



## FACTORS ASSOCIATED WITH FRAILTY SYNDROME IN THE ELDERLY: A SYSTEMATIC REVIEW

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### ABSTRACT

Frailty syndrome is a common condition among the elderly. Frailty has become a major health issue in the 21st century, affecting older adults and being associated with various negative outcomes such as decreased quality of life, increased mortality, hospital admissions, risk of falls, depression, and dementia. Objective: This study aims to identify and summarize the factors associated with frailty syndrome in the elderly through a systematic literature review. The findings are expected to serve as a basis for early prevention and management efforts of frailty in older adults. This study employs a systematic literature review method by analyzing 7 relevant journal articles published between 2020 and 2025. Articles were sourced from databases such as ProQuest, SpringerLink, and ClinicalKey for Nursing, selected based on topic relevance and publication quality to provide a comprehensive overview of the factors influencing frailty syndrome in the elderly. Based on the review of 7 journal articles, several factors influencing frailty syndrome were identified, including: age over 80 years, polypharmacy (use of multiple medications), gender, low body mass index (BMI), history of hospitalization, previous alcohol use, history of falls, living alone, presence of comorbidities, and impaired cognitive function. Frailty syndrome in the elderly is influenced by various risk factors spanning physical, psychological, and social aspects. Identifying these factors is crucial to support early interventions and preventive efforts, thereby improving the quality of life of older adults and reducing the risk of further complications. This systematic review can serve as a reference in developing strategies for the prevention and management of frailty among the elderly population.

Keywords: elderly; frailty; older adults; older population

### How to cite (in APA style)

Efendi, J. R., Rekawati, E., permatasari, H., & Rachmawati, U. (2025). Factors Associated with Frailty Syndrome in the Elderly: A Systematic Review. *Indonesian Journal of Global Health Research*, 7(4), 17-26. <https://doi.org/10.37287/ijghr.v7i4.6254>.

## INTRODUCTION

The aging process is a process that occurs naturally, continuously and sustainably. When humans reach old age, anatomical, physiological and biochemical changes occur in body tissues, affecting the function and ability of the body as a whole. The aging process is the result of the accumulation of molecular and cellular changes over time, causing gradual loss of physical and mental function, increased risk of disease and ultimately functional dependence and death (Mayela, De La Vega, 2023). Therefore, elderly health efforts are carried out since a person is 60 years old and are aimed at maintaining a healthy, quality and productive life in accordance with human dignity (Ministry of Health of the Republic of Indonesia, 2023).

Globally, the elderly population is currently increasing. Countries around the world are experiencing an increase in the number of elderly people. It is estimated that by 2050, the population of people aged 65 and over will double (16% of the world's population). The elderly population in the United States is expected to double between 2010 and 2050. In Europe, the proportion of elderly is expected to increase from 18.2% in 2013 to 28.1% in 2050. The World Health Organization (WHO) reports that there are 2.1 billion people aged 60 and over and 426 million people aged 80 and over in 2050. In Indonesia, the number of elderly people is currently expected to increase by 33.69 million in 2025 and to 48.19 million

in 2035. Since 2013, there has been an increase in the percentage of elderly people (8.9% in Indonesia and 13.4% worldwide) until 2050 (21.4% in Indonesia and 25.3% worldwide). In 2100, the elderly population in Indonesia will increase higher than the elderly population in the world. This is due to the increase in life expectancy and affects the elderly population every year. Indonesia is included in the aging population group, with the proportion of the elderly population having exceeded 7% since 2000 (Noor et al., 2023).

One of the important problems that occurs in the elderly today is frailty, where frailty is a symptom or geriatric syndrome characterized by cumulative decline in function in various physiological systems. Then there is an increase in vulnerability to stressors that have negative consequences for various indicators of elderly health, resulting in decreased physical, mental, and social health (Zhou, T., et al., 2023). Currently, frailty is a multidimensional and complex syndrome that includes physical, cognitive, psychological, and social aspects. Frailty in the elderly is not just experiencing functional loss, but presents the vulnerability of interrelated relationships between health and social factors. In addition, frailty is also associated with other negative risks. According to Captain, et al (2023), frailty is generally defined as a state of continuous change from the loss of one or more health domains, the result of complex interactions of disorders in various organ systems of the body that increase vulnerability to experiencing adverse health or adverse health impacts, including negative impacts on individual prosperity. In nursing science, it is defined according to the NANDA-I taxonomy (Herdman et al., 2021), frailty or vulnerability in the nursing diagnosis of Frail Elderly Syndrome, which is a dynamic state of unstable equilibrium that causes elderly individuals to experience decline in one or more health domains (physical, psychological, social, and functional) leading to increased vulnerability to experiencing adverse health effects, especially disability.

