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Person-Centred Dementia Care: Exploring Case Formulation and Technological Interventions

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Chapter 1 Systematic Review

Robotic and Smart Technology Interventions in Dementia Care: Are People at the Centre?

An Updated Systematic Review

Prepared in accordance with the author requirements for the Journal ‘The Clinical Neuropsychologist’.

Submission Guidelines

Keywords: dementia, robotics, non-pharmacological, assistive technology, person-centred

Abstract

Objective

To evaluate whether robotic and smart technology (RST) interventions in dementia care align with the person-centred care principles outlined by the British Psychological Society (BPS, 2016). This review specifically examined: (1) the person-centredness of RSTs; (2) the promotion of autonomy and choice; (3) support for meaningful living; (4) the impact on social inclusion and stigma; and (5) improvements in study quality since the previous review by (Kapoor, 2019). Finally, it aimed to explore the ethical considerations and transparency surrounding RSTs.

Method

A systematic search of CINAHL, PsycInfo, PubMed, PBSC, Web of Science CC, and Google Scholar identified 21 eligible studies (22 articles) published between October 2018 and March 2025. Included studies involved people with a dementia diagnosis and evaluated RSTs (e.g., robots, hand-held devices, or adapted software) using quantitative, qualitative, or mixed-method designs. Systematic reviews, protocols, and studies focused solely on caregivers or other assistive technologies were excluded. Study quality was appraised using the QualSyst tool (Kmet et al., 2004), and alignment with psychological care principles was assessed using the Dementia Psychological Care Benchmarking Scale . Independent samples t-tests and Cohen's *d* were used to compare mean DeBs scores with those from Kapoor's earlier review.

Results

Significant improvements were observed in several items on the DeBs, including identity (*d*= 1.07), activity (*d*= 1.09), meaningful (*d* = 1.52), and roles (*d* = 2.32). While methodological quality improved, reporting of person-centred implementation remained inconsistent, and reporting on research ethics, particularly regarding informed consent and data transparency, was limited.

Conclusions

Although RSTs in dementia care increasingly support psychosocial outcomes, reported alignment with person-centred values remains partial. Greater emphasis and reporting on co-design, dynamic consent, and autonomy-supporting features is needed to ensure these technologies respect the rights and lived experiences of people with dementia.

Registration: PROSPERO CRD42025646530

Background

Dementia is a neurodegenerative condition marked by progressive cognitive impairment. It affects millions globally, with prevalence forecast to increase with an ageing population (Brück et al., 2022). The condition imposes significant psychological, physical, social, and economic consequences on individuals, families, and healthcare systems worldwide (World Health Organization, 2021).

Due to the progressive nature of the condition, people living with dementia (PwD) will experience a decline in their ability to carry out Activities of Daily Living (ADLs), such as washing and dressing, and are likely to need caregivers or assistance (Amato et al., 2021). PwD may also exhibit Behavioural and Psychological Symptoms of Dementia (BPSD), an umbrella term which encompasses a range of non-cognitive disturbances, including agitation, aggression, anxiety, and depression, that frequently occur in individuals with dementia (Finkel & Burns, 2000). These symptoms are highly prevalent, affecting up to 90% of dementia patients at some point during their illness (Feast et al., 2016), and pose significant challenges for caregivers and healthcare providers (Losada-Baltar & Jiménez-Gonzalo, 2021).

Traditionally, pharmacological treatments such as antipsychotics have been employed to manage BPSD. However, these medications are associated with adverse effects, including increased mortality risk, prompting a shift towards nonpharmacological interventions as first-line treatments (National Institute for Health and Care Excellence, 2018). Nonpharmacological approaches offer a safer and often more cost-effective alternative, improving patient outcomes without the associated risks of pharmacotherapy (Ryu et al., 2005; Cohen-Mansfield et al., 2011). A wide spectrum of nonpharmacological interventions exists, including music therapy, sensory stimulation, cognitive-behavioural interventions, and assistive technology.

Assistive technology refers to any system or device which aids an individual to carry out a task they would not be able to perform otherwise, or increases their ease or safety in doing so (Gibson et al., 2016). It includes non-electronic devices such as calendars or wheelchairs, and more advanced devices such as robotic and smart technology (RST). RSTs come in various forms, ranging from hand-held devices to computer software to robots. Broadbent et al. (2009) broadly categorised robotic technologies according to their mode of interaction and function: physical assistance robots, monitoring and safety robots, and social companion robots. Physical assistance robots support daily tasks such as lifting or mobility (e.g., Care-O-bot, Ri-man), while monitoring robots (e.g., Pearl, Wakamaru) focus on reminders and health tracking. Social robots like PARO or NeCoRo are designed to provide companionship and emotional support.

Increasingly, RSTs are being used to support PwD due to a range of clinical benefits (Saragih et al., 2021). The use of RST in dementia care has shown improvements in quality of life (Jøranson et al., 2016), as well as reducing BPSD and stimulating communication (Jung et al., 2017). Other research has found benefits in reducing BPSD but no significant improvements in cognitive function or quality of life (Leng et al., 2019). Furthermore, a meta-analysis conducted by Saragih et al. (2021) demonstrated a reduction in depression and improvement in sleep, but no improvements in agitation, anxiety, cognitive function, or quality of life.

