



Access to Ambulance Services for People with Dementia: A Comprehensive Review of Facts, Challenges, Strategies and Future Scopes

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ABSTRACT

Dementia is a progressive neurological impairment, causing a significant public health challenge worldwide. This pathological condition is characterized by cognitive decline and impairment in memory, thinking, behaviour, and the ability to perform daily activities. In Australia, dementia is a major health issue, with over 472,000 cases as of 2022. As the population ages, it is expected for this number to increase to 1.1 million by 2058, if no effective interventions are found.

The impact of dementia on individuals, families, caregivers, and society in general, leads to an increase in demand for healthcare and emergency services. Currently, there is limited research on challenges that are faced by individuals with dementia in navigating the healthcare system for a timely and proper access to emergency care such as ambulance services. This review article will provide a comprehensive overview of the current state of research on the access of patients with dementia to ambulance services and the impact of dementia on ambulance utilization. This article also identifies the opportunities and directions for future research and interventions to improve the care and outcomes for individuals with dementia in the prehospital setting.

Keywords: Dementia, Ambulance Access, Emergency Care, Paramedic Training, Dementia-Friendly Guidelines

1. Introduction

1.a. Prevalence of Dementia:

Dementia is a neurodegenerative disorder characterized by a decline in cognitive function and memory loss, that is severe enough to interfere with daily life [1]. According to the latest statistics, dementia affects over 50 million people worldwide. That includes half a million people in Australia, with Alzheimer's disease, as the most common form of it, is accounted for approximately 70% of cases [2, 3]. The prevalence of dementia increases with age, and its risk is doubling every five years after the age of 65. With the aging population, the number of people living with dementia is projected to increase to over 1 million only in Australia by 2058 [4, 5].

The pathology of dementia involves progressive change in the brain structure and function, which ultimately results in cognitive impairments [1, 6]. The key pathological hallmarks of dementia include the presence of abnormal protein deposits in the brain, neuroinflammation, and neuronal loss, the later refers to the death of nerve cells. As the disease progresses, the gradual loss of neurons in certain brain regions becomes abundant to a level, where the individual's ability to function in daily basis will be impaired and a constant care of them will be a requirement [7]. While recent studies have seen significant advancements in discovering pathogenesis of this condition, no certain cure is known at this stage. The exact causes of dementia are not fully understood, however genetic, environmental, and lifestyle factors are believed to play a role in the development and progression of the disorder [1, 6, 8, 9].

1.b. Impact of Dementia:

The impact of dementia on individuals and caregivers is profound. Caregivers, including family members and friends, often bear the emotional, physical, and financial burden of caring. This situation can lead to caregiver stress, depression, and decreased quality of life [10, 11].

The economic burden of dementia is significant. In 2020, the estimated total cost of dementia in Australia was \$15 billion, including healthcare costs, productivity losses, and informal care [12]. As the prevalence of dementia increases in the coming years, the economic burden is expected to rise, posing challenges for the healthcare system and the wider society.

2. Access to Appropriate Healthcare Services

Dementia is a leading cause of disability and dependency among elderly. As the population continues to age, the demand for accessing healthcare including ambulance services is likely to increase. Such an increase is driven by several factors, including the growing aging population, improved awareness, early detection of dementia, the complex nature of dementia care, and the burden on caregivers of patients with dementia [13, 14].

2.a. Growing Aging Population:

Dementia is more common among older adults. As populations worldwide are living longer, there is an increasing number of individuals with dementia, who require healthcare services at different stages of diagnosis, management, and care. Such a demographic shift puts pressure on healthcare systems to provide adequate resources to meet this growing demand [15].

2.b. Improved Awareness:

Early detection of dementia because of increased public awareness, has contributed to raising the demand for healthcare services. Healthcare practitioners are now better equipped to identify individuals with cognitive impairment and refer them for further evaluation and management [16]. While early diagnosis of dementia could mean timely medical, cognitive, and behavioural interventions to slow the progression of the disease, it also leads to more individuals, seeking healthcare services [17].

