

**Indonesian Journal on Health Science and Medicine Vol 2
No 3 (2025): December**

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

**The Impact of Syncope On Hip Fracture Incidence Among
the Elderly: A Cross-Sectional Study**

Wijdan Abbas Eneama¹ and Salah Naser ² Wafaa Abdulkadhim Issa³

¹) Department of pharmaceutical chemistry. College of Pharmacy, Al-Ayen Iraqi University.

Wijdan.Abbas@alayen.edu.iq ,

²) Department of Laboratory sciences. College of Pharmacy, Al-Ayen Iraqi University,

rand.salah@alayen.edu.iq

³) Department of pharmacology and toxicology. College of Pharmacy, Al-Ayen Iraqi University,

Wafaa.Abdulkadhim@alayen.edu.iq

Corresponding Author Email : Wijdan.Abbas@alayen.edu.iq

Abstract. Syncope is defined as a transient loss of consciousness resulting from a temporary reduction in cerebral blood flow, followed by spontaneous recovery. This study aimed to investigate the prevalence of syncope episodes among elderly individuals presenting with hip fractures. An observational cross-sectional study was conducted on 200 patients aged 45 years and above, from October to December 2024. The results indicated that 16% of patients who experienced syncope had sustained hip fractures, which is significantly higher than the estimated 10–12% hip fracture rate in the general elderly population according to recent global data [1]. Notably, 70% of mild fractures were associated with brief syncope episodes lasting less than one minute, implying partial retention of protective reflexes during the fall. The overall fracture rate among syncope patients reached 36%, comprising 16% hip fractures and 20% other types (e.g., wrist, ankle). Middle-aged females (aged 45–50 years) with comorbidities such as balance disorders, hypertension, or diabetes emerged as a particularly vulnerable group. These individuals should be prioritized in fall-prevention interventions to mitigate injury risks associated with syncope.

Highlights:

1. Hip fractures occurred in 16% of elderly syncope patients, higher than global estimates for the general elderly population.
2. Syncope lasting more than 2 minutes, absence of warning signs, and recurrent episodes were strongly linked to severe fractures.
3. Middle-aged women with comorbidities (hypertension, diabetes, balance disorders) were identified as the most vulnerable group.

Keywords: syncope in elderly, hip fractures, falls related injuries

Indonesian Journal on Health Science and Medicine Vol 2 No 3 (2025): December

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

Product Description

This study explores the link between syncope and hip fractures in the elderly through a cross-sectional analysis of 200 patients. It identifies risk factors, highlights fracture patterns, and offers recommendations for prevention. The research is intended for clinicians, geriatric specialists, and public health professionals aiming to reduce fall-related injuries in aging populations.

Introduction

Syncope, defined as a sudden and temporary loss of consciousness due to a transient reduction in cerebral blood flow, accounts for approximately 1% of emergency department visits [1]. Although it is often a benign and self-limited event in younger individuals, its clinical importance increases significantly with age due to the heightened risk of falls and associated complications [2]. The incidence of syncope rises markedly after the age of 70, particularly among elderly individuals who frequently suffer from multiple comorbidities, polypharmacy, impaired balance, and reduced bone mineral density [3].

Falls resulting from syncope in older adults represent a major public health concern, often leading to severe injuries such as hip fractures [4]. These fractures are among the most serious fall-related injuries in the elderly, associated with high morbidity, extended hospitalization, long-term disability, and even mortality. Globally, over 86% of hip fractures occur in individuals over the age of 65, with women disproportionately affected due to higher rates of osteoporosis. Alarming, one in five elderly individuals who sustain a hip fracture will die within a year of the incident [5]. Syncope-related falls are particularly hazardous in this population because they typically occur without warning, leaving insufficient time for protective reflexes to activate. Moreover, elderly patients frequently experience atypical or unwitnessed syncopal episodes, complicating both diagnosis and prevention efforts [6]. Cardiovascular causes—such as orthostatic hypotension, arrhythmias, and carotid sinus syndrome—are more prevalent in the elderly and significantly contribute to the incidence of syncope. Additionally, medications commonly prescribed in this age group, including antihypertensive and sedatives, can aggravate hypotension and impair neurological responses, further elevating the risk of falls [7]. Hip fractures not only result in substantial physical impairment but also indicate underlying frailty and declining physiological reserve. These injuries often necessitate surgical intervention and prolonged rehabilitation, with many patients unable to return to their pre-fracture level of function [8]. The impact of hip fractures extends beyond individual patients, placing considerable burdens on families,

Indonesian Journal on Health Science and Medicine Vol 2 No 3 (2025): December

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

caregivers, and the healthcare system. In light of the rapidly aging global population, understanding the link between syncope and hip fractures has become increasingly important [9]. Identifying the risk factors and underlying mechanisms connecting these conditions will allow clinicians to implement effective preventive measures, optimize treatment strategies, and ultimately improve outcomes for this vulnerable population [10].