In 2016, the British Psychological Society (BPS) published a report titled ‘Psychological dimensions of dementia: Putting the person at the centre of care’ which presents psychological principles for dementia care (BPS, 2016). Moving away from a medical model, the report emphasised person-centred care, focusing on enabling PwD to live meaningful and fulfilling lives in the absence of a cure. Drawing on the four principles of person-centred care—personalised, enabling, coordinated care, and dignity and respect, it highlighted the importance of involving PwD in meaningful activities and fostering dementia-friendly communities. The BPS identified gaps in service provision and recommended tailoring biopsychosocial treatment plans to individual needs, with PwD actively participating in decisions about their care. The report promotes the use of non-pharmacological approaches such as positive behaviour support (PBS) and life story work, however, it does not refer to RSTs. This may be explained by the early applications of technology in dementia care being focused on the safety and security of PwD as opposed to addressing quality of life issues (Orpwood et al., 2010).

Researchers have made several recommendations for the application of RSTs to improve the quality of life in PwD. Daly Lynn et al. (2019) advocate for the use of person-centred assessments to understand the needs of the PwD prior to implementing RSTs. Additionally, they recommend continuous assessments since care needs will evolve over time and adjustments may be necessary. Leng et al. (2019) recommend considering cultural backgrounds, preferences, and life stories when using RSTs and including self-report measures where possible to better understand the experience of the PwD.

There are concerns that the application of RSTs in dementia care is not adequately person-centred. However, Kubota et al. (2021) raise awareness of possible harm caused by personalised robots, including ‘dark patterns’, which are user experiences and user interfaces which mislead or trick users, typically to increase engagement and maximise revenue. Engagement in this context refers to keeping the consumer invested in their product. The authors also highlight issues concerning who or what is responsible for causing any harm, how personal data may be used, and how informed consent is gained. The issue of consent is also raised by Daly Lynn et al. (2019) which found many studies lack detail in this area making it difficult to ascertain the strength of engagement and voices of PwD involved in RST research.

A systematic review conducted by Kapoor (2019) synthesised attitudes towards the application of RSTs and the extent to which they were person-centred. The review used The Dementia Psychological Care Benchmarking Scale (DeBs), developed by Morris (2018) as cited in Wilson et al. (2018), to assess researcher attitudes towards RSTs in dementia care and the extent to which studies adhere to psychological principles of care based on the recommendations made by the BPS (2016). The review included 37 studies and results indicated RSTs were in low adherence with person-centred care principles. The review also revealed a shift in how RSTs were being implemented, moving from assisting with ADLs to focusing on engagement and companionship. Furthermore, the review included quality appraisal of each study using the QualSyst (Kmet et al., 2004) highlighting a need for more methodologically robust studies.

Rationale and Aims

With advancements in artificial intelligence (AI) showing great promise for dementia care (Su et al., 2022), there have likely been new developments in robotic interventions over recent years. Nevertheless, no updated synthesis has evaluated whether these innovations align with person-centred care principles.

This study reviewed developments in the literature from October 2018 to date and contrasted the state of the field described in the review by Kapoor (2019). It identified updated attitudes towards the use of RST in dementia care and whether these were consistent with BPS (2016) recommendations. The review also assessed the methodological quality of the studies included.

Review Question(s)*

1. To what extent are RSTs for dementia person-centred? (DeBs items 1, 2, 3)
2. To what extent do RSTs foster independence in people with dementia by offering them choice and control? (DeBs items 4, 5)
3. To what extent do RSTs help people with dementia live more meaningful and fulfilling lives? (DeBs items 6, 8)
4. To what extent do RSTs promote social inclusion in people with dementia, tackling loneliness and isolation? (DeBs items 7, 9, 10)
5. To what extent has the overall quality and person-centredness of RST studies improved over time, as reflected in DeBS and QualSyst ratings?

Exploratory question

6. How transparent are RSTs in dementia care regarding data usage and ethical considerations (e.g. consent)?

**Note*. The review questions were reworded from Kapoor (2019) and the initial proposal for this research to better reflect the dimensional nature of person-centredness assessed through the DeBS tool.

Method

The protocol for this review was published on PROSPERO (ID: CRD42025646530). The review follows the PRISMA reporting guidelines (Page et al., 2021). The completed checklist can be found in Appendix A (p. 90).

Eligibility

Studies were included in this review if they met the following criteria:

- Intervention: forms of RST, including hand-held devices, adapted computer software, and robots in humanoid or animal form.
- Population: people with a dementia diagnosis, of all types, irrespective of age.
- Design: quantitative, qualitative, observational, experimental, single case studies and case series which use a systematic approach rather than purely exploratory design.

The following exclusion criteria were used:

- Intervention: other forms of assisted technology (e.g., wheelchairs, remote controls, and home alarms/sensors).
- Population: studies including people without a diagnosis of dementia, or studies focused solely on staff or caregivers rather than PwD themselves.
- Design: systematic reviews, meta-analyses, books, book chapters, conference abstracts without associated full texts, purely exploratory design, trial protocols or studies in the design or planning stage only.

Search Strategy

A literature search was conducted from 1st October 2018 to 14 March 2025 using PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycInfo, Embase, Web of Science Core Collection (WoS), Psychology and Behavioural Sciences Collection (PBSC) and Google Scholar. The results were restricted to English language.

A specialist university librarian was consulted on the development of the search strategy. A combination of terms related to dementia (e.g., “Alzheimer’s” OR “dementia” OR “vascular dementia” OR “cognitive impairment” OR “cognitive dysfunction”), as well as terms relating to RST (e.g., “assistive technology” OR “smart technology” OR “self-help device” OR “robotics” OR “cognitive prosthetics“) were used across databases. Truncation was used (i.e. Alzheimer*, dement*, robot*, impair*) to capture all relevant research. Each database was searched according to its unique thesaurus of subject headings. See Appendix B (p.96) for full search strategies.

