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# The Earthquakes in Turkey and Syria Remind Us That Long-Term Care Residents and Older Adults Are Most Affected by Natural Disasters

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## INTRODUCTION

Earthquakes are one of the most powerful and devastating natural catastrophes, capable of destroying or damaging buildings and infrastructure in seconds and affecting all members of society. Nearly 750 000 people died worldwide from earthquakes between 1998 and 2017, accounting for more than half of all deaths from natural disasters (World Health Organization, 2023).

Earthquakes are induced by the rupture of fault lines caused by the abrupt release of stored energy (National Research Council, 2003, p. 12). Fault lines arise when rocks in the stony sphere break under high-pressure circumstances such as tension and compression. Accurate earthquake prediction and control will considerably lessen the loss of lives and property (National Research Council, 2003). Multiple earthquake experiences are known to affect people's opinions of it (McClure et al., 2016). It is crucial to consider how these experiences affect people and whether they are prepared for them. Preparing for earthquakes, including modifying the residence and location, is essential to minimize the damage they cause (Spittal et al., 2006). Additionally, for earthquake response, public involvement in disaster preparedness is essential (Pearce, 2003).

## Türkiye and Syria Earthquake

Earthquakes continue all over the World. Two major earthquakes with magnitudes of Mw 7.7 and Mw 7.6 were registered on February 6th, 2023, centered around two districts of Kahramanmaraş, at 04:17 (Pazarcık) and 13:24 (Elbistan) local time (AFAD Deprem Dairesi Baskanligi, 2023a). The epicenter of the 7.7 magnitude quake was located at a depth of 8.6 km, while the 7.6 magnitude quake happened at a depth of 7 km (AFAD Deprem Dairesi Baskanligi, 2023a). The earthquake was felt in Cyprus, Lebanon, Iraq, Iran, and Syria, but it is commonly referred to as the Türkiye and Syria earthquake since Türkiye and Syria sustained the most damage.

In the 15 days after the earthquake, there were a total of 7,184 aftershocks in Türkiye (AFAD Deprem Dairesi Baskanligi, 2023b). The earthquake caused significant destruction in both Türkiye and Syria. The first earthquake struck at midnight, jolting people out of their deep sleep, and was followed by another quake of the same magnitude the following lunchtime, greatly increasing the number of damaged buildings and casualties. After the earthquakes, there was a mass exodus to neighboring cities because many lost loved ones, and those who survived were left without shelter, food, or water in an unforgiving environment. Despite state institutions' efforts and non-governmental organizations' efforts, particularly AFAD, the earthquake's losses and devastation increased daily. The number of people killed in earthquakes is 50.096, and the number of people wounded is 107.204 as of March 20th, 2023 (Yılmaz, 2023). Over 6,000 people were killed and 12,000 injured in Syria due to the earthquake (UNICEF, 2023). Recent devastating earthquakes in Turkey and Syria, one after the other, reminded experts of the long-term, devastating consequences an earthquake may have on the frail and vulnerable. The earthquake region's poorest and most vulnerable residents were probably hit the hardest by the earthquake. It is reasonable to assume that those in the disadvantaged group are more likely to remain in the earthquake debris and lose their lives than others and are in the riskier group. However, the author of this article has not yet come across a statement stating how many of the people who died in the earthquake were children, how many were older adults, how many were sick and bedridden, and how many were disabled. Even if an earthquake does not directly damage one, the experience of living through one may significantly impact one's life, especially for the disabled, young children, inpatients, and older adults. Therefore, it is noted that recovery from this devastating earthquake might take a long time (Villasana, 2023).

This article focuses on the experiences of older adults or those in need of long-term care prior to, during, and after the earthquake, as well as the approaches that care for older adults or those in need of long-

term care in earthquake and treatment studies, as well as earthquake prevention studies, due to its scope.

## Impact of Earthquakes on Older Adults

Physical frailty, mobility issues, and chronic health problems make older adults especially susceptible to the hazards presented by earthquakes. The interruption of care services and medication access can have a negative impact on older adults' health. It is crucial to have emergency plans that prioritize older adults' needs, such as ensuring access to medical care and medication. Additionally, community outreach programs can help provide support and resources for older adults during and after an earthquake.

In addition, age-related factors make it challenging to prepare for earthquakes (Tuohy et al., 2014). Physical limitations may make it difficult for older adults and long-term care residents to take critical actions during an earthquake, particularly for earthquake safety initiatives. As a result of physical limitations, older persons may be more concerned about the magnitude and length of the earthquake than younger people. Furthermore, older adults with spouses may have life-safety issues during and after the earthquake because of their and their wives' movement constraints. Similarly, because of their restricted mobility, those needing long-term care rely on others to preserve their lives during an earthquake. The extra stress and worry may be excruciating for people with chronic illnesses or mental health issues.

Due to age-related decreases in physical and mental health, older adults are typically particularly susceptible to natural catastrophes. They may be economically or socially marginalized, or they may be living alone. When taken together, these variables may put older people at a higher risk of experiencing psychological distress in the aftermath of a tragedy than younger ones. Here, physical health effects and psychological health effects are described.

### Physical Health Effects

#### *Injuries and Health Issues*

Older adults have experienced injuries ranging from minor cuts and bruises to more severe injuries such as broken bones or head trauma after earthquakes. After an injury sustained due to an earthquake, it is essential to provide older people with timely medical attention and care tailored to their specific needs. Concerns about the health of older adults have been raised in the aftermath of earthquakes (Shenk et al., 2010). Besides, it was mentioned that people of a certain age were included in the risk groups regarding mortality (Hu et al., 2022). 7.6% of older adults, compared to 19.7% of the community sample, suffered acute kidney injuries after the Wenchuan earthquake (Zhang et al., 2012). Similarly, there were elevated health problems in the cardiovascular and

gastrointestinal systems after the Croatia earthquakes (Kušević et al., 2021). Also, physical and psychological health issues have been related. For instance, older adults who experienced bone fractures after earthquakes in Japan reported posttraumatic stress disorder (Hayashi et al., 2021). These studies highlight the importance of considering vulnerable older adults' specific needs in disaster preparedness and response plans. Adequate medical care and support should be provided to prevent and address potential health complications.

*Loss of Home*

Displacement can have serious consequences for a person's physical and mental health, and older adults are especially susceptible because of the central role their home plays in their lives. In other words, homebound older people face unique challenges (Dostal, 2015). Therefore, there must be an effort to supply trustworthy and safe housing options. The need for safe and accessible housing for older adults and the physically impaired is universal. Baseline data on the number of older people who are disabled or require specialized equipment is essential for those responsible for planning and preparing evacuations and temporary shelters during a natural disaster (McGuire et al., 2007). As a result, providing comprehensive data on older adults with multiple impairments is critical.

*Disruption of Routines*

Disruption of routines can significantly impact the well-being of older adults with multiple impairments and may lead to increased confusion, anxiety, and social isolation. Therefore, it is important to consider ways to maintain or adapt routines in order to support their overall health and quality of life. To example daily lives, functional behaviors (such as sharing, praying, and dealing with activities) and dysfunctional behaviors (such as loss of motivation, sharing, and activity) were observed in older adults who had experienced an earthquake in Iran in a qualitative study (Ahmadi et al., 2018). The study highlights the importance of providing support and resources for older adults in times of crisis, as disruptions to their routines can have significant impacts on their well-being. Additionally, interventions aimed at promoting functional behaviors and addressing dysfunctional behaviors may be beneficial for older adults in disaster-prone areas. Besides, families can help older adults promote daily routines after earthquakes (Shenk et al., 2010). After an earthquake, it may be possible to reestablish new daily routines with the assistance of members of one's own family, even if one is unable to access any potential resources. This highlights the importance of strong family support systems in natural disasters, as they can play a crucial role in facilitating recovery. Additionally, it emphasizes the need for families to be prepared and equipped with the necessary knowledge and resources to

assist their older adult members in such situations.

### Psychological Health Effects

An earthquake may irreparably damage an older adult's mental health if he or she has spent years saving for a better life, laboring to create or maintain a comfortable living environment, forging strong social ties, and amassing a multitude of memories, all of which were obliterated in an instant. Losing personal belongings, social networks, and familiar surroundings can cause helplessness and hopelessness. Furthermore, the trauma of experiencing a natural disaster can exacerbate existing mental health conditions or lead to the development of new ones.

Experiencing an earthquake may lead to a variety of issues, including adjustment problems (Annear et al., 2013; Joffe et al., 2013; Shenk et al., 2010), anxiety (Adams-Hutcheson, 2017), emotional stress (Rushton et al., 2021), uncertainty about the future (Salim & Darmayanti, 2021), psychological distress (Karanci et al., 1999), depression (Kilic & Ulusoy, 2003; Sasaki et al., 2019; Watanabe et al., 2004), suicide (Guo et al., 2018), somatic complaints (Carmassi et al., 2020), insomnia, and Posttraumatic Stress Disorder (PTSD) (Adams-Hutcheson, 2017). It is important to note that the severity and duration of these mental and emotional health effects may vary depending on factors such as the individual's prior mental health status, level of exposure to the earthquake, and availability of social support. For instance, social support received before the earthquake was reported to be a protective factor for depression evaluated after the earthquake and Tsunami in older Japanese adults (Sasaki et al., 2019).

Seeking professional help and engaging in self-care practices can be beneficial in managing these effects. It is also important to recognize that these effects may not be immediate and can manifest months or even years after the earthquake. Therefore, it is crucial to continue monitoring and addressing any long-term mental and emotional health concerns.

## PTSD Among Older Adults of Earthquake Survivors

Due to relocation and lifestyle changes after a catastrophe, older persons may also suffer a shift in their sense of self. This shift might turn into PTSD reactions. Because infrastructure disruption makes it harder for older people to access crucial support systems such as healthcare and emergency services, older adults experience despair, helplessness, and anxiety as a consequence of feeling powerless in the face of such calamities. Even if individuals prepare, such as building earthquake-resistant buildings and infrastructure, they may be helpless in the event of an earthquake since they have no control over the timing or magnitude of the disaster. Those old and overwhelmed by their sensitivity to earthquakes as horrific events may find it more difficult

to overcome their sadness.

Several factors have influenced the PTSD reactions of older individuals. Physical disabilities and PTSD have been reported to be correlated in older adults (Hayashi et al., 2021). Similarly, physical illnesses and family members' lack of social support have been associated with PTSD in older adults (Li et al., 2020). These findings highlight the importance of considering physical health and social support when assessing and treating PTSD in older adults. Healthcare providers should take a holistic approach to care to address this population's physical and mental health needs.

Losing family members or acquaintances during an earthquake can also result in social isolation for older adults (Li et al., 2020). A sense of social isolation can contribute to developing PTSD and depression symptoms or exacerbate existing symptoms. Those older people who lost loved ones in the quake or whose caretakers relocated to other areas to rebuild their lives may feel even more alone and abandoned. Risk factors for PTSD are a research subject that mental health practitioners are interested in exploring in different studies. To begin, a study conducted two years after the 2008 Wenchuen-China Earthquake, which killed nearly 90.000 people, uncovered traumatic experiences such as witnessing someone seriously injured, severe damage to the home, and severe injury to close relatives (Yin et al., 2019).

## Reasons Why Some Survivors Might Get Posttraumatic Stress Disorder

After experiencing an earthquake, older persons are more prone to develop PTSD. Understanding the signs and symptoms of PTSD is vital for family members and caregivers to help older persons who may be suffering from the illness.

### Memory and Attention Issues

Following an earthquake, older adults may have trouble remembering facts and concentrating. Cognitive decline in old age contributes to these memory issues (Böttche et al., 2012). This issue may linger even after the first shock of an earthquake has subsided. Having memory gaps affects older individuals more negatively. These gaps are also seen in trauma-related memory (American Psychiatric Association, 2000). It is noted that the treatment of trauma in older adults incorporate the recall of traumatic incident into a cohesive life story to integrate (Böttche et al., 2012). Also, interventions for memory recall are recommended for people with dementia who experienced an earthquake. These findings suggest that integrating traumatic events into a person's life story may be beneficial for older adults with a trauma history, and those with dementia who experienced a natural disaster may benefit from memory recall interventions. However, further research is needed to explore the effectiveness of these interventions in different populations and contexts.

### Avoidance Behaviors and Emotional Numbness

Avoidance behaviors, in other words avoiding persons or locations linked with the quake, are also typical among older individuals who have been affected by a natural catastrophe. People older than 67 years old were most likely to show avoidance symptoms, which were seen in 39% of those people (Rutherford et al., 2021). They may also exhibit emotional numbness, such as not caring about anything or feeling disconnected from their own feelings. In a longitudinal study, older adults reported less distress than others, and the oldest old reported lower levels of earthquake-related rumination (Knight et al., 2000). These signs and symptoms should not be disregarded since they may have major ramifications for a person's mental health if left untreated for too long. Therefore, it is important to continue conducting longitudinal studies on older adults to better understand their mental health changes and provide appropriate interventions. Additionally, these findings highlight the need for targeted support for individuals who have experienced traumatic events such as earthquakes.

