# OSMANİYE KORKUT ATA UNIVERSITY
# FACULTY OF HEALTH SCIENCES
# DEPARTMENT OF GERONTOLOGY

# ABSTRACT BOOK

# I. International Falls and Accidents in Older Adults Symposium

## 1 OCTOBER-ONLINE

**OSMANİYE KORKUT ATA UNIVERSİTY**

**FACULTY OF HEALTH SCIENCES**

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# ABSTRACT BOOK

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## I. INTERNATIONAL FALLS AND ACCIDENTS IN OLDER ADULTS SYMPOSIUM

**1 OCTOBER 2024**

# I. INTERNATIONAL FALLS AND ACCIDENTS IN OLDER ADULTS SYMPOSIUM

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*I. INTERNATIONAL FALLS AND ACCIDENTS IN OLDER ADULTS SYMPOSIUM*

(SYMPOSIUM PROGRAM)

**TUESDAY, OCTOBER 1ST**

**OPENING SPEECHES (10.15-10.55)**

**Asst. Prof. Dr. Sümeyra Mihrap İlter**
Osmaniye Korkut Ata University Faculty of Health Sciences, Head of Gerontology Department

**Prof. Dr. İsmail Tufan**

Founding Head of the Department of Gerontology, Faculty of Health Sciences, Akdeniz University

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**Tolga Nacar**
Osmaniye Provincial Director of Family and Social Services

**İbrahim Çenet**
Mayor of Osmaniye Municipality

***10.55-11.00 Break***

**I. ORAL PRESENTATION SESSION (11.00-12.15)**

Session Moderator **Asst. Prof. Dr. Öznur İspir Demir**

**Sadanobu Kagamimori, Minako Nakabayashi, Masanori Kawahara (11.00-11.15)**

Measures to Reduce the Risk of Care Dependency: Spa Exercise Center

**Alper Doyuran (11.15-11.30)**

Evaluation of Fractures Due to Falls in the Older People from an Orthopedist's Perspective

**Aslı Gözde Akış, Ayşe Gülay Şahan, Özge Ertürk (11.30-11.45)**

The Effect of Psycho-Social and Environmental Factors on Fear of Falling in Older People and Its Results

**Lutfiye İpek, Gökçe Yağmur Güneş Gencer (11.45-12.00)**

Fear of Falling and Mindfulness in Older People

***12.15-13.00 Lunch Break***

**II. ORAL PRESENTATION SESSION (13.00-14.00)**

**Oturum Başkanı (Session Moderator): Asst. Prof. Dr. Melek Yağcı Özen**

**Jalal Alnatour & Bernd Seeberger (13.00-13.15)**

Risk Factors for Falls and Accidents in Older Adults in Germany: A Gerontological Perspective

**Christian Heidl & Gerhard Müller (13.15-13.30)**

Preventive Measures Against Falls in Older People in Germany: Innovative Interventions and Best Practices

**Nilufer Korkmaz Yaylagül (13.30-13.45)**

Theoretical Foundations of Environmental Gerontology in Prevention of Falls and Accidents in Old Age

**Melek Yavuz, Özlem Özgür & Gülüşan Özgün Başıbüyük (13.45-14.00)**

Ergonomic Investigation of Houses in Rural Areas: Ibradı Case

**Işık Akman & Deniz Pamuk (14.00-14.15)**

Informal Care from the Perspective of a Gerontologist: An Autoethnography

***14.15-14.30 Break***

**(III. ORAL PRESENTATION SESSION) 14.30-15.45**

**Oturum Başkanı (Session Moderator): Asst. Prof. Dr. Sümeyra Mihrap İlter**

**Derya Tülüce (14.30-14.45)**

Prevention of Falls and Accidents in Elderly Individuals: Empowerment Model

**Barış Kılıç & Gülüşan Özgün Başıbüyük (14.45-15.00)**

Bibliometric Analysis of Falls in Older Adults

**Semen Gökçe Tan (15.00-15.15)**

The Role of Local Governments and Urban Policies in Preventing Falls in Older Adults

**Mehmet Efe (15.15-15.30)**

"Sarcopenia in the Older Adults

***Kapanış Konuşmaları***

**Measures To Reduce The Risk Of Care Dependency: Spa Exercise Center**

**Sadanobu KAGAMİMORİ**

**Masanori KAWAHARA**

**Minako NAKABAYASHİ**

***Abstract***

In supporting the health of the elderly, an important perspective, beyond providing care for those already in need, is “preventing long-term care” for seniors who do not yet require assistance. In Japan, under the long-term care insurance system, municipalities and villages are now mandated to provide services aimed at preventing the risk of dependency for the elderly who do not yet need care. These services can foster unique activities tailored to the characteristics of the region. However, implementing such measures is not as straightforward as it sounds. Many regions face trial-and-error situations as they develop and execute prevention programs based on local conditions.

The Kadokawa Dependency Prevention Center in Toyama City was established in 2011 in the heart of the city. Utilizing hot springs, it serves as an exercise facility focused on preventing long-term care dependency. The center operates in collaboration with 32 Regional Comprehensive Support Centers across the city, and users come from all over Toyama. This report introduces the activities of Toyama City's only public center dedicated to preventing long-term care dependency, with the hope of aiding the development of regional preventive programs.

**Key words:** Frailty prevention, frailty prevention, hot spring exercise, Toyama-shi (Toyama City)

**Evaluation Of Fractures Due To Falls İn The Older People From An Orthopedist's Perspective**

**Alper Doyuran**

***Abstract***

With the more organized and reliable collection of statistical data today, health problems related to falls can be evaluated more objectively. When looking at data from the United States, around 300,000 people lost their lives due to trauma in 2022. Additionally, more than 300,000 people were adversely affected, unable to return to their previous daily routines. Elderly trauma is of great importance due to its high morbidity and mortality rates, as well as being largely preventable. Through short-term training that involves making adjustments in the living spaces of adults aged 60 and over, it is possible to prevent such traumas.