Screening Process

All records were imported into Rayyan (Ouzzani et al., 2016). Duplicates were automatically excluded. The primary researcher then reviewed the titles and abstracts and included or excluded based on the criteria. A second independent rater (Trainee Clinical Psychologist) screened a portion (10%) of these, resulting in 99% initial agreement. Full texts were screened by the primary researcher, with another portion (10%) of these screened by the second reviewer, with 100% agreement. In addition, reference lists of the included studies were searched. Papers published in 2018 were checked against the original review paper (Kapoor, 2019) to avoid duplication, resulting in one exclusion.

Data Extraction Process

The primary researcher completed data extraction of 22 full-text articles. The following information was extracted: title, authors, and year of publication; study design and setting; type of RST; type of intervention; outcome measures used and reporter; type of analysis; sample size and characteristics; main results; and ethical considerations.

Rating Procedure and Tools

To meet the study objectives and ensure consistency, the same assessment tools were used in this study as in the original review paper (Kapoor, 2019).

Quality appraisal was completed using the QualSyst (Kmet et al., 2004). This tool uses separate checklists for quantitative and qualitative research. Questions are assigned a score relating to the degree to which the study meets the criteria ("yes" = 2, "partial" = 1, "no" = 0) and given a summary score. Where permitted, questions which did not apply to the study design were marked "N/A" and excluded from the summary score calculation. See appendix C (p.99).

The DeBs by Morris (2018) as cited in Wilson et al. (2018) was employed to evaluate researcher attitudes towards the use of RST in dementia care, and additionally the degree to which each study aligned with psychological principles of dementia care. The scale is grounded in the recommendations made by the British Psychological Society (BPS, 2016) and comprises ten items, each addressing a distinct aspect of psychological care for people with PwD. Each question is rated on a 5-point scale, ranging from 1 ("not at all mentioned") to 5 ("considered and strongly advocated"). See appendix D (p.101).

Data Analysis

The primary researcher reviewed a portion of the studies (*n*=4) included in the original review (Kapoor, 2019) and rated them using the DeBs and the QualSyst. A two-way mixed effects intraclass correlation (ICC) was calculated to determine inter-rater reliability between the current and previous research. Furthermore, inter-rater reliability was also assessed between the primary researcher and the second reviewer for the current research.

Scores on the QualSyst were converted to percentages, excluding any items scored as ‘not applicable’, as recommended by previous research (Lee et al., 2008). The same interpretation labels were applied to the current study as used in Kapoor (2019) for the QualSyst: strong (scores >80%), good (scores ranging from 70–80%), adequate (scores ranging from 50–69%) or limited (scores <50%). Scores on the DeBs were also converted to percentages and interpreted using the same categories to determine the extent to which they adhered to the psychological principles outlined by the BPS (2016).

The distribution of scores on the QualSyst measure and DeBs was calculated for each study, represented by the mean (*m*), median (*Mdn*), standard deviation (*SD*), and range. One-tailed independent samples t-tests and Cohen’s *d* were conducted to determine the significance and size of any effects between differences in scores on the DeBs from the previous review and the current one.

Data Presentation

Table 1.1 presents the characteristics of each study, which are summarised according to their design, methodology, and outcomes. This is followed by quality assessment ratings and ratings on adherence to psychological principles of dementia care. Complete data on the QualSyst tool and the DeBs ratings are provided in Appendix E (p.102).