## FUTURE DIRECTIONS AND RECOMMENDATIONS

Building a strong support system to heal the effects of a traumatic experience and observing persons who overcome trauma and establish a new life assist older adults in overcoming trauma effects. Therefore, it is crucial to provide targeted support for individuals who have experienced traumatic events such as earthquakes, especially older adults, to help them build a strong support system and establish a new life after the traumatic experience. This can significantly contribute to their overall well-being and recovery. Recognizing PTSD in older adults might be challenging since it is an emotional reaction to a terrible incident. Teaching caregivers and family members about PTSD may be helpful because they can help those in their care recognize the signs and symptoms of the disease. Additionally, providing older adults access to mental health services and support groups can aid their well-being and recovery from PTSD. It is important to address PTSD in older adults to ensure they receive the necessary care and support for their mental health.

The psychological consequences of earthquakes may exacerbate the symptoms of preexisting mental health issues in older people. Fortunately, precautions may be taken to keep older people safe in the case of an earthquake: Recommendations for earthquake preparation are included in Table-1.

In the aftermath of a tragedy, some older may be more resilient than others, but those who are already vulnerable (such as those with past illnesses or who live alone and are socially isolated) may have a far

more difficult time recovering. It is crucial to provide older people with access to mental health resources and support systems to aid in their recovery. This includes therapy, counseling, and social programs encouraging connection and community.

Table-1. Earthquake Preparedness in Older Adults

| |
|---|
| (1) Learning about the likelihood of an earthquake in the region, making necessary precautions, and deciding what to do if an earthquake occurs in the living area, |
| (2) Putting together an emergency kit with food, water, flashlights, and batteries, |
| (3) Discussing with loved ones what to do in the event of an earthquake, |
| (4) Having access to an open forum where people may express their experiences, anxieties, and worries in the aftermath of an earthquake, |
| (5) Providing emotional and financial assistance after an earthquake, |
| (6) Helping older adults find counseling, mental health support, and crisis intervention teams so they may get the emotional help they need to get through this difficult period, |
| (7) Teaching older adults about earthquake safety and how to prepare for future catastrophes will make them more resilient should another disaster strike. |

## CONCLUSION

It is easy to overlook how devastating an earthquake may be emotionally for older adults. Unsurprisingly, older persons have difficulty recovering after an earthquake due to a lack of resources, poor physical and mental health, and social and economic difficulties. Long-term impacts of sensory overload, physical repercussions of the earthquake, and disturbance of daily life might manifest as PTSD and depression in the older adult population. Recognizing the psychological consequences of an earthquake on older people and providing the appropriate assistance and tools to help in the healing process may be challenging but essential. Earthquake preparedness of older adults is essential to be ready for future events (Tuohy et al., 2014). It is important to understand the emotional toll an earthquake has on older adults so that we may better support them throughout recovery.

The greatest distinguishing trait of earthquakes is that, unlike other natural catastrophes such as floods, storms, and volcanic eruptions, they are difficult to anticipate (if not impossible) and hard to avoid with present scientific knowledge. Although scientific forecasts indicate that the earthquake will occur over a lengthy period of time, the precise moment of the earthquake is unknown. Because earthquakes may occur at any moment, it is critical to design adequate response plans to decrease the number of injuries and fatalities. On the other hand, it is feasible to construct evacuation and security facilities that will mitigate the consequences of the earthquake and develop cities into safer places. Therefore, focusing on physical preparations and mental and emotional preparedness is important to minimize an earthquake's impact. This can include practicing drills, having emergency supplies on hand, and seeking support from mental health professionals. Furthermore, it is noted that effective

and prompt psychological therapies immediately after the earthquake are useful in terms of mitigating the earthquake's impacts (Wang et al., 2000).

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# Conflict Between Respect for Autonomy and Care: A Grounded Theory Study on Action Strategies to Care for People With Physical Disabilities

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## ABSTRACT

People with physical disabilities (PWD) are a large population group in Germany. Due to functional limitations of the body, they may be dependent on nursing assistance. PWDs' wishes for assistance can be expressed verbally to nurses. However, these wishes do not always match what nurses want to happen. As a result, nursing care and the autonomy of PWDs can be critically opposed to each other. Thirteen problem-centered interviews were conducted with nurses on the care of PWDs. According to Strauss and Corbin (2010), analysis was conducted using grounded theory. When caring for PWDs, nurses may be confronted with wishes and needs they cannot or do not want to fulfill. As a result, they experience a conflict between care and respect for autonomy. Nurses critically assess these situations, including professional, ethical, and legal-organizational aspects. They interact with PWDs as well as colleagues to manage the conflict. Positive outcomes result in the conflict being resolved; negative outcomes result in nurses stopping care. Ambivalence also exists, which is characterized by tensions in further care. Nurses want to support PWDs, enable participation, and promote independence. They want to feel comfortable with their decisions. Therefore, they weigh carefully whether wishes for nursing assistance are realized or denied. Decision coaching can be a new task for academic nurses to enable PWDs to make health-promoting decisions for themselves.

**KEYWORDS:** Grounded Theory; Physical Disabilities; Autonomy; Care; Ethics; PWD; People with Physical Disabilities.

## KEY PRACTITIONER MESSAGE

1. Conflicts between autonomy and care can occur as natural phenomena in the nursing care of people with physical disabilities.
2. Ethics, nursing-medical expertise, and legal-organizational aspects must be weighed against each other to make decisions for or against desired nursing assistance.
3. People with physical disabilities can learn to make good decisions for themselves through decision coaching by nurses.

## INTRODUCTION

In Germany, approximately 7.9 million people live with a severe disability, of which the largest proportion (58%) have a physical disability (Destatis Statistisches Bundesamt, 2021). People with physical disabilities (PWDs) may have a need for care due to accompanying physical functional limitations. Since 2017 in Germany, the need for care has been defined based on the degree of independence. The greater the loss of independence is, the more nursing assistance is required (Medizinischer Dienst, 2022).

Nursing care is defined as the autonomous provision and care of people of all ages in all life situations. Care promotes health, serves to prevent illness, and has the key task of safeguarding the interests and needs of care recipients (International Council of Nurses, 2022). From the perspective of nursing theory, the need for nursing actions can be justified by a lack of self-care. A self-care deficit can be compensated for by professional nurses. According to Dorothea Orem, actions can be supportive, advisory, and partially or fully compensatory (Dennis, 2001).

In Germany, the need for care is recorded and described according to six modules (Medizinischer Dienst, 2022). The modules have a percentage weighting that determines the extent of the need for care: organization of everyday life (15%), mobility (10%), cognitive and communicative abilities or behavior and psychological problems (15%), self-care in the sense of personal hygiene and nutrition (40%), coping with and independently dealing with therapy-related demands and burdens (20%) (GKV Spitzenverband, 2022). On this basis, nursing tasks may arise in the areas of mobility, cognitive and communicative abilities, behavioral and psychological problems, self-care, coping with illness/therapy-related demands and stresses, shaping everyday life and social contacts, and housekeeping (Wingenfeld & Büscher, 2017).

Due to the permanence of their disability, their superior level of knowledge about the disability picture, and the assistance they require, PWDs are experts with regard to themselves, their way of life, and the care they receive. PWDs can explicitly formulate their wishes for nursing support for their care and lifestyle nursing. In this context, one can speak of autonomy, in which self-determination and the ability to act in favor of more subjectivity and individuality are of great importance (Schopp et al., 2004; Wulff et al., 2010).

Autonomy is one of six ethical principles, and together with care, justice, dialogue, responsibility, and dignity, it is part of an overarching basic ethical orientation of nursing action (Rabe, 2017). The Charter of the Rights of Persons in Need of Assistance and Care also addresses the issue of self-determination in Article 1 (Bundesministerium für Familie Senioren Frauen und

Jugend & Bundesministerium für Gesundheit, 2018). Accordingly, every person has the right to help and support to lead as self-determined and independent a life as possible. Self-determination has its limits where the rights and development opportunities of others are affected (Bundesministerium für Familie Senioren Frauen und Jugend & Bundesministerium für Gesundheit, 2018). Care professionals are committed to the autonomy of affected persons and are guided by the principle of care (Kotsch & Hitzler, 2011). In Germany, nursing care is understood as a caring relationship that is emotionally supportive. Caring in the sense of worrying, helping, and providing care is also the core of professional nursing care (Schnepp, 2015). The Charter of the Rights of Persons in Need of Assistance and Care points out that conflicts can arise between care professionals' duties of care and the right to self-determination (Bundesministerium für Familie Senioren Frauen und Jugend & Bundesministerium für Gesundheit, 2018). Self-determination in nursing means realizing successful interactions between nursing and affected persons (Kotsch & Hitzler, 2011). Enabling self-determination in the context of nursing activities can be described as a genuine goal (Behrens & Zimmermann, 2006).

Conflicts can arise within the nursing practice when the wishes of PWDs regarding the realization of nursing assistance differ significantly from the realization by nursing. It is not known how nurses experience and describe conflicts within the care of PWDs.

### Research Questions

The following questions were asked of the data: (1) Which of PWDs' wishes for nursing assistance are nurses unable or unwilling to fulfill? and (2) How do nurses deal with these wishes?

## METHOD

Within this grounded theory research project, the question "How is the care of PWDs shaped by care professionals?" was researched. To answer this question, a total of 40 problem-centered interviews were conducted throughout Germany with two target groups: PWDs (N=27) and care professionals (N=13). This article focuses on nurses involved in the care of PWDs.

A qualitative research design was chosen to answer the research questions. Qualitative studies are widely used in nursing research and are particularly suitable for exploring the experience of coping with illness, promoting health, and accompanying processes of human existence. Grounded theory was chosen as the method for generating knowledge because of the central importance of the processes and associated interactions between PWDs and care professionals. The aim of this method is theory building (Boehm, 1994; Strauss & Corbin, 2010).

Ethical clearance was conducted by the ethics committee of the University of Witten/Herdecke (Application no. 22/2019). Compliance with the European General Data Protection Regulation (GDPR/DSGVO 2016) was ensured.

## Data Collection

Between 2019 and 2021, 13 problem-centered interviews (Witzel, 2000) were conducted throughout Germany with care professionals working with PWDs (interview length, mean 39 min, mode 38 min). After a pretest, a guideline was developed in advance using the SPSS (collect, examine, sort, subsume) method (Helfferich, 2010). The interviews took place at the request of the interviewees either face to face (n=11) or, in the context of the SARS-CoV-2 pandemic, by telephone (n=2) (Ristau et al., 2021).

The study included nurses who had three years of professional training in health care and nursing (n = 5), geriatric care (n = 5), or curative education (n = 3). The professional experience of all interviewees varied from one to 35 years (mean 13.3, median 10). Seven interview participants were female, and six were male. Of the nurses, eight worked in outpatient settings, and four worked in inpatient settings. Another nurse worked in a medical care center. The nurses were asked about autonomy in the context of nursing assistance, among other things. They were also asked about conflicts and their effects on daily care.

## Data Analysis

Data collection and evaluation were performed in an iterative process (Corbin & Strauss, 2015). MAXQDA was used as the software. Line-by-line, open coding of the interviews was conducted. The codes emerged inductively from the data material. The codes were reassembled in the axial coding phase by connecting and linking the categories. The coding paradigm was applied. In the last step, the main category was identified within the framework of selective coding, which was systematically and continuously developed from the data material (Strauss & Corbin, 2010).

# RESULTS

When caring for PWDs, nurses may be confronted with wishes and needs that they cannot or do not want to realize. As a result, they experience a conflict between respect for autonomy and care. They critically evaluate these sequences. The evaluation process includes professional, ethical, and legal-organizational aspects. Nurses interact with PWDs themselves as well as with their colleagues to manage conflicts.

As a positive consequence, conflicts are resolved; as a negative consequence, care professionals refuse to fulfill the desired assistance. Ambivalences may also exist, characterized by tensions in further care (Figure 1).

