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Review Article

Towards an improved dementia care experience in clinical radiography practice: A state-of-the-art review

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ABSTRACT

Introduction: The increasing global incidence rate of dementia and associated co/multimorbidity has consequently led to a rise in the number of people with dementia (PwD) requiring clinical radiography care services. This review aims to explore and integrate findings from diverse settings with a focus on the experiences of PwD and stakeholders, towards the development of a holistic approach for dementia care and management within the context of radiography services.

Method: An electronic search was performed across the following databases: PUBMED, CINAHL, Medline, SCOPUS, and ScienceDirect for articles published from January 2009 and June 2023. Articles were included if they fulfilled a predefined criteria mainly focused on experiences of PwD and/or other stakeholders when using the radiography services. Data obtained from the included studies were analysed using a result-based convergent synthesis.

Result: Eleven studies from diverse settings met the inclusion criteria. A mix of both positive and negative experiences of PwD and stakeholders were reported following visits to radiology and radiotherapy departments were highlighted across settings. The findings were themed around the need for: person-centred care, effective communication, attitudinal changes of staff, specialised and improved clinical environment and inclusion of caregivers for the care of PwD.

Discussion: This study emphasise the critical importance of adopting holistic approaches to caring for PwD. This involves adopting a person-centred approach, actively involving caregivers, effective communication, and adequate training for radiographers to provide quality services, all in dementia-friendly environments.

Conclusion: The experiences of various stakeholders highlight the need for a more holistic approach and strategy for the care and management of PwD within the context of the radiography services. This calls for an urgent need for a comprehensive strategy that includes awareness creation of staff to enhance the quality of care and the overall experience for PwD using the radiography services.

RÉSUMÉ

Introduction: L'augmentation de l'incidence mondiale de la démence et de la co-multimorbidité associée a entraîné une hausse du nombre de personnes atteintes de démence nécessitant des services de radiographie clinique. Cette étude a pour but d'explorer et d'intégrer les résultats obtenus dans divers contextes, en mettant l'accent sur les expériences des personnes atteintes de démence et des parties prenantes, en vue de développer une approche holistique des soins et de la gestion de la démence dans le contexte des services de radiographie.

Méthodologie: Une recherche électronique a été effectuée dans les bases de données suivantes : PUBMED, CINAHL, Medline, SCOPUS et ScienceDirect pour les articles publiés entre janvier 2009 et juin 2023. Les articles ont été inclus s'ils répondaient à des critères prédéfinis, principalement axés sur les expériences des personnes

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atteintes de démence et/ou d'autres parties prenantes lors de l'utilisation des services de radiographie. Les données obtenues à partir des études incluses ont été analysées à l'aide d'une synthèse convergente basée sur les résultats.

Résultats: Onze études réalisées dans différents contextes ont répondu aux critères d'inclusion. Un mélange d'expériences positives et négatives des personnes atteintes de démence et des intervenants a été rapporté à la suite de visites dans les services de radiologie et de radiothérapie. Les conclusions s'articulent autour de la nécessité de soins centrés sur la personne, d'une communication efficace, d'un changement d'attitude du personnel, d'un environnement clinique spécialisé et amélioré et de l'inclusion des soignants dans les soins aux personnes atteintes de démence.

Discussion: Cette étude souligne l'importance cruciale de l'adoption d'une approche holistique des soins aux personnes atteintes de démence. Cela implique l'adoption d'une approche centrée sur la personne, l'implication active des soignants, une communication efficace et une formation adéquate des radiographes pour fournir des services de qualité, le tout dans un environnement sensible à la démence.

Conclusion: Les expériences des différents intervenants soulignent la nécessité d'une approche et d'une stratégie plus holistiques pour les soins et la gestion des personnes atteintes de démence dans le contexte des services de radiographie. Il est donc urgent d'élaborer une stratégie globale qui comprenne la sensibilisation du personnel afin d'améliorer la qualité des soins et l'expérience globale des personnes atteintes de démence qui utilisent les services de radiographie.

Keywords: Dementia; Radiography; Radiotherapy; Alzheimer's; Medical imaging

Introduction

Approximately 55 million people worldwide are affected by dementia, with around 10 million new cases emerging each year [1,2]. While dementia is more prevalent among the geriatric population aged 60 and older [3,4], there is a subset of cases (∼8 %) classified as early onset dementia (EOD), who experience symptoms (of a mixed aetiology) before the age of 65 [5–7]. A body of research findings consistently suggest that individuals with dementia (PwD), exhibit an increased propensity to receive diagnoses of later-stage or un-staged cancer as concurrent co/multimorbid conditions [8–11]. Co/multimorbidity (e.g., fractures due to osteoporosis or falls) alongside dementia diagnosis is known to create complexity around treatment and care [11,12]. These complex problems and multimorbidity require person-centred care at all stages of the clinical management journey [13].

The increasing incidence rate of dementia and associated co/multimorbidity has consequently led to a notable rise in PwD requiring radiography care services [14]. However, the hospital environment often fails to consider the cognitive and physical limitations of PwD, exposing them to increased risks and poor outcomes [15]. Enhancing the quality of the experiences of PwD during their time within diagnostic and therapeutic radiography departments is essential for improving their overall care outcome. Radiographers have a pivotal role in the care of PwD, including the delivery of radiotherapy for cancer treatment and/or clinical imaging assessments [16] and thus require good knowledge of person-centred dementia care for improved outcomes. Regrettably, previous reports [17–20] highlighted the lack of adequate knowledge and skills of some newly qualified radiographers to deliver high quality health and care services for PwD. The issue of inexperienced and junior radiographers lacking confidence in dementia knowledge and technological advances present some hindrances that threatens optimal and effective care [19]. These challenges manifest as distressing experiences for PwD, characterised by the feeling of discomfort, pain, perceptions of disrespect, challenges in communication, and instances of being overlooked by the staff in Radiography departments [21].

The collaborative efforts of other stakeholders, including government institutions, regulatory bodies, families, and patient groups, is crucial to dementia care and management [22]. These stakeholders play integral roles in shaping policies, standards, support networks, and advocacy efforts that collectively influence the quality and accessibility of radiography services for dementia care and management [23]. Their collaboration is essential in ensuring that radiography departments effectively address the specific needs of individual patients, thereby enhancing overall care outcomes [24]. As such, it is imperative to explore the experiences of all stakeholders, including carers, who contribute to the effective management of PwD. In fact, an account shared by McEntee [25] described the negative impact of excluding a caregiver during a radiological examination of a relative with dementia, resulting in distress, discomfort, and fear for the patient. This implies that, the impactful roles and experiences of dementia caregivers provide valuable insights [26,27] for the enhancement of person-centered care, which in tandem, is recommended to reduce healthcare costs [28]. Evidence show that carers usually contribute to the quality and cost effectiveness of dementia care by fostering a supportive environment that promotes early intervention, reduces hospital admissions, and optimizes resource allocation through tailored preventive strategies, thereby alleviating the burdens on healthcare systems [29,30]. Further pertinent insights have emanated from a multitude of research inquiries, wherein some PwD and their caregivers have expressed diverse opinions on the necessity and effectiveness of radiotherapy as a treatment modality while making references to some reports of poor experience during clinical care and consequent lower survival rates and/or insignificant outcomes [28,31]. However, the opportunity to incorporate the experience of these critical group together with other stakeholders in the delivery of radiography services for the care of PwD is persistently overlooked [17,21,32]. This oversight and its potential impact on the quality and effectiveness on a holistic dementia care underscores the critical need

Table 1
Search parameters (PICO criteria).