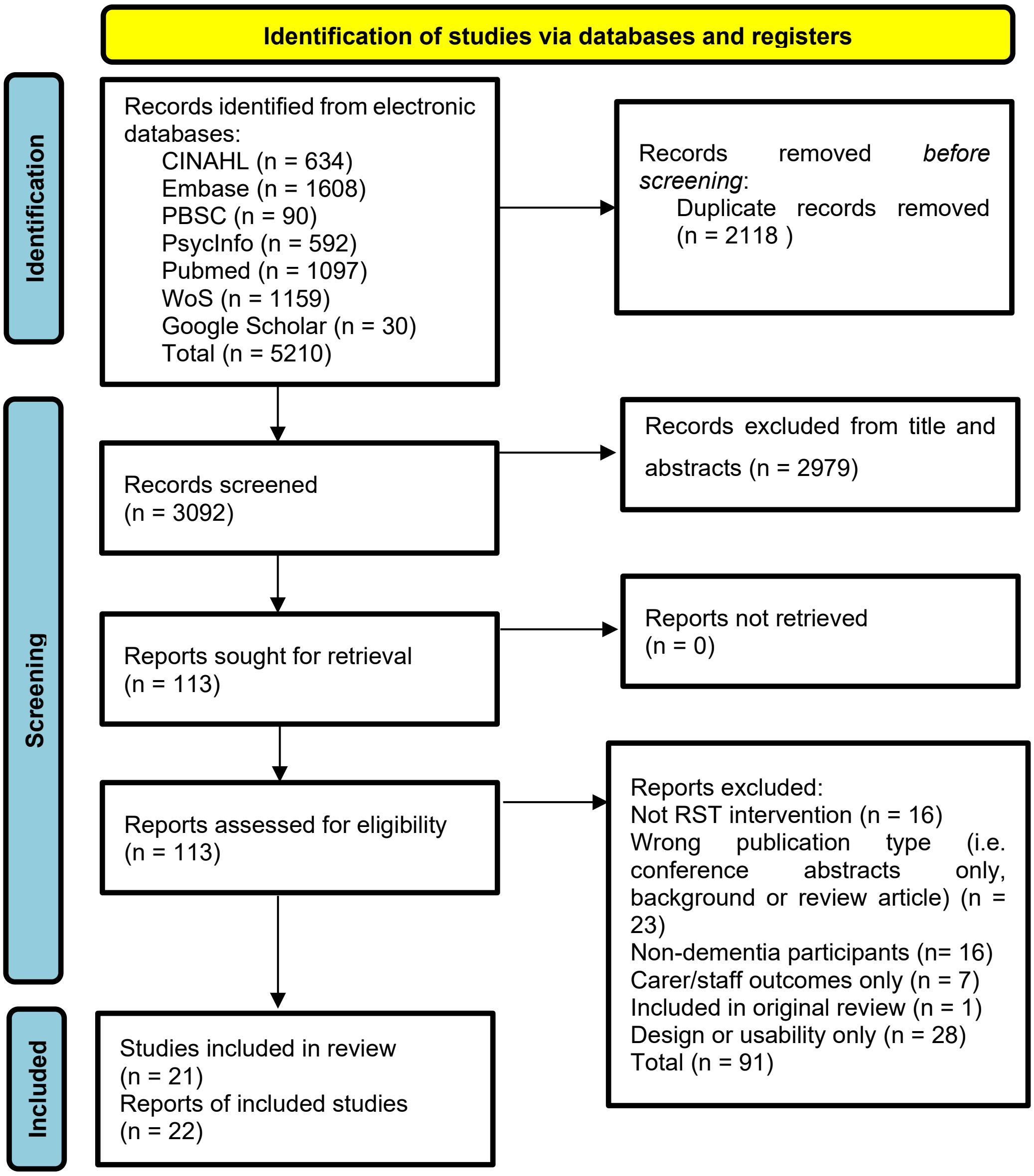
Results

Search Results

Following a search of 6 databases and Google Scholar search engine, 5210 records were identified. After 2118 duplications were removed, 3092 titles and abstracts were screened, and 2979 records were removed. This resulted in 113 records for full-text screening against the inclusion and exclusion criteria. A total of 22 records (21 studies) met the criteria and were retrieved. This process is illustrated in Figure 1.1 below.

Figure 1. 1

PRISMA flow Diagram (adapted from (Page et al., 2021)



Data Extraction and Inter-rater Agreement

Table 1.1 illustrates the key information systematically extracted from the included studies, relevant to the objectives of this review. To ensure a consistent comparison between the previous (Kapoor, 2019) and current studies, ICC was calculated for both measures. This demonstrated excellent inter-rater agreement for both DeBs ratings (ICC = 0.998) and QualSyst ratings (0.985). The inter-rater reliability between the primary researcher and the second reviewer for the current review was also excellent for both the QualSyst (ICC = 0.976) and DeBs (ICC = 0.924)

Table 1. 1

Data extraction summary and assessment ratings (%)

Authors and year of publication	Study design and setting	RST type	Intervention	Outcome measures* and reporter	Analysis	N and diagnosis**	Main results	Total QualSyst rating (%)	Total DeBS rating (%)
Blindheim et al. (2023)	Exploratory, Qualitative methods Norwegian long-term care facility	Social robot (Pepper)	Group social and exercise activity (15–30 min/day, 5 days/week for 4 weeks)	Semi-structured interviews Participants (PwD & staff) Researcher	Content analysis	*N* = 7 3 dementia (type not specified) 4 staff	Positive effect of RST = increase in communal activity (physical exercise, joint interaction, social stimulation)	13/20 (65%) Adequate	27/50 (54%) Adequate
Chen, Jones, et al. (2024)	Comparative quasi-experimental Private long-term care facilities in	Social robot (PARO the seal)	Individual non-facilitated PARO (60 mins/day, 3 days/week, for 8 weeks)	UCLA-3, GDS-SF, EPWDS Participants (PwD) Researchers	Mixed between-within subjects ANOVA, Mann-Whitney U Test	*N* = 52 26 PARO (dementia, type not specified) 26 TAU (26 dementia,	Positive effect of RST = decrease in depression and loneliness	21/26 (81%) Strong	20/50 (40%) Limited

	Southern Taiwan					type not specified)			
Chen, Lin, et al. (2024)	RCT with 2-arm parallel groups, single blind repeated measures design Dementia day centres in Southern Taiwan	Social robot (PARO the seal)	Group PARO intervention (30 mins/week for 6 weeks)	MMSE, FTT, HRV, UCLA-3, GDS-SF, WEMWBS Participants (PwD) HRV device	Mixed-design generalised linear model, planned contrasts	*N* = 118 58 PARO group (mild dementia, type not specified); 60 TAU (mild dementia, type not specified)	Positive effect of RST = improved cognitive function, autonomic stability, and mental well-being	26/28 (93%) Strong	16/50 (32%) Limited
D'Amico et al. (2023)	Non-concurrent multiple baseline design Social-medical centre Italy	Prompter: MacroDoid application using tablet, voice recording, and mini speaker	Activity intervention (2-3 times/day, 3 days/week)	Number of activity steps, number of songs participant activated, length of the sessions Researcher	Mean percentages, Kolmogorov-Smirnov test	*N* = 5 dementia (1 moderate, 4 severe)	Positive effect of RST = increase in activity	14/22 (64%) Adequate	24/50 (48%) Limited