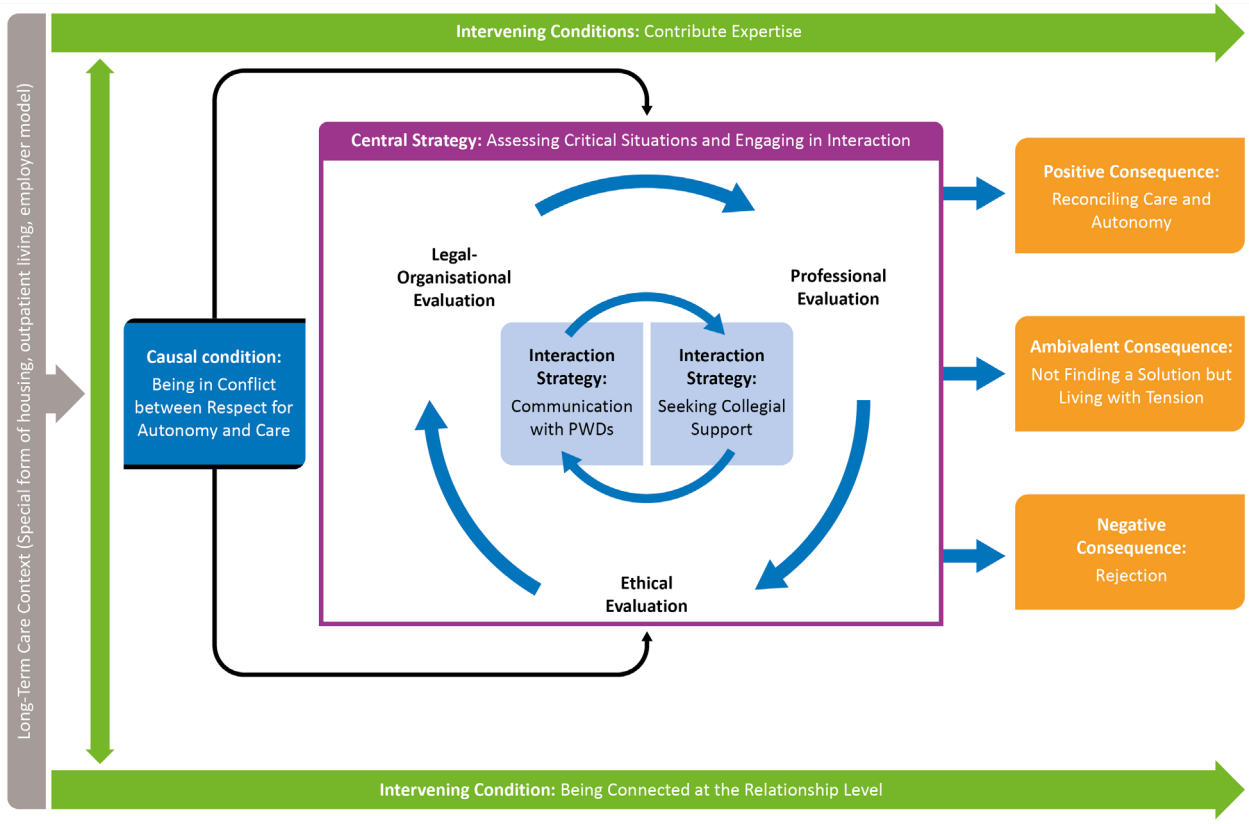


Figure-1. The evaluation process

## Long-Term Care Context

The care of PWDs is provided in a long-term care setting. Long-term care can be provided in different contexts: inpatient, outpatient with care service, and outpatient with a personal budget in the employer model. All forms of care have in common that nurses and PWDs spend everyday life together over a long period of time, up to 24 h a day.

## Causal Condition: Being in Conflict between Respect for Autonomy and Care

Conflicts can arise when clients' wishes for nursing assistance are incompatible with the professional understanding of the profession or how nurses perform the assistance. Nurses describe situations with a high potential for conflict in everyday life. Table-1 shows the reported critical sequences from which conflicts can arise in nursing care. For better illustration, the assessment modules used in Germany demonstrated some critical sequences in the care of PWD. The contents mentioned are taken from interviews with nurses.

The sequences shown have in common that PWDs can form or express their wishes within the framework of (nursing) care. At the same time, complete, sole realization is not possible due to their physical functional limitations.

Table-1. Critical Sequences From the Nurses' Perspective

| |
|---|
| Mobility: |
| - Refusing to change position regularly in case of complete immobility, thus increasing the risk of pressure sores. |
| - Not wanting to use existing aids for changing position, e.g., patient lifter. Expect to be mobilized without aids. |
| Cognitive and communicative skills: |
| - Demanding moral support for private life decisions, e.g., dealing with one's own parents. |
| - Wanting to talk shit about colleagues. |
| Behavioral and psychological problems: |
| - Showing aggressive behavior (verbal, physical). |
| - Desiring a beer at 9:00 a.m. |
| Self-care: |
| - Neglecting a balanced, healthy diet and eating only fast food. |
| - Neglecting personal hygiene, neglecting outward appearance. |
| - Not wanting to brush their teeth. |
| - Not wanting to shower (for up to 6 months). |
| - Have strong body odor. |
| - Not having their hair washed. |
| - Wear dirty clothes. |
| Coping with and independently dealing with demands and stresses caused by illness or therapy: |
| - Desire simultaneous alcohol and medicine administration through PEG. |
| - Not wanting to take up further therapy, e.g., physiotherapy or occupational therapy. |
| - Abuse medication. |
| - Wanting help with cannabis use. |
| - Not provide physical relief for existing wounds on legs and feet. |
| - Want to drink cola if they have diabetes mellitus. |
| - Not wanting to comply with medical prescriptions. |
| * Refuse compression stockings or adjust prescriptions (do not put them on before getting out of bed, but after showering). |
| * Refusing to take prescribed medication |
| * Refusing to follow a prescribed diet |
| * Not adhering to the prescribed frequency of disposable catheterization and thereby causing medical complications. |
| Shaping everyday life and social contacts: |
| - Wanting help with tax returns (entering something into the tax return that is not true). |
| - Falsely expecting to do something together with the care professional, e.g., celebrate New Year's Eve |
| - Texting carers in their spare time asking for favors, e.g., running errands. |
| Extra-curricular activities: |
| - Neglecting social life, e.g., no longer going out, wanting to lie in bed all day. |
| Housekeeping: |
| - Neglecting household, having a messy/dirty flat / room |

The sequences potentially harm PWDs' health or worsen their living situations if realized. Nurses are compensatory in nursing care, increasing independence and promoting health. They motivate PWDs to make self-determined decisions for their own lives. Decisions can be health-related, care-related, or private decisions. In this context, nurses have a professional self-image that includes a sense of responsibility for those who receive nursing care. They restrict the autonomy of people in need of care to protect them. Autonomy and care are balanced by care professionals.

> "I am a service provider and have to do my job as well as possible. On the other hand, I also have to do it as professionally as possible and make the most professionally correct decisions possible. And that also means I can't realize everything people with physical disabilities want. I also have a responsibility towards the people or the activities." (I14, item 48)

Being unable to realize wishes for nursing assistance is a dilemma for nurses. They move between autonomy and care and develop emerging conflict and solution strategies.

## Intervention Conditions

Professional care is designed on both a professional and a relationship level. Both levels shape the nursing care of PWDs as intervening conditions. Assistance is required that necessitates nursing expertise (e.g., knowledge of disability patterns and associated phenomena; performance of activities in the context of self-care, such as personal hygiene, feeding, and medically prescribed therapy, such as administering medication). On the relationship level, a relationship characterized by closeness and trust develops over long intervals of nursing care (up to 24 hours a day over several decades).

### Intervening Condition: Contribute Expertise

Professional knowledge comprises theoretical training content, professional experience in different settings, and professional experience. At the same time, a sound level of existing knowledge represents the potential to make professionally correct and good decisions. Nurses gain professional experience in different fields of activity. On the one hand, some nurses work in hospitals or care for older patients and then switch to the care setting for PWDs. Others spend their entire professional life caring for PWDs.

A distinction can be made by years of professional experience. Depending on the amount of professional experience, existing or impending conflict situations are handled differently by nursing. Beginners in the setting may assess a situation more critically than competent nurses who have been in the field for longer and have been able to gain more professional experience in the area. At the beginning of a professional activity, nursing work with PWDs is described as ranging from demanding to

overstraining. Rules, procedures, and limits are not sufficiently known, so one's scope of action as a nursing professional cannot be assessed. Experience is needed to ensure that PWDs want to be involved in nursing decisions, that proposed measures are rejected, or that wishes for nursing assistance are clearly expressed. One nurse commented on her entry as follows:

> Some don't want any help at all. So, you notice that it's more of a blocking, although you notice that they are getting worse. And, of course, you try to make yourself feel a bit better, but that is often very difficult. And sometimes it's also very demanding for you. Or even an excessive demand. When I started, it was definitely an excessive demand. (I39, item 18)

Textbook knowledge from training cannot be transferred unreflectively to PWDs. PWDs' partially altered body anatomy, expert knowledge, and high demand to make decisions differ from what is described in the textbook. What nurses have learned is questioned and adapted. Nurses' wealth of experience expands.

## Intervening Condition: Being Connected at the Relationship Level

Due to long care intervals, nurses and PWDs get to know each other intensively and develop relationships.

> I think you build up some kind of relationship with someone, and there is a big difference between knowing them for three weeks and knowing them for many years. You have a different relationship. (I7, item 93)

Common interests are identified through small talk. Personal stories are exchanged. Nurses emphasize that they also reveal personal information about themselves, as this is the only way to build a relationship of mutual trust. Sympathy and antipathy decide with whom a special relationship develops.

> I think the chemistry just has to be right, and you have to find each other likable. (I1, pos. 16)

If there is sympathy, additional experiences, e.g., going on holiday together, are added to everyday life, positively influencing the relationship. Other activities include joint visits to discos, shopping trips, or excursions. Nurses reported having fun during their time together.

> I had a resident who grew very close to my heart. He passed away two or three years ago. That gave me a lift. We had a lot of fun; we went on two holidays. (I10, pos. 92)

If sympathy is lacking, nurses nevertheless carry out all necessary measures in a professional manner. However, communication may be more limited, and the atmosphere may be less relaxed.

Nurses reported that it is difficult to separate the professional and relational levels. There are interactions from one level to the other, which in turn influence nursing support as a whole. Sequences that have a high potential for conflict can exist on a professional level. Critical situations can be influenced

and quickly alleviated if the relationship level is positive and trusting. However, critical situations can also exist at the relationship level and influence the professional level, e.g., when an idea or a measure is rejected due to a lack of sympathy.

## Central Strategy: Assessing Critical Situations and Engaging in Interaction

The central strategy starts with a request for care assistance by people with physical disabilities. Nursing assesses whether a request for nursing assistance can be met by weighing up nursing-medical expertise, ethics, and legal-organizational aspects. A defined order of priority in the weighing process cannot be discerned. Rather, it seems that nursing considers all three assessment criteria and weighs them subjectively. The assessment process is complemented by interaction strategies with PWDs and colleagues to obtain further information.

### Professional Evaluation

Nursing-medical expertise is formed from theoretical professional training and practical professional experience. Necessary nursing measures, as well as their positive effects, are known. The negative consequences of neglected care measures are also known, and nurses see it as their task to inform PWDs of these negative consequences.

> You have to show the consequences if, for example, he says he does not want to brush his teeth for six months. What are the consequences that this can simply also become life-threatening if there is inflammation in the mouth? (I4, item 85)

Taking care of recipients' wishes into account is essential to maintain or establishing autonomy within care interactions. When realizing wishes, nurses distinguish between basic and therapeutic care. Basic care activities such as body care are realized based on the wishes and habits of PWDs. Within treatment care, e.g., medically prescribed compression therapy or medication administration, nurses retain decision-making authority and place their professionalism and correct realization above the autonomy of PWDs.

> In personal and basic care, it is possible to do almost everything the person wants. With treatment care, of course, it's a different matter. Because people usually haven't learned that and have a clear idea of treatment care, but they can't realize it at all. (I14, item 4)

They cannot be realized if wishes are subject to risk, e.g., the risk of medical complications or interactions. Nurses refuse to take responsibility for conducting activities in this way.

Nursing distinguishes between ignorance of interactions or causal relationships and behavior that is consciously dangerous to oneself or others. In the first case, counseling is needed. In the case of a risk to oneself or others, nursing checks whether the person can make decisions for himself or herself or whether there are

legal guardians who need to be informed.

Autonomy also plays a supporting role in professional assessment. Attempts are made to allow autonomy within nursing activities of self-care. In the case of activities within the framework of medical treatment, however, the focus is on professional and correct realization. Risks should be avoided, and the associated needs should be improved. Talks with the clients are seeking.

### Ethical Evaluation

Ethics as a basis for action is of great importance for nursing. They move within the lifeworld of the persons concerned and cannot detach themselves from it. Rather, they are a part of it. Wishes for nursing assistants are also part of the subjective lifeworld. Questions about professional identity, limits of action, and values play a central role in professional activity. The interviewed nurses' values and understanding of their profession are reflected in their consideration of autonomy while providing nursing care.

> For me, autonomy and self-determination are the most important point. (I9, pos. 28)

Nurses evaluate the value of existing autonomy from an ethical perspective. As a result, nursing assistance is not imposed. Nursing assistance is provided individually with the participation of PWDs. The expressed wishes and needs have an orientation function. Care professionals can determine whether autonomy has been achieved by comparing the actual and target assistance.

In the second step, care professionals evaluate autonomy concerning care. Autonomy is opposed to a caring action in the sense of caring. The interviewed nurses are aware that PWDs can make decisions for themselves. Caring means understanding bad decisions on a human level but also accepting them. Nurses care and respect autonomy equally, without seeing themselves as superior.

> If someone is diabetic but insists on drinking their cola, I cannot force them, but I would explain that it just has health consequences. (I40, item 34)

### Legal-organizational Evaluation

Care assistance must be more legally secure. First, the legal examination of a wish is carried out by care professionals. In this context, nursing speaks of responsibility for realization. Due to their existing knowledge as well as their involvement in medical therapy, they have a mandate that must be fulfilled responsibly and professionally. The legislative framework establishes a basic set of rules and protects care providers at the same time.

> If I make mistakes in the realization, do things that I know are not right, for which I could be legally prosecuted, I must, of course, see to it that I refrain from doing so as much as possible. (I14, item 10)

Nursing actions and decisions are also related to organizational conditions. In organizations, rules are in place that results from the corporate hierarchy

and collegial interaction. These rules determine the collective behavior of the staff by defining uniform boundaries. The legal framework includes the documentation of deviations, consultations, and assistance provided or refused. This formal step legally safeguards nursing.