Population	Intervention/Exposure	Comparator	Outcomes
PwD, People with Alzheimer's disease, Radiographers, Radiotherapists, Student radiographers, Caregivers, stakeholders	Imaging interventions (Diagnostic and/or therapeutic radiography)	Positive or Negative attitude/treatment from radiography/radiotherapy departments towards patients	Experiences, attitudes, practices, policies, and protocols

for exploring the diverse experiences and collaborative efforts among various stakeholders.

In response to enhancing a more holistic dementia care practice while ensuring effective collaborative efforts among the various stakeholders to achieving optimal dementia care in radiography, many regulatory bodies including, the Society and College of Radiographers, have provided operational guidelines, recommendations and care strategies for radiography staff [32,33]. These recommendations have spurred subsequent research endeavors, resulting in a body of literature characterised by diverse and varied findings [17–21,25,33], addressing the care of PwD who are needing radiography services as part of their clinical management. The current review therefore aims to systematically explore and integrate the findings from diverse settings with a focus on the experiences and perspectives of stakeholders, to underpin and bolster a more holistic approach towards the care and management of PwD within the context of Radiography services. The insights gleaned from stakeholders' experiences and the understanding of their perspectives could potentially guide in the development of comprehensive protocols and strategies that better address the specific challenges of PwD and their caregivers while attending a Radiography department for care.

Methods

A literature review approach, as described by Renner and colleagues [34], was adopted for this study to address current knowledge and priorities for future [76,77]. Briefly, this methodology adopts a comprehensive and structured approach of information gathering, evaluating, and synthesising existing relevant studies on a specific research question/topic. It aims to minimise bias and provide an objective summary of the available evidence by following a predefined set of methods and criteria. In this study, a predefined research protocol and search strategy, as suggested by Pelone and colleagues [35], was implemented for the literature search, which involved both electronic and manual exploration and then data extraction. The process was reported according to the PRISMA guidelines [36]. This approach is considered methodologically inclusive and optimal to broaden the conceptualisation and understanding of available research.

Eligibility criteria

The study included primary studies published in peer-reviewed journals. Articles that solely focused on the experiences of PwD and/or stakeholders (including carers) accessing radiological services (diagnostic and/or therapeutic), published in English from January 2008 to June 2023, were included in this review. To ensure the accuracy, currency, reliability, and validity of our findings, grey literature, conference abstracts, dissertations, and reports not rigorously reviewed were excluded.

Search strategy and sources

The initial literature search was conducted between June 2022 and August 2022 and updated in June 2023 to improve the recency of the available evidence. Databases including PubMed, Science Direct, CINAHL, and SCOPUS via EBSCOhost were searched through the Bournemouth University online library facility. To ensure that relevant evidence was not omitted, additional sources, including Google Scholar and the reference lists of the included articles, were manually searched for articles that met the inclusion criteria for this study. Key radiography journals (including *Radiography, Journal of Medical Imaging and Radiation Sciences, Radiologic Technology*, and *Journal of Medical Radiation Sciences*) were searched for any articles that might have been missed.

The PICO framework (Patient/Population, Intervention, Comparison, Outcome) was employed for precise search parameters, including the development of the key search terms [37]. The search was conducted using the key words (Table 1) combined with Boolean operators (OR, AND) and a truncator (*) to increase the sensitivity of our search across databases. A referencing programme (Endnote) was used to manage the screening process and search outputs.

Data screening and quality assessment

Following the removal of duplicates, two reviewers (JAA and MAS) meticulously performed individual screenings of all titles and abstracts, followed by comprehensive full-text screening. They independently carried out data extraction and reconciled their findings in a consensus meeting. In cases where discrepancies or disagreements arose during the screening, the principal investigator (TNA) was engaged to address and resolve them.

With a third reviewer resolving any discrepancies, two reviewers (JAA and MAS) adopted the QATSDD tool [38], comprising 16 criteria, to critically appraise the selected studies. Scores ranging from 0 to 3 were assigned to each criterion (0=not at all, 1=very slightly, 2=moderately, 3=complete). An overall quality score was calculated by summing up these criterion scores. Studies were categorised as high quality

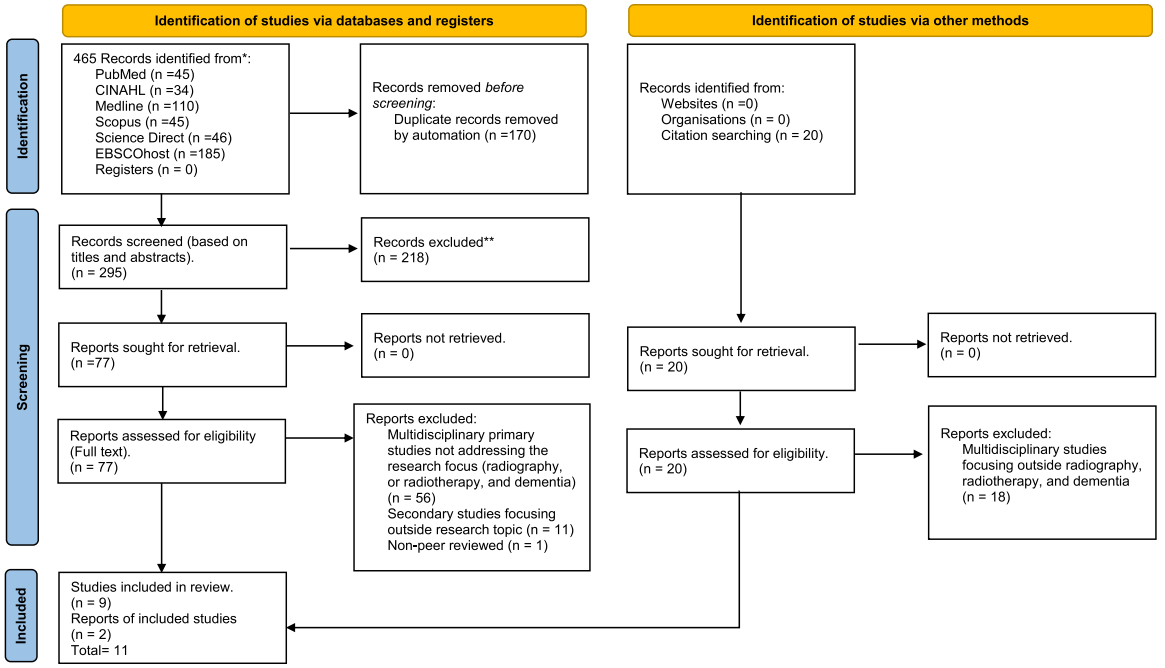

Fig. 1. PRISMA Flowchart detailing the article identification, screening and inclusion process.