Dinesen et al. (2022)	Exploratory study, mixed methods Nursing homes in Denmark	Social robot with artificial intelligence (LOVOT)	Group sessions (30- 45 mins/day, 2 days/week for 12 weeks) Individual sessions (20- 30 mins/day, 2 days/week, for 4 weeks)	WHO-5, Face Scale, participant observations, focus group interviews Staff Researchers	Quantitative: Median and interquartile range Qualitative: Thematic analysis	Quantitative = 42 dementia (20 DAT, 22 Other dementia) 12 Ind. 30 Group Qualitative= not reported	Little effect of RST = no clinically significant changes in wellbeing, more positive facial expressions following sessions but not sustained	26/40 (65%) Adequate	19/50 (34%) Limited
Feng et al. (2020)	Experimental repeated measures design (three conditions) Dementia living facility in the Netherlands	Social robot (LiveNature: robotic sheep and augmented reality display)	C1: interaction with proactive robot and reactive context C2: interaction with static robot and dynamic context Control: no robot, dynamic context	OME, EPWDS, OERS, PEAR-Apathy Staff Researchers	Kruskal-Wallis H with pairwise comparisons, ANOVA	*N* = 16 7 C1/Control (2 DAT, 1 VD, 4 Mixed) 9 C2/Control (3 DAT, 2 VD, 4 Mixed)	Positive effect of RST= motivating engagement, provoking, facilitating purposeful activities.	26/28 (57%) Adequate	16/50 (32%) Limited

Fogelson et al. (2022)	Mixed research design Residential care facility in USA	Social robot (Joy for All Companion Pets)	Individual companion pet for six weeks	GDS-15, UCLA-3, Individual interviews Participants (PwD) Carers Staff	Quantitative: Spearman's rank, Friedman's ANOVA Qualitative: overall perception from comments	*N* = 18 dementia (type not specified, early stage, moderate stage	Positive effect of RST = significantly lower depression and loneliness scores Positive comments from participants, staff and carers	25/40 (63%) Adequate	16/50 (32%) Limited
Harris et al. (2021)	Exploratory study, quantitative NHS memory clinic	Prompter: software with tablet	Complete tasks using toolkit over a period of four weeks	ACE-III, CVLT-II, D-KEFS-TM, BADLS, ADKS, SCQ, GAS, log of prompter use, ratings of success Participants (carers and PwD)	Independent samples t-test, chi-squared test	*N* = 28 14 dyads, 14 dementia (7 DAT, 3 VD, 4 Mixed), 14 family carers	Positive effects of RST = majority met goals either partially or fully	17/22 (77%) Good	25/50 (50%) Adequate
Hung et al. (2021)	Observational, qualitative study using	Social robot (PARO the seal)	Individual facilitated social interaction with	Conversation interviews and video	Thematic analysis	*N* = 10 dementia (type not	Positive effect of RST = helpful in supporting	17/20 (85%)	37/50 (74%)

	video ethnography Geriatric mental health unit in Canada		PARO (2-4 observations)	recordings, semi-structured individual interviews, two focus groups Participants (PwD, staff) Researchers		specified; 2 early stage, 5 middle stage, 3 late stage)	the psychosocial needs for inclusion, identity, attachment, occupation and comfort	Strong	Good
Ikeya et al. (2018)	Two-group comparison design, quantitative Special nursing home in Kanagawa, Japan	Communication humanoid robot (PALRO)	Activity intervention for 30 minutes	Countenance, non-verbal, verbal and sonorous musical communication scores Researchers	Unpaired *t*-test	*N* = 48 dementia (type not specified; severe stage)	Positive effect of RST = ability to identify non-communicative strengths	9/22 (41%) Limited	15/50 (30%) Limited

Inoue et al. (2021)	Exploratory study, mixed methods Tokyo, participants' homes	Social robot (PARO the seal)	Non-facilitated PARO intervention (15-180 minutes per day lasting 1-3 months)	MMSE-J, N-ADL, DBD, ZBI, semi-structured family interviews, participant observation using DCM Carers Researchers	Quantitative: Central tendencies Qualitative: inductive thematic analysis	*N* = 15 7 dementia (6 DAT, 1 type not specified) 8 family caregivers	Positive effect of RST = positive reactions and 5/7 achieved goals	28/42 (67%) Adequate	33/50 (66%) Adequate
Inoue et al. (2022)	One-group pretest-post-test design, quantitative methods Long-term care facilities in Kanagawa, Japan	Communication humanoid robot (PALRO)	Robot-assisted activity group 30-minute leisure programme	Participant observation using DCM, WIB Researchers Carers	DCM analysis, Spearman's rank, Wilcoxon rank-sum test, Friedman test	*N* = 77 dementia (53 DAT, 9 VD, 15 Other dementia)	Positive effect of RST = improvements in 'positive state'	16/22 (73%) Good	23/50 (46%) Limited
Jøranson et al. (2021)	Cluster randomised	Social robot (PARO the seal)	Group PARO activity 30 mins/day, 2	ActiSleep+, sleep efficiency, wake after	One-way ANOVA, chi	*N* = 54 27 PARO (dementia,	Positive effect of RST = improved	18/26 (69%)	19/50 (38%)