The prevalence of frailty worldwide, according to 21 studies in Asian countries, showed results that were said to be quite large, namely 20.5% in 52,283 elderly people (To et al., 2022). According to a systematic review and meta-analysis of 20 studies related to vulnerability from 2015 to 2022, involving 6,719 participants from 15 regions, data on the prevalence of frailty and pre-frailty in the elderly as a whole in Indonesia were 26.8% and 55.5%, in nursing homes (37.9% frailty & 44.8% pre-frailty), hospitals (26.3% frailty & 59.6% pre-frailty), then in the community or community environment (21.1% frailty & 59.6% pre-frailty) (Pradana et al., 2023). Pradana et al. (2023) also stated that other studies reported a prevalence of pre-frailty of 35% in nursing homes, 47.3% in the community, and 25.8% - 36.4% in hospitals so that the high prevalence of pre-frailty in Indonesia is worrying because it is a sign of early weakness but can be recovered, but can have a negative impact on health. Where the impact of frailty can ultimately lead to loss of life (27.9%), organ damage (21.4%), dementia (13.8), cancer (19.3%), cardiovascular disease (2.7%), to a decline in other health conditions (14.9%), this is stated in Caplan's research et al. (2023).

Frailty is also associated with decreased daily life activities, falls, deep vein thrombosis, hospitalization, institutionalization, long-term care, and disability (Kasfi, A., 2024; Akner, 2023; Chu et al., 2021; L et al., 2022). In the elderly frailty will often occur increased symptoms including a variety of medical complexities and decreased tolerance to medical and surgical interventions (Wowor & Wantania, 2020). With such a large impact on health, frailty is a disorder or health problem that is increasing in the elderly in the world's aging population. However, frailty is not an inevitable consequence of the aging process, nor is it a definite disease, and its clinical manifestations are also heterogeneous in various elderly populations. (Kasfi, A et al., 2024). Several studies have indicated that frailty easily causes a decline in the overall health function of the elderly and functional disorders in various organs, which indicates the beginning of vulnerability and a series of functional declines towards health

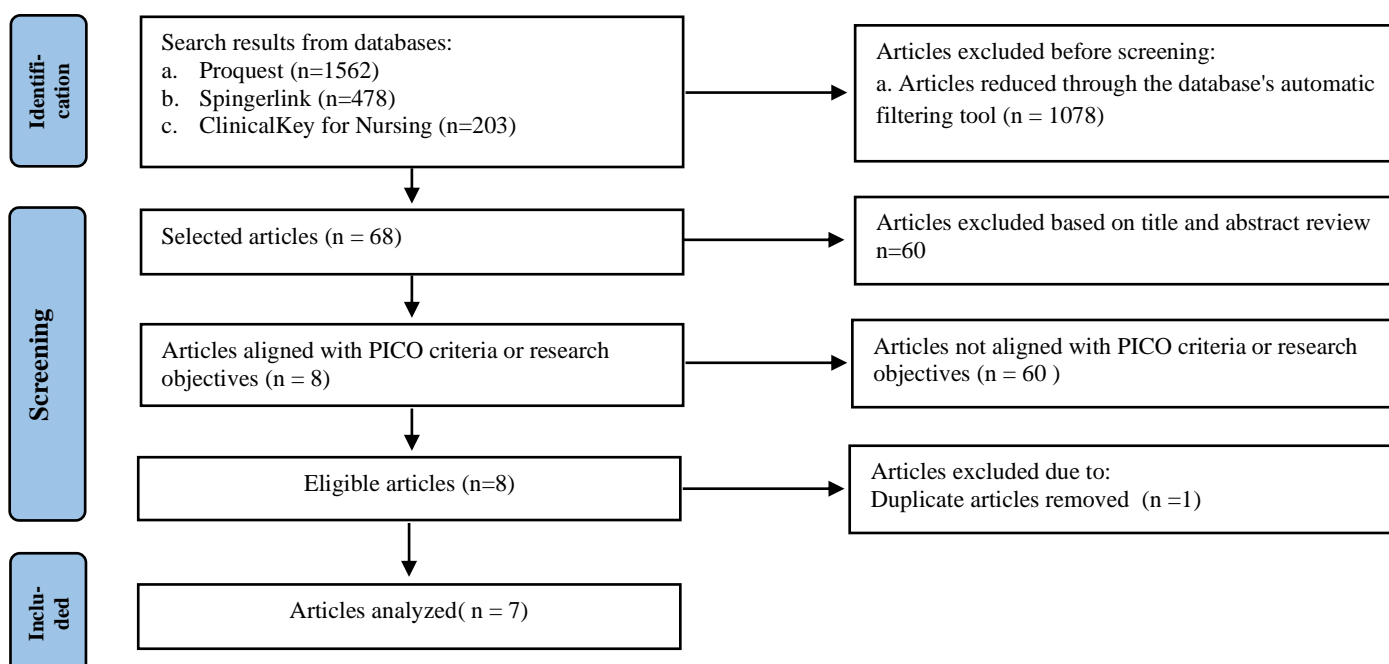
complications (Chu et al., 2021). Frailty is also said to be able to affect families, society and communities indirectly (Lekan et al., 2021). The variety of theoretical definitions of frailty in the elderly, although there is no consensus on the operational definition, it is very important to identify frailty early to limit its negative impacts (Boucham, M., et al 2024). Frailty in the elderly is influenced by many factors, and it is important to approach it holistically by considering all determinants related to the individual, social relationships, and the elderly's living environment.