# The Effect Of Psycho-Social And Environmental Factors On Fear Of Falling İn Older People And Its Results

**Aslı Gözde Akış**

**Ayşe Gülay Şahan,**

**Özge Ertürk**

***Abstract***

Fear of falling in elderly individuals is an important problem that can have serious psychosocial consequences even if they do not fall. This study examines the psychosocial and social-environmental factors that affect the fear of falling in elderly individuals, the relationships between these factors, and their consequences. In this context, a comprehensive literature review has shown that fear of falling in elderly individuals can have negative consequences that affect both the physical and psychosocial health of individuals and reduce their social participation.

In general, fear of falling is associated with concerns about decreased physical capacity and loss of balance, as well as a weakening of the sense of social environment and personal control. This fear is based not only on the fear of physical injury, but also on the fear of decreasing the capacity to move independently and becoming dependent on others. Studies in this field show that fear of falling can lead to mental health problems such as anxiety and depression in elderly individuals; and individuals who constantly live with the fear of falling may experience a lack of self-confidence, low self-esteem, and a sense of loss of control. This situation can cause people to be hesitant to go out of the house or participate in social activities and experience social isolation, and over time, it can increase the risk of loneliness and depression. In addition, decreased participation in social activities in order to avoid the risk of falling may cause individuals to narrow their social networks and decrease their social participation. Another important consequence of fear of falling is the restriction of physical activity. Elderly individuals may reduce or completely stop their physical activities due to fear of falling. This situation may lead to physical declines such as decreased muscle strength and balance control and may make individuals more vulnerable to the risk of falling. Therefore, fear of falling has a dual effect on both psychosocial and physical health; decreased physical activity may cause more fear of falling and, as a result, more physical weakness. In this respect, fear of falling should be considered as a multidimensional problem shaped by psychosocial and social-environmental factors that directly affect the quality of life of elderly individuals. Measures such as education, safe environmental arrangements and physical activity programs are of great importance both in terms of reducing fear of falling and improving the general quality of life of individuals. As a result, interventions aimed at strengthening social support mechanisms, making physical environmental arrangements and increasing individuals' sense of self-efficacy are recommended to reduce fear of falling in elderly individuals. In this context, rehabilitation programs, safe home arrangements and social awareness activities stand out as effective strategies in reducing the fear of falling.

**Keywords**: Fear of falling, older people, socio-environmental

**Fear Of Falling And Mindfulness In Older People**

**Gökçe Yağmur Güneş Gencer**

**Lutfiye İpek**

***Abstract***

Falls represent significant public health concern among older adults, with the potential to result in adverse outcomes including morbidity, mortality, and loss of independence. A history of falls may result in the development of a fear of falling in older adults. It is established that fear of falling is a prevalent and significant issue among older adults, negatively impacting their quality of life and potentially leading to social isolation. Despite the apparent efficacy of mindfulness-based interventions in assisting older adults to cope with the fear of falling, there is a paucity of studies in the literature on this subject.

Mindfulness can be defined as a cognitive practice whereby one focuses attention on the experience that is currently occurring. It has been demonstrated that mindfulness-based interventions result in increased mindfulness and a reduction in the tendency of the mind to avoid other places. The application of mindfulness-based practices has been demonstrated to induce structural and functional alterations in the brain, including enhanced attention focus and a reduction in stress responses. These points are highly pertinent to the prevention of falls, given that distraction and inattention are known to increase the risk of such incidents. The application of mindfulness-based practices facilitates the development of the capacity to identify and modify involuntary cognitive processes. In relation to this, it has been stated that these practices have the potential to reduce the risk of falls in older adults due to their ability to reduce the level of anxiety, depression, fear and improve balance with increased body awareness. In a study, it was emphasized that walking meditation, which is one of the basic exercises in older adults with a history of falls, can be considered as an alternative treatment to improve the balance abilities of the older adults.

It is hypothesized that structured mindfulness-based programs may contribute to the reduction of fear of falling and the prevention or reduction of the risk of falling in older adults, thereby positively impacting their health and quality of life. It is therefore anticipated that the necessity for medical interventions associated with falls may diminish, resulting in substantial savings in healthcare expenditure. Given the simplicity of integrating mindfulness-based interventions into existing healthcare provision, it is postulated that these interventions may serve as a promising approach to mitigate the fear of falling and prevent falls. However, further research is required to substantiate this hypothesis.

**Keywords**: Older adults, mindfulness, mindfulness, balance, falls, interventions to prevent falls

**Theoretical Foundations of Environmental Gerontology in Preventing Falls and Accidents in Old Age**

**Nilufer Korkmaz-Yaylagul**

Falls and accidents are significant risk factors for serious health problems among older adults. Falls in old age are often associated not only with age-related changes but also with physical environmental factors such as poor lighting, inappropriate furnishings, or unsafe flooring. This study examines the effects of home modifications in the microenvironment and public space designs in the macroenvironment on the safety of older adults within the theoretical framework of environmental gerontology.

The theoretical foundations of this framework are based on Kleemeier's approach, which emphasizes the compensation of motor ability decline through environmental adaptations, Lawton and Nahemow's press-competence model highlighting the importance of adapting to environmental demands, and Kahana's person-environment fit model, which stresses the alignment between individual needs and environmental resources.

Building on these theories, this study suggests that interventions inspired by environmental gerontology can significantly reduce the risk of falls in older adults. Moreover, innovative approaches such as age-friendly neighborhoods and smart home technologies hold the potential to enhance safety environment and improve the quality of life for older individuals.

**Keywords**: Aging, fall prevention, environmental gerontology, person-environment fit.

**Ergonomic Investigation Of Houses In Rural Areas: Ibradı Case**

**Gülüşan Özgün Başıbüyük**

**Özlem Özgür**

**Melek Yavuz**

***Abstract***

Objective: This research is a small-scale pilot study conducted during the preliminary preparation phase of the project to test the feasibility, effectiveness, and suitability of the main methods and data collection tools. The aim of the study is to investigate how the houses of elderly individuals in rural areas can be evaluated ergonomically and to provide improvement suggestions. The importance of examining elderly housing in rural areas from an ergonomic perspective is to ensure that elderly individuals can live safely, comfortably, and healthily. This study aims to identify these issues and offer solutions, especially in preventing falls and accidents caused by non-ergonomic environmental conditions.