(70 % and above), moderate quality (50 % to 70 %), or low quality (below 50 %), but these scores were not a part of the exclusion criteria.

Data extraction and synthesis

Essential details, including authorship, publication year, geographical location, sample size, participant characteristics, study design, and duration, the objectives, principal findings, and conclusions were extracted using a systematic approach.

A result-based convergent and sequential synthesis approach [39] was utilised to integrate findings from the diverse literature included with different study designs. This approach allows for a comprehensive understanding of complex phenomena. Briefly, this analysis involved independent examination of study findings and presentation in a tabular format following conversion of quantitative data into qualitative data and then integrating all the findings together. A textual narrative synthesis [40] was then employed to describe the synthesised findings, ensuring reproducibility.

Results

The electronic database search yielded 295 articles after removal of duplicates from a total of 456 initial hits: PubMed ($n = 45$), CINAHL ($n = 34$), Medline ($n = 110$), SCOPUS ($n = 45$), and ScienceDirect ($n = 46$). Afterwards, screening exercises based on the titles and abstracts excluded 218 articles. Following the screening exercise, 77 articles were left for full-text assessment for eligibility. Full-text screening based on the predefined eligibility criteria resulted in the removal of 68 articles and the inclusion of 9 articles. A manual search of relevant reference lists yielded 20 articles, out of which 2 met the inclusion criteria (Fig. 1). A total of 11 primary studies were included for this study (Table 2).

These selected studies comprised of 8 qualitative and 3 quantitative studies covering the diverse experiences of 245 PwD, 230 caregivers, 309 radiology staff, 33 students, 9 radiotherapy centres, and other 19 hospital staff. The geographical representation was primarily centered around Europe (Norway, Denmark, Ireland, England), Australia, and USA, encompassing nursing/care homes, universities, and hospitals. Table 2 provides an overview of the study characteristics, including aims, methodology, key findings, and conclusions, revealing some level of heterogeneity in the extracted data. All 11 included studies were highly rated, indicating high-quality data, of note, this is not a part of the exclusion criteria (Supplementary Table 1).

The articles revealed both positive and negative experiences of PwD and their caregivers during visits to the radiology and radiotherapy departments, including mobile procedures undertaken in nursing homes. Several themes were developed from the analysis of findings from the included studies, primarily focusing on radiographers' attitudes, communication, person-centered care, radiographers' knowledge of dementia, departmental design, and the involvement of caregivers (Fig. 2).

Discussion

This study sets out to explore and integrate the literature findings from diverse settings with a focus on the experiences

Table 2
Characteristics of the included studies.

Study Reference AND Journal	Methods				Study Aim(s)	Study Outcomes		Study Quality Grading
	Country/ Continent of Study	Sample/ Study site characteristics	Study Design and Analysis Approach	Study Settings		Key Findings	Key Conclusions	
1. Challen et al. 2018 **Radiography**	Australia	Dementia – 4 Caregivers – 6 Radiography academics – 8 Radiography students – 19 Total sample size - 37	Cross-sectional qualitative study (semi-structured interview)	Hospital	To explore the experiences of dementia care in imaging departments through the perspectives of people living with dementia, caregivers, radiographers, and student radiographers	Participants described positive and negative experiences during imaging procedures	People with dementia and their caregivers can experience poor care in imaging departments and radiographers can find it difficult working with people with dementia.	High
2. Miller et al. 2019 **Dementia**	United Kingdom Europe	Diagnostic radiographers – 6	Qualitative study Data analyses: Interpretative phenomenological analysis (semi-structured interview schedules)	Hospital	To focus on the experiences of junior clinicians working in plain radiography in the UK, exploring their everyday work regarding patients with dementia	The participants recurrently cited a lack of confidence in their knowledge of dementia. Education for new professionals was deemed lacking. Caregivers and family members were viewed by participants as potentially positive and negative forces within an examination context.	Some of the junior radiographers argued that they had not been prepared – by their radiographic education or subsequent training – to actively manage patients with dementia.	High
3. Kada 2009 **European Journal of Radiography**	Norway Europe	radiographers – 146	Quantitative study Using Questionnaire survey Data analyses: descriptive and inferential statistics	Hospitals	To assess the attitude of radiographers towards people with dementia.	The attitude of radiographers towards people with dementia was measured to be of a negative rather than a positive nature	Male radiographers, and staff with fewer than 10 years of work experience reported significantly more negative attitude.	High
4. Flood et al. 2019 **Journal of Geriatric Oncology**	Ireland Europe	Radiotherapy departments within the Republic of Ireland, both public and private – 9/12	Quantitative study National Audit	Hospitals	The quality of dementia care in radiotherapy departments in Ireland	In this audit, the lowest overall compliance (65 %) was in relation to the environmental recommendations, indicating that layouts have not in general been designed to optimize dementia care	The care of people with dementia poses challenges in the radiotherapy department.	High
5. Ashley et al. 2021 **Age and Ageing**	England Europe	Participants – 58 PwD and comorbid cancer – 17 Informal caregivers – 22 Hospital staff - 19	Ethnographic study, involving semi-structured interviews, observations, conversations, and medical review.	Hospitals and Care Homes	To examine the challenges and support needs of people with dementia and comorbid cancer, caregivers, and clinicians in relation to hospital-based cancer care and treatment, and to identify ways to address these	Highlights how dementia complicates the practicalities of attending oncology appointments due to 'dementia-unfriendly' features of the organizational and built hospital environment.	A need for several strategies and interventions to improve cancer care and treatment.	High

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Table 2 (*continued*)

Study Reference AND Journal	Methods				Study Aim(s)	Study Outcomes		Study Quality Grading
	Country/ Continent of Study	Sample/ Study site characteristics	Study Design and Analysis Approach	Study Settings		Key Findings	Key Conclusions	
6. Higgins et al. 2023 **Radiography**	United Kingdom	Diagnostic radiographers-15 Therapeutic radiographers 2	Qualitative multi-method study (online discussion and individual semi-structured interview) Data Analysis: narrative and thematic	Hospital	To examine the perspectives and experiences of diagnostic and therapeutic radiography professionals in the UK as they deliver care to people living with dementia (PLWD) in healthcare facilities. It also seeks to compare the results with the insights of key stakeholders involved in the development of the SCoR dementia clinical practice guidelines.	Radiography practitioners recognize the importance of adapting PCC for PLWD, but face workforce pressure to implement it. More role-specific dementia education and training is needed. Prioritizing a positive patient experience and supporting PCC are crucial.	Delivering person-centered care (PCC) tailored to the unique needs of PLWD can be challenging in practice due to time, resource constraints, and difficulties in identifying PLWD prior to their arrival. Involving caregivers could help mitigate some of these challenges. Profession-specific education and dementia awareness training are necessary to support the implementation of PCC for PLWD.	High
7. Wonnacott et al. 2023 **Radiography**	United Kingdom (England)	Radiography students-14	Exploratory study with Interpretivist phenomenological approach Data analysis: Thematic analysis	School-university	To understand undergraduate radiography students' experiences of undertaking the Time for Dementia (TFD) programme.	Participants highlighted the value of direct learning from people with dementia and their caregivers, leading to increased awareness and understanding of dementia's impact on both individuals and caregivers. Key takeaways included person-centered care, compassion, and patience, while acknowledging the presence of learning challenges.	This research indicates that an extended, hands-on educational program for radiography students offers them a chance to enhance their comprehension of dementia in a comprehensive manner, considering its effects on both the individual and their family members.	High