Improving and maintaining the health of the elderly requires a deep understanding of the factors associated with frailty syndrome in the elderly. This understanding can be a consideration for taking effective promotive and preventive measures to reduce the risk and improve the health of the elderly. The purpose of this systematic review is to explore more deeply the factors causing frailty syndrome in the elderly, so that it can provide a better understanding and become a basis for developing better strategies in maintaining the health of the elderly in families and communities.

**METHOD**

The article search used in this study was the PRISMA method. to determine the factors associated with *frailty syndrome* in the elderly. The article search was conducted in September 2023 using 3 electronic databases ProQuest, SpringerLink, and ClinicalKey for Nursing. Then the article screening was carried out by reading the complete contents of the article based on the inclusion criteria that have been set in this study. The inclusion criteria included in the search for this research article are quantitative research articles that explain the causative factors of *frailty syndrome* in the elderly. The publication of this article is limited from 2020 to 2024 written in English. To assess the quality of journal articles, the author uses a checklist from the Joanna Briggs Institute (JBI). Journal articles are considered to have good quality if they meet the critical appraisal criteria of at least 70% with *cut-off* value was determined by the author. The exclusion criteria for this article were *systematic review*, *literature review* , and *meta-analysis article criteria*. The search for this article was conducted in September 2023 using electronic databases, namely Proquest, Clinical Nursing, and Springer link using the keywords *Older adults*, *Older population*, *Elderly*, *frailty* , and *factor*.

**RESULT**



Scheme 1. Flow Diagram for New Systematic Reviews : PRISMA 2020

The initial search obtained 1078 articles from all *databases* combined. After being reduced based on the database's automatic filter, 68 articles were obtained. Then based on the abstract and title, it was reduced again so that 8 articles were obtained that were in accordance with the research objectives. After the full text of the 8 research articles was read, 7 eligible articles were obtained. Then duplicate articles were removed so that finally only 7 studies met the criteria. The selection details are shown in the flow diagram (PRISMA) in Scheme 1.