	multicentre trial Special care units in Norway		days/week, for 12 weeks	sleep onset, nocturnal awakenings, total sleep time Device Researchers	square, Mixed model	type not specified) 27 TAU (dementia, type not specified)	quantity and quality of sleep	Adequate	Limited
Lancioni et al. (2018)	Non-concurrent multiple baseline design Dementia day centres in Italy	Study 1: Tablet or smartphone with android operating system and the Talking Alarm Clock application, and wireless Bluetooth earpiece Study 2: four-wheel walker device with tilt microswitch,	Study 1: 5-6 activities scheduled over 1.5 or 2 hour sessions (overall 37-82 sessions) Study 2: 3 minute sessions occurring 3 to 7 times a day (overall 73-119 sessions)	Study 1: number of activities started independently; number of activity steps performed correctly Study 2: stimulation events and prompts, signs of positive involvement Devices	Study 1: Kolmogorov-Smirnov test Study 2: mean frequencies and mean percentages, Kolmogorov-Smirnov test	Study 1: *N* = 8 dementia (mild to moderate, type not specified) Study 2: *N* = 9 dementia (moderate to severe DAT)	Positive effect of RST = promoting independence in ADLs and supporting ambulation	14/22 (64%) Adequate	44/100 (44%) Limited

		notebook computer and earpieces		Researchers					
Mizuno et al. (2021)	Single case study experiment Japan, home setting	Information support robot (PaPeRo), sensors and cloud technology	Distribution of information by robot for 2 weeks	MMSE-J, COGNISTAT, Episodes of restlessness Participant (PwD) Device	Paired *t*-test	*N* = 1 dementia (DAT)	Positive effect of RST = decreased frequency and duration of restlessness	16/18 (89%) Strong	22/50 (44%) Limited
Pu et al. (2023)	Qualitative study as part of a feasibility RCT Residential aged care facility (RACFs) in Brisbane, Australia	Social robot (PARO the seal) and PainChek App	PARO intervention (15 mins/day, 5 days/week for 3 weeks	Individual semi-structured interviews Participants (PwD, staff, carers)	Inductive thematic analysis	*N* = 34 13 dementia (4 DAT, 2 VD, 1 Mixed, 6 unspecified dementia), 3 family caregivers, 18 staff	Positive effect of RST = help manage pain and behavioural symptoms	16/20 (80%) Strong	24/50 (48%) Limited

Pu et al. (2019)	Qualitative study as part of RCT in Pu, Moyle, Jones, and Todorovic (2020) RACFs in Australia	Social robot (PARO the seal)	Individual non-facilitated PARO intervention, (30 minutes, 5 days/week for 6 weeks)	Individual semi-structured interviews Participants (PwD)	Inductive thematic analysis	*N* = 11 dementia (1 DAT, 2 VD, 8 Dementia unspecified)	Positive effect of RST = positive attitudes, mood improvements and pain relief	16/20 (80%) Strong	15/50 (30%) Limited
Pu, Moyle, Jones, and Todorovic (2020)	Parallel pilot RCT, quantitative methods	Social robot (PARO the seal)	Individual non-facilitated PARO intervention, (30 minutes, 5 days/week for 6 weeks)	PAINAD, estimated pain level (0-10), CMAI-SF, CSDD, RADS, MQS-III Participants (PwD) Researchers Staff	Generalised estimating equation model, Covariate-adjusted mean differences, change scores	*N* = 43 21 PARO Group (9 DAT, 2 VD, 10 Dementia unspecified); 22 TAU (8 DAT, 3 VD, 1 FTD, 10 Dementia unspecified)	Partial positive effect of RST = reduced observation pain levels and PRN medication use, no difference in BPSD	22/28 (79%) Good	15/50 (30%) Limited
Shoesmith et al. (2024)	Qualitative study	Social robot (PARO the seal)	Six 20-30 minute sessions of individual	Individual semi-structured	ICAMO configuration	Interviews *N* = 13	Positive effect of RCT = positive impact on mood,	14/20 (70%)	35/50 (70%)

	Inpatient dementia ward in the UK		facilitated PARO intervention	interviews, observations Participants (PwD, staff, carers) Researchers	, thematic analysis	6 staff, 3 relatives, 4 dementia (1 VD, 3 Mixed dementia, all moderate to severe) Observations *N* = 5 dementia (1 VD, 1 DAT, 3 Mixed, all moderate to severe)	engagement, social interaction and soothing effect	Good	Good
Stoddart and Galvin (2019)	Qualitative exploratory ethnographic study Aged care home in Australia	Social robot (PARO the seal)	Group facilitated PARO intervention (30 mins/day, 5 days/week for 4 weeks)	Observations, focus group Researchers	Coding and thematic analysis	*N* = 8 dementia (4 DAT, 3 not specified, 1 mild dementia)	Positive effect of RST = enablement, attention, quality of life	6/20 (30%) Limited	31/50 (62%) Adequate

Tummers et al. (2020)	Study 1: qualitative, comparative within-subjects Study 2: qualitative, longitudinal case study Care home and home setting, in the Netherlands	Companion robotic animals Study 1: animatronic dinosaur (Pleo) Study 2: robotic cat (Hasbro)	Study 1: Short duration intervention with Pleo, real dog, and human only Study 2: intense interaction with Hasbro over 12 months	Observations and interviews Participants (PwD) Researchers	Thematic analysis	Study 1: *N* = 12 dementia (type not specified) Study 2: *N* = 1 dementia (type not specified, middle stage)	Positive effect of RST = psychosocial benefits, prolonged engagement	12/20 (60%) Adequate	30/100 (30%) Limited
Whelan et al. (2020)	Multiple case study, mixed methods Residential setting in Ireland	Social robot (MARIO)	Individual facilitated MARIO intervention 12 sessions (5-60mins, 3	DCM, RS-14, QOL-AD, observations using OME, interviews	Quantitative: DCM analysis, Wilcoxon signed-rank test	*N* = 23 10 dementia (type not specified, 2 mild, 6 moderate, 2 severe), 6	Positive effect of RST = increased resilience, engagement	35/40 (88%) Strong	39/50 (78%) Good

			days/week for 5 weeks)	Participants (PwD, staff, relatives) Researchers	Qualitative: framework analysis	staff, 7 relatives		