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Table 2 (*continued*)

Study Reference AND Journal	Methods				Study Aim(s)	Study Outcomes		Study Quality Grading
	Country/ Continent of Study	Sample/ Study site characteristics	Study Design and Analysis Approach	Study Settings		Key Findings	Key Conclusions	
8. O'Leary et al. 2023 **Radiography**	Ireland	Radiographers-123	Quantitative study (survey) Data analyses: descriptive statistics, linear regression, and correlation	National Online (social media via LinkedIn, Facebook, and twitter) of Radiographers	This study aims to evaluate the knowledge and attitudes of Irish radiographers towards dementia. It will explore associations between knowledge and attitudes with factors like age, gender, qualification, radiography grade, hospital setting, and work experience.	There were no significant differences in knowledge scores among different demographic groups ($p > 0.05$). Participants with BSc, MSc, or other post-graduate degrees had higher attitude scores compared to those with a diploma qualification ($p = 0.027$). Those with less than 20 years of experience scored higher than those with more. There was a weak correlation between knowledge and attitude ($r = 0.0522$; $p = 0.5667$)	The study findings reveal that attitudes vary based on age and experience, and there are observable misconceptions within different groups. It is evident that interventions are necessary to enhance attitudes and increase awareness.	High
9. Bisgaard et al. 2022 **Radiography**	Denmark	Radiographers-9	Qualitative design hermeneutic approach (using semi-structured interview) Data analyses: verbatim transcription using Dahlager and Fredslunds hermeneutic analysis based on Malterud's four steps.	Hospital	This study aims to investigate whether radiographers' self-perceived competencies have changed during their work in the mobile X-ray unit, and if so, how these competencies are applied within the department-based medical imaging team.	Radiographers in the mobile X-ray unit gained new competencies, such as improved communication and creative positioning skills. All nine participants recognized the value of sharing experiences and competencies, suggesting the need for a formal forum. They also expressed the desire for broader utilization of the mobile X-ray unit in their region and profession.	The study highlights that, radiographers in the mobile X-ray unit acquired new competencies in communication and positioning. However, the findings suggest a lack of knowledge transfer to colleagues in the medical imaging team.	High

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Table 2 (*continued*)

Study Reference AND Journal	Methods				Study Aim(s)	Study Outcomes		Study Quality Grading
	Country/ Continent of Study	Sample/ Study site characteristics	Study Design and Analysis Approach	Study Settings		Key Findings	Key Conclusions	
10. Gadbois et al. 2022 **Journal of the American Geriatrics Society**	USA	Patients with Dementia or Mild Cognitive Impairement-2228, Care partners- 1872 With 196 complete dyads for scan recipient/care-partner	Qualitative study Data analyses: inductive qualitative content analytic approach.	Hospital	To explore the perspectives and experiences of individuals with cognitive impairment who underwent an amyloid PET scan, as well as their care partners. The focus was on examining the process, logistics, and decision-making involved in receiving the scan and its results	Participants and care partners shared their experiences in seeking a diagnosis for memory issues, including decision-making and logistical aspects of receiving an amyloid PET scan. They discussed factors influencing their decision and their expectations from the scan. The process varied, with some facing challenges in finding appropriate providers and coordinating care. Participants also noted the challenge of physicians attributing cognitive decline to normal aging instead of a neurodegenerative disorder.	The study exposes barriers and delays in accessing comprehensive evaluations for cognitive problems. It emphasizes the need for improved care coordination, communication, and referral systems, particularly for managing older patients.	High
11. Jensen et al. 2021 **Radiography**	Denmark	PwD-23 Caregivers-6	Qualitative design using phenomenology-hermeneutic approach (observation and semi-structured interview) Data analysis: Meaning condensation using Malterud's analysis.	Nursing homes	To explore the experiences and perspectives of patients with dementia and their caregivers regarding receiving a mobile X-ray examination in nursing homes.	It was found that a familiar environment, a recognizable structure, and a calm atmosphere were crucial for patients with dementia. The patients exhibited a sense of calmness and relaxation during the examination conducted in their familiar nursing home environment, which offered fewer stimuli and distractions, as observed.	Mobile X-ray examinations conducted in nursing homes had a positive impact on patients with dementia. By performing the examinations in their familiar and safe environments, where stimuli and impressions were minimized, the patients' reactions were improved.	High

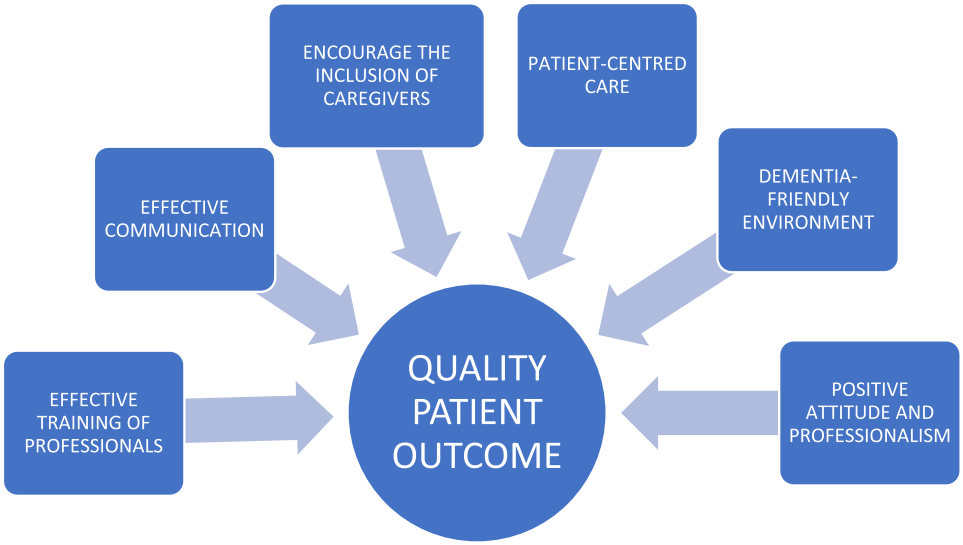

Fig. 2. Themes developed from the analysis – strategy for improved dementia care experience in clinical radiography practice.

and perspectives of stakeholders, to underpin and bolster a more holistic approach towards the care and management of PwD within the context of Radiography services. Dementia is a significant health concern that often requires the use of radiography services for diagnostic and therapeutic care purposes. Despite the increasing prevalence of dementia, there has been a noticeable dearth of comprehensive research on care for PwD, especially within the context of clinical radiography.