Nurses derive actions from the assessment. Thus, assessments and interactions are directly linked. They interact both with the persons concerned themselves and with colleagues. There is an alternating process between conversations, consultations, and collegial support. This, in turn, has an influence on the professional, ethical, and legal-organizational assessment of the individual nurse.

## Interaction Strategy: Communication with PWDs

From the assessments, further strategies emerge that are of great importance for the ongoing assessment process. Ethics, professionalism, and law as overarching dimensions are complemented by concrete actions and thus flow into the assessment process. Part of the assessment and weighing process is to have conversations with PWDs. The discussions can have several objectives and take place on the basis of the objective and the current status (the phase between the first mention of the wish and the achievement of a solution). Goals can have an informational function or go as far as the desired behavioral change. Since nurses are initially confronted in the direct nursing process with demands for nursing assistance that are experienced as critical, they must initially decide which strategy is suitable for the specific situation. However, it can also be noted that strategies are subsequently discussed and reflected upon in a collegial exchange. (1) Desire to understand wishes and concerns and give feedback, (2) Professional counseling and discussion (3) Emotional-empathetic discussions (4)Desire to negotiate compromises and propose alternatives.

In long-term care, expressed wishes for nursing assistance, experienced as critical by nurses, can be communicated in different phases. A distinction can be made based on whether the wishes are communicated for the first time. In conversations, care professionals first want to understand the wishes and concerns. To do this, they ask specific questions to obtain information.

> Then, I ask again more often. I try to ask about ambiguities very precisely. This enables me to think of new solutions. (I8, item 26)

Information is used by nurses to gain more clarity about the situation and associated concerns. This enables nurses to assess whether it is ethical, legal-organizational, or professional concerns that they experience as critical. When nurses have developed an understanding, counseling or discussion follows if there are professional concerns. It is important that PWDs are willing to

engage in a discussion about risks. First, nurses perceive whether there is an information deficit that can be remedied by professional information. From the previous questions, it can be deduced whether expressed wishes are meant seriously; whether knowledge about consequences, risks, and causal relationships is available; and whether the consequences are correctly assessed. Care professionals understand counseling as an individual process in which the needs of PWDs and the professional expertise of care professionals are brought into harmony with each other. For this purpose, requirements and wishes for nursing assistance are expressed, and possibilities of realization are enriched with professional expertise and thus individualized as much as possible. Counseling only takes place if the persons concerned want it. A reciprocal process of identifying needs or wants is created and enriched with nursing knowledge.

Professional discussions can be described as expert discussions. Nurses are professional actors and therefore have expert status. Due to their disability-specific traits and long-term experience with disability, PWDs are experts in their daily lives and have a specialized status. Conversations and discussions could lead to conflicts if no position supported by both sides can be found. This requires a different approach than a professional approach. In addition, the emotional-empathic approach is used in ethical conflicts.

If nurses do not have professional access to PWD or if the discussions do not lead to a solution, they conduct discussions on an emotional-empathic level. In this form of discussion, nurses do not argue exclusively on a professional level but on an emotional level and thus try to de-escalate impending conflicts on a professional level. These discussions are conducted with a trusted nurse. For this purpose, nurses on the team talk to each other to determine who can lead the talks. In addition, the atmosphere of the conversation is consciously influenced. It is easier to talk about difficult topics if it is relaxed and pleasant. Conversations are held with enough time and in a disturbance-free environment.

In the last step, nurses suggest compromises if realizing the desired nursing assistance is out of the question. They do this with caution, as interference in the autonomy of action of the persons concerned is to be avoided. No regulations in the sense of external determination are to be made. Compromises represent a balance between the desired assistance and its realization.

> There are always certain things that I simply suggest. Then, it is up to me to explain: Why is it important to do that? And to convince people of that. (I5, item 80)

The intensity of the talks varies. They take place repeatedly, if necessary. For care professionals and

PWDs, questions can also arise at a later point in the process, so that offers for later conversations are continuously maintained. In this way, processual action is created in addition to the original care process.

## Interaction Strategy: Seeking Collegial Support

Supporting each other in the team is particularly important for nurses during decision-making and assessment. This makes the interviewed nurses feel less alone. Situations from practice are reflected upon, and solutions are developed together. On the basis of the evaluated interviews, it becomes clear that different collegial support options are chosen. A hierarchy can be identified here: (1) Conversations with trusted colleagues, (2) Talks with superiors, (3) Discussions with the whole team, under moderation if necessary, e.g., ethical case discussion or case discussion, (4) Discussions with the extended team (therapists, medical team).

If nurses feel overwhelmed, insecure, or uncomfortable, they first turn to direct colleagues who have more professional experience or have already experienced comparable situations. An exchange with team colleagues helps to reflect on one's impression of the subjectively experienced critical situation and to obtain an assessment of the situation from an outside person. Impressions, experiences, and tips are exchanged.

Nurses reported that they first talk to individual colleagues, which is easier than addressing a conflictual situation as a whole team. The focus is not only on how to deal with the situation but also on the situation of the person concerned. One nurse tells us about this:

> Most of the time, I first get someone on board with whom I also have a relationship, where I know that if I express it there now, it will definitely stay there. However, just to get another opinion, to ask: This is happening right now, and I feel uncomfortable with it. Is that how you see it? (I39, item 20)

Suppose the entrusted colleagues confirm the situation to be critical. In that case, the next higher level in the hierarchy is informed in the context of special inpatient forms of housing and outpatient care services. The situation is explained, and the next steps are discussed. Care professionals experience passing on information to superiors as a handing over of responsibility and relief. To obtain external help, e.g., in the form of ethical case discussions, the support of superiors and time resources are needed, which is why it is indispensable to inform the management level. Nurses report that there is a large amount of support from management, that they feel taken seriously, and that this is a relief for them.

In the context of the employer model, where PWDs are supervisors themselves, exchange

with individual colleagues can occur when situations need to be reflected upon. Depending on the relationship level, the critical points can be clarified directly between the nurse and the PWD. Clarification is difficult because of the dual role of the supervisor and the person concerned.

Each critically experienced sequence has high significance from the perspective of an individual nurse and the whole team.

> And that's why it's always good to get the respective colleagues on board. And in fact, sometimes, to have a case discussion to look at things from all possible angles, to see: Am I missing something here? Am I getting lost in some situations? (I39, item 32)

Sometimes no solution is found within the team discussion that brings new insights for all. In this case, ethical case discussions can be helpful in examining the tension between autonomy and care from different perspectives of the actors involved. Since time resources must be available for organization and realization, ethical case discussions are rarely used and often as a last resort.

> Ethical case discussions help enormously to discover new perspectives in a reflective way. Our company has its own ethics team. They come into the teams and are neutral. Everyone talks. We use this for ourselves so that we become clear about what the problem is. (I8, item 18)

As a last resort, nurses talk to the extended team. Therapists and medical staff can be involved in an advisory capacity. In addition, a medical safeguard can be provided in the context of ordered therapies.

> When you lump them together, the one-sidedness of one professional group and the uniqueness of the other professional group can produce such wonderful things. (I7, pos. 81)

Before doctors or other actors are involved, all the strategies mentioned above should be used. Nurses want to hand over responsibility, so they are no longer prepared to bear it alone. If the PWD is informed about the communication, this can be interpreted as a breach of trust. Therefore, nurses think through this last step very intensively.

## Continuous Consequences

Interaction strategies result in positive, ambivalent, or negative consequences.

### Positive Consequence: Reconciling Care and Autonomy

As a positive consequence, nurses find alternatives or compromises that resolve the critical situation. When the previous interactions are successful, needs on the side of PWDs and concerns on the side of nurses could be reconciled. Nurses want to carry out the assistance they feel comfortable with, i.e., without a sense of doing something professionally, ethically, or legally wrong. Positive consequences can only occur if PWDs are genuinely interested in an alternative solution. They must be able to

understand the concerns of the care professionals. In this case, joint, productive cooperation occurs. To give an example, consider the critical situation in which alcohol and medication were to be administered together via percutaneous endoscopic gastrostomy. First, medical advice was sought. Then, it was agreed that the medication could be administered first and with an interval of one hour for the alcoholic drink.

Nursing work is successful when causal relationships, expertise, and professional experience are used coherently to develop solutions for sequences experienced as critical. When the relationship level is characterized by trust, it is easier to develop compromise solutions. It is crucial that care professionals avoid the feeling of a "loss of autonomy" for PWDs. This can be achieved by continuously involving the people concerned in the process so that they do not talk about each other but with each other.

> It is important to know the alternatives. There is rarely only one possible solution. (I5, item 80)

## Ambivalent Consequence: Not Finding a Solution but Living with Tension

Sometimes nurses do not succeed in resolving the conflict. This leads to ambivalent consequences. Consequently, PWDs can make bad decisions for their lives, and nurses cannot always avoid this. Acceptance of this condition is a major challenge. Nurses need to learn that they have no power to create a desired condition or realize what they think is best. Instead, it must be accepted that other people may have different ideas, even if it is difficult. It is challenging for nurses to continue to feel responsible even though they know they are not.

> It is unsatisfactory because you know it is not good and will cause a lot of damage to the client over time. But as long as the client is adequate enough to be aware of the consequences, this tension has to be endured. Then, there is no solution for the moment. That has to be endured. Perhaps there will be other solutions at a later time. (I9, item 54)

Even though the sequence experienced as critical is still experienced within nursing care, the deeper needs of PWDs are not recognized. Additionally, no more conversations initially take place to bring about a solution. Everyone is aware of the tensions. No change takes place negatively or positively. As a result, the condition is endured.

> For me, autonomy and self-determination are the most important point. (I9, pos. 28)

## Negative Consequence: Rejection

On the one hand, care professionals can temporarily or generally refuse nursing care. On the other hand, PWDs may also reject certain care professionals and refuse the nursing assistance offered.

The fundamental question to be clarified is whether all team members experience the causal situation as

critical or whether this is a subjective view of a single nurse. In the case of general problems and agreement among all nurses, nursing care may be discontinued, and another form of care must be sought for the PWD. In the context of the employer model, staff members quit when they no longer want to provide nursing care because they cannot be assigned to other clients.

Sometimes the refusal of care in the process is no longer primarily due to professional reasons. Rather, conflicts at the relationship level, which strengthen the process and create negative dynamics, can be a reason for refusal. The reasons are reciprocal: lack of trust, disregard for the autonomy of the people concerned, and a disparity in which the nurse symbolically places her views above the person with physical disabilities.

Occasionally, the caregiver does not reject the care but rather is rejected by the PWD. Here, too, it is mainly the relationship level that is the trigger. Lack of trust and sympathy are seen as reasons.

> In fact, behind the back of the person they don't want to have, they just talk shit about it and try to influence everything. And they also pass this on to the management: "So, I don't want him anymore. (I14, item 32)

In case of refusal, nurses try to make it possible for other nurses to take over the nursing care, for example, by changing the duty roster. This shows that conflicts can arise if causal conditions are not resolved. Nurses have a high level of professionalism, so they offer nursing care despite rejection if there is no solution.

## DISCUSSION

This article shows how nurses deal with PWDs' wishes for nursing assistance that they cannot or do not want to realize.

Grypdonck (2005) distinguishes between two main streams of nursing science. On the one hand, Grypdonck speaks of an orientation towards the functioning of the human body and refers to this as medically oriented nursing science. According to this stream, nursing assistance is supportive in the establishment of function or the establishment of health. Participation in activities of daily living is thus the measure of potential quality of life. Grypdonck calls the second orientation "experience-oriented." This phenomenological approach aims to show that human reality is created by the meaning of a person himself or herself. Accordingly, illness is experienced by people themselves, which thus gives illness subjective meaning. Although Grypdonck relates her findings to the care of chronically ill people, the study's results show that PWDs also experience assistance from nurses who support them in conducting tasks of daily living. Applied to PWDs, this means that only the PWD experiences the situation himself or herself.

Thus, his or her wishes for nursing assistance have a natural, human meaning from his or her perspective. Wishes for nursing assistance that nurses do not realize can be evaluated as critical and cause discomfort, but from the perspective of PWDs, they can be taken for granted and have a specific reason. For example, the desire to administer alcohol and medication at the same time may serve to reduce pain. Hidden needs can come to the surface. The phenomenological approach points to another train of thought. Suppose a disability changes one's previous life and the meaning of life content. In that case, disability becomes a part of the individual's perspective. In her normative care theory, Grypdonck suggests that people with a chronic illness should succeed in positioning the illness at the margins of life or, better still, in elevating life above the illness. In this way, life becomes the center of attention, and it is possible to live with the illness. Transferred to PWDs, physical disability can also be placed on the margins, and life can be moved to the center. Through the existing basis of trust within the care process, nurses can enquire how exactly the specific wishes that cannot be realized come to be. By discovering PWDs' underlying needs, new nursing task areas can be opened up, which can be solved through nursing or medical approaches.