Method: This study was conducted using a mixed-methods design, in which both qualitative and quantitative data were collected and utilized together, combining both research approaches. The data collection tools consisted of a Socio-Demographic Information Form, a Home Safety Conditions Assessment Form in Terms of Fall Risk, and a semi-structured interview form developed by reviewing the relevant literature. This study was conducted in the Aşağı and Yukarı neighborhoods of the İbradı district in Antalya province. The sample of the research was determined using snowball sampling, a type of non-probability sampling. The research was carried out through in-depth interviews and surveys with 20 participants. With the participants' consent and in accordance with their knowledge, the interviews were audio-recorded. The interviews were transcribed based on the audio recordings and the notes taken during the interviews.

Findings: The youngest participant is 65 years old, and the oldest is 92 years old. There were no significant differences in the socioeconomic levels of the participants. Generally, the participants had either completed primary school or were illiterate. Half of the participants are married, while the other half are widowed. Although most of the participants do not live alone, nearly half of them do. According to the results of the Home Safety Conditions Assessment Form in Terms of Fall Risk, the highest total score was 37 (out of 37), and the lowest was 20. The average score was 26.6. The majority of participants have experienced a fall. Most of them stated that they fell because they tripped over something, like a rug, inside the house. Falls also occurred around the house, not just indoors.

Conclusion: In conclusion, the ergonomic evaluation of elderly housing in rural areas is important for enhancing the quality of life of elderly individuals and making their homes safer and more functional. Recommendations have been provided in areas such as accessibility for the disabled, lighting, flooring materials, furniture arrangement, bathroom and toilet design, kitchen layout, heating and cooling systems, and communication. These recommendations offer a general framework for the ergonomic assessment of elderly housing in rural areas. However, since each house has different characteristics, evaluations should be tailored to individual needs and the structure of the house.

**Keywords**: Rural area, ergonomics, old age, falls

**Informal Care From The Perspective Of A Gerontologist: An Autoethnography**

**Deniz Pamuk**

**Işık Akman**

***Abstract***

This study reflects the experiences of the first author as the grandchild of a grandfather with cancer diagnosis in Muş during the last year of her undergraduate gerontology education covering the dates of December 2023-July 2024. It was aimed to present these experiences with a qualitative design and based on the autoethnographic narratives of the first author. Autoethnography is a qualitative research method in which a person who interacts with social and cultural institutions investigates her own life experience. While the first author conveyed her experiences, the second author collaborated in analyzing to increase the understanding of the interaction within the context. Thus, it will provide the opportunity to learn first-hand the reflections of informal older care on the caregiver family member within the sociocultural context.

In the study, the emphasis given to care within the extended family since the cancer diagnosis, the difficulties experienced by the grandfather diagnosed with bone cancer, and the processes related to the emergence of falls, accidents and fear of falling during the care process, access to health services, gender roles and the impact of cultural values on care were discussed.

**Keywords:** Narrative gerontology, reminiscence, biographical ageing

**Prevention Of Falls And Accidents In Elderly Individuals: Empowerment Model**

**Derya Tülüce**

***Abstract***

The process of aging is a biopsychosocial change. The human body undergoes a series of physiological changes as a consequence of the aging process. During the aging process, a number of physiological changes occur in a number of different systems in the body, including the hematological system, immune system, cardiovascular system, respiratory system, gastrointestinal system, neurological system, endocrine system, excretory system, musculoskeletal system and senses. The physiological changes that occur during the aging process can lead to the development of multiple chronic diseases in elderly individuals. This situation results in the loss of function in tissues and organs, psychomotor regression, and limitations in individuals' daily activities. Additionally, there is an increased frequency of falls and accidents.

Falls and accidents are a significant cause of fractures and dependency in elderly individuals. It is established that over half of the elderly population experiences falls, with a significant proportion requiring medical intervention. Such circumstances can engender a psychological aversion to falling. Nevertheless, the fear of falling can also result in a reduction in activity levels, muscle strength and the incidence of falls. In order to interrupt this cycle, it is essential to enhance the self-efficacy levels of elderly individuals. One of the most efficacious methods of enhancing the level of self-efficacy is the elderly empowerment model. The term 'empowerment' is used to describe a process whereby individuals gain greater control over decisions and actions that affect their health. The term "empowered elderly" denotes an individual who is actively engaged in the empowerment process and who demonstrates an ability to enhance their actions. The empowerment model can be effectively employed in the management of both self-care and health problems among the elderly. The empowerment model encompasses a range of strategies, including health education, rehabilitation, active utilization of healthcare services, and the promotion of physical activity. In particular, the empowerment of elderly individuals through health education has been shown to enhance their daily living activities, augment their level of independence in daily activities, and bolster their capacity to cope with problems. This study aims to contribute to the enhancement of physical activity levels among elderly individuals, the reduction of the incidence of falls, and the prevention of accidents through the empowerment model.

**Keywords**: Elderly; fall risk; empowerment model; nursing

**Bibliometric Analysis Of Falls In Older Adults**

**Barış Kılıç**

**Gülüşan Özgün Başıbüyük**

***Abstract***

The objective of this study is to conduct a comprehensive and systematic analysis of the current status and development trends of research related to falls in older adults, employing bibliometric methods. The literature related to falls in older adults published between 1977 and 2023 was retrieved from the Web of Science Core Collection database. The statistical analysis and knowledge mapping of the literature were conducted using the R Studio Bibliometrix software. A total of 2,826 publications related to falls in older adults were retrieved. The articles were authored by 11,280 researchers from 2,080 institutions across 66 countries and published in 696 academic journals. The work of Lord SR, Delbaere K, Rubenstein LZ, Tinetti ME, and others has had a significant impact on the study of falls in older adults. Lord SR is the most prolific author, while Rubenstein LZ is the most cited author. The United States and Australia have the highest number of publications in this field, while Harvard University and the University of New South Wales, Sydney, are the most influential institutions. The highest number of articles were published in BMC Geriatrics, while the Journal of the American Geriatrics Society had the highest number of citations. The current research focus and development direction in the field of falls in older adults is the development of fall detection systems, perturbation-based balance training and fall risk assessment. The current focus of research on falls in older adults is on risk factors, prevention and balance. This study employs bibliometric and knowledge mapping analysis to examine the present research trends and pivotal areas in the domain of falls among older adults, while also underscoring prospective research directions. The findings can serve as a theoretical foundation and practical guide for scholars to build upon. Despite the considerable research efforts that have been made, fall prevention remains a pivotal public health concern in our ageing society, as many older adults still lack access to effective interventions. These insights can be leveraged to improve services, develop policies, and design exercise programs aimed at preventing falls in this vulnerable population.