2.c. The Complex Nature of Dementia Care:

The management of patients with dementia often requires a multidisciplinary approach involving healthcare practitioners from various specialties, including neurologists, geriatricians, psychiatrists, psychologists, nurses, and emergency care providers including ambulance personnel. The complexity of dementia care and the need for specialized interventions contribute to the increased demand for healthcare services to effectively address the unique needs of patients with dementia. Furthermore, it is important to note that not only does dementia itself require healthcare and ambulance attendance, but patients with dementia may also need access to ambulances due to other health complications they may experience. These additional health issues can arise alongside dementia, necessitating prompt medical attention and transportation to healthcare facilities to ensure comprehensive and appropriate care for the patient [18-21].

2.d. Burden on Caregivers

Caregiver burden is another factor driving the increased demand for ambulance services for patients with dementia. Caregivers often face significant challenges, including managing the behavioural symptoms, aiding with activities of daily living, coordinating medical appointments, and navigating the complex healthcare system. Therefore, they may experience physical, emotional, and financial strain, which can impact their ability to effectively manage emergencies that may arise. In some cases, caregivers may need to rely on ambulance services to provide emergency medical care and transportation for their loved ones with dementia [22, 23]. The burden on caregivers may also lead to increased utilization of ambulance services for non-emergent situations, such as transportation to and from medical appointments or assistance with activities of daily living.

3. Access to Emergency Care Services (EMS)

Dementia can progressively impact a person's ability to safely navigate their environment, leading to increased risks of injuries and medical emergencies [20, 24-26]. There are also unique needs of these patients, attributed to several factors such as the complex nature of dementia, challenges in recognizing and managing medical emergencies, and the need for specialized care in the pre-hospital setting.

3.a. Patterns of Ambulance Use:

Dementia can significantly affect the utilization of ambulance services in various ways, leading to different patterns of ambulance use among patients with dementia from those without dementia [27-29]. As dementia progresses, individuals may require special medical attention and support, resulting in increased frequency of emergency calls [23, 30, 31]. In 2018, Harrison et al, investigated the pattern of using ambulance service by the patients with dementia [32]. In this retrospective cohort study, he analysed data from the National Emergency Medical Services Information System database from 2012 to 2015. The results identified over 4 million ambulance transports for individuals aged 65 and older, of which 9.3% had a diagnosis of dementia. His findings showed that individuals with dementia were 2.5 times more likely to use ambulance services than those without dementia, and they were more likely to have repeated ambulance use within a 30-day period. The study also highlighted that people with dementia were more likely to be transported to the emergency department, rather than receiving alternative forms of care.

Kent et al. findings suggested the same results, showing that dementia was a significant predictor of 30-day revisiting of emergency department by patients [33]. Another study conducted in the United Kingdom found that patients with dementia were four times more likely to use ambulance services than individuals without dementia [31]. The study analysed data from over 1.5 million emergency ambulance attendances in London over a three-year

period. The researchers found that individuals with dementia accounted for 5.6% of all ambulance attendances and were more likely to be transported to the hospital than individuals without dementia.

Booker et al. research in Australia reported similar findings after analysing data from 3,500 ambulance attendances for individuals with dementia in Melbourne over a two-year period. His results showed that calls for individuals with dementia were particularly placed during night-time, when 70% of them occurred between 6 pm and 6 am [30]. The different timing pattern of using ambulance by individuals with dementia may be attributed to sleep disturbances commonly experienced by these patients, which can disrupt their ability to manage their health needs.

3.b. Reasons for Ambulance Call:

Individuals with dementia may experience various symptoms such as confusion, disorientation, and agitation, which can lead to accidents or injuries. An increased risk of falls due to the cognitive impairment, and impaired coordination associated with motor deficits is common among these patients [23, 25, 34]. According to a study by Brown et al. [35], falls were the most common reason for ambulance calls, accounting for 30% of ambulance calls for these individuals.