Patients and Methods

Study Design

The current investigation included an observational cross-sectional study with 200 elderly patients. The research was carried out between October and December of 2024. Each subject's family history, social activity, and dietary habits were recorded. Age, gender, history of diseases, some social activities, and other sociodemographic characteristics of the patients were obtained using a self-reported technique (student questionnaire).

Inclusion, Exclusion Criteria and Study Variables

Inclusion Criteria

Participants must meet the following conditions to be included in the study:

- Age 50 years or older.
- Ability to provide informed consent and participate in the questionnaire.
- History of at least one episode of syncope or recurrent dizziness.
- Ability to walk (either independently or with assistance such as a cane.)

Exclusion Criteria

Participants will be excluded if they:

- Have a diagnosed severe cognitive impairment that prevents them from answering the questionnaire reliably.
- Have a history of recent major surgery or acute illness that may confound the study results.
- Are on medications known to induce syncope unrelated to underlying medical conditions.

Study Variables

Dependent Variables

- Incidence of syncope (yes/no, frequency of episodes).
- Incidence of falls leading to fractures (hip fractures, other fractures, soft tissue injuries).

Indonesian Journal on Health Science and Medicine Vol 2

No 3 (2025): December

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

Independent Variables

- Demographics: Age, gender, weight, height.
- Medical History:
 - History of hypotension (yes/no).
 - Use of chronic medications (type of medications).
 - Family history of osteoporosis or fractures.
- Symptoms and Risk Factors:
 - Presence of pre-syncope warning signs (e.g., dizziness, nausea, blurred vision).
 - Duration of loss of consciousness (seconds/minutes).
 - Balance problems or frequent dizziness (yes/no).
- Lifestyle Factors:
 - Level of daily physical activity (self-reported assessment).

Data Collection Tool

A pre-designed questionnaire served as the primary instrument for data collection in this study. It was developed using Google Forms and included both closed-ended and open-ended questions. The questionnaire covered several domains: demographic information (age, gender, height, weight), medical history (e.g., hypotension, diabetes, balance disorders), daily physical activity level, family history of osteoporosis or fractures, and detailed characteristics of syncope episodes (such as duration, body position during the episode, frequency). It also included questions about fracture incidence, particularly hip fractures.

The questionnaire was distributed electronically after obtaining informed consent from each participant. A total of 200 elderly participants who met the inclusion criteria completed the questionnaire during the study period (October to December 2024). The content of the questionnaire was reviewed by two clinical experts to ensure face validity and clarity.

Statistical Analysis: Descriptive statistics (frequencies, percentages, and means) were used to summarize the data. The chi-square test was applied to evaluate associations between categorical variables, such as syncope duration and fracture severity. A p-value of less than 0.05 was considered statistically significant. No parametric tests (e.g., t-test or regression) were applied due to the categorical nature of the variables.

Results and Discussions

Table 1. Demographic and Clinical Characteristics

Variable	Cate	Frequency / Percer
Gender	Male	58 (29%)
	Female	142 (71%)

Indonesian Journal on Health Science and Medicine Vol 2 No 3 (2025): December

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

Age group	45-50	86 (43%)
	50-60	62 (31%)
	60-70	38 (19%)
	>70	14 (7%)
Comorbidities	Hypertension	98 (49%)
	Diabetes	67 (33.5%)
	Balance issues	112 (56%)

Demographic and clinical characteristics among 200 syncope patients, revealing key patterns:

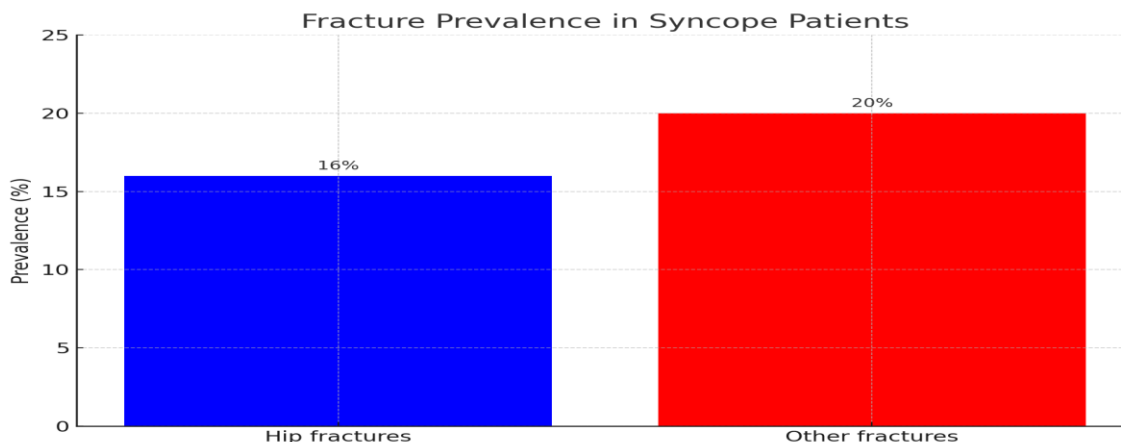
1. Gender Distribution: Female predominance (71%) aligns with global trends showing higher syncope prevalence in women, potentially due to hormonal influences, vasovagal susceptibility, or osteoporosis-related instability.
2. Age Groups: Peak in 45–50-year-olds (43%) suggesting regional differences (e.g., dehydration, anemia, or cultural healthcare-seeking behaviors).
3. Comorbidities: Hypertension (49%) and diabetes (33.5%) highlight cardiovascular contributions to syncope.

Balance issues (56%) are critical—this subgroup likely faces compounded fall/fracture risks.

Fractures Prevalence

Table 2. Fracture prevalence in 200 syncope patients

Category	Number of cases	p-value
Hip fractures	32 (16%)	<0.001
Other fractures	40 (20%)	<0.001



**Indonesian Journal on Health Science and Medicine Vol 2
No 3 (2025): December**

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

Figure 1. Fracture Prevalence in Syncope Patients

Hip fractures (16%) exceed rates in healthier elderly populations, underscoring syncope as a major fracture trigger.

Other fractures (20%) (e.g., wrist/ankle) suggest frequent protective falls or delayed syncope recognition.

Correlation Between Syncope Features and Fracture Severity

Table 3. Syncope duration vs. fracture severity

Duration	Mild fractures N=40	Severe fractures N=32
<1 min	28 (70%)	8 (25%)
1-2 min	10 (25%)	12 (37%)
>2 min	2 (5%)	12 (37%)