Nurses pursue the idea of a shared decision-making approach in nursing. The essential elements are in place: Information flows both ways within conversations, and professionalism is complemented by a personal, relaxed atmosphere. Our study shows that a genuine shared decision-making approach cannot be assumed. This would mean that nurses and PWDs make a joint decision not to perform an action. This essential element of shared decision-making could not be confirmed in the present study. In the end, it is often the nurse who decides, according to the paternalistic model (Simon et al., 2008; Solari et al., 2013), whether a wish is complied with, whereas at the beginning, based on the information model (Solari et al., 2013), the person concerned makes decisions for himself or herself that are to be realized by others. This phenomenon can also be called information asymmetry. According to this concept, care professionals provide information about different options and thus enable a decision between alternatives. The need for counseling exists because PWDs may have an information deficit (Behrens & Langer, 2020). The same applies in the opposite scenario: PWDs know more about their own lives and individual characteristics and need to share this information with nurses.

Complementary to the shared decision-making approach (Rahn et al., 2021), decision coaching can be offered in the sense of decision guidance. Here, the focus is on enabling and encouraging the persons concerned to make the right decision for themselves

and their situations individually. In this coaching, PWDs can find arguments for and against nursing assistance and are accompanied by nurses. The needs underlying PWDs' wishes can be heard and appreciated. Ideally, decisions against assistance are made jointly and comprehensibly by both sides.

Internationally, the care of people with physical disabilities is becoming increasingly important. Requirements for inclusion and diversity should be implemented from a nursing science perspective. The results can enrich care and create awareness for justified action regarding requested nursing assistance. These are often seen as a wish to increase one's quality of life (Helbig et al., 2022) and offer the potential for discussion.

## Quality and Limitations

The quality of the present study can be assessed based on the formulated criteria of procedural documentation, rule-governed ness, argumentative interpretation validation, proximity to the subject matter, and communicative validation (Mayring, 2015). According to Strauss and Corbin, the grounded theory methodology is convincing due to its clear proposal for data evaluation. The procedural steps were followed and documented with computer support. Relevant elements of the theory development were supported with citations to make the conclusions comprehensible. The results were continuously discussed among the authors. In addition, the research results were discussed among the faculty of the doctoral college of the University of Witten/Herdecke. In the last step, the results were presented to active nurses involved in the care of PWDs. The results have thus been validated communicatively.

The results offer initial insights into dealing with wishes for nursing assistance that nurses in the field of care for PWDs do not realize. The scope of the developed theory refers to nurses in different settings of long-term care who care for PWDs (small to medium scope). Due to the sampling, it can be assumed that the results offer realistic recommendations for action for inpatient and outpatient residential and support settings and the employer model. It is unclear how caregivers deal with the possible dilemma of implementing desired assistance against their will. Further research is needed here. The transferability of the results to other care and health systems is conceivable in principle. Wherever there are interactions between self-determined people with physical disabilities and care professionals, critical situations can arise. These can be assessed using the model presented. It should be critically noted that only 13 care professionals were interviewed. A sample of 25 care professionals would be desirable. Unfortunately, it was impossible to recruit more participants due to the coronavirus pandemic.

## CONCLUSION

Nurses should always include professional, ethical, and legal-organizational criteria in the assessment of critical situations. The development and realization of decision coaching is a potential field of work for nurses. First, nurses can be trained on embedding autonomy and ethics within nursing assistance. This can prepare nurses to work with PWDs. Another advantage of training is that autonomy and self-determination can be reflected as a focus of one's nursing professionalism. Future research should address the experience of autonomy and care from the perspective of PWDs and create insights from the perspective of those affected.

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# A Systematic Review of Economic Evaluations of Fall Prevention Interventions for Community-Dwelling Older People

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## ABSTRACT

The purpose of this article was to identify the best cost-effective fall prevention measures for 65-year-old and older community-dwelling older adults. Eligibility criteria included being 65 or older, residing in the community, experiencing primary or recurrent falls, and evaluating the cost-effectiveness of any fall prevention intervention. Web of Science, National Institute for Health and Care Excellence Compliance Database, Cinahl Plus, Ovid (Medline), PubMed, ProQuest, Wiley Online, National Health Services Economic Evaluation Databases, EBSCOhost, and PubMed databases were scanned for this study. The risk of bias in cost-effectiveness study reviews was assessed using the Consensus Health Economics Criteria checklist and the Review Manager software. Thus, twenty-two studies met the inclusion criteria (multifactorial program: 12, exercises program: 6, home assessment program: 3, vitamin D supplement: 1). Analyzing those research results, it was revealed that preventive interventions were cost-effective, cost-saving, or cost-beneficial in 17 of them. The Falls Rehabilitation Program, the Home Hazard Reduction Program, and the Community-Based Interventions Targeting Falls Prevention were identified as net cost savings in studies suggesting the assessment of treatments.

**KEYWORDS:** Fall Prevention; Older People; Community-Dwelling; Economic Evaluation; Systematic Review.

## KEY PRACTITIONER MESSAGE

1. This study shows that fall prevention programs might lower and limit healthcare costs.
2. A limited number of interventions, such as home modifications, vitamin D supplementation, and Tai Chi were evaluated in many studies.
3. Further studies taking into account other interventions targeting exercise programs, medication compliance, cognitive behavioral therapy, podiatry intervention, and combinations of these programs might help decision-makers allocate the resources more efficiently.

## INTRODUCTION

Falls are the second leading cause of injury deaths worldwide (World Health Organization, 2007). According to the data released by the World Health Organization (WHO), approximately one-third of the population aged 65 and over experience falls every year, and approximately half of them experience falls in the following year (Lim, 2010; World Health Organization, 2007). The high incidence, long-term effects, and costs of fatal injuries related to falls in each country constitute a significant burden for the health system and the social economy (Burns et al., 2016; Davis et al., 2010). Due to the increase in the aging population in the world, falls costs are expected to increase even further (Matchar et al., 2019). Although effective fall prevention programs are available, fall rates are still high among older people (Olij et al., 2018). The economic and social costs of falls are high in older people. Community-based fall prevention programs that are affordable and feasible should be implemented (Hoffman et al., 2016). The purpose of fall prevention programs is to improve health outcomes. However, cost-effectiveness is also critical (Isaranuwatchai et al., 2017).

Systematic reviews (SRs) can play a crucial role in assessing the cost-effectiveness of a healthcare intervention in creating an efficient healthcare system. In addition, the systematic review provides a clearer insight into the methodological aspects of such studies, their overall quality, and the issues related to the practical implementation of their results. The objective of this paper was to conduct a systematic review of the literature to identify and critically appraise economic evaluation studies on interventions/programs for fall prevention among community-dwelling older people.

## METHOD

### Protocol and Registration

The Systematic Reviews and Meta-Analysis standard for reporting systematic reviews (Preferred Reporting Items for Systematic Reviews and Meta-analyses -PRISMA) (Figure-1) guided this review (Moher et al., 2009) (Supplementary File-1). This review was registered with CRD42018110907 number of PROSPERO.

### Search Strategy

Screenings were made according to the eligibility criteria. The following databases were used during the literature search process: Web of Science, National Institute for Health and Care Excellence Compliance Database, Cinahl Plus, Ovid (Medline), PubMed, ProQuest, Wiley Online, National Health Services Economic Evaluation Databases, EBSCOhost, PubMed (Search dates - from inception to September 10, 2018). The reference list of selected studies was screened for additional studies for critical appraisal. Keywords and subject headings/MeSH terms using

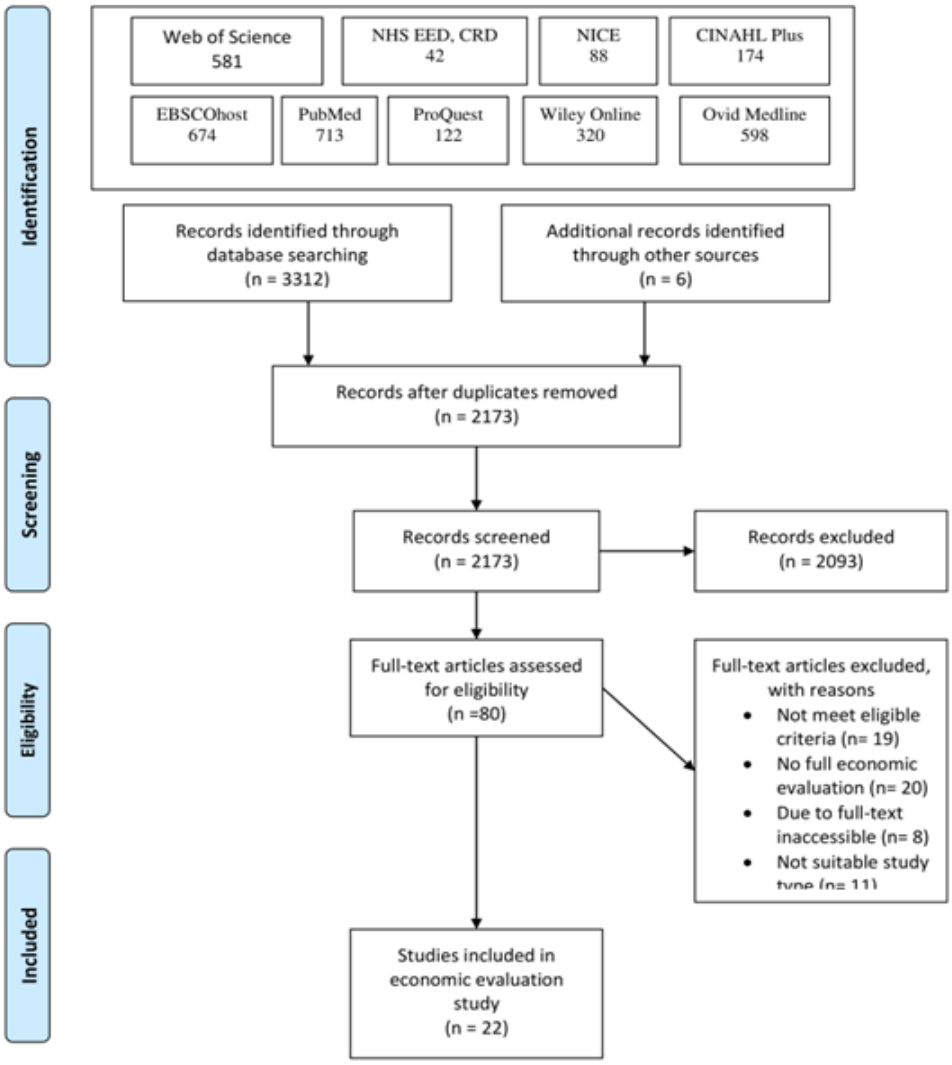


Figure-1. PRISMA Flow

BOOLEAN operators were searched in titles and abstracts using various combinations, including falls/faller, fall prevention/intervention, falls prevention, accidental falls, community-dwelling, elder, elderly, senior, older, aged, old, ICER, cost, cost-effectiveness, cost-benefit, cost-utility, cost-minimization analysis, cost and cost analysis, cost-consequences analysis. It can be examined from Prospero records how search terms are used according to databases. The first search was conducted in January 2017; it was repeated and finalized in September 2018 for updates of studies made after the initial search.

## Study Selection

The protocol defined eligibility criteria a priori using the PICOS (Population, Intervention, Comparison, Outcomes, Study type) (Table-1). The full text of selected studies was retrieved and assessed in detail based on the inclusion criteria. The review included

Table-1. Eligibility Criteria (PICOS)

| | |
|---|---|
| **Population** | Inclusion: Men and women aged 65 and over, older people with a primary/recurrent fall in the community (such as environment/home, street).<br>Exclusion: Studies conducted only for women or men only, older people in nursing homes or hospital. |
| **Intervention** | Any intervention for the prevention of fall. |
| **Comparison** | Alternative forms of fall prevention intervention programs will be evaluated and compared with standard/usual care alone. |
| **Outcome** | Main Outcome: Incremental cost-effectiveness ratio (ICER) Additional outcome(s): Probability of cost-effectiveness, total costs, and total QALYs (or alternative measure of health benefit). |
| **Study Type** | Cost-Effectiveness Analysis, Cost-Benefit Analysis, Cost-Utility Analysis. |

full economic evaluation studies such as Cost-Effectiveness Analysis (CEA), Cost-Benefit Analysis (CBA), and Cost-Utility Analysis (CUA). The studies must provide information on both costs and outcomes. In CEA studies, the effects of interventions and comparators are measured in the same outcome units. Costs are expressed in monetary terms such as dollars and euros. In the CBA, health care benefits are expressed by equal consumption. Both the costs and the results obtained measure impacts on health on a currency basis (Drummond et al., 2015). In the CUA, the effects of interventions and comparators are most commonly expressed and measured in Quality Adjusted Life Years (QALY) or Disability Adjusted Life Years (DALY) units (Gomersall et al., 2015; Munn et al., 2014; Ruger & Emmons, 2008; Thielen et al., 2016; van Mastrigt et al., 2016; Wijnen et al., 2016). In addition, these studies must compare the intervention to another intervention or control. Both trial-based economic evaluations (TBEEs) and model-based economic evaluations (MBEEs) were included in this study. The burden of illness studies and quality-of-life studies were excluded.