Altered mental status is the second most common reason for ambulance calls for patients with dementia, accounting for 19% of calls. Such alterations in their mental status can be due to the disease process, infections, or medication side effects [36]. Respiratory distress because of pneumonia, chronic obstructive pulmonary disease (COPD), or other respiratory conditions (11%), followed by chest pain and other types of injuries excluding falls (7%), dehydration (4%) and urinary tract infection and seizures (3%) are the other common reasons for calling ambulance services [36].

Dementia itself, can exacerbate existing health conditions, such as diabetes, gastrointestinal conditions, or infections. A person with dementia may also forget to take their prescribed medications or may have difficulty recognizing the signs of worsening symptoms, resulting in a call to ambulance services [37, 38].

Individuals with cognitive impairment may have problems adhering to prescribed medications or medical treatments, such as physical therapy or rehabilitation due to memory loss, confusion, and poor motor function. This nonadherence is associated with an increased risk of hospitalization, and emergency department visits [37, 39].

The lack of appropriate community-based resources and support for individuals with dementia is another reason behind calling the ambulance services. Many individuals with dementia live at home or in community-based settings, with no access to specialized dementia care services or resources. As a result, when they experience medical emergencies or challenging behaviours, caregivers may resort to calling ambulance as the primary source of help [40, 41].

Dementia can impact the mental health and well-being of caregivers, too, leading to calls for ambulance services. Caregivers of individuals with dementia often experience significant stress, burnout, and emotional distress due to the demanding nature of caregiving responsibilities. Witnessing a loved one with dementia experiencing a medical emergency can exacerbate caregiver stress and anxiety, leading to calls to ambulance services for support and assistance [42, 43].

Additionally, individuals with dementia may use ambulance services for non-urgent reasons, such as assistance with basic activities of daily living, transportation to medical appointments, or social isolation. These non-urgent uses of ambulance services can strain ambulance resources and impact the availability of services for urgent matters [44, 45].

4. Challenges in Ambulance Service Utilization

As dementia progresses, patients may experience difficulties in interaction with the surrounding environment as well as decision-making. Individuals with dementia may not fully understand the complications arise from their health conditions, resulting in delays in seeking medical attention. It was reported that patients with dementia have difficulty recognizing symptoms of a heart attack, when only 29% of them were able to associate chest pain with heart attack, compared to 55% of those without dementia [46]. While this could be due to cognitive impairment, these patients may also have a reduced sensitivity and higher threshold for pain due to pathological changes in their brain. This means that they may not experience pain in the same way as those without dementia, or they may be less likely to report pain when they do experience [47]. Either way, such a delay in recognizing and responding to emergencies, increases their morbidity and mortality rates.

The challenging behaviours of individuals with dementia is another issue that complicates ambulance service utilization. Agitation, confusion, and aggression are common behavioural symptoms of dementia, especially in response to stress, pain, or environmental changes. During a medical emergency, those patients may become agitated and resistant to receiving care from unfamiliar healthcare providers, including ambulance crews. While caregivers of individuals with dementia often rely on ambulance services as a mean of managing challenging behaviours [48], these behaviours themselves can slow down the assessment, treatment, and transportation to the hospital, and impacts the overall quality and timeliness of care provided by ambulance services [22, 49].

Difficulties with communication, also hinders the ability of a person with dementia to effectively communicate to ambulance crews. Struggling to articulate the symptoms, providing accurate information about the medical condition, or remembering important details such as their name, address, or contact information can pose challenges for ambulance team in accurately providing appropriate care during transport [50]. It has been shown that in

most cases caregivers of individuals with dementia act as intermediaries between the individual and ambulance crews as the patients often struggle to communicate their needs to limitations in language and cognitive function [51].

Difficulties with mobility including problems with balance, coordination, or muscle strength also impacts the ability of patients to access ambulance services. This can make it challenging for those individuals to reach a phone to call for an ambulance or to go to the door to let ambulance crews in. Being bedridden or wheelchair-bound in some of these patients can furthermore complicate their ability to access ambulance services [52, 53].