**Keywords**: fall, older adults, bibliometrics

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Muş Alparslan Üniversitesi

**The Role Of Local Governments And Urban Policies In Preventing Falls In Older Adults Semen Gökçe Tan**


***Abstract***

Falls among the elderly are a significant public health concern, often leading to serious injuries, loss of independence, and increased healthcare costs. Local governments play a crucial role in addressing these risks through urban policy and infrastructure, creating safer environments that promote active aging. This makes integrating fall prevention into urban planning a critical public health priority. The World Health Organization's Age-Friendly Cities initiative is vital in reducing falls among older adults by improving urban design, transportation, housing, and public space safety. Local governments can play a key role in reducing falls and promoting safer, more active aging. This study examines how urban planning decisions, such as public lighting, transportation systems, and housing arrangements, affect fall risks. The aim is to explore the role of local governments and urban policies in reducing fall risks among elderly populations living in urban areas. Qualitative research methods were used in this study, along with statistical data from institutions and organizations, and a literature review. The findings are organized around examples and recommendations from age-friendly city initiatives in various countries aimed at ensuring the safety of aging populations.



**Keywords:** Falls, urban policies, age-friendly cities, older adults, local governments.

**Sarcopenia In The Older Adults**

**Mehmet Efe**

***Abstract***

Sarcopenia is a progressive and generalized skeletal muscle disorder involving the accelerated loss of muscle mass and function that is associated with increased adverse outcomes including falls, functional decline, frailty, and mortality. It occurs commonly as an age- related process in older people, influenced not only by contemporaneous risk factors, but also by genetic and lifestyle factors operating across the life course. It can also occur in mid-life in association with a range of conditions.

Sarcopenia has become the focus of intense research aiming to translate current knowledge about its pathophysiology into improved diagnosis and treatment, with particular interest in the development of biomarkers, nutritional interventions, and drugs to augment the beneficial effects of resistance exercise

Sarcopenia results from complex and interdependent pathophysiological mechanisms that include aging, physical inactivity, neuromuscular compromise, resistance to postprandial anabolism, insulin resistance, lipotoxicity, endocrine factors, oxidative stress, mitochondrial dysfunction, and inflammation

The Prevalence of sarcopenia ranges from 3% to 24% depending on the diagnostic criteria used and increases with age.

# Risk Factors For Falls And Accidents In Older Adults In Germany: A Gerontological Perspective

**Bernd Seeberger,**

**Jalal Alnatour**

**Objective**: Falls and accidents in older people represent a significant public health challenge, particularly in ageing societies such as Germany. These incidents often lead to serious injury, disability, loss of independence and increased mortality. A thorough understanding of the multifactorial causes of falls is crucial for the development of effective prevention strategies. The aim of this study is to identify and analyze the main risk factors that contribute to falls and accidents in older adults in Germany.

**Methods:** A comprehensive review of the literature and epidemiological data was conducted to investigate the physiological, environmental and behavioral determinants of falls.

**Results**: The results show that a holistic approach to fall prevention, taking into account both individual and environmental factors, is essential. Key physiological factors include age-related declines in muscle strength, balance and vision, as well as chronic conditions such as osteoporosis, cardiovascular disease and diabetes. Environmental hazards, such as uneven surfaces, inadequate lighting and a lack of safety in the home environment, also increase the risk of falling. Behavioral factors such as the use of certain medications, alcohol consumption and lack of exercise also contribute significantly to the incidence of falls. Interventions that include physical training programs to improve balance and strength, adaptations in the home environment and training in the use of medication have been shown to be particularly effective in reducing the risk of falls. The importance of regular falls risk assessments by healthcare professionals and the provision of tailored prevention measures is also emphasized.

**Discussion:** Falls in older people in Germany result from a complex interplay of factors. Effective prevention requires a multidisciplinary approach involving healthcare providers, carers and community organizations. By addressing both modifiable and non-modifiable risk factors, the incidence of falls can be reduced and the quality of life of the elderly population improved.

**Keywords:** accidental falls, risk factors, falls prevention, elderly people,

## 1. Background

Falls are a leading cause of morbidity and mortality among older adults, representing one of the most pressing public health challenges in aging societies worldwide (World Health Organization, 2021). The consequences of falls extend far beyond immediate injuries, impacting individuals, families, and healthcare systems. In Germany, where the population aged 65 years and older is projected to grow significantly over the coming decades, falls represent a substantial and escalating public health concern (Statistisches Bundesamt, 2023).

Falls are a multifactorial phenomenon resulting from a complex interplay of physiological, environmental, and behavioral factors. Physiological declines, including age-related reductions in muscle mass, balance, and sensory perception, are compounded by environmental hazards and modifiable behaviors such as physical inactivity or improper medication use (Ambrose, Paul, C Hausdorff, 2013). Beyond physical injuries like fractures and head trauma, falls have profound psychological consequences, including fear of falling and associated reductions in mobility and social participation (Gillespie et al., 2012).

The economic implications are equally significant. Falls are a leading cause of hospitalizations and long-term care admissions in older adults, placing a substantial financial burden on healthcare systems (Rubenstein, 2006). These cascading consequences necessitate a comprehensive and evidence-based understanding of the risk factors contributing to falls, as well as targeted strategies for their prevention.

This systematic review employs a Cochrane-style methodology to synthesize evidence on the risk factors associated with falls and accidents among older adults in Germany, with the ultimate aim of informing clinical practice and policy initiatives.

## 2. Objectives

This review systematically evaluates the physiological, environmental, and behavioral risk factors associated with falls in older adults living in Germany. It also seeks to identify effective intervention strategies and provide evidence-based recommendations for reducing fall risks and associated injuries. The primary aim is to identify key factors contributing to falls in older adults, including physiological changes, environmental hazards, and behavioral patterns.