In studies, perspectives for the calculations (such as societal, national health service, and all-payer) and discount rates were assessed. After the first search round, full texts of the remaining articles were taken into account. In cases when the original articles' full text could not be located online, the authors were contacted through email and asked for the article's full text. Elimination of the full texts during the second round was conducted, and the reasons for exclusion were documented.

## Data Extraction

There are two data extraction tables. The first data extraction table includes the following: authors, country, economic evaluation, analysis, perspective, and time horizon (Table-2). The second data extraction

Table-2. Main Characteristics of Economic Evaluations of Interventions/Programs for Prevention of Falls

| ID | Reference | Country | Economic Evaluation | Analysis | Perspective | Time Horizon |
|---|---|---|---|---|---|---|
| 1 | Tinetti et al. (1994) | USA | TBEE | CEA | Medicare | Three months |
| 2 | Smith et al. (1998) | Australia | MBEE | CEA | - | 1 year & 10 years |
| 3 | Salkeld et al. (2000) | Australia | MBEE | CEA | Societal | 12 months |
| 4 | Beard et al. (2006) | Australia | MBEE | CBA | - | - |
| 5 | Hendriks et al. (2008) | Netherlands | TBEE | CEA, CUA | Societal | 12 months |
| 6 | Day et al. (2010) | Australia | MBEE | CEA | - | 26 weeks |
| 7 | Frick et al. (2010) | USA | MBEE | CEA, CUA | Healthcare system | Lifetime |
| 8 | Wu et al. (2010) | USA | TBEE | CEA | All-payer | 12 months |
| 9 | Peeters et al. (2011) | Netherlands | TBEE | CEA, CUA | Societal | 3, 6, and 12 months |
| 10 | Church et al. (2012) | Australia | MBEE | CEA, CUA | - | One year |
| 11 | Lee et al. (2013) | USA | MBEE | CEA, CUA | Societal | - |
| 12 | van Haastregt et al. (2013) | Netherlands | TBEE | CEA | Societal | 14 months |
| 13 | Carande-Kulis et al. (2015) | USA | TBEE | CBA | A third-party payer | One year and 14 months |
| 14 | Farag et al. (2015) | Australia | MBEE | CEA, CUA | Health funder | Five years |
| 15 | McLean et al. (2015) | Australia | MBEE | CEA, CUA | Healthcare system | 18 months |
| 16 | Li et al. (2016) | USA | TBEE | CEA | - | Six months |
| 17 | Polinder et al. (2016) | Netherlands | TBEE | CUA | - | 12 months |
| 18 | Cockayne et al. (2017a) | England and Ireland | TBEE | CEA | NHS and societal | 12 months |
| 19 | Cockayne et al. (2017b) | England and Ireland | TBEE | CEA | NHS and societal | 12 months |
| 20 | Isaranuwatchai et al. (2017) | Canada | TBEE | CEA, CBA | Societal | 6 months |
| 21 | Wilson et al. (2017) | New Zealand | MBEE | CEA, CBA | Health system | - |
| 22 | Corbacho et al. (2018) | England and Ireland | TBEE | CEA, CUA | NHS and personal social services | 12 months |

Note: USA: United States of America, MBEE: Model-Based Economic Evaluation, TBEE: Trial-Based Economic Evaluation, CEA: Cost-Effectiveness Analysis, CUA: Cost-Utility Analysis, CBA: Cost-Benefit Analysis, NHS: National Health Service

table includes the following: intervention, comparator, discount rates, reporting of cost, outcome measurement, Incremental cost-effectiveness ratio (ICER), and health economic result.

## Quality Assessment

The Consensus Health Economic Criteria (CHEC) list was used for the quality identification of both the TBEE and MBEE studies included in the search (Evers et al., 2005). Each question in the CHEC list was scored as "Yes" (1), "No" (0), "NA" (not applicable), or "indefinite" (no scoring). The "indefinite" option is only used when the information in an item is not completely clear. Studies scoring more than 14 (>75%) were graded as high quality, studies scoring between 10 and 14 (50-75%) were graded as moderate, and those with scores below 10 (<%50) were graded as poor quality (Hamberg-van Reenen et al., 2012; Winser et al., 2019).

Using Mendeley, the two researchers (MY, GAK) studied blinded and independently at each stage (search strategy, study selection, data extraction, and quality assessment). In cases where between-researcher disagreements could not be resolved by discussion to achieve consensus, a third reviewer (MKS) arbitrated.

## Outcomes

Incremental costs, cumulative effects, and incremental cost-effectiveness ratio (ICER) were extracted from each research. Under the Consolidated Health Economic Evaluation Reporting Standards (CHEERS), the healthcare and societal viewpoints for calculations were examined (Husereau et al., 2013). Due to heterogeneity in outcome parameters, a meta-analysis could not be conducted.

The threshold value for cost-effectiveness is a tool that indicates how much a country or organization is willing to invest per additional QALY gained. The threshold value varies from one country to another depending on the assumptions and methods used. Cost-effectiveness thresholds commonly used in some countries are reported as 50,000 USD in the USA, 80,000 Euro in the Netherlands, and £ 20,000 / QALY in the UK, and these values are constantly updated (Cameron et al., 2018). In countries where the threshold is not formally stated, the World Health Organization considers it cost-effective if it is up to 3 times the gross national product per capita. If an intervention was below the threshold values, it was considered cost-effective (Health Committee of the UK Parliament, 2012). All monetary values were given in the currencies presented in the article or USD-Euros.

## Risk of Bias Assessment

The risk of bias in reviews of cost-effectiveness studies was evaluated using the Consensus Health Economics Criteria (CHEC) checklist and the Review Manager software (Evers et al., 2005).

# RESULTS

## Study Selection and Characteristics

The results of the systematic study were presented in the PRISMA Flow Diagram (Figure-1). Twenty-two studies were identified as full-text papers. These studies were published between 1994 and 2018. The majority of the studies (17 out of 22) were published in or after 2010. The studies were conducted with samples in developed countries (Table-2). The economic evaluation methods, time horizon, and perspectives used in the studies are shown in Table-2. In 10 of the studies included in the study (Study S2, S3, S4, S6, S8, S11, S13, S15, S16, S21), an economic evaluation of a single fall prevention intervention was performed. In the remaining 12 studies, multiple interventions were evaluated. Supplementary File-2 provides information about the characteristics of these studies, details about interventions, and economic evaluation methods used for these interventions. Five out of 22 studies compared the interventions with a control group (S1, S6, S14, S18, S19), ten compared with usual care (S3, S4, S5, S7, S9, S12, S15, S17, S20, S22), and seven had status quo or no intervention group.

The authors of the studies used many different cost classification approaches. Of these cost classification approaches, the most commonly used ones are outcome measures of the cost of hospital admission (S4, S7, S9, S10, S15, S17, S18, S19, S21, S22) and the number of falls prevented (S3, S5, S12, S16, S20) followed by per fall prevented (S1, S2, S6, S7), per injury prevented (S2, S11) and cost per participation (S13, S14).

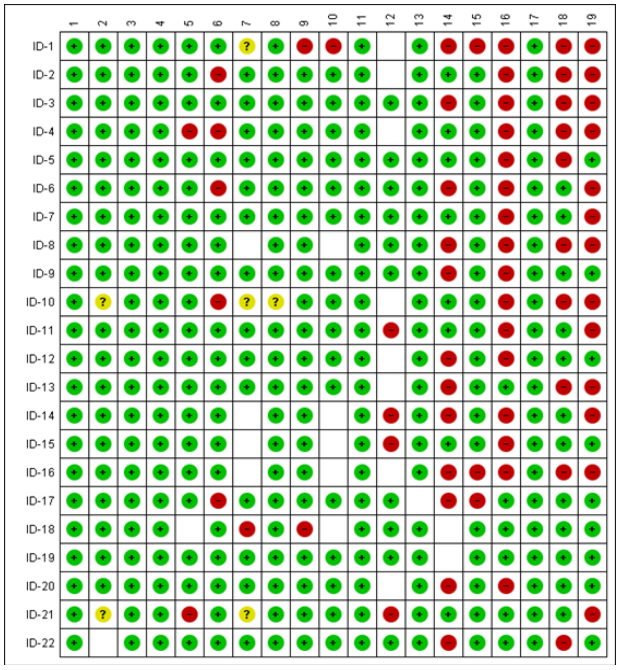


Figure-2. The Methodological Quality of The Studies

## Risk of Bias Within Studies

The CHEC list details the scoring instructions in the supplementary files (Supplementary File-3). The methodological quality of the studies was investigated in the Revman program, and the risk of bias was given in Figure-2 and Figure-3. None of the included studies met all the CHEC criteria. Four items (S14, S16, S18, and S19) received the lowest scores. Item 16, "the conclusions followed from the data reported," was not included in most articles. The other items with the lowest scores were "discounting issue" (item 14), "generalizability of the results and

other groups" (item 18), and "ethical and distributional issues" (item 19). Four items received full scores (1, 3, 4, 11) (Figure-3). According to the analysis of the results of the study, prevention interventions were cost-effective, cost-saving, or had a positive net monetary benefit in 17 studies (S1, S2, S3, S4, S6, S7, S8, S10, S11, S12, S14, S15, S16, S18, S19, S21, S22).

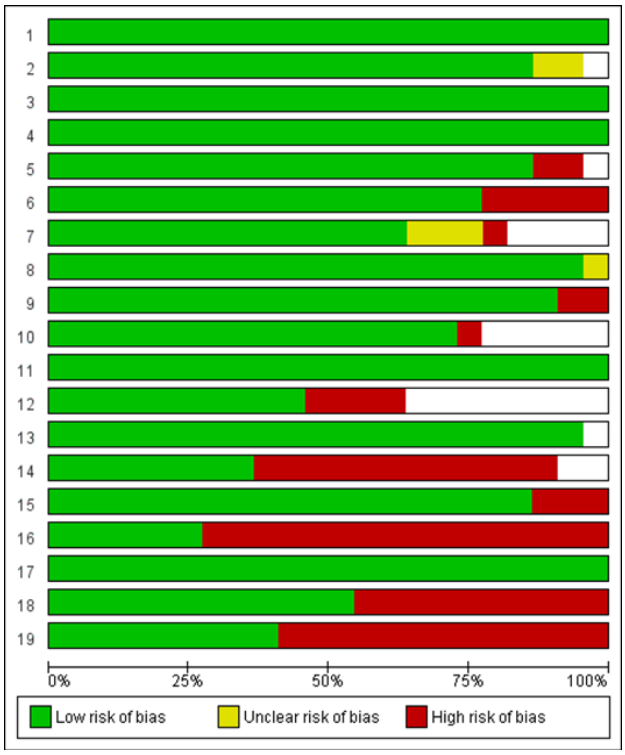


Figure-3. Risk of Bias

## Results of Individual Studies

The interventions in the systematic review were grouped into separate titles and examined. In the last part, interventions were evaluated through outcomes.

### Exercise Programs

The community-based *"Stay on Your Feet"* program aimed to prevent falls among old individuals was reported as highly cost-effective (S4). Group-based Tai-Chi program modeling study reported limited effectiveness on the population; however, if the cost per participant could be substantially reduced and covered by the individual out-of-pocket expenditure, it might be cost-saving. (S6). The "No Falls Exercise Program" (S15) was cost-effective for women. Tai Ji Quan: Moving for Better Balance (TJQMBB) Program (S16) was cost-effective per fall prevented.

### Home Assessment Programs

The home hazard reduction program, which was applied to individuals who experienced falls in the previous year, was cost-saving (S3). Home Safety Assessment and Modification (HSAM) program targeted people aged 65+ or 75+ with a history of previous injurious falls and was estimated to be cost-effective (ICERs: NZ$700 and NZ$832, respectively) and lower confidence intervals for ICERs were cost-saving (S21).

### Multifactorial Programs

Multifactorial interventions (S1) implemented by the nurse and physiotherapist have found net cost savings. A study examined fall prevention programs in seven groups (S7). The cost of Vitamin D supplementation was less than the home modifications; home modifications were more costly and more effective, with an ICER of $14,794/QALY. A study comparing multiple interventions for the general population (S10) determined Tai Chi as the most cost-effective

intervention. While the multicomponent cognitive behavioral group intervention (S12) significantly reduced the fear of falling, it increased costs slightly. The Public Health program, implemented in Australia, was costlier and more effective, with an ICER of $A28 (S14). The multifaceted podiatry intervention was cost-effective for fall prevention, with an incremental cost per QALY ranging between £19,494 and £20,593 (S18). A multifaceted podiatry intervention was more costly and more beneficial in terms of health-related quality of life years gained (S19). The benefits of the Multifaceted Podiatry Intervention were cost-effective, and the probability for CE was 65% for the NICE willingness to pay threshold, which is GBP 30000 (S22). Some programs (Interdisciplinary intervention program, multifactorial transmural intervention, Fall Risk Increasing Drugs (FRIDs) assessment combined with FRIDs-withdrawal or modification, plus monthly in-home visits) were not regarded as cost-effective (S5, S9, S17, S20).