Table 1.  
Literature Search

No.	Author, Place of Research and Year of Publication	Article Title	Research purposes	Research Design	Results/Conclusions
1.	(Santos et al., 2023) Lafaite Coutinho-BA	Factors associated with frailty syndrome in older adults with three- and four-criteria clustering	This study aims to identify the main groups of diagnostic criteria associated with weakness syndrome as well as factors associated with the occurrence of weakness without groups of diagnostic criteria and with groups of three and four criteria.	This study uses a <i>cross-sectional study design</i> .	The results showed that frailty with a grouping of three criteria was related to age group and health perception, indicating that long-lived elderly were 7.52 times more likely to be frail with a grouping of three criteria, compared to younger elderly. Elderly who had a negative perception of health were 3.51 times more likely to be frail with a grouping of three criteria compared to elderly who had a positive health perception.
2.	(Barros et al., 2024) Brazil	Factors associated with frailty, pre-frailty, and each of Fried's criteria of frailty among older adult outpatients	This study aimed to investigate the prevalence and factors associated with <i>frailty</i> , <i>prefrailty</i> , and each of the <i>frailty criteria</i> according to Fried's phenotype criteria among elderly adult outpatients receiving care from geriatric services.	This study uses a <i>cross-sectional study</i> .	More than half of the participants showed frailty (11.6%) and/or pre-frailty (43.3%) according to the Fried criteria, with physical inactivity and low gait speed being the most common criteria. Several factors were associated with a diagnosis of frailty/pre-frailty, including retirement status, marital status (single), use of a walking aid, low education level, reduced functional status, and poor mental health. In addition, multiple factors were associated with each of the Fried criteria, highlighting that certain factors may be consistent with certain criteria without necessarily correlating with a diagnosis of <i>frailty</i> and <i>pre-frailty</i> .
3.	(Li et al., 2022) Ibadan North, Nigeria	Risk factors and a nomogram for frailty in Chinese older patients with Alzheimer's disease: A single-center cross-sectional study	This study aims to determine the risk factors for <i>frailty</i> in elderly Chinese patients with Alzheimer's disease (AD) and then construct a nomogram for <i>frailty</i> in this	This study uses a <i>cross-sectional study</i> .	Older age, lack of regular exercise habits, severe cognitive decline, and low social support are important risk factors contributing to the development of <i>frailty</i> in older Chinese AD patients. A nomogram for frailty prediction was created based on its four significant risk factors, and this nomogram was validated

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			population.		to have good discrimination and calibration ability in this population.
4.	(Liu et al., 2020) Changsha, China	Physical frailty and its associated factors among elderly nursing home residents in China	The aim of this study was to investigate the prevalence of physical frailty and associated factors among elderly people living in nursing homes in China.	This study uses a <i>cross-sectional study</i> .	This study showed that the overall prevalence of <i>frailty</i> and <i>prefrailty</i> were 55.6 and 38.5%, respectively. The rate of <i>frailty</i> increased substantially with age, and was higher in women than in men (69.5% vs. 30.5%). A multinomial logistic regression analysis showed that older age, female, living in a private institution, living alone or with a stranger, not exercising regularly ( $\leq 2$ times/week), and self-reported poor health were associated with significantly associated with an increased likelihood of being physically frail.  <i>Frailty</i> is highly prevalent in nursing home residents in China, especially in women. The potential role of factors associated with <i>frailty</i> warrants further investigation to explore their clinical application among elderly nursing home residents
5.	(Alqahtani et al., 2021) Riyadh	Prevalence of frailty and associated factors among Saudi community-dwelling older adults: a cross-sectional study	The aim of this study was to examine the prevalence of physical frailty, and associated factors among the elderly population in Saudi Arabia.	This study used a community-based <i>cross-sectional study</i> .	Research shows that the prevalence of physical weakness in elderly aged 60 years or more in Saudi Arabia is 21.4% (females, 22.7%), 47.3% in pre-frail conditions (females, 51.5%), and 31.2% in strong conditions (females, 32.2%). Women reported a higher prevalence of fatigue (35.3%), weakness (36.2%), and low physical activity (32.8%)  This study highlights the high prevalence of frailty and pre-frailty among Saudi elderly. Both frailty and pre-frailty are associated with living alone, multiple comorbidities, and impaired cognitive function.
6.	(Rahman et al., 2021) Bangladesh	Frailty indexed classification of Bangladeshi older adults' physio-psychosocial health and associated risk factors a cross	This study aims to understand the prevalence of frailty in elderly in Bangladesh; classify their health status and investigate	This study uses a <i>cross-sectional study</i> .	The mean age of participants was 63.6 years, and 61.6% were assessed as having poor to very poor health (moderate frailty/36.3% severe frailty/25.3%). The oldest group, women, and participants from low-income families were found

