate their engagement in these processes. Therefore, fracture management should be approached holistically, combining medical biological therapy with psychosocial support to achieve more effective, sustainable recovery and improved quality of life. Such a multidisciplinary approach is crucial for optimizing clinical outcomes in fracture patients, particularly when addressing complex physical and psychological barriers.

AUTHOR CONTRIBUTION

All authors have made significant contributions to the data collection and preparation of the final manuscript.

FUNDING AND SPONSORSHIP

There was no external funding or sponsorship.

ACKNOWLEDGMENT

The author would like to express sincere gratitude to all parties who contributed to and participated as research subjects throughout the course of this study.

CONFLICT OF INTEREST

There was no conflict of interest.

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