## Outcomes

Comparing studies with different types of interventions on different target populations for the cost-effectiveness of fall prevention strategies is not easy. Most studies provided mean values and estimated an incremental cost-effectiveness ratio (ICER). It is calculated by dividing the difference in costs of two programs by differences in effects such as QALYs. In nine studies (CUA studies), QALY results were provided. According to research conducted in the USA, the cost for falls prevented ranged between USD 850-1947(S1, S8, S16), ICER was reported in 2 studies, and the cost of Vitamin D supplementation per QALY gained was 8758 USD (S11), and it was cost-saving in another study (S7). ICER for home modification compared to Vitamin D supplementation was USD 14,794, which was cost-effective. Four studies were conducted in the Netherlands, and two randomized controlled trials, in which multidisciplinary fall prevention programs were applied. The ICERs were not cost-effective as the interventions yielded a higher cost and lower effectiveness when compared with usual care (S5, S9). Improving medication prescription resulted in lower costs and higher effectiveness with an ICER: of EUR 2400 (S17). The study, aimed to reduce the fear of falling, provided an ICER: of EUR 1070. These values are lower than the Dutch cost-effectiveness threshold (EUR 80.000). The randomized controlled trial of multifaceted podiatry intervention with a duration of 12 months conducted in England and Ireland had ICER values ranging between 19.494 and 20.593 pounds and were below the national cost-effectiveness threshold (S18, S19, S22). According to research conducted in Australia, the cost of falls prevented ranged between Australian Dollars 1721 and 4986 (S2, S3, S6). According to research, conducted in Australia, the cost of falls

prevented ranged between Australian Dollars 1721 and 4986 (S2, S3, S6). According to research, Home Assessment Programs were considered cost-saving (S2, S3).

## DISCUSSION

In this systematic review of twenty-two studies, we present information on current economic assessments of fall prevention treatments for community-dwelling persons aged 65 and older in this vital public health sector. These findings clearly suggest the need for a study assessing the costs of fall prevention initiatives, particularly in industrialized nations. Conducting model-based research to measure the impact of fall prevention interventions on quality of life will also contribute substantially to the existing body of knowledge.

According to the results of the 17 studies, prevention interventions were cost-effective, cost-saving, or had a positive cost-benefit (S1, S2, S3, S4, S6, S7, S8, S10, S11, S12, S14, S15, S16, S18, S19, S21, S22). In two studies (S5, S9), interventions were less effective and more costly; they were not cost-effective in this respect. In a study conducted in Canada, the fall prevention program in the whole community was not cost-profitable; however, the intervention was considered acceptable if the willingness to pay a fall (WTP) in the 75-84 age group was C$ 25000 or C$5000 in those aged ≥85 years. In a systematic review investigating the economic evaluation of WTP for fall prevention programs in older people over 60 years of age receiving community or residential care (Olij et al., 2018), home assessment and medication adjustment programs had the most favorable results due to lower ICER values. According to a review published in 2010, the medication adjustment program, Vitamin D supplementation, and cataract surgery were reported as cost-effective (Davis et al., 2010).

In almost one-third of the studies, the assessment was made from the perspective of the payer/health care provider (S2, S4, S6, S10, S16, S17), whereas in seven of the studies, evaluation was made from a societal perspective (S3, S5, S9, S11, S12, S18, S19, S20). However, there are also studies in which the perspective was not clearly defined. It is recommended that studies from all perspectives be performed to guide decision-makers.

In more than half of the studies, the time horizon was between 1 and 5 years. There were few studies in which the time horizon was less than one year. In some studies, the time horizon was not reported. Physical and psychological disabilities due to aging will increase health problems, increasing risks for falls in older people and incurring high health care costs. Given this situation, conducting studies with a longer time horizon would be valuable in identifying costs covering advanced ages.

While eight studies reported a discounting rate ranging between 3% and 8%, some studies did not report any discounting rate. In the studies, the authors used various cost classification approaches. Of them, the most commonly used ones were outcome measures of the cost of hospital admission (S4, S7, S9, S10, S15, S17, S18, S19, S21, S22) and several falls prevented (S3, S5, S12, S16, S20) followed by per fall prevented (S1, S2, S6, S7), per injury prevented (S2, S11) and cost per participation (S13, S14).

The methodological quality of the studies was assessed using a validated checklist for the methodological quality assessment of economic evaluations named the CHEC-list (Evers et al., 2005); according to the CHEC list scores of the studies, the risk of bias was low in five studies and high (≥50%) in four studies. According to the CHEC list scores, fourteen studies had high quality (S3, S5, S6, S7, S9, S11, S12, S13, S15, S17, S19, S20, S21, S22), six studies (S2, S4, S8, S10, S14, S18) had moderate quality and two studies (S1, S16) had low quality.

Multifactorial interventions performed by various multidisciplinary team members, the Falls Rehabilitation Program, Home Hazard Reduction Program, and Community-Based Interventions Targeting Falls Prevention, were determined to be net cost saving. In the other study (S2) in which the two-stage intervention (home hazard diagnosis and fall prevention devices presentation) was implemented, the intervention was considered dominant in terms of both cost per fall and cost per injury prevented. Vitamin D supplementation was less costly and less effective compared to home modifications. Both universal supplementation and population screening for vitamin D deficiency among older people, women, and men were cost-effective from a societal perspective. All three fall interventions (The Otago Exercise Program, Tai Chi: Moving for Better Balance, Stepping On) provided positive net monetary benefits (S13). Tai-chi, No Falls Exercise Program, Tai Ji Quan: Moving for Better Balance Program, and multifaceted podiatry intervention were reported as cost-effective. Home Safety Assessment and Modification (HSAM) only for people age 65+ or 75+ with previous injurious falls was estimated to be particularly cost-effective (ICERs: $700 and $832, respectively), with the latter intervention being cost-saving (S21).

## LIMITATIONS

There are also several limitations to be noted regarding this review. We did not include the studies published other than in the English language, which limited the number of research evaluated in this study; however, we believe that this problem is limited as the majority of the health economics research on this topic was conducted in English-speaking countries.

We had difficulties comparing the study findings as they used different health economic evaluation methodologies and outcome measures. Variations in currencies, inflation rates, discount rates, and the time horizon of the studies made it more difficult to combine the results. The provision of health services for older people might show the difference between countries, limiting the generalizability of the findings. However, we tried to solve this issue by subgrouping the same countries, such as the USA, the Netherlands, and Australia, and comparing within-country cost-effectiveness results.

## CONCLUSION

This systematic review indicates that most fall prevention programs were cost-effective, cost-saving, or cost-beneficial. Most of the studies were conducted in developed countries; hence, data is needed from developing countries that experience epidemiological transition with an aging population. Variations in the economic evaluation methods and the differences in the overall quality of the studies limited the comparability and generalizability of the results. This problem can be solved by conducting studies and presenting the findings under health economics guidelines (Husereau et al., 2013). Clearly, fall prevention initiatives might reduce healthcare expenditures.Many studies evaluated a limited number of interventions, such as home modifications, vitamin D supplementation, and Tai-Chi; thus, further studies examining other interventions targeting exercise programs, medication compliance, cognitive behavioral therapy, podiatry intervention, and combinations of these programs might help decision-makers for allocating the resources more effectively.

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## Supplementary File-1. Prisma 2009 Checklist

| Section/Topic | # | Checklist Item | Reported on Page # |
|---|---|---|---|
| **Title** | | | |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | 1 |
| **Abstract** | | | |
| Structured Summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | 1 |
| **Introduction** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. | 2-3 |
| Objectives | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). | 2-3 |
| **Methods** | | | |
| Protocol and Registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information, including registration number. | 3 |
| Eligibility Criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. | 4 |
| Information Sources | 7 | Describe all information sources (e.g., databases with coverage dates, contact with study authors to identify additional studies) in the search, and the date last searched. | 3 |
| Search | 8 | Present a full electronic search strategy for at least one database, including any limits used, such that it could be repeated. | 3 |
| Study Selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in a systematic review, and, if applicable, included in the meta-analysis). | 4 |
| Data Collection Process | 10 | Describe a data extraction method from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming investigator data. | 5 |
| Data Items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. | 4 |
| Risk of Bias in Individual Studies | 12 | Describe methods used for assessing the risk of bias in individual studies (including specification of whether this was done at the study or outcome level) and how this information will be used in any data synthesis. | 6 |
| Summary Measures | 13 | State the principal summary measures (e.g., risk ratio, the difference in means). | - |
| Synthesis of Results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$) for each meta-analysis. | - |

## Supplementary File-2. Main Characteristics of Economic Evaluations of Interventions

| ID | Ref | Intervention | Comparator | Discount Rates | Reporting of Cost | Outcome Measurement | ICER | Health Economic Result |
|---|---|---|---|---|---|---|---|---|
| 1 | Tinetti et al., 1994 | A multifactorial intervention<br><br>By a nurse and physical therapist | Control group | - | Dollars, USA | Per fall prevented | The cost of preventing one fall that required medical care was $12,392.<br><br>The cost per fall prevented was $1,947. | A complete analysis of total and fall-related healthcare costs may show that the intervention results in net cost savings. |
| 2 | Smith and Widiatmoko, 1998 | The intervention has two stages. (First: assessment of home hazards and appropriate suggestions. Second, provide fall-prevention devices for those identified with such home hazards). | No intervention | 5 % | 1996 Australian dollars | - cost per fall prevented<br>- cost per injury prevented | The incremental cost per fall prevented is $1,720.80. The incremental cost per injury prevented is $17,208 Over one year of ICER, the intervention was $172 per person per fall, which prevented $1,721, cost per injury, and $1 7,208. Over ten years: cost saving of $92 per person | The intervention is dominant. |
| 3 | Salkeld et al., 2000 | Home hazard reduction program | Usual care | - | 1997 prices Australia | -number of falls prevented<br>-SF 36 | For all subjects, the average cost per fall prevented is $4,986. For falls in the last year, the average cost per fall prevented is $3,980. | The program was cost-saving for subjects who had fallen in the 12 months prior to randomization |
| 4 | Beard et al., 2006 | Stay on Your Feet (SOYF) | Usual care | 8% | 1995/96 Australian dollars | - the cost of hospital admissions | | Well-designed community-based interventions targeting fall prevention among older people are highly cost-effective. |
| 5 | Hendriks et al., 2008 | Interdisciplinary intervention program | Usual care | 4% | Dutch manual | -number of people sustaining a fall during one year of follow-up<br>-QALYs<br>-the Dutch version of the EuroQol (EQ-5D) | 27 % of the ICERs were in the dominant quadrant (representing the probability of the intervention having more effective and lower costs compared with usual care) | The multidisciplinary intervention program to prevent falls was not cost-effective compared with usual care.<br><br>According to probabilistic sensitivity analysis, only 27 percent of the ICERs were on the dominant quadrant. |
| 6 | Day et al., 2010 | Group-based tai-chi | Control group | - | 2009 Australian dollars | -Total falls<br>-fall-related hospitalization | This equates to $A4414 and $A220 712 per fall, and fall-related hospital admission prevented, respectively. | Tai-chi programs may present good value for falls- prevention resources if the cost per participant can be substantially reduced compared to treatment cost estimates |
| 7 | Frick et al., 2010 | Fall-prevention interventions are into seven groups: medical management (withdrawal) of psychotropics, group tai chi, vitamin D supplementation, muscle and balance exercises, home modifications, multifactorial individualized programs for all older people, and multifactorial individualized treatments for high-risk frail elderly people | Usual care | 3% | Medical care inflation 1998 to 2007<br>General economic inflation rate before 1998 | -Prevention of falls<br>-QALYs | ICER for vitamin D supplementation and home modifications is $14,794<br><br>Medical management of psychotropics and group tai chi was the least-costly, most-effective option. Excluding these interventions, the least-expensive, most-effective options are vitamin D supplementation and home modifications. ICER for home modifications was $14,794/quality-adjusted life year (QALY) gained. In probabilistic sensitiv-ity analyses excluding psychotropics and tai chi management, home modification is most likely to have the highest economic benefit when the cost-effectiveness threshold for QALYs was valued at $50,000 or $100,000. | Management of psychotropics and tai chi reduces costs the most. Of more studied interventions, home modifica-tions provide the best value. |
| 8 | Wu et al., 2010 | The Falls Rehabilitation Program (FRP) | No intervention | - | 2008 dollars, USA | -Per recurrent fall prevented | The FRP would have a net cost to Medicare of about $435 million, or equivalently, $850 per person prevented from experiencing a recurrent fall. | Such a program could potentially be cost-saving from an all-payer perspective, as the total reduction in annual healthcare costs ($2.67 billion in the base case, with 54% charged to Medicare) is estimated to outweigh the program cost ($1.88 billion). |
| 9 | Peeters et al., 2011 | The multifactorial transmural intervention<br><br>The multifactorial transmural intervention started with a visit to the geriatric outpatient clinic. The geriatrician conducted a multifactorial fall risk assessment to identify modifiable fall risk factors. The assessment of fall risk factors and the treatment plan design was based on the Dutch Institute for Healthcare Improvement (CBO) guideline "Prevention of fall incidents in older persons." | Usual care | - | 2007 Euros | -Fallers<br><br>-Recurrent fallers<br><br>- Utility (quality of life). | The mean costs were Euro 7,740 (SD 9,129) in the intervention group and Euro 6,838 (SD 8,623) in the usual care group (mean difference Euro 902, bootstrapped 95% CI: −1,534 to 3,357). | Multifactorial evaluation and treatment of persons with a high risk of recurrent falling were not cost-effective com-pared to usual care. |