Furthermore, the review assesses the prevalence and impact of these factors within the German context, recognizing the unique demographic and social characteristics of the aging population. In addition, this review examines the effectiveness of various intervention strategies designed to mitigate fall risks, focusing on their applicability and outcomes in real-world settings. By synthesizing this information, the review aims to provide actionable insights for healthcare practitioners, policymakers, and caregivers, enabling them to develop and implement targeted prevention measures. Ultimately, the study seeks to bridge gaps in existing literature and advance a holistic understanding of fall prevention, contributing to improved safety and quality of life for Germany's aging population.

## 1. Methods

To address the objectives of this review, a systematic methodology was employed, adhering to rigorous eligibility criteria to ensure the inclusion of high-quality studies. The review focused on studies examining older adults aged 65 years and above residing in Germany, targeting factors that influence the occurrence of falls. The inclusion criteria specified studies that explored physiological, environmental, and behavioral risk factors, as well as those comparing individuals who experienced falls with those who did not. Additionally, only studies that reported outcomes such as fall frequency, injury severity, and the effectiveness of preventive interventions were considered. Randomized controlled trials (RCTs), cohort studies, case-control studies, and observational studies published in peer-reviewed journals formed the basis of the analysis.

The literature search was conducted across multiple databases, including PubMed, Cochrane Library, and Google Scholar. Complementary data sources included reports from the Robert Koch Institute and the Federal Statistical Office (Statistisches Bundesamt). Search terms such as "Falls in older adults," "Risk factors," "Germany," and "Fall prevention strategies" were employed to ensure comprehensive coverage of relevant studies.

To maintain methodological rigor, the Cochrane Risk of Bias Tool was utilized to evaluate the quality of the included studies. This assessment considered factors such as randomization, allocation concealment, blinding, and the accuracy of outcome reporting. The majority of the studies demonstrated low to moderate risk of bias, ensuring reliable and robust findings.

Data extraction followed a structured approach, capturing key details about study design, population characteristics, identified risk factors, and intervention outcomes. A narrative synthesis was employed to integrate findings, supported by tabulated summaries for clarity. While quantitative synthesis or meta-analysis was not conducted due to heterogeneity in study designs and reported outcomes, the review provides a comprehensive overview of the multifactorial nature of fall risks in older adults and the strategies available for their prevention.

## 4. Results

Falls in older adults are influenced by a multifaceted interplay of physiological, environmental, and behavioral factors. This section elaborates on these risk factors, demonstrating how intrinsic and extrinsic conditions contribute to fall susceptibility.

### 4.1 Physiological Risk Factors

Physiological declines associated with aging are among the most critical contributors to fall risk. These intrinsic factors often exacerbate one another, creating a cascade of vulnerabilities.

One prominent physiological factor is sarcopenia, the age-related loss of muscle mass and strength. This condition particularly affects the lower extremities and impairs balance and mobility, significantly increasing susceptibility to falls. Studies estimate that sarcopenia impacts up to 40% of individuals aged 70 and older, making it a substantial risk factor for falls (Cruz-Jentoft et al., 2019).

Chronic illnesses such as osteoporosis, diabetes, and cardiovascular diseases also play a pivotal role. Osteoporosis reduces bone density, making fractures more likely during falls, especially in critical areas like the hips. Diabetes and cardiovascular conditions impair sensory-motor integration and contribute to balance deficits, further elevating fall risk (Bergström et al.,

2008).

Additionally, neurological disorders such as Parkinson's disease and stroke are strongly associated with increased fall risks. These conditions impair motor coordination, gait stability, and reflex responses, making it difficult for affected individuals to navigate even minor obstacles safely (Lord et al., 2007).

Finally, sensory deficits significantly heighten fall risks. Visual impairments, including cataracts and macular degeneration, limit depth perception and the ability to detect potential obstacles. These impairments are particularly problematic in poorly lit environments, where visual acuity is further compromised (Black et al., 2011). Combined, these physiological factors highlight the intrinsic vulnerabilities that older adults face as they age.

### 4.2 Environmental Risk Factors

Environmental hazards are another substantial contributor to fall risks, particularly for older adults who often spend significant time in their immediate surroundings. Unsafe environments can exacerbate physiological vulnerabilities and increase the likelihood of accidents.

Home hazards are among the most common environmental risk factors. Loose carpets, uneven flooring, poor lighting, and the absence of assistive devices such as grab rails in bathrooms are widespread in the living environments of older adults. These hazards are particularly problematic for individuals with reduced mobility or impaired vision, creating a high-risk scenario for falls (Pynoos et al., 2012).

Outdoor risks further complicate mobility for older adults. Uneven sidewalks, slippery surfaces during icy winters, and inadequate urban infrastructure present significant challenges. These conditions are especially dangerous for individuals who rely on mobility aids, as navigating uneven terrain increases their risk of tripping or losing balance.

Additionally, the risk is amplified for individuals who are living alone. In such situations, the absence of immediate assistance after a fall can exacerbate the consequences, leading to longer recovery times and, in severe cases, higher mortality rates. Social isolation often correlates with a lack of awareness or implementation of safety modifications in the home, further increasing the risk (Bergland C Wyller, 2004).

### **4.3 Behavioral Risk Factors**

Behavioral patterns and lifestyle choices also play a significant role in determining fall risk. These factors are often modifiable, making them a critical area for intervention.

One of the most significant behavioral contributors is polypharmacy, defined as the concurrent use of five or more medications. Medications such as sedatives, antidepressants, and antihypertensives are particularly problematic as they impair cognitive and motor functions, leading to an increased risk of falls. Polypharmacy is a prevalent issue among older adults, with studies showing a strong correlation between medication use and fall incidents (Maher et al., 2014).

Alcohol consumption further compounds these risks. Even moderate alcohol intake can impair motor coordination, reflexes, and judgment, all of which are critical for maintaining balance. The effects of alcohol are often magnified in older adults due to age-related changes in metabolism, making even small amounts risky (Langlois et al., 2005).

Lastly, physical inactivity is a major behavioral risk factor. Sedentary lifestyles contribute to decreased muscle strength, balance, and overall fitness, making individuals more susceptible to falls. Conversely, regular exercise programs focusing on strength and balance have been shown to reduce fall risk by as much as 30%. These programs are particularly effective when tailored to the specific needs of older adults, highlighting the importance of physical activity in fall prevention strategies (Sherrington et al., 2011).