Findings of this review showed that PwD were perceived to have been treated poorly while accessing radiography care in nursing/care homes and hospitals (across both diagnostic and therapeutic disciplines), while staff and trainee students in the department expressed difficulties working with PwD. These highlights are discussed across the emergent themes, primarily focusing on person-centred care, communication, radiographers' attitudes, radiographers' knowledge of dementia, departmental design, and the involvement of caregivers.

Inclusion of caregivers

This review revealed divergent opinions regarding the presence of caregivers during interactions with individuals with dementia (PwD) within the radiography department. The uncertainty surrounding the caregiver-patient relationship was identified as a determining factor in whether their presence had a positive or negative impact [19]. In keeping with previous studies [41–45], this review has shown that family caregivers possess valuable insights and can be instrumental in understanding and managing crises [21,46,47]. Therefore, if a visit to the radiology department is perceived as traumatic, considering the availability of caregivers in close proximity to the services provided may be beneficial. Guidelines from the Society and College of Radiographers [32] emphasise the need for imaging and radiotherapy departments to collaborate with caregivers to mitigate stress triggers. An account shared by McEntee [25] described the negative impact of excluding a caregiver during a radiological examination of a relative with dementia, resulting in distress, discomfort, and fear for the patient. Similarly, Ashley and colleagues [46] highlighted the vital roles played by caregivers in providing emotional support and reporting treatment-related side effects during cancer treatment (radiotherapy) for PwD. Striking a balance between including caregivers in departmental services can be challenging due to the inherent risks associated with equipment and radiation exposure. However, there are situations that may require consent (if PwD are able) to ensure privacy and this needs to be carefully considered and discussed with carers in line with established protocols.

Person-centered care

Individuals with dementia and their caregivers have consistently expressed their desire to be treated with dignity and without stigma [18]. Some individuals even choose not to disclose their condition to avoid biased treatment [21]. In the context of care delivery in radiology departments, it is crucial to view people with dementia as complete human beings rather than mere collections of symptoms or "cases." Numerous studies have emphasised the specific care needs of individuals with dementia, including the recognition and response to their unique requirements as well as simplified communication [18,33,46,48]. Although clinical radiography acknowledges these needs, there are persistent shortcomings in the care provision process [19,21].

The Alzheimer's Association recommends a person-centred care approach that involves knowing the patient, recognising, and accepting their reality, and facilitating meaningful engagement and healthy relationships [49]. This recommendation is agreed upon by some researchers, [17,19,21] who further identified the fast-paced nature of the department as a significant barrier to delivering such care. This fast pace often perpetuates stereotypes and results in less attention being given to the individual needs of patients. Conversely, effective time management has been associated with more positive experiences.

Additionally, Flood and colleagues [17] found low compliance in promoting patients' rights and autonomy. While it is true that dementia can lead to reduced decision-making capacity as the condition progresses, individuals with dementia should not be automatically labelled as incompetent or lacking in capacity. Instead, their competence should be regularly assessed for each care and treatment decision [50].

A study evaluating the feasibility of a patient-centred care model in radiology demonstrated high rates of satisfaction among patients and providers when virtual consultations were implemented to assess PwD prior to arrival at the department for care [51]. Although this aforementioned study did not specifically address the needs of PwD, who constitute a significant proportion of those accessing radiology departments, participants reported that the consultations were helpful in their management decisions, representing a step forward in care provision. The evidence from this review reveals a clear need for comprehensive patient-centred care and affirms the feasibility of its implementation in radiology units to incorporate the specific needs of PwD.

Communication

Effective communication is perceived as the main attribute of the delivery of patient-centred care and efficient coordination between the PwD, care-partner, and staff [52]. The current study highlights the importance of both verbal and non-verbal communication in fostering a strong practitioner-patient relationship within radiography units, particularly in the areas of consent, privacy, and confidentiality, as well as diagnoses and therapeutics [21,53,54]. Despite the memory and language skill impairments observed in advanced and later stages of dementia, the studies conducted by Jensen and colleagues [47] and that of Bisgaard and colleagues [48] emphasised the significance of non-verbal communication as an effective method for positively influencing dementia care during mobile X-ray procedures in nursing homes. Miller and others [19] argued that advancements in technology within imaging departments could hinder patient-provider contact, leading to a reduction in verbal and person-to-person interaction and a missed opportunity to learn from patients' experiences. This contradicts the intended purpose of technology in healthcare, which is to empower professionals and provide them with additional time to dedicate to patient care [55,56]. Effective communication amongst members of the radiology staff, radiology nurses, caregivers, and patients is beneficial to enhancing care and preventing difficulty in imaging, distress, and potential inappropriate treatment within the department [57].

Attitudes towards people with dementia

Previous research revealed that PwD and their caregivers frequently reported negative attitudes among radiographers, as assessed by Kada and colleagues [18]. Current studies have associated such negative attitudes with inexperienced staff and students who lack the requisite training and exposure to dementia care [19,58]. These findings were supported by the study conducted by Challen and colleagues [21] and that by Gadbois and colleagues [53], which revealed that people with dementia felt unheard and unseen and that staff members occasionally made derogatory remarks about them. Similar variations in attitudes based on personnel attributes have been observed among other healthcare professionals in relation to different medical conditions [59]. These attitudes are rooted in pre-conceived negative assumptions about dementia, leading to counterproductive anxiety and negative treatment. Also, poor knowledge or exposure to unacceptable comments from coworkers within the department can contribute to the development of these assumptions. This study acknowledges the significant contributions and efforts made by the Society and College of Radiographers (UK) in cultivating a cadre of professionals who exemplify compassion, respect, empathy, and a commitment to maintaining ethical standards while providing care to service users. However, the authors suggest that there is still ample opportunity for further improvement in this regard.

Training aimed at improving knowledge of dementia care

Interprofessional education was suggested and emphasised by Jackson and colleagues [60] as a crucial approach for educating therapeutic and diagnostic radiographers and students to enhance interprofessional practice, collaborative knowledge, and organisational awareness of dementia care and its management [17–19,21,46,54]. The lack of knowledge among radiographers about their patients' needs and changes in dementia is identified as a potential reason for negative attitudes [18]. Student radiographers expressed a need for broader knowledge of dementia to enhance their confidence and skills [19,21]. Understanding the various forms of dementia is crucial, as symptoms vary depending on the type and stage of the illness [61]. A lack of specific training in dementia care is observed in radiography departments, highlighting the need for tailored care based on the specific forms of dementia [17]. General knowledge of dementia care is insufficient, and additional training is necessary to meet the specific needs of patients [17,62]. Hence, the need for effective practical training is imperative in preparing practitioners and students to care for PwD [60,63,64].