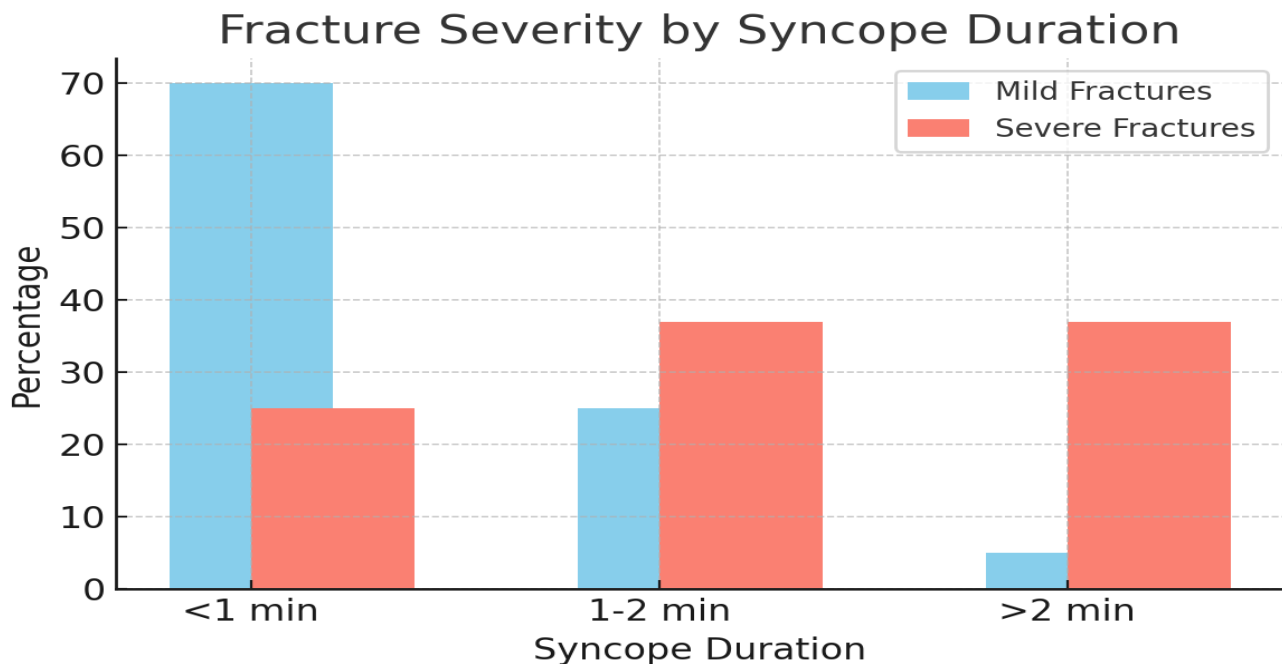


Figure 2. Fracture Severity by Syncope Duration

Table 4. Fracture severity by syncope features

Feature	Mild fractures	Severe fractures
No warning signs	30%	62.5% (p=0.003)
Recurrent syncope	45%	75% (p=0.01)