No.	Author, Place of Research and Year of Publication	Article Title	Research purposes	Research Design	Results/Conclusions
		sectional survey study	associated risk factors.		to be more vulnerable than their peers. Participants aged 70 years and above were more likely (adjusted OR: 4.23, 95% CI: 2.26–7.92, $p < 0.0001$ ) experienced frailty (medical condition) compared to the pre-elderly age group (55–59 years). Female participants were more susceptible (adjusted OR = 1.487, 95% CI: 0.84–2.64, $p < 0.0174$ ) to frailty (medical conditions) compared to males. In addition, older adults with higher family income (Income > \$473.3) found a lower risk (adjusted OR: 0.294, 95% CI: 0.11–0.76, $p < 0.011$ ) frailty (poor health)
7.	(Jiao et al., 2020) China in Tertiary Level Hospitals in China	Prevalence and associated factors for frailty among elderly patients in China: a multicentre cross-sectional study	The aim of this study was to identify the prevalence and factors associated with physical weakness among elderly patients in China.	This study used a <i>cross-sectional study</i> whose data came from a large-scale cohort survey.	<ul style="list-style-type: none"> <li>• A total of 9996 patients from 314 wards in 6 hospitals were studied in this study. The prevalence of frailty was 18.0% and the prevalence of pre-frailty was 43.0%. The average age of all respondents was <math>72.47 \pm 5.77</math> years and ranged from 65 to 97 years. A total of 57.8% of respondents were male, and most respondents were Han (94.16%)</li> <li>• The educational background of the total 40.29% of respondents was high school. Most of the respondents were married (88.81%) and almost half of the respondents had a BMI between 18.5 and 23.9. More than half of the patients were non-smokers (66.11%) and non-drinkers (70.50%); 14.23% of patients had a history of falls in the last 12 months. A small number of respondents had visual dysfunction (22.03%), hearing dysfunction (19.40%), urinary dysfunction (14.11%), bowel dysfunction (12.53%), and cognitive impairment (20.57%). Many respondents suffered from sleep dysfunction (43.87%).</li> </ul>

No.	Author, Place of Research and Year of Publication	Article Title	Research purposes	Research Design	Results/Conclusions
					<ul style="list-style-type: none"> <li>• Factors associated with weakness after being analyzed using a multivariate Poisson regression model obtained the following results: age (OR: 1.016, 95% CI: 1.012–1.020), BMI &lt;18.5 (OR: 1.248, 95% CI: 1.171–1.330), female gender (OR: 1.058, 95% CI: 1.004–1.115), ethnic minority (OR: 1.152, 95% CI: 1.073–1.236), hospital admission by emergency unit (OR: 1.104, 95% CI: 1.030–1.184), transit from another hospital (OR: 1.159, 95% CI: 1.049–1.279), previous alcohol use (OR: 1.094, 95% CI: 1.022–1.171), history of falls in the last 12 months (OR: 1.257, 95% CI: 1.194–1.323), visual dysfunction (OR: 1.144, 95% CI: 1.080–1.211), cognitive impairment (OR: 1.182, 95% CI: 1.130–1.237), sleep dysfunction (OR: 1.215, 95% CI: 1.215–1.318), urinary dysfunction (OR: 1.175, 95% CI: 1.104–1.251), and defecation dysfunction (OR: 1.286, 95% CI: 1.217–1.358). When stratified by sex, factors associated with frailty from mixed-effects Poisson regression models showed little difference between men and women. Hospital admission, history of alcohol consumption, and hearing loss were not associated with frailty in older women.</li> </ul>

## DISCUSSION

The increasing number of elderly people is currently not only happening in one country but is happening globally. As the elderly age, they will gradually become frail, a condition characterized by reduced physiological reserve capacity and reduced resistance to stress due to a decline in various physiological systems (Qi, Xin., et al. 2023). Frailty is an early sign of various adverse health impacts, which puts the elderly at higher risk of falls, fractures, disability, and morbidity when faced with stressors. Frailty has emerged as an urgent and serious public health problem in the elderly population because it impacts health care resources and services. In recent years, frailty has attracted significant attention in community