*ACE-III: Addenbrooke's Cognitive Examination; ADKS: Alzheimer's Disease Knowledge Scale; BADLS: Bristol Activities of Daily Living Scale; BPSD: Behavioural and Psychological Symptoms in Dementia; CMAI-SF: Cohen-Mansfield Agitation Inventory-Short Form; COGNISTAT: Neurobehavioural Cognitive Status Examination Japanese Version; CSDD: Cornell Scale for Depression in Dementia; CVLT-II: California Verbal Learning Task; DBD: Dementia Behaviour Disturbance; DCM: Dementia Care Mapping; D-KEFS-TM: Delis Kaplan Executive Functions System Trails Making Test; EPWFS: Engagement of a Person with Dementia Scale; FTT: Finger Tapping Test; GAS: Goal Attainment Scale; GDS-16: The Geriatric Depression Scale; GDS-SF: Geriatric Depression Scale – Short Form; HRV: Heart Rate Variability; ICAMO: Intervention-Context-Actor-Mechanisms-Outcomes; MMSE: Mini Mental State Examination; MMSE-J: Mini Mental State Examination – Japanese Version; MQS-III: Medication Quantification Scale-III; N-ADL: Nishimura's Activity of Daily Living Scale; OERS: Observed Emotional Rating Scale; OME: Observational Measurement of Engagement; PAINAD: Pain Assessment in Advanced Dementia Scale; PEAR-Apathy: People Environment Apathy; Rating Scales – Apathy Subscales; QOL-AD: Quality of Life in Alzheimer's Disease Scale; RADS: Rating Anxiety in Dementia Scale; RCT: Randomised Controlled Trial; RS-14: The Resilience Scale; SCQ: Sense of Competence Questionnaire; WEMWBS: Warwick-Edinburgh Mental Well-being Scale; WIB: Well-Ill-Being score; ZBI: Zarit Burden Interview

** DAT: Dementia Alzheimer's Type; FTD: Frontal-Temporal Dementia; VD: Vascular Dementia

Participant Characteristics

All studies in the review included participants with a diagnosis of dementia. Seventeen of the studies reported the type, severity or stage of dementia, including Alzheimer's Disease (*n* = 17), vascular dementia (*n* = 6), mixed dementia (*n* = 4), unspecified dementia (*n* = 4), and other dementias (*n* = 2). Severity reported included mild (*n* = 4), moderate (*n* = 5) and severe (*n* = 5). Four studies did not specify the type, severity or stage of dementia.

Sample Size

There was a large variety of sample sizes, ranging from one participant (Mizuno et al., 2021) to a maximum of 118 participants (Chen, Lin, et al., 2024). Eleven studies used a small (<20 participants) sample size, six were moderate (20-50 participants), and four used a large (>50 participants) sample size.

Study Design

Most of the studies adopted quantitative methods (*n* = 10), followed by qualitative (*n* = 6), and mixed methods (*n* = 5). Five of the studies were exploratory but used systematic procedures to analyse the effects of the RST. Three of the studies were randomised controlled trials (RCT). Other designs included within-subject uncontrolled experiments (*n* = 3), non-concurrent multiple baseline (*n* = 2), single case study (*n* = 2), experimental repeated measures (*n* = 2), observational (*n* = 1), quasi-experimental (*n* = 1), multiple case study (*n* = 1), and cluster randomised multicentre (*n* = 1).

Type of RST

Many the studies used socially assistive robots (SARs; *n* = 18). This included animal-type robots such as PARO (*n* = 9), PARO in combination with the PainChek app (*n* = 1), LiveNature (*n* = 1), Joy for all pet (*n* = 1), Pleo (*n* = 1) and Hasbro (*n* = 1). Humanoid-type robots included Pepper (*n* = 1), PALRO (*n* = 2), LOVOT (*n* = 1), and PaPeRo (*n* = 1). The remaining two studies used other assistive smart technology, including prompter software or applications with a tablet (*n* = 2), a talking clock with a tablet (*n* = 1), and a walker with a notebook computer (*n* = 1). Examples of some of the included RSTs can be seen in Figure 1.2.

Figure 1. 2

Images of RST types included in this review

PARO (above)

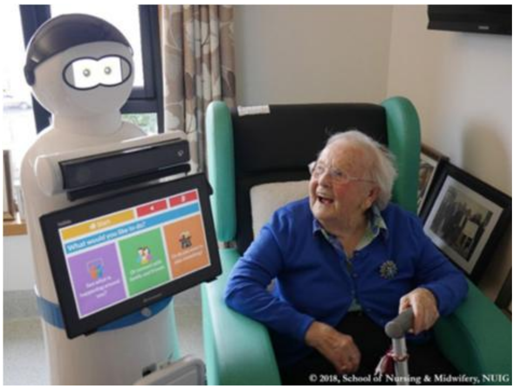
LOVOT (above)

Battery: 13%

place cd in the slot writing side up

Touch here for next step

Prompter software (above)



MARIO with participant (above)

Note. Copyright owned by original authors from top left to right PARO (p34; Stoddart & Galvin, 2019), LOVOT (p2; Dinesen et al., 2022), and bottom left to right, Prompter software (p.872; Harris et al., 2021), MARIO (p.11 Whelan et al., 2020).