## 5. Discussion

The discussion synthesizes the findings of this review, emphasizing the multifaceted nature of fall risks among older adults in Germany. It also explores practical implications for prevention, highlights the role of emerging technologies and community-based initiatives, and identifies limitations and gaps in existing research.

### 5.1 Integration of Findings

The findings demonstrate that falls among older adults result from a complex interplay of intrinsic (physiological) and extrinsic (environmental and behavioral) factors. Physiological declines, such as sarcopenia, chronic illnesses, and sensory deficits, represent largely non-modifiable risk factors. However, these intrinsic vulnerabilities are often exacerbated by environmental hazards and modifiable behavioral patterns, such as sedentary lifestyles and polypharmacy. This interplay underscores the importance of addressing fall risks holistically rather than focusing on isolated factors.

Environmental hazards, such as unsafe home settings or poorly designed urban infrastructure, highlight the critical need for structural modifications and policy-level interventions. At the same time, the behavioral domain presents significant opportunities for individual and community-level interventions, such as promoting physical activity and ensuring safe medication practices.

By recognizing these interdependencies, stakeholders can design and implement comprehensive strategies that address both the root causes and the contextual factors contributing to falls. This integrated approach is particularly relevant in Germany, where the aging population necessitates scalable and sustainable fall prevention solutions.

## 5.2 Implications for Prevention

The review identifies several evidence-based strategies that can effectively mitigate fall risks among older adults. These strategies emphasize multifactorial interventions, technology integration, and community engagement to address the diverse causes of falls.

**Multifactorial Interventions:**

Programs combining physical activity, home modifications, and medication reviews are particularly effective in reducing fall risks. Exercise programs that focus on balance, strength, and flexibility not only improve physical resilience but also help build confidence and reduce fear of falling. For instance, tai chi and strength training have shown substantial benefits in improving balance and muscle strength. Home safety assessments and modifications, such as installing grab rails, decluttering living spaces, and improving lighting, address environmental risks. Medication reviews by healthcare professionals ensure that prescribed drugs, such as sedatives and antidepressants, do not inadvertently increase fall risk (Gillespie et al., 2012). These integrated interventions are most successful when tailored to individual needs and supported by healthcare teams.

**Technology Integration:**

Emerging technologies provide innovative solutions for fall prevention. Wearable devices, such as fall detectors, can monitor movements and send alerts to caregivers or emergency services when falls occur. Smart home systems equipped with motion sensors, automated lighting, and voice- activated controls reduce environmental risks and enhance safety. Virtual reality (VR) and augmented reality (AR) applications are increasingly being used for balance and coordination training, offering engaging and personalized exercise routines (Rubenstein, 2006). While these technologies show promise, widespread adoption requires addressing barriers such as cost, accessibility, and user education.

**Community Engagement:**

Community-based programs are crucial for raising awareness about fall risks and supporting older adults in maintaining their independence. Educational initiatives targeting caregivers, healthcare providers, and older adults can increase awareness of fall risks and promote proactive prevention measures. Group exercise classes, particularly those designed for older adults, not only improve physical fitness but also foster social connections, which are vital for mental and emotional well-being (Zijlstra et al., 2007). Local governments and community organizations can also contribute by improving urban design, such as ensuring safer pedestrian pathways, maintaining sidewalks during winter, and increasing access to public transportation.

## 5.3 Limitations and Research Gaps

Despite robust findings, this review highlights several limitations and gaps in the existing research:

**1. Heterogeneity in Study Designs:**

The variability in study designs, populations, and intervention protocols limits the ability to directly compare results across studies. For instance, some studies focus exclusively on individuals with specific conditions, such as osteoporosis or diabetes, while others evaluate broader populations, leading to inconsistent risk profiles.

**2. Short-Term Data on Interventions:**

Many studies assess the effectiveness of interventions over short durations, leaving uncertainties about their long-term benefits. For example, while exercise programs show immediate improvements in balance and strength, their adherence and effectiveness over years remain underexplored.

**3. Socioeconomic and Cultural Disparities:**

There is limited research on how socioeconomic factors, cultural norms, and geographic location influence fall risks and access to prevention resources. Understanding these disparities is essential in a country like Germany, where demographic diversity is increasing.

**4. Real-World Application of Technology:**

Although technological solutions show promise, their effectiveness in real-world settings is under-researched. Questions about user compliance, cost-effectiveness, and integration with existing healthcare services remain unanswered. Future research should prioritize large-scale, long-term studies that address these gaps, focusing on inclusive and sustainable strategies to improve fall prevention.

## 6. Conclusion and outlook

Falls in older adults are a multifaceted issue requiring comprehensive, evidence-based prevention strategies. The findings of this review highlight the critical role of integrated approaches in addressing physiological, environmental, and behavioral risk factors. By leveraging exercise programs, environmental modifications, and medication reviews, healthcare providers can significantly reduce fall-related morbidity and mortality.

Emerging technologies and community-based initiatives offer innovative pathways to enhance fall prevention efforts. However, their successful implementation will depend on overcoming barriers such as cost, accessibility, and user acceptance. Policymakers and healthcare leaders must work collaboratively to ensure these solutions are scalable and equitable, addressing the unique needs of Germany's aging population.

Future research should focus on the long-term efficacy and scalability of interventions, with an emphasis on understanding socio-economic and cultural influences. By advancing holistic and proactive prevention strategies, the quality of life for older adults in Germany can be significantly improved, ensuring their safety and well-being in an increasingly aging society.

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# Preventive Measures Against Falls In Older People In Germany: Innovative Interventions And Best Practices

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**Introduction:** Falls and accidents are among the most frequent and serious health risks for older people in Germany. Around 30% of people over the age of 65 who live at home fall at least once a year, with the figure in care homes rising to 50%. These incidents lead to both physical injuries and psychological stress, such as loss of independence, etc. In view of the ageing population in Germany, it is important to develop preventive measures to minimize the risk of falls and improve the quality of life of older adults. The aim of this article is to analyze which innovative and preventive approaches and best practices exist in Germany to reduce falls in older people.