health nursing because of its potentially detrimental consequences for older individuals and society as a whole. Therefore, there are several studies that conduct research on factors related to with frailty among the elderly population. After conducting a systematic review by screening 1078 journal articles and selecting 7 articles that discussed factors related to frailty in the elderly. Research conducted by Santos, PHS, et al (2023) with a sample population of 216 elderly in 2014 with inclusion criteria of a minimum age of 60 years and living in urban areas and being able to participate in cognitive interviews. In another study conducted by Jiao, J., et al., (2024) had a sample population of 9996 elderly patients from 6 tertiary hospitals in China and patients were recruited if they met the criteria, namely aged 65 years and over, understood the purpose of the study and signed the consent form. Frailty assessment uses the FRAIL scale which is a clinical frailty screening tool consisting of 5 simple self-reported questions. The FRAIL scale score ranges from 0 - 5, 0, 3- 5 means representing a frail condition, 1-2 pre-frail and 0 is resilient (Jiao, J., et al., 2024). Then, in a study involving 486 elderly people aged 60 years and over living in the Riyadh area, the prevalence of frailty was determined using the Fried frailty phenotype ( Alqahtani, BA, et al 2021).

Based on the results of the prevalence of diagnostic criteria for frailty syndrome , frailty was found to be the most common criterion in the overall population (58.3%) and by gender (63.5% women and 52.5% men) (Santos, PHS, et al., 2023). The prevalence of frailty and pre-frailty were 18% and 43% respectively with 57.8% of respondents being male (Jiao, J., et al., 2024). The characteristics of the study respondents can also affect the differences in results in the study. The prevalence of physical weakness in the elderly aged 60 years and over in Saudi Arabia was 21.4% (women, 22.7%) 47.3% in pre-frail conditions (women, 51.5%), and 31.2% in strong conditions (women, 32.2%). Women reported a higher prevalence of fatigue (35.3%), weakness (36.2%), and low physical activity (32.8%) ( Alqahtani, BA, et al., 2021). Frailty rates increased substantially with age and were more higher in women compared to men (69.5% vs 30.5%) (Liu et al., 2020). According to research conducted by Santos, PHS, et al (2023) stated that frail elderly people show various combinations of clustered diagnostic criteria, and noted that frailty syndrome in the elderly occurs more often with clustered criteria compared to criteria that appear randomly with groupings of three and four criteria. The results of the study above state that the factors associated with frailty syndrome with a grouping of three criteria are the age group of 80 years and negative self-perception of health. While the grouping of four criteria is the age group of 80 years and the use of polypharmacy. Another study conducted by Jiao, J., et al. (2024) stated that frailty is associated with age, gender, lower BMI, hospitalization, previous alcohol use, history of falls, cognitive impairment and other factors. Meanwhile, the study conducted by Alqahtani, BA, et al (2021) explained that living alone, various comorbidities and impaired cognitive function are associated with the occurrence of frailty.

According to other research conducted by Barros., et al (2024) Lack of physical activity and low walking speed are the risk factors for frailty in the elderly. Several other factors including retirement status, marital status (unmarried), use of walking aids, low education level, decreased functional status, and poor mental health have been associated with frailty in the elderly. Liu et al., (2020) stated that frailty is common in nursing home residents in China. Older age, female, living in a private institution, living alone or with strangers, not exercising regularly ( $\leq 2$  times/week), and poor health were significantly associated with an increased likelihood of frailty. In line with research conducted on Rahman et al., (2021) participants aged 70 years and over, women and participants from low-income families were more vulnerable than their peers.

## CONCLUSION

As one of the risky aggregates, the elderly are at risk of experiencing various health problems, one of which is frailty. This systematic review has analyzed the literature on factors related to frailty in the elderly. Age is the most common factor found in several studies above. Elderly people over 70 years of age and taking several types of drugs have a higher risk of experiencing frailty. Age, gender, lower BMI, hospitalization, previous alcohol use, history of falls, living alone, irregular exercise, various comorbidities and cognitive dysfunction are associated with the occurrence of frailty. Elderly people who live alone and in social institutions are also associated with the incidence of frailty. These factors interact and influence each other in the occurrence of frailty in the elderly. Therefore, appropriate preventive and intervention steps, such as providing education to the elderly and their families to increase awareness of frailty. It is hoped that this systematic review can add new sources of knowledge about frailty, so that it can be used as a reference for researchers and other health workers.

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