Environment

Recent research in hospital radiology and radiotherapy departments has focused on improving workflow, standardisation, and computerisation of data pathways, with a focus on staff satisfaction [65]. This review highlights the impact of the department's structure on meeting patients' care needs and ensuring safety [17] PwD have been found to experience increased anxiety due to various aspects of an unfamiliar environment such as lighting, flooring, poor signage descriptions and sounds [21,46]. These factors can act as triggers to enhance anxiety and stress during hospital or radiology department visits [66–69]. Challenges related to toilet use and compliance with continence and orientation were also identified [17]. These difficulties may

also arise from the lack of convenient and accessible facilities within the hospital environment [70]. To help improve the care experience for PwD and provide a more dementia-inclusive environment, studies have suggested playing music and for PwD to bring personal objects and devices [15,71–73].

Strengths and limitations

The strength of this review lies in its comprehensive scope, as it incorporates a wide range of relevant literature published in English over a substantial timeframe, from 2009 to mid-2023. This extensive coverage allows for a thorough examination of the subject matter and facilitates a more holistic understanding of dementia care in radiography. Meanwhile, all primary studies were conducted in developed countries, and research conducted in developing countries were lacking. This hinders the generalisability of research findings to a global context, as the experiences and challenges faced by PwD and their caregivers can significantly differ in resource-limited settings in developing countries due to factors such as variations in healthcare infrastructure, cultural norms, and socioeconomic disparities. We also missed the opportunity to address the experiences of stakeholders and specific needs and vulnerabilities of PwD from these regions, which warrants the need for future investigations from these regions. Moreover, a small number of heterogeneous studies were discovered, fewer regarding radiotherapy. While the studies included in this review provide valuable and diverse insights, it is important to approach their findings with caution due to the heterogeneity in methodology and settings of the included studies. Despite these methodological concerns, the key themes identified are strongly relevant for the development of a comprehensive approach to caring for PwD in the Radiography department. Furthermore, the pathway to diagnose and stage dementia was beyond the scope of our review, as details of these may reveal additional explanations of the findings.

The authors further recommend the need for more diverse global research, involving developing countries, to provide a more comprehensive understanding of dementia care in various contexts. There is a strong need for patients and family engagement, as well as interdisciplinary collaboration among healthcare professionals, diagnostic radiographers and radiotherapists, and caregivers to ensure the development of integrated and patient-centered care models aimed to achieve optimal outcomes. Policymakers, regulatory bodies, and higher education institutions should advocate for policies that prioritise dementia care in radiography and collaborate to develop and improve specialised training for healthcare professionals. The authors strongly recommend the **"This is me"** leaflet created by the Society of Alzheimer's [74], as an effective support tool for caring and managing PwD and the **"Dementia champions"** initiative [75] to provide quality training for radiographers in Dementia care.

Conclusion

This review highlighted the experiences and perspectives of various stakeholders and underpins the need for a more holistic approach towards the care and management of PwD within the context of Radiography services. Our findings indicate, that across clinical Radiography service settings, the poor care experience for PwD may be attributed to factors related to the environment, the exclusion of carers in the management plans and the radiographers' professional limitations, such as years of experience in caring for PwD, knowledge base in dementia care, education, and training. There is evidence of a lack of agreement when employing practical aspects of models of care or in the implementation of regulatory guidelines.

Major stakeholders, PwD and their caregivers have shared diverse experiences that underscore the need for tailored approaches in radiography services. It is highlighted that collaboration among stakeholders, encompassing government institutions, regulatory bodies, families, and patient groups, is essential for optimal outcomes. Moving forward, research should extend into resource-limited settings in developing countries to further promote equity and a truly inclusive care for PwD across all settings. Interdisciplinary collaboration, technology integration, specialised training for radiographers, and standardized outcome measures are key steps. Active involvement of patients and their families, alongside designating "Dementia Champions," can catalyze positive change within radiography departments.

Embracing these recommendations has the potential to inform the development of comprehensive protocols and strategies that address the unique challenges faced by PwD and their caregivers.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jmir.2024.01.008.

References

[1] World Health Organization, 2021. Global status report on the public health response to dementia Methodology for producing global dementia cost estimates [online]. Available from: http://apps.who.int/bookorders.
[2] World Health Organization, 2023. Dementia [online]. Available from: https://www.who.int/news-room/fact-sheets/detail/dementia [Accessed 3 Jul 2023].
[3] Prince M., Wimo A., Guerchet M., et al. World Alzheimer Report 2015. The global impact of dementia: an analysis of prevalence, incidence, cost and trends. World Alzheimer Report 2015 The Global Impact of Dementia An AnalysIs of Prevalence, Incidence, Cost and Trends. Accessed September 18, 2023. www.alz.co.uk/worldreport2015correction.