5. Outcomes of Ambulance Care for Patients with Dementia

Dementia-related challenges can affect the quality and effectiveness of ambulance care. Previous studies indicated that patients with dementia were more likely to experience adverse outcomes following ambulance care, including hospitalization, rehospitalization, and mortality [54].

5.a. *Complex Nature of Dementia:*

A key challenge in providing ambulance care in these situations is difficulty in assessing and managing the complex needs of patients. Inability to communicate the health relevant information by the patients with dementia interfere the accurate assessing of the condition, identifying appropriate treatments, and making critical decisions by the ambulance personnel [55]. Adding to already complicated situation, individuals with dementia may also exhibit challenging behaviours such as agitation or resistance to care. These symptoms either caused by pain and discomfort, or fear, can make it difficult to provide effective care. Due to impaired judgment or memory loss, the patients with dementia may also not understand the severity of their symptoms or may perceive the care as threatening. Such a behaviour consequently delays necessary medical interventions or transportation, causing potential adverse outcomes. These behaviours may also pose a risk to the safety of both the patient and the ambulance service providers [55].

5.b. *Experiences and Perspectives of Paramedics in Providing Care:*

The lack of knowledge, skills, and training about dementia care among paramedics have significant implications for the care they provide. Ambulance personnel who are not fully aware of the appropriate communication strategies or techniques to use when interacting with dementia patients, may misunderstand or misinterpret the patients' needs. Lloyd et al. reported that ambulance staff often felt unprepared and unsure how to manage this situation, leading to a range of potential risks [56]. Being unfamiliar with the potential complications associated with dementia, such as medication interactions or safety concerns, may also result in suboptimal care or adverse outcomes.

Furthermore, ambulance personnel often lack knowledge of medication interactions and safety concerns in patients with dementia [57]. Combined with the lack of resources to manage the risks associated with these patients, suboptimal care or adverse outcomes are likely to happen. In 2018, Martin and his team of researchers reported that ambulance personnel perceived their knowledge of dementia care as limited and expressed a need for more training in this area. In his Study, he conducted semi-structured interviews with 20 ambulance personnel from two ambulance services in England. The results showed that ambulance personnel felt unprepared to deal with a range of challenges included difficulty communicating with people with dementia, managing behavioural symptoms, and addressing the needs of family members or caregivers. The study also found that ambulance personnel often relied on their own experiences or those of colleagues when providing care for people with dementia [58]. While this approach may be helpful, it may not always be sufficient, particularly when dealing with life threatening situations. On the other hand, ambulance personnel who received specialized training in dementia care were more likely to recognize and manage potential risks and complications, leading to improved outcomes for patients [59].

5.c. *Neighbourhood Characteristics:*

Neighbourhood characteristics can significantly impact the patients' access to ambulance services. The availability and proximity of ambulance can affect the ability of individuals with dementia to access EMS. Research has shown that the availability of ambulance services varies significantly across different neighbourhoods, with individuals living in low-income areas or areas with high levels of social deprivation having limited access to EMS [60]. Similarly, individuals living in rural areas may have limited access to ambulance services, which may impact their ability to access emergency medical care.

Moreover, neighbourhoods with high crime rates or unsafe environments may pose challenges for individuals with dementia to seek help during emergencies, as they may feel threatened or intimidated. Studies by Liu et al. [61] has shown that individuals living in neighbourhoods with high levels of social disorder, such as litter and graffiti, were less likely to use emergency medical services. Similarly, Buja et al. [62] found that individuals living in neighbourhoods with high levels of crime were less likely to utilize emergency medical services.

6. Existing Interventions to Improve Access to Ambulance Services and Their Effectiveness.

Accessing ambulance services can be challenging for people with dementia. There are several interventions and strategies have been implemented to improve the patients with dementia's access to ambulance services.

6.a. Dementia-Friendly Training for Ambulance Personnel:

Dementia Friends Program [63] is an example for a public awareness initiative that aims to increase understanding and awareness of dementia. The program includes a range of resources and training materials such as online training program for ambulance personnel. Another example is the Dementia Champions Program [64], providing specialized training for ambulance personnel and equipping them with the skills and knowledge needed to provide effective care for individuals with dementia.