**Methodology:** The study is based on a comprehensive literature review on prevention strategies for falls in older people in Germany. The data sources include scientific articles, case studies, fall prevention programs and national health reports. The focus is on multifactorial approaches that integrate both physical and technological interventions, such as exercise programs, home adaptations and the use of digital technologies for fall risk assessment.

**Results:** The analysis shows that exercise programs that improve balance, strength and mobility are one of the most effective preventive measures. Programs such as 'Fall Prevention in Care' have reduced the risk of falls in older people. Technological solutions, such as the Lindera mobility analysis, offer additional personalized fall risk profiles and enable targeted interventions based on artificial intelligence. Environmental adaptations such as the removal of trip hazards and the installation of grab rails also make a significant contribution to reducing the risk of falls.

**Discussion:** The results show that a multifactorial combined prevention strategy that includes physical, technological and environmental measures is most effective in preventing falls in older people. The integration of exercise training programs into the daily lives of older people should be further promoted, as should the use of technologies that can accurately assess individual risks. The challenges in implementation lie in both the availability of and access to technical aids as well as the widespread implementation of such programs in rural areas.

**Keywords**: Prevention, falls, older people, innovative interventions, best practices

Falls are one of the most common and most serious health risks for older people. In Germany, around a third of people over the age of 65 who live at home fall at least once a year. In care facilities, the figure is as high as 50% (RKI, 2021). These incidents often have significant health and psychosocial consequences. These include fractures, head injuries, long-term loss of mobility and the impairment of a person's mental, emotional and social health. In addition to the physical damage, many of those affected suffer from psychological stress such as the fear of falling again, which often leads to a withdrawal from social activities and a reduction in quality of life (Rapp et al., 2011).

Demographic change in Germany is increasing the urgency of this problem: by 2035, the proportion of over 65-year-olds is expected to rise to 28% (Federal Statistical Office, 2020). Against this backdrop, the development and implementation of effective fall prevention measures is of crucial importance. Studies show (Lewis et al., 2024; NIA, 2020) that falls are not only related to physical factors such as limited mobility and strength, but also to environmental conditions, cognitive abilities and social isolation (Rubenstein C Josephson, 2006; DNQP, 2022).

Numerous approaches to fall prevention have proven their worth. Physical measures such as exercise programmes to strengthen strength and balance are among the most effective strategies. At the same time, technological innovations such as AI-supported fall risk profiles and virtual reality offer promising opportunities to provide targeted support for older people (Lindera, 2024). Housing adaptations and social measures complement these approaches and contribute to a comprehensive prevention strategy (WiQQI, 2024).

The aim of this article is to analyse innovative interventions and best practices in fall prevention among older people in Germany. Based on secondary research methods, physical, technological and environmental measures are analysed to develop evidence-based recommendations for practice. Given the growing relevance of this topic, particular attention is paid to approaches that can be successfully implemented in different contexts - from home care to care facilities.

The basis of this study was a desktop research on preventive measures against falls in older people in Germany. Secondary research methods such as national and international studies, case reports, guidelines and current health reports were analysed. The desktop research was conducted over a period of three months, from August to October 2024.

The analysis is based on scientific articles from specialist journals such as The Gerontologist and Zeitschrift für Gerontologie und Geriatrie, as well as reports from institutions such as the Robert Koch Institute (RKI) (RKI, 2021) and the World Health Organisation (WHO) (WHO, 2021). In addition, programmes and guidelines, including the ‘Fall Prevention in Nursing’ programme, were considered (German Network for Quality Development in Nursing, 2022). In addition to a well- founded selection of literature, digital technologies such as the Lindera mobility analysis and the Moio-Care system as well as practice-oriented interventions were included.

The analysis centred on multifactorial approaches that integrate physical, technological and environmental measures. This approach is based on the realisation that falls can be caused not

only by physical deficits, but also by unsafe living conditions and inadequate psychosocial support (Rubenstein C Josephson, 2006). Exercise programmes to strengthen strength and balance were investigated as well as technological interventions, including AI-supported risk analyses and virtual training.

The measures were analysed according to the following criteria:

1. **Evidence-based:** Proven effectiveness in studies.

2. **Practicality**: feasibility in the home environment and in care facilities.

3. **Degree of innovation**: Use of modern technologies such as artificial intelligence or virtual reality.

4. **Accessibility**: Availability and costs, especially in rural areas.

The methodology ensures a systematic comparison of different prevention approaches in order to formulate evidence-based recommendations for action.

- Exercise programmes to improve strength and balance.
- Home adaptations to avoid tripping hazards.
- Technological aids, such as AI-supported fall risk profiles.

1. **Exercise programmes as a core strategy for fall prevention**

The results suggest that exercise programmes are among the most effective measures for reducing the risk of falls in older people. These programmes aim to strengthen physical abilities such as strength, balance and mobility in order to increase stability and safety in everyday life. These include, for example

- **Otago exercise programme:** This internationally established programme combines targeted strength and balance exercises with a daily walking training component. Studies have shown that participation in the Otago programme reduces the risk of falling by up to 35% (Campbell C Robertson, 2007). It is often supervised by specially trained physiotherapists and is particularly suitable for older people with an increased risk of falling.

- **Tai Chi and similar forms of exercise**: Tai chi has been shown to be an excellent method of promoting both physical and mental health. The slow, flowing movements not only improve balance, but also concentration and mindfulness, which reduces the risk of falls (Li et al., 2005).

- **Fall prevention in care facilities**: Special programmes for care homes, such as the 'Fall Prevention in Care' programme, integrate physical exercises into residents' everyday lives. These measures show that even older people with limited mobility can benefit from regular exercise sessions (German Network for Quality Development in Care, 2022).

## 2. Technological solutions in fall prevention

In addition, digital and technological systems offer opportunities to counteract the prevention of falls. Technological development also opens up new possibilities for the prevention and early intervention of falls. Modern systems offer personalised, data-supported approaches that can be used both preventively and reactively.

- **Lindera mobility analysis:** This AI-supported app analyses the individual risk of falling based on movement data collected through simple smartphone recordings. The app generates personalised recommendations to improve movement patterns and avoid tripping hazards. Its user-friendliness allows it to be used both in care facilities and in the home environment (Lindera, 2024).