[4] International A.D., Guerchet M., Prince M., Prina M. Numbers of people with dementia worldwide: an update to the estimates in the World Alzheimer Report 2015. Published online November 30, 2020. Accessed September 18, 2023. https://www.alzint.org/resource/numbers-of-people-with-dementia-worldwide/.
[5] Harding AJE, Morbey H, Ahmed F, et al. What is important to people living with dementia?: the "long-list" of outcome items in the development of a core outcome set for use in the evaluation of non-pharmacological community-based health and social care interventions. *BMC Geriatr*. 2019;19(1):94. doi:10.1186/s12877-019-1103-5.
[6] Couzner L, Day S, Draper B, et al. What do health professionals need to know about young onset dementia? An international Delphi consensus study. *BMC Health Serv Res*. 2022;22(1):1–12.
[7] National Health Service (NHS), 2022. About dementia. [online]. Available from: https://www.nhs.uk/conditions/dementia/about, [Accessed: 21 June 2022].
[8] Blytt KM, Selbæk G, Drageset J, Natvig GK, Husebo BS. Comorbid dementia and cancer in residents of nursing homes: secondary analyses of a cross-sectional study. *Cancer Nurs*. 2018;41(2) E13. doi:10.1097/NCC.0000000000000478.
[9] Mcwilliams L, Farrell C, Grande G, Swarbrick J, Yorke C. A systematic review of the prevalence of comorbid cancer and dementia and its implications for cancer-related care. *Aging Ment Health*. 2020 Citation for published version (APA). doi:10.1080/13607863.2017.1348476.
[10] Fowler H, Belot A, Ellis L, et al. Comorbidity prevalence among cancer patients: a population-based cohort study of four cancers. *BMC Cancer*. 2020;20(1):1–15. doi:10.1186/S12885-019-6472-9/FIGURES/3.
[11] Courtier N, Milton R, King A, Tope R, Morgan S, Hopkinson J. Cancer and dementia: an exploratory study of the experience of cancer treatment in people with dementia. *Psychooncology*. 2016:1079–1084 December 2015. doi:10.1002/pon.4212.
[12] MacRae R, Papadopoulou C. Managing a dual diagnosis of cancer and dementia in an acute setting: considerations, implications, and future recommendations. *Semin Oncol Nurs*. 2021;37(6):151233 Vol., No., p.). WB Saunders.
[13] Bunn F, Burn AM, Goodman C, et al. Comorbidity and dementia: a scoping review of the literature. *BMC Med*. 2014;12(1):1–15. doi:10.1186/S12916-014-0192-4/TABLES/4.
[14] Wolf LK, Gunderman RB. Dementia care in radiology. *Am J Roentgenol*. 2020;214(1):34–36.
[15] Hermann DM, Muck S, Nehen HG. Supporting dementia patients in hospital environments: health-related risks, needs and dedicated structures for patient care. *Eur J Neurol*. 2015;22(2):239–245.
[16] Akudjedu TN, Mishio NA, Elshami W, et al. The global impact of the COVID-19 pandemic on clinical radiography practice: a systematic literature review and recommendations for future services planning. *Radiography*. 2021;27(4):1219–1226.
[17] Flood J, O'Hanlon S, Gibb M, O'Donovan A. Caring for patients with dementia undergoing radiation therapy–a national audit. *J Geriatr Oncol*. 2019;10(5):811–818.
[18] Kada S. Radiographers' attitudes towards persons with dementia. *Eur J Radiogr*. 2009;1(4):163–168.
[19] Miller PK, Booth L, Spacey A. Dementia and clinical interaction in frontline radiography: mapping the practical experiences of junior clinicians in the UK. *Dementia*. 2019;18(3):1010–1024.
[20] Booth L, Kada S, Satinovic M, Phillips P, Miller PK. Student radiographers' attitudes towards the older patient–a longitudinal study. *Radiography*. 2017;23(3):229–234. doi:10.1016/J.RADI.2017.03.014.
[21] Challen R, Low LF, McEntee MF. Dementia patient care in the diagnostic medical imaging department. *Radiography*. 2018;24:S33–S42.
[22] Hwang U, Carpenter C, Dresden S, et al. The Geriatric Emergency Care Applied Research (GEAR) network approach: a protocol to advance stakeholder consensus and research priorities in geriatrics and dementia care in the emergency department The GEAR* and GEAR 2.0** Networks. *BMJ Open*. 2022;12:60974. [online]Available from. http://bmjopen.bmj.com/ . [Accessed 18 Sep 2023].
[23] Masoud SS, Glassner AA, Patel N, et al. Engagement with a diverse Stakeholder Advisory Council for research in dementia care. *Res Involv Engagem*. 2021;7(1):1–12. [online]Available from. https://link.springer.com/articles/10.1186/s40900-021-00297-8 . [Accessed 18 Sep 2023].
[24] Kadom, N., Zafar, H.M., Cook, T.S., Greene, A. and Durand, D.J., 2018. Engaging patients: models for patient- and family-centered care in radiology. [online], 38 (5), 1866–1871. Available from: https://pubs.rsna.org/doi/10.1148/rg.2018180018 [Accessed 18 Sep 2023].
[25] McEntee M. A personal view of dementia care in radiography. *J Med Imaging Radiat Sci*. 2022;53(1):5–6 [online]Available from. doi:10.1016/j.jmir.2021.10.001.
[26] Brodaty H, Donkin M. Family caregivers of people with dementia. *Dialogues Clin Neurosci*. 2009;11(2):217–228. doi:10.31887/dcns.2009.11.2/hbrodaty.
[27] Tay FHE, Thompson CL, Nieh CM, et al. Person-centered care for older people with dementia in the acute hospital. *Alzheimer's Dement Transl Res Clin Interv*. 2018;4:19–27.
[28] Wimo A, Winblad B, Jönsson L. The worldwide societal costs of dementia: estimates for 2009. *Alzheimer's Dement*. 2010;6(2):98 -1.
[29] Burley C, Livingston G, Knapp M, Wimo A, Norman R, Brodaty H. Time to invest in prevention and better care of behaviors and psychological symptoms associated with dementia. *Int Psychogeriatr*. 2020;32(5):567–572. doi:10.1017/S104161022000037X.
[30] Romeo R, Zala D, Knapp M, Orrell M, Fossey J, Ballard C. Improving the quality of life of care home residents with dementia: cost-effectiveness of an optimized intervention for residents with clinically significant agitation in dementia. *Alzheimer's Dement*. 2019;15(2):282–291.
[31] Jazzar U, Shan Y, Klaassen Z, et al. Impact of Alzheimer's disease and related dementia diagnosis following treatment for bladder cancer. *J Geriatr Oncol*. 2020;11(7):1118–1124.
[32] SCoR, The Society and College of Radiographers, 2020. Caring for People with Dementia: a clinical practice guideline for the radiography workforce (imaging and radiotherapy).
[33] Higgins R, Spacey A, Innes A. Optimising care and the patient experience for people living with dementia: the perceptions of radiography practitioners. *Radiography*. 2023;29:S52–S58 [online]Available from. doi:10.1016/j.radi.2023.01.016.
[34] Barry ES, Merkebu J, Varpio L. Understanding State-of-the-Art Literature Reviews. *J Grad Med Educ*. 2022;14(6):659–662.
[35] Pelone F, Reeves S, Ioannides A, et al. Interprofessional education in the care of people diagnosed with dementia: protocol for a systematic review. *BMJ Open*. 2015;5(4):1–6.
[36] Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Syst Rev*. 2021;10(1):1–11.
[37] Methley AM, Campbell S, Chew-Graham C, et al.PICO PICOS and SPIDER: a comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. *BMC Health Serv Res*. 2014;14:579. doi:10.1186/s12913-014-0579-0.
[38] Sirriyeh R, Lawton R, Gardner P, Armitage G. Reviewing studies with diverse designs: the development and evaluation of a new tool. *J Eval Clin Pract*. 2012;18(4):746–752.
[39] Hong QN, Pluye P, Bujold M, Wassef M. Convergent and sequential synthesis designs: implications for conducting and reporting systematic reviews of qualitative and quantitative evidence. *Syst Rev*. 2017;6(1):1–14.
[40] Popay, J., Roberts, H., Sowden, A., et al. 2006. Guidance on the conduct of narrative synthesis in systematic reviews. A product from the ESRC methods programme Version, 1(1), p.b92.
[41] Toot S, Hoe J, Ledgerd R, Burnell K, Devine M, Orrell M. Causes of crises and appropriate interventions: the views of people with dementia, carers, and healthcare professionals. *Aging Ment Health*. 2013;17(3):328–335.
[42] Chiang GC. Does integrated PET/MR have a role in the management of patients with dementia? *Radiology*. 2018;288(1):207–208.
[43] Filippi M, Agosta F, Barkhof F, et al. EFNS task force: the use of neuroimaging in the diagnosis of dementia. *Eur J Neurol*. 2012;19(12):1487–1501.