The effectiveness of dementia-friendly training for ambulance personnel has been the subject of several studies. The findings from a study by Robinson et al. [65] demonstrated that these trainings improved ambulance personnel knowledge of dementia, as well as their ability in providing person-centered care. These trainings also increase confidence of ambulance personnel to recognize and respond to the specific needs of individuals with dementia, especially when it comes to collaboration with other healthcare providers and resources for patients and caregivers [65-67]. As a result, the overall quality of care provided to these individuals improved significantly as measured by patient satisfaction, clinical outcomes, and reductions in hospitalization rates [64, 68, 69].

6.b. Dementia-Specific Protocols and Guidelines:

Developing dementia-specific guidelines provide standardized procedures for the personnel to follow when responding to dementia-related emergencies. That includes strategies for communication, assessment, management of behavioural symptoms, and transportation to appropriate care settings.

One example is the Dementia Action Plan developed by the National Fire Chiefs Council (NFCC) in the United Kingdom. The plan outlines a series of steps that fire and rescue services can take to improve their response to individuals with dementia [70]. Another example is the Dementia-Friendly Hospital Charter developed by the UK Alzheimer's Society. The charter includes recommendations on staff training, communication, and the physical environment of hospitals to ensure that they are more accessible and welcoming for individuals with dementia [71].

In addition to these guidelines, there are also specific tools that can be used to assess and manage dementia-related behaviour during ambulance transport. One such tool is the "Behavioural and Psychological Symptoms of Dementia (BPSD) in Emergency Medical Services (EMS)" protocol, which was developed in the United States. The protocol provides guidance on how to identify and manage behavioural and psychological symptoms of dementia during ambulance transport [72]. (75).

In UK, the National Institute for Health, and Care Excellence (NICE) has developed guidelines for the diagnosis, treatment, and care of individuals with dementia, which include recommendations on how ambulance services should respond to individuals with dementia [73]. Similarly, the Alzheimer's Association in the United States has developed a toolkit for emergency medical services (EMS) personnel, on how to communicate with individuals with dementia and their families, and how to manage behavioural and psychological symptoms of dementia during ambulance transport [74].

In Australia, there are several existing dementia-specific protocols and guidelines in place to improve dementia patient access to ambulance services. One example is the National Safety and Quality Health Service Standards (NSQHS) for Dementia Care. These standards were developed by the Australian Commission on Safety and Quality in Health Care (ACSQHC) and provide a framework for improving the quality of care for people with dementia in all healthcare settings, including emergency services [75].

Another example is the Queensland Ambulance Service (QAS) Clinical Practice Manual, which includes a section on Dementia and Delirium Management [76]. The manual provides guidance on how ambulance personnel can best respond to emergency calls involving individuals with dementia, including recommendations for communication, assessment, and management of behavioural and psychological symptoms. The manual also emphasizes the importance of person-centered care and provides guidance on how to involve family members and other caregivers in the care process.

The Victorian Ambulance Clinical Practice Guidelines also include a section on Dementia and Cognitive Impairment. The guidelines provide guidance on the assessment and management of behavioural symptoms of dementia, as well as recommendations for involving family members and other caregivers in the care process [77].

6.c. Community Partnerships and Collaborations:

Community partnerships can facilitate communication, coordination, and information-sharing among different stakeholders to ensure that people with dementia receive timely and appropriate care when accessing ambulance services. In New South Wales, Australia, the Dementia-Caring Ambulance Services (DCAS) program was developed through a partnership between the New South Wales Ambulance Service and Alzheimer's Australia NSW (now known as Dementia Australia). The DCAS program aims to improve the care and management of people with dementia in emergencies by providing training to ambulance personnel, developing dementia-specific protocols, and promoting awareness of dementia among the community. The program has been shown to increase knowledge about dementia among ambulance personnel and improve their confidence in managing dementia-related emergencies [78].