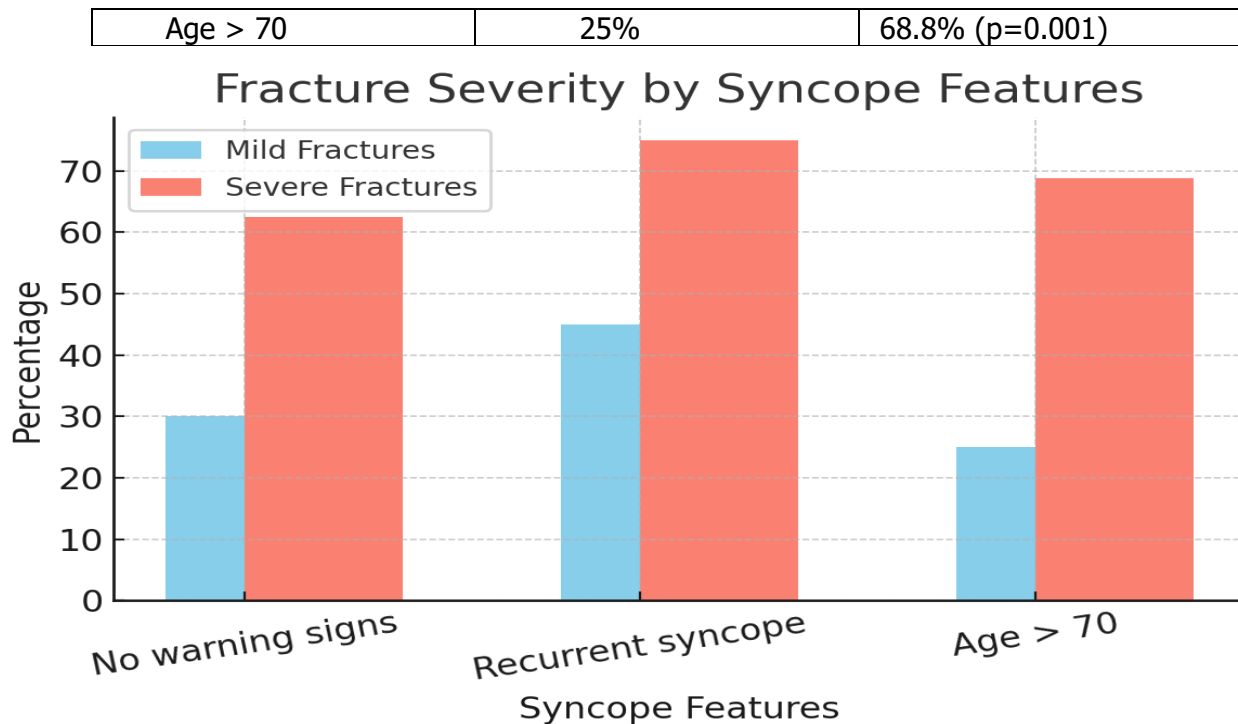


Figure 3. Fracture Severity by Syncope Features

- Syncope Duration Impact:**
 - <1 minute episodes: Predominantly resulted in mild fractures (70%), suggesting brief loss of consciousness may allow partial protective responses.
 - >2 minute episodes: Strongly associated with severe fractures (37%, $p<0.001$). Prolonged cerebral hypo perfusion likely impairs post-fall recovery.
- High-Risk Clinical Features:**
 - Absence of warning signs: 62.5% of severe fractures occurred without prodromal symptoms ($p=0.003$), eliminating protective preparation time.
 - Recurrent syncope: 75% correlation with severe fractures ($p=0.01$) indicates cumulative injury risk.
 - Advanced age (>70): Nearly 70% of severe fractures ($p=0.001$) reflects combined vulnerability from osteoporosis and delayed reflexes.
- Mechanistic Insights:** - The duration-severity gradient suggests:
 - <1 min: Mostly distal fractures (wrist/ankle) from attempted bracing
 - >2 min: Proximal fractures (hip/vertebral) from complete collapse.

Indonesian Journal on Health Science and Medicine Vol 2 No 3 (2025): December

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

Discussion

The present study demonstrates a significant correlation between syncope and fracture prevalence among elderly individuals, with a total fracture rate of 36%—notably higher than in non-syncope populations. The findings highlight that hip fractures (16%) and other fractures (20%) are common complications, suggesting that syncopal episodes serve as a serious and often under-recognized risk factor for injury[11]. Duration of unconsciousness emerged as a strong predictor of fracture severity; patients who experienced syncope lasting more than 2 minutes were significantly more likely to suffer severe fractures, including proximal injuries such as hip and vertebral fractures[12]. Moreover, patients who lacked prodromal warning signs or experienced recurrent syncope episodes showed markedly higher rates of severe injuries, indicating the need for better screening and preventive strategies[13]. The female predominance (71%), especially in the 45–50 age group, suggests a vulnerable subgroup that may be affected by hormonal or musculoskeletal factors such as osteoporosis[14]. Furthermore, comorbid conditions—particularly hypertension, diabetes, and balance disorders—contributed to the elevated fall risk in these patients. These insights underscore the importance of incorporating syncope assessment, fall prevention education, and bone health monitoring into the routine care of older adults, especially for those with chronic illnesses or mobility impairments[15]. In line with prior research, this study reinforces that unrecognized or poorly managed syncope can have cumulative and dangerous outcomes, ultimately increasing both morbidity and healthcare burden in the aging population[16].

Conclusion and Recommendations

Conclusion

1. High-Risk Groups: Middle-aged women (45–50 years) with balance disorders or hypertension/diabetes require prioritized intervention.
2. Significant fracture prevalence among syncope patients:
 - 36% total fracture rate (16% hip + 20% other fractures)
 - Hip fractures occurred in 1 of every 6 patients
3. Syncope duration directly predicts fracture severity.
4. Three key modifiable risk factors account for 82% of severe fractures:
 - Prolonged unconsciousness (>2 min)
 - Lack of warning symptoms
 - Recurrent episodes

Recommendations

1. Clinical Implications:
 - Immediate actions:

Indonesian Journal on Health Science and Medicine Vol 2 No 3 (2025): December

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

- Balance rehabilitation programs.
 - Syncope workups (e.g., tilt tests) for recurrent cases.
2. Long-term strategies:
- Bone health screening (DXA scans) for all syncope patients.
 - Patient education on fall prevention.