[44] McWilliams L. An overview of treating people with comorbid dementia: implications for cancer care. *Clin Oncol*. 2020;32(9):562–568.
[45] Chen R, Chien WC, Kao CC, et al. Analysis of the risk and risk factors for injury in people with and without dementia: a 14-year, retrospective, matched cohort study. *Alzheimers Res Ther*. 2018;10(1):1–12.
[46] Ashley L, Kelley R, Griffiths A, et al. Understanding and identifying ways to improve hospital-based cancer care and treatment for people with dementia: an ethnographic study. *Age Ageing*. 2021;50(1):233–241.
[47] Jensen JM, Andersen PAB, Kirkegaard L, et al. Exploring the patient perspectives of mobile X-ray in nursing homes–a qualitative explorative pilot study. *Radiography*. 2021;27(2):279–283 [online]Available from. doi:10.1016/j.radi.2020.08.009.
[48] Bisgaard M, Andersen PAB, Jensen AT, et al. Exploring radiographers' experience with mobile X-ray of patients in their homes. *Radiography*. 2022;28(1):102–106 [online]Available from. doi:10.1016/j.radi.2021.08.008.
[49] Fazio S, Pace D, Maslow K, Zimmerman S, Kallmyer B. Alzheimer's Association dementia care practice recommendations. *Gerontologist*. 2018;58(suppl_1):S1–S9.
[50] ALzheimer COoperative Valuation in Europe, 2013. Alzheimer Europe [online]. Available from: https://www.alzheimer-europe.org/research/projects/alzheimer-cooperative-valuation-europe [Accessed 3 Jul 2023].
[51] Daye D, Joseph E, Flores E, et al. Point-of-care virtual radiology consultations in primary care: a feasibility study of a new model for patient-centered care in Radiology. *J Am Coll Radiol*. 2021;18(9):1239–1245.
[52] Hyde E, Hardy M. Patient centred care in diagnostic radiography (Part 3): perceptions of student radiographers and radiography academics. *Radiography*. 2021;27(3):803–810.
[53] Gadbois EA, Bélanger E, Shield RR, Plassman BL, Van Houtven CH, Wetle TF. "Now at least we have something to call it": patient and care partner experiences receiving an amyloid PET scan. *J Am Geriatr Soc*. 2022;70(10):2938–2947.
[54] Wonnacott L, Banerjee S, Hicks B, Daley S. Understanding the experience of time for dementia education programme on undergraduate radiography students. *Radiography*. 2023;29:S46–S51 [online]Available from. doi:10.1016/j.radi.2023.02.020.
[55] Akudjedu TN, Torre S, Khine R, Katsifarakis D, Newman D, Malamateniou C. Knowledge, perceptions, and expectations of Artificial intelligence in radiography practice: a global radiography workforce survey. *J Med Imaging Radiat Sci*. 2023;54(1):104–116. doi:10.1016/j.jmir.2022.11.016.
[56] Rimmer A. Technology will improve doctors' relationships with patients, says Topol review. *BMJ*. 2019;364:l661. [online]Available from. https://www.bmj.com/content/364/bmj.l661 . [Accessed 18 Sep 2023].
[57] Haddad L, Bigger S. Radiology nursing ethics and moral distress. *J Radiol Nurs*. 2020;39(4):278–285.
[58] O'Leary AB, Scally A, Moore N, Maiorino-Groeneveld C, McEntee MF. Radiographers' knowledge and attitudes toward dementia. *Radiography*. 2023;29(2):456–461 [online]Available from. doi:10.1016/j.radi.2023.02.010.
[59] Brown I. Nurses' attitudes towards adult patients who are obese: literature review. *J Adv Nurs*. 2006;53(2):221–232.
[60] Jackson M, Pelone F, Reeves S, et al. Interprofessional education in the care of people diagnosed with dementia and their carers: a systematic review. *BMJ Open*. 2016;6(8):e010948. doi:10.1136/bmjopen-2015-010948.
[61] Mowbray J, Mowbray H. A consideration of the needs of the adult patient with dementia attending for radiotherapy and its impact on the practical consent process. *J Radiother Pract*. 2010;9(2):107–116.
[62] Dookhy J, Daly L. Nurses' experiences of caring for persons with dementia experiencing responsive behaviours in an acute hospital: a qualitative descriptive study. *Int J Older People Nurs*. 2021;16(4):e12379 p..
[63] Alushi L, Hammond JA, Wood JH. Evaluation of dementia education programs for pre-registration healthcare students–a review of the literature. *Nurse Educ Today*. 2015;35(9):992–998.
[64] Eccleston CE, Lea EJ, McInerney F, Crisp E, Marlow A, Robinson AL. An investigation of nursing students' knowledge of dementia: a questionnaire study. *Nurse Educ Today*. 2015;35(6):800–805.
[65] Troude P, Dozol A, Soyer P, et al. Improvement of radiology requisition. *Diagn Interv Imaging*. 2014;95(1):69–75.
[66] Qazi A, Spector A, Orrell M. User, carer and staff perspectives on anxiety in dementia: a qualitative study. *J Affect Disord*. 2010;125(1–3):295–300.
[67] Fujii T, Wada M, Hasebe S, Takeuchi K, Yorozuya T, Yakushijin Y. Treatment and prognosis of patients with both cancer and impaired decision–patient with both cancer and dementia making as a symptom of dementia. *Geriatr Gerontol Int*. 2021;21(12):1105–1110.
[68] Zuidema SU, de Jonghe JF, Verhey FR, Koopmans RT. Environmental correlates of neuropsychiatric symptoms in nursing home patients with dementia. *Int J Geriatr Psychiatry*. 2010;25(1):14–22.
[69] Cerejeira J, Lagarto L, Mukaetova-Ladinska EB. Behavioral and psychological symptoms of dementia. *Front Neurol*. 2012;3:73 p..
[70] Borbasi S, Jones J, Lockwood C, Emden C. Health professionals' perspectives of providing care to people with dementia in the acute setting: toward better practice. *Geriatr Nurs*. 2006;27(5):300–308.
[71] Evans SC, Waller S, Bray J. Designing inclusive environments for people living with dementia: how much do we really know? *Work Older People*. 2022;26(2):89–96.
[72] Waller, S., Masterson, A. and Evans, S.C., 2016. The development of environmental assessment tools to support the creation of dementia friendly care environments: innovative practice. 16 (2), pp. 226–232. Available from: https://journals.sagepub.com/doi/abs/10.1177/1471301216635829 [Accessed 16 Sep 2023].
[73] Waller S, Masterson A. Designing dementia-friendly hospital environments. *Future Hosp J*. 2015;2(1):63 [online]pmc/articles/PMC6465876, [Accessed 16 Sep 2023].
[74] Alzheimer society, 2022. This is me [online]. Available from: https://www.alzheimers.org.uk/get-support/publications-factsheets/this-is-me [Accessed 27 June 2022].
[75] Mayrhofer, A., Goodman, C. and Smeeton, N., 2016. The role of Dementia Champion in dementia care: its aspirations, development and training needs (innovative practice), 15 (5), pp.1306–1312. Available from: https://journals.sagepub.com/doi/abs/10.1177/1471301216631448 [Accessed 18 Sep 2023].
[76] Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libr J*. 2009;26(2):91–108. doi:10.1111/j.1471-1842.2009.00848.x.
[77] Barry ES, Merkebu J, Varpio L. Understanding State-of-the-Art Literature Reviews. *J Grad Med Educ*. 2022;14(6):659–662. doi:10.4300/JGME-D-22-00705.1.