6.d. Telehealth and Telemedicine:

Telehealth and telemedicine can improve the access of patients with dementia to healthcare services, including assessment, diagnosis, treatment, and monitoring, particularly in remote and rural areas where access to ambulance services may be limited.

It was shown that telemedicine consultations between ambulance personnel and dementia specialists were well-received by patients, families, and ambulance personnel, associated with high levels of satisfaction [79]. Using this technology resulted in improving decision-making, reducing hospitalization rates, and increasing access to specialist care [58, 79]. In UK, the Dementia Connect service technology provides a single point of contact including helpline and an online forum for individuals with dementia and their families to access support and advice and to connect with others affected by dementia [80]. Developing a Dementia Roadmap, as a free online tool that provides information and guidance on the dementia journey from diagnosis through to end-of-life care was another step, in management of dementia by National Health Services in England [81]. That tool includes a directory of services and resources, as well as information on how to access emergency services and what to expect during an ambulance transport.

In Australia, telehealth has been used in dementia care to provide remote consultations and support to ambulance personnel responding to dementia-related emergencies. Dementia Telehealth (QDT) program in Queensland provides telehealth consultations between ambulance personnel and specialized dementia clinicians to support the assessment and management of the patients during emergencies. The program has been effective in reducing hospitalization rates and increasing the likelihood of people with dementia being treated at home or in their preferred care setting [82]. It is also demonstrated that telehealth consultations between ambulance personnel and specialized dementia clinicians led to improved clinical decision-making and reduced hospitalization rates for people with dementia [83].

6.e. Mobile Apps and Digital Technologies:

Mobile apps and digital technologies can provide information, support, and communication tools to assist ambulance personnel in managing dementia-related emergencies. An example of this technology is the Mobile Assessment for the Prediction of Emergencies (MAPLE) app, developed in South Australia. This digital tool assists ambulance personnel in assessing the severity of BPSD during emergencies. The app provides a standardized assessment tool in selecting appropriate interventions, including pharmacological and non-pharmacological strategies, to manage the symptoms. The app helps to reduce the time and resources required to manage BPSD in emergency situations, through generating a report that summarizes the severity of each symptom and provides recommendations for managing the symptoms. This app can also improve the quality of life of patients with dementia and their caregivers [84].

6.f. Person-Centred Care Approaches:

Person-centred care approaches prioritize the individual needs and preferences of people with dementia. It involves tailoring care to the specific preferences and involving the patients in decision-making and care planning to the extent possible.

Recently, a team of researcher conducted a study by interviewing people with dementia, family caregivers, ambulance personnel, and healthcare professionals. Through this research, they identified the importance of several key components of person-centred care, including communication, respect for the person's dignity and autonomy, and the involvement of the person and their family in decision making about their care [85]. Respecting the person's choices, ensures that the care during emergencies aligns with the patients' values, preferences, and wishes, and improves their overall experience with ambulance services.

7. The Gaps in Literature

To ensure that the health needs of individuals with dementia are addressed in an effective manner, the timely access to appropriate healthcare is crucial, however, there are significant gaps in the literature regarding these patients' access to ambulance services.

7.a. Limited Research on the Challenges Faced in Accessing Ambulance Services:

Individuals with dementia may have several social and cultural barriers to accessing ambulance services along with difficulty understanding and complying with instructions provided by ambulance personnel [86], which hinder their access to timely care. Despite the significant impact of communication challenges on dementia patient ambulance services, there is limited research on how these challenges affect the appropriate care of individuals with dementia during medical emergencies. One of the primary reasons for the current lack of research on these challenges is that dementia is a complex condition that affects individuals in different ways, making it difficult to determine exactly what challenges patients with dementia may face when trying to access ambulance services.

Additionally, patients with dementia may not always be able to effectively communicate their needs or experiences to researchers, making it difficult to gather accurate and comprehensive data. This can be compounded by the fact that patients with dementia may have coexisting medical conditions or mobility limitations that can further complicate their ability to access ambulance services. Furthermore, research on dementia is often focused on medical interventions or care settings, rather than on emergency medical services. As a result, there may be less attention given to understanding the unique challenges that patients with dementia may face in accessing ambulance services.