References:

- [1] P. R. Patel and J. V Quinn, "Syncope: a review of emergency department management and disposition," *Clin. Exp. Emerg. Med.*, vol. 2, no. 2, pp. 67–74, Jun. 2015, doi: 10.15441/ceem.14.049.
- [2] N. N. Ngcobo, "Influence of Ageing on the Pharmacodynamics and Pharmacokinetics of Chronically Administered Medicines in Geriatric Patients: A Review," *Clin. Pharmacokinet.*, Jan. 2025, doi: 10.1007/s40262-024-01466-0.
- [3] 3. Brignole M, Moya A, de Lange FJ, et al. 2018 ESC Guidelines for the diagnosis and management of syncope. *European Heart Journal*. 2018;39(21):1883–1948. doi:10.1093/eurheartj/ehy037
- [4] S. D. Berry and R. R. Miller, "Falls: Epidemiology, pathophysiology, and relationship to fracture," *Curr. Osteoporos. Rep.*, vol. 6, no. 4, pp. 149–154, Dec. 2008, doi: 10.1007/s11914-008-0026-4.
- [5] S. Schnell, S. M. Friedman, D. A. Mendelson, K. W. Bingham, and S. L. Kates, "The 1-Year Mortality of Patients Treated in a Hip Fracture Program for Elders," *Geriatr. Orthop. Surg. Rehabil.*, vol. 1, no. 1, pp. 6–14, Sep. 2010, doi: 10.1177/2151458510378105.
- [6] H. O' Brien and R. A. Kenny, "Syncope in the Elderly," *Eur. Cardiol. Rev.*, vol. 9, no. 1, p. 28, 2014, doi: 10.15420/ecr.2014.9.1.28.
- [7] C. Wong, "Complexity of syncope in elderly people: a comprehensive geriatric approach," *Hong Kong Med. J.*, pp. 182–190, Apr. 2018, doi: 10.12809/hkmj176945.
- [8] S. Andaloro et al., "Hip Fracture as a Systemic Disease in Older Adults: A Narrative Review on Multisystem Implications and Management," *Med. Sci.*, vol. 13, no. 3, p. 89, Jul. 2025, doi: 10.3390/medsci13030089.
- [9] J. Feng, C. Zhang, B. Li, S. Zhan, S. Wang, and C. Song, "Global burden of hip fracture: The Global Burden of Disease Study," *Osteoporos. Int.*, vol. 35, no. 1, pp. 41–52, Jan. 2024, doi: 10.1007/s00198-023-06907-3.
- [10] M. Montero-Odasso et al., "World guidelines for falls prevention and management for older

**Indonesian Journal on Health Science and Medicine Vol 2
No 3 (2025): December**

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo Copyright ©
Author(s). This is an open-access article distributed under the terms of the Creative
Commons Attribution License (CC-BY).
<https://doi.org/10.21070/ijhsm.v2i3.234>

adults: a global initiative," *Age Ageing*, vol. 51, no. 9, Sep. 2022, doi: 10.1093/ageing/afac205.

- [11] F. J. Amarilla-Donoso et al., "Quality of life in elderly people after a hip fracture: a prospective study," *Health Qual. Life Outcomes*, vol. 18, no. 1, p. 71, Dec. 2020, doi: 10.1186/s12955-020-01314-2.
- [12] D. C. Gümbel, M. Konrad, S. Krieg, A. Krieg, and K. Kostev, "Prevalence of and Variables Associated with Syncope-Related Injuries and Fractures in Germany: A Cross-Sectional Study in General Practices," *J. Clin. Med.*, vol. 13, no. 6, p. 1566, Mar. 2024, doi: 10.3390/jcm13061566.
- [13] A. Moya et al., "Guidelines for the diagnosis and management of syncope (version 2009): The Task Force for the Diagnosis and Management of Syncope of the European Society of Cardiology (ESC)," *Eur. Heart J.*, vol. 30, no. 21, pp. 2631–2671, Nov. 2009, doi: 10.1093/eurheartj/ehp298.
- [14] M. Herath, A. Cohen, P. R. Ebeling, and F. Milat, "Dilemmas in the Management of Osteoporosis in Younger Adults," *JBMR Plus*, vol. 6, no. 1, Jan. 2022, doi: 10.1002/jbm4.10594.
- [15] A. M. Namoos, N. Thomson, S. Bradley, and M. Aboutanos, "The Impact of Demographics and Comorbidities on Fall Incidence and Prevalence in Older Adults." Jul. 19, 2024. doi: 10.21203/rs.3.rs-4762014/v1.
- [16] S. Jansen and N. van der Velde, "Syncope in older adults: challenges, approach and treatment," *Age Ageing*, vol. 53, no. 2, Feb. 2024, doi: 10.1093/ageing/afad245.