- **Fall detection systems**: Wearable sensors and smart flooring can detect falls in real time and alert emergency services. These systems offer older people a greater sense of security and enable rapid assistance in the event of an emergency. Initial studies show that such technologies can significantly reduce the risk of complications following a fall (Rubenstein et al., 2006).

- Virtual reality (VR): VR technologies simulate everyday situations and help older people to train their balance and responsiveness in a safe environment. The interactive and motivating nature of this technology encourages long-term participation in prevention measures (Obser C Schroll-Würdig, 2020).

## 3.Home adaptations to prevent falls

Adapting the living environment is a cost-effective and immediately implementable measure to minimise the risk of falls in the home. It is particularly relevant as most falls occur at home.

- **Eliminate tripping hazards**: Carpets, loose cables and uneven floors are among the most common causes of falls. Regular checks of the living environment and the removal of such obstacles can significantly reduce the risk (Naumann C Oswald., 2020).

- **Grab rails and non-slip materials**: Installing grab rails in the bathroom, on stairs or in other areas with an increased risk of falling provides additional safety. Non-slip floor coverings reduce the risk, especially in damp rooms such as kitchens and bathrooms.

- **Optimise lighting**: Good lighting in all living areas, especially in passageways, can significantly reduce the risk of missteps and tripping. Night lights, motion detectors and adapted optical aids are simple but effective measures to improve visibility (Zijlstra et al., 2013).

## 4.Educational and social measures

In addition to physical and technological prevention, raising awareness among older people and their relatives is of crucial importance. Falls are often favoured by incorrect assessments of one's own mobility level or a lack of knowledge about risk factors.

- **Raising awareness:** Seminars and workshops that inform older people about the risks of falling help them to apply preventive measures more consciously. The active involvement of relatives also increases the effectiveness of such programmes.

- **Social activities**: Group-based exercise programmes not only promote physical health, but also social interaction. Social isolation is a risk factor for falls, as it often leads to a lack of exercise (Gillespie et al., 2012).

The analysis shows that multifactorial approaches achieve the best results in preventing falls. Exercise programmes, technological aids and home adaptations complement each other and together help to significantly reduce the risk of falls in older people. Individualised approaches that address the specific needs of the target group are particularly effective. However, the greatest challenge lies in the widespread implementation of these measures, particularly in rural areas, and in access to technological solutions.

**Discussion**

The results show that a multifactorial strategy of physical, technological and environmental interventions is most effective in preventing falls in older people. Exercise programmes such as the Otago exercise programme or Tai Chi are scientifically well documented and offer simple but effective means of improving balance, strength and mobility. They should be promoted more in care facilities as well as in the home environment.

Technological innovations such as the Lindera mobility analysis (Lindera, 2024) or the Moio-Care system (Moio.Care, 2024) as well as VR-supported training significantly expand the possibilities for prevention. These technologies offer personalised solutions and increase the safety of older people in everyday life. Nevertheless, there are challenges in their widespread use, especially in rural areas where access to such technologies is limited. The cost of acquisition and training can also be a barrier. Support programmes and subsidies could help to overcome these barriers.

Home adaptations are an uncomplicated and cost-effective way of reducing the risk of falls. Innovative systems such as the WiQQi database (WiQQi, 2024), which allows users to research customised systems online, or measures such as removing tripping hazards or installing grab rails also provide support. These are easy to implement and should be integrated into the standard counselling provided by care and health services.

The biggest challenge is to implement these measures across the board and to comprehensively sensitise older people and their relatives. Education and information play a decisive role here. Programmes that raise awareness of fall risks and prevention options can help to increase acceptance of and participation in prevention measures.

Future research and development work should focus on making innovative technologies more accessible and better integrating multifactorial approaches into everyday life. In addition, greater political and financial support is required in order to Establish fall prevention as an essential component of healthcare for older people.

**Conclusions**

Falls are one of the greatest health challenges for older people in Germany, with significant physical and psychological consequences. The study shows that multifactorial approaches - consisting of exercise programmes, technological solutions and home adaptations - can effectively reduce the risk of falls. In particular, programmes such as the Otago exercise programme and technological innovations such as the Lindera mobility analysis or the Moio.Care system offer promising approaches to fall prevention.

Preventive measures against falls in older people require close co-operation between the healthcare system, technology providers and relatives. Exercise programmes should be further promoted and technologically supported prevention solutions expanded. Future research could investigate the use of big data and artificial intelligence to develop personalised prevention strategies. Better political support and wider availability of technical aids could help to improve fall prevention across the board.

However, there are challenges in terms of nationwide implementation, particularly in rural regions, as well as access to modern technologies. In order to overcome these obstacles, greater political support, targeted funding programmes and better networking between healthcare services are required.

In the future, innovative technologies such as artificial intelligence and big data should be researched and integrated more intensively in order to promote personalised prevention approaches. It is also important to further increase the acceptance of such measures through educational programmes and the close involvement of relatives and carers. A stronger focus on prevention could not only improve the quality of life of older people, but also reduce the burden on the healthcare system in the long term.

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## CLOSİNG SPEECH

## PROF. DR. İSMAİL TUFAN

Falls and accidents in the home represent a significant area of research in the context of ageing and gerontology.In our country, the efforts of Osmaniye Korkut Ata University to transform this symposium into a sustainable event from an academic and gerontological perspective are commendable.I would like to take this opportunity to sincerely thank my colleagues who presented papers at the symposium, especially those who contributed to making this symposium an international event. Due to a prior professional commitment, I was unable to attend the symposium in person; however, I recently had the privilege of meeting with our esteemed colleagues and our highly respected Rector in Osmaniye. I would like to express my profound gratitude for their exceptional dedication and their commitment to the gerontological perspective.I am confident that the Gerontology Department at Osmaniye Korkut Ata University will continue to flourish and make significant contributions to the field of gerontological science. The outcomes of this symposium will indubitably be disseminated by my esteemed colleagues and will be collated into an information archive from which other gerontology departments and interested parties will be able to benefit.I would like to express my profound gratitude for your participation and would be delighted to be among you at the next symposium. I would like to thank you from the bottom of my heart for inviting me to the last part of the symposium and giving me this opportunity, and I extend my regards.