Supplementary File-2. *continues...*

| ID | Ref | Intervention | Comparator | Discount Rates | Reporting of Cost | Outcome Measurement | ICER | Health Economic Result |
|---|---|---|---|---|---|---|---|---|
| 10 | Church et al., 2012 | The interventions (home exercise, group exercise, tai chi, multiple and multifacto-rial interventions) aimed at the general population; high-risk populations (group exer-cise, home hazard assess-ment/modification, and multifactorial interventions); and specific populations (cardiac pacing, expedited cataract surgery, and psy-chotropic medication with-drawal). | No intervention | 5% | - | -QALY<br>-Fall-Related Injuries<br>-Fear Of Falling | In the general population, compared with no intervention, the ICERs were tai chi ($44,205), group-based exercise ($70,834), multiple interventions ($72,306), home exercise ($93,432), multifactorial interventions with only referral ($125,868) and multifactorial interventions with an active component ($165,841). | Tai chi remained the only cost-effective intervention for the general population. |
| 11 | Lee et al., 2013 | Population screening strategy and universal supplementation strategy of vitamin D | No intervention | 3% | 2011 dollars, USA | -No Injury,<br>-Injurious Fall Without Hospitalization,<br>-Injurious Fall with Hospitalization. | For females, universal supplementation resulted in incremental costs of $51.44 and an effectiveness of 0.005 QAL-Ys.<br><br>For males, universal supplementation resulted in incremental costs of $52.55 and incremental effectiveness of 0.006 QALYs. | Both universal supplementation and population screening for vitamin D deficiency among older adult women and men are cost-effective from a societal perspective. |
| 12 | van Haastregt et al., 2013 | The multicomponent cognitive behavioral group intervention | Usual care | NA | 2004 Euros, Netherlands | - Fear of Falling or Avoiding Activity | The base-case analysis for fear of falling revealed that the cost for every additional patient who is no longer afraid of falling is €1,070 (ICER = 4,925–4,828 / 0.235–0.144), and the cost for every additional patient who is no longer avoiding activity due to fear of falling is €683 (ICER = 4,925–4,828 / 0.374–0.232). | A multicomponent nurse-led cognitive behavioral group intervention significantly reduced fear of falling and asso-ciated activity avoidance while only slightly increasing costs. |
| 13 | Carande-Kulis et al., 2015 | The Otago Exercise Program, Tai Chi: Moving for Better Balance, Stepping On | No intervention | - | 2012 dollars, USA | -Cost Per Participant Per Year | For the Otago Exercise Pro-gram (>65), the net benefit was $121.85 per participant; the return on investment (ROI) was 36%; for the Otago exercise program (>80), the net benefit was $429.18, the ROI was 127%. Tai chi: Moving for Better balance had a net benefit of $529.86 and an ROI of 509% Stepping On had a net benefit of $134.37 and an ROI of 64%. | All three fall interventions provided positive net benefits. The ROIs showed that the benefits covered the implemen-tation costs and exceeded the expected direct program delivery costs. |
| 14 | Farag et al., 2015 | Public Health Program | Control group | - | 2011 Australian dollars | -QALY<br>-Hospital Admission<br>-Emergency Department Consultations. | The program was more costly and more effective with an ICER of $A28,931; however, the probability for being cost-effective was 57% when the cost-effectiveness threshold was set to $A50,000 per QALY gained | This ICER would be considered cost-effective at a threshold value of $A50,000 per QALY gained. |
| 15 | McLean et al., 2015 | No Falls Exercise Program | Usual care | 3% | 2010 Australian Dollars<br>And British Pound Sterling (GBP) | -QALY<br>-Falls Prevention | The ICER of GBP£51,483 per QALY for the base case analysis was well above the accepted cost-effectiveness threshold of GBP£20,000 to £30,000 per QALY; the ICER value in the base case analysis was GBP£99,664 per QALY and GBP£50,549 per QALY in the lower cost analysis. | The exercise program is cost-effective for women only. |
| 16 | Li et al., 2016 | Tai Ji Quan: Moving for Better Balance (TJQMBB) Program | No intervention | - | - | -Number of falls | The average cost-effectiveness ratio for implementing the 48-week program was $917 per fall prevented; for partic-ipants who reported multiple falls at baseline and during the 48-week intervention period, the ratio was an estimated $676 per fall prevented | TJQMBB is an effective public health program that can be broadly im-plemented in senior community centers for the primary prevention of falls |
| 17 | Polinder et al., 2016 | FRIDs assessment combined with FRIDs-withdrawal or modification | Usual Care | - | Dutch cost prices | -HRQoL<br>-the Dutch versions of the EuroQol-5D (EQ-5D)<br>-Short Form-12 (SF-12) version 2 | The mean cost of the FRIDs intervention was €120 per patient. The withdrawal of FRIDs reduced medication costs with a mean of €38 per participant. | The mean QALY differ-ence between both groups was 0.05 QALY. For the total fall-related healthcare costs, no sig-nificant differences be-tween both study groups could be detected. |

## Supplementary File-2. *continues...*

| ID | Ref | Intervention | Comparator | Discount Rates | Reporting of Cost | Outcome Measurement | ICER | Health Economic Result |
|---|---|---|---|---|---|---|---|---|
| 18 | Cockayne et al., 2017a | The multifaceted podiatry intervention | Control group | NA | - | -Self-reported falls per participant<br>-The proportion of fallers<br>-Those reporting multiple falls. | The cost per fall averted was £1,254. | This multifaceted intervention program could be a cost-effective option for fall prevention, with the incremental cost per QALY (based on health-related quality of life) ranging between £19,494 and £20,593. |
| 19 | Cockayne et al., 2017b | A multifaceted podiatry intervention | Control group | NA | UK pounds sterling (£) at 2015 prices | -Falls per participant | The intervention was more costly but marginally more beneficial in terms of health-related quality of life (mean quality-adjusted life year (QALY) difference 0.0129, 95% CI -0.0050 to 0.0314) and had a 65% probability of be-ing cost-effective at a threshold of £30,000 per QALY gained. | The intervention may be cost-effective. |
| 20 | Isaranuwatchai et al., 2017 | The intervention group received usual care, plus monthly in-home visits by an interprofessional team with special-ized training in the area of fall prevention. | Usual care | - | 2006 Canadian dollars. | -The number of falls at six-months | For young-old to prevent one fall willingness-to-pay< $25,000 CAD,<br><br>For the old-old group, the intervention was cost-effective at willingness-to-pay < $5000 CAD to prevent falls. | The multifactorial fall prevention intervention was not cost-effective compared to usual care. The cost-effectiveness of the intervention depends on age and decision-makers' willingness to pay to prevent falls. |
| 21 | (Wilson et al., 2017) | HSAM (Home Safety Assessment and Modification) | No intervention | 3% | 2014 New Zealand Dollar | -QALY | ICER was estimated at NZ$5480, suggesting HSAM is cost-effective (95%UI: cost saving to NZ$15,300 [equivalent to US $10,300]). | The program was estimated to be cost-effective (ICERs: NZ$700 and NZ$832, respectively), and lower confidence intervals for ICERs were cost-saving |
| 22 | (Corbacho et al., 2018) | Multifaceted Podiatry Intervention-REFORM | Usual care | - | UK pounds sterling, 2015, England and Ireland | -Incidence of falls -the proportion of fallers<br>-EQ-5D-3L<br>-QALYs | Incremental cost-effectiveness ratios ranged between GBP 19,494 and GBP 20,593 per QALY gained, which is be-low the conventional National Health Service cost-effectiveness thresholds (GBP 20,000 to GBP 30,000) per addi-tional QALY. | The benefits of the intervention justified the moderate cost. |

## Supplementary File-3. CHEC-List

| CHEC/ID | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 2 | Y | Y | Y | Y | Y | Y | Y | Y | Y | U | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | U | NA |
| 3 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 4 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 5 | Y | Y | Y | N | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | NA | Y | Y | Y | Y |
| 6 | Y | N | Y | N | Y | N | Y | Y | Y | N | Y | Y | Y | Y | Y | N | N | Y | Y | Y | Y | Y |
| 7 | U | Y | Y | Y | Y | Y | Y | NA | Y | U | Y | Y | Y | NA | NA | NA | Y | N | Y | Y | U | Y |
| 8 | Y | Y | Y | Y | Y | Y | Y | Y | Y | U | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 9 | N | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y | Y |
| 10 | N | Y | Y | Y | Y | Y | Y | NA | Y | Y | Y | Y | Y | NA | NA | NA | Y | NA | Y | Y | Y | Y |
| 11 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 12 | NA | NA | Y | NA | Y | Y | Y | Y | Y | NA | N | NA | NA | N | N | NA | Y | Y | Y | NA | N | Y |
| 13 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | NA | Y | Y | Y | Y | Y |
| 14 | N | Y | N | Y | Y | N | Y | N | N | Y | Y | N | N | N | Y | N | N | NA | N | N | Y | N |
| 15 | N | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | N | Y | Y | Y | Y | Y |
| 16 | N | N | N | N | N | N | N | N | N | N | N | N | Y | N | N | N | Y | Y | Y | N | Y | Y |
| 17 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 18 | N | N | N | N | N | Y | Y | N | Y | N | Y | Y | N | Y | Y | N | Y | Y | Y | Y | Y | N |
| 19 | N | N | N | N | Y | N | N | N | Y | N | N | Y | N | N | Y | N | Y | Y | Y | Y | N | Y |
| Total | 10 | 14 | 15 | 13 | 17 | 15 | 17 | 13 | 17 | 11 | 16 | 16 | 15 | 13 | 15 | 10 | 15 | 14 | 18 | 16 | 15 | 16 |

Note: Y: Yes, N: No, NA: Not Applicable

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# INSTRUCTIONS TO AUTHORS

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*Journal Articles:*

Lo, C. L., & Su, Z. Y. (2018). Developing multiple evaluation frameworks in an older adults care informa-tion system project: A case study of aging country. Journal of Aging and Long-Term Care, 1(1), 34-48. doi:10.5505/jaltc.2017.65375.

*Edited Book:*

Whitbourne, S. K. (Ed.) (2000). Wiley Series on Adulthood and Aging. Psychopathology in Later Adulthood. Hoboken, NJ, US: John Wiley & Sons Inc.

*Book Section:*

Bowen, C. E., Noack, M. G., & Staudinger, U. M. (2011). Aging in the Work Context. In K. W. Schaie & S. Willis (Eds.), Handbook of the Psychology of Aging (7th Ed.) (pp. 263-277). San Diego: Academic Press.

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*Web Page:*

Borji, H. S. (2016, 25.07.2016). Global Economic Issues of an Aging Population. Retrieved from http://www.investopedia.com/articles/investing/011216/4-global-economic-issues-aging-population.asp.

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Vision and Mission

The major goal of the Journal of Aging and Long-Term Care (JALTC) is to advance the scholarly contri-butions that address the theoretical, clinical and practical issues related to aging and long-term care. The JALTC, while making efforts to create care services for older people at the best quality available that are more humane, that pay special attention to people's dignity, aims from the perspective of the whole aging process- to discuss Social Care Insurance as a human right, to contribute care for older people to be trans-formed into an interdisciplinary field, to integrate care services for older people and gerontological concepts and to create more effective collaboration between them, to enhance the quality of care services for older people and the quality of life of caregivers from medical, psychological and sociological perspectives, to highlight the cultural factors in care for older people, to increase the potential of formal and informal care services, to provide wide and reachable gerontological education and training opportunities for caregivers, families and the older people.

Aims and Scope

"National Association of Social and Applied Gerontology (NASAG)"has recently assumed responsi-bility for the planning and introduction of a new international journal, namely, the Journal of Aging and Long-Term Care (JALTC). With world societies facing rapid increases in their respective older populations, there is a need for new 21st century visions, practices, cultural sensitivities and evidenced-based policies that assist in balancing the tensions between informal and formal longterm care support and services as well as examining topics about aging.

The JALTC is being launched as the official journal of the NASAG. The preceding journal aims to foster new scholarship contributions that address theoretical, clinical and practical issues related to aging and long-term care. It is intended that the JALTC will be the first and foremost a multidisciplinary and interdis-ciplinary journal seeking to use research to build quality-based public policies for long-term health care for older people.

It is accepted that aging and long-term care is open to a diverse range of interpretations which in turn cre-ates a differential set of implications for research, policy, and practice. As a consequence, the focus of the journal will be to include the full gamut of health, family, and social services that are available in the home and the wider community to assist those older people who have or are losing the capacity to fully care for themselves. The adoption of a broader view of aging and long term care allows for a continuum of care support and service systems that include home base family and nursing care, respite day care centers, hospital and hospice care, residential care, and rehabilitation services. It is also crucial to be aware that life circumstances can change suddenly and dramatically resulting in the need for transitional care arrange ments requiring responsive, available, accessible, affordable and flexible health care service provision.

For further assistance and more detailed information about the JALTC and the publishing process, please do not hesitate to contact Editor-in-Chief of the JALTC via sending an e-mail: editor-in-chief@jaltc.net Editor-in-Chief: Emre SENOL-DURAK

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