Another factor contributing to the limited research is that ambulance services vary widely across different regions and countries, making it difficult to compare experiences across different contexts. Additionally, ambulance services may be provided by a variety of different organizations, including government agencies, private companies, and non-profit organizations, which can further complicate efforts to understand challenges faced by patients with dementia.

7.b. The Lack of Research on the Role of Caregivers in Facilitating Access to Ambulance Services:

While caregivers may be responsible for recognizing the signs of medical emergencies in individuals with dementia and initiating appropriate care-seeking behaviours, they may face challenges in accurately managing medical emergencies due to the complex and varied symptoms of the disease.

There is a significant lack of research on the role of caregivers in facilitating access to these services, which can lead to delays in seeking medical attention. Caregivers of patients with dementia often experience high levels of emotional burden, which can make it difficult for them to participate in research studies. They have also limited time and resources to devote to research participation, particularly if they are responsible for providing 24-hour care to a patient. Furthermore, the role of caregivers in facilitating access to ambulance services may vary widely depending on several factors, including the severity of the patient's dementia, the caregiver's level of involvement in the patient's care, and the specific circumstances surrounding the need for emergency medical services. As a result, it can be challenging to design research studies that capture the full range of caregiver experiences and perspectives related to ambulance services.

A few studies examining the experiences of caregivers of individuals with dementia who had called emergency medical services showed that caregivers had limited knowledge of how to access emergency services, were not aware of available resources in their community and faced challenges such as difficulty in communicating with emergency medical services personnel. Additionally, caregivers reported feeling unsupported and uninformed during the emergency response process [87]. Further research is needed to understand the specific challenges faced by caregivers and to develop effective interventions to improve their involvement in accessing emergency services for individuals with dementia.

7.c. The Lack of Research on Dementia-Related Training and Experience of Ambulance Personnel:

The limited research on the experiences and perspectives of paramedics in caring for individuals with dementia creates another gap in literature. Ambulance personnel may face challenges in identifying and managing the unique needs of individuals with dementia due to the limited training and education on dementia care. It has been indicated that the personnel who had more experience with patients with dementia were more likely to use non-pharmacological interventions to manage BPSD during emergency situations. It was also found that personnel who had received training on dementia care were more confident doing their jobs [88, 89]. These studies, however, were limited in their scope and did not provide a comprehensive understanding of the impact of ambulance personnel's dementia-related training and experience on providing appropriate care to patients with dementia during emergencies. Further research is needed to explore the relationship between training, experience, and the provision of appropriate care to patients with dementia during emergency situations.

In addition, there is a lack of research on the availability and accessibility of specialized ambulance services for individuals with dementia. Limited research suggests that specialized services, such as those staffed by personnel with dementia-specific training or those equipped with specialized equipment to manage BPSD, may be effective in providing appropriate care during emergency situations [90]. However, the availability and accessibility of such services remain largely unknown. For example, these services were available in some regions of the United States but were not uniformly accessible across the country [91]. Another study in Japan noted that while such services were effective in reducing hospitalizations and improving patient outcomes [92], their availability varied across different regions, with some areas having limited access to them.

7.d. Limited Research on the Impact of Social and Environmental Factors:

There is limited research on the impact of social and environmental factors on the quality of access to ambulance services for the patients with dementia. Dementia has significant implications for an individual's ability to seek timely medical care. In this sense, social and environmental factors play a crucial role in determining the accessibility of ambulance services, they can either facilitate or hinder the ability to receive prompt and appropriate medical attention when needed. Living arrangements are one of the key social factors that can influence the patients' access to ambulance services. Many individuals with dementia live alone, either by choice or due to the loss of a spouse or caregiver. Living alone can pose challenges during medical emergencies, as the individuals may have difficulty recognizing the severity of their condition or may be unable to communicate their needs effectively, which can have dire consequences.

Moreover, addressing neighbourhood characteristics, such as improving the availability and accessibility of ambulance services in remote or rural areas, and enhancing the safety and security of neighbourhoods can also play a significant role in improving dementia patients' access to emergency medical care. This may include strategies such as increasing the number of ambulance stations, improving transportation infrastructure, and enhancing community-based initiatives to promote safety and security for individuals with dementia.

8. Areas for Future Research:

Access to ambulance services is crucial for individuals with dementia as they may require urgent medical attention. Such access can be challenging for these patients due to various factors, including communication difficulties, lack of awareness about ambulance services, difficulties in navigating the healthcare system, and stigma associated with dementia. These challenges may lead to delays in receiving timely and appropriate care, which can negatively impact the health outcomes and well-being of these patients.

Further research in this area can provide valuable insights into the barriers faced by these individuals. Research on the coping mechanisms the patients use, their perspectives on the quality of emergency services, and their preferences and needs in improving their access to these services creates the required knowledge, policy, and practice interventions to improve the proper access to ambulance services, ultimately enhancing the overall care and outcomes for patients with dementia.

The complex nature of dementia changes all the usual ways a patient use to navigate the healthcare system. The disease progressively affects memory, communication, orientation, and judgment and impairs the ability of patients to seek help during emergencies. Research in this area can shed light on these challenges and provide insights into how to overcome them.

The coping mechanisms and strategies used by patients with dementia to overcome the barriers they face in accessing ambulance services, is another critical area for future research. Patients with dementia may rely on caregivers, family members, or support groups to communicate their symptoms during emergencies. They may also have specific strategies in place, such as wearing medical alert bracelets or keeping emergency information handy, to facilitate their access to ambulance services.

Electronic medical alarm, also known as personal emergency response system (PERS), is another way for individuals with dementia to access emergency services. PERS can provide individuals with dementia and their families with peace of mind, especially for individuals who live alone or who are at high risk for medical emergencies. One potential issue is the false alarms that can also be triggered, which will be confusing and distressing for both the individual with dementia and emergency responders. Another potential drawback of PERS is that they may not be suitable for all individuals with dementia, especially those with advanced stages of the disease or with comorbid conditions that may affect their ability to use the device.

How these coping mechanisms can be improved can be the subject of future research. The finding of these kinds of research can develop targeted interventions to support them in accessing ambulance services more effectively. Additionally, more research is required about improving paramedics knowledge and training on providing the patients with dementia with adequate care. Ambulance personnel play a critical role in the care of these individuals during emergencies, however, they may face challenges in understanding and managing the unique needs and behaviors of these patients, which can impact the quality of care provided. Research has shown that some ambulance personnel may hold negative attitudes or misconceptions about dementia, finding the patients affected by this disorder challenging or difficult to communicate with, which can affect their interactions with them and leading to their frustration or impatience. This may result in suboptimal care or even mistreatment of dementia patients. Further research can explore the common patterns of attitudes and behaviors of ambulance personnel towards dementia patients, and their experiences and perspectives in providing care for individuals with dementia.

Improving ambulance dispatch protocols and guidelines for patients with dementia is a significantly important research area. While the current guidelines are stepping in the right direction, there is still much work to be done in this area. One challenge is the lack of standardization across different ambulance services and healthcare organizations. An example is the lack of research on the effectiveness of these protocols and guidelines when it comes to the availability and proximity of ambulance services and the safety and security of the neighbourhood that the patient is located. Therefore, there is more research needed to determine the impact of these protocols and guidelines on patient outcomes.

8. Conclusion

Dementia is a debilitating condition that affects millions of people worldwide. The number of individuals with dementia is expected to rise as the global population ages. The increased vulnerability and unique needs of these patients are reflected on their increased needs for specialized care and support. That includes urgent medical assistance from ambulance personnel in the case of emergencies or incidents. As such, it is crucial to understand the challenges and gaps in providing emergency care for these individuals when they need it. Addressing these challenges requires further research towards establishing proper strategies within the ambulance setting to improve the quality of care for patients with dementia.

Conflict of Interest:

The authors of this manuscript declare that they have no conflict of interest.

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