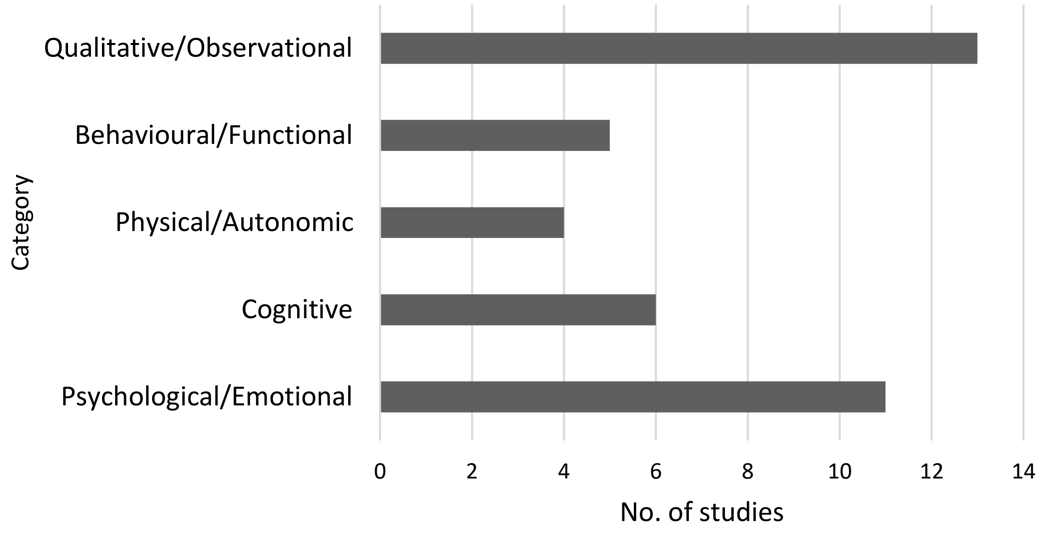
Main Outcome Measures

As detailed in Table 1.1, the included studies employed a wide range of outcome measures. These have been categorised into five main outcome types (see Appendix F, p.111): psychological and emotional, cognitive, physical and autonomic, behavioural and functional, and qualitative and observational. Figure 1.3 illustrates that the most frequently used outcome measures fell within the qualitative and observational category (*n* = 14), followed by the psychological and emotional category (*n* = 11), cognitive (*n* = 6), behavioural and functional (*n*

= 5), and physical and autonomic (*n* = 4). Twelve studies used a combination of more than one outcome measure category. Nine studies used one category of outcome measure.

Figure 1. 3

Bar graph depicting the primary outcome measure categories

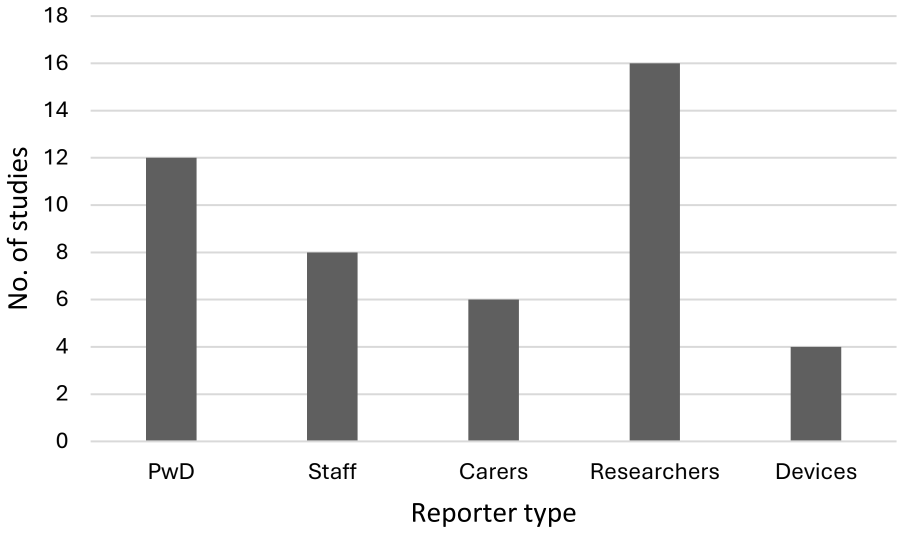


Reporting of Outcomes

Figure 1.4 shows the range of reporters included across the included studies. The most common reporting of outcomes was done by participants (*n* = 26) which included PwD (*n* = 12), staff (*n* = 8), or carers (*n* = 6). It was common for the researchers themselves to do the reporting (*n* = 16). Most studies used more than one reporter (*n* = 18), and only three used a single reporter (researchers; *n* = 3). Nine studies did not include PwD as a reporter, and no study included PwD as a single reporting source.

Figure 1. 4

Bar graph illustrating the frequency of types of reporters



Nature of Outcomes

Most studies reported positive (*n* = 18) or partially positive (*n* = 1) effects of RST on a range of factors, including wellbeing, quality of life, BPSD symptoms, engagement, and activities (refer to Table 1.1). One study reported a neutral impact of RST on wellbeing and one study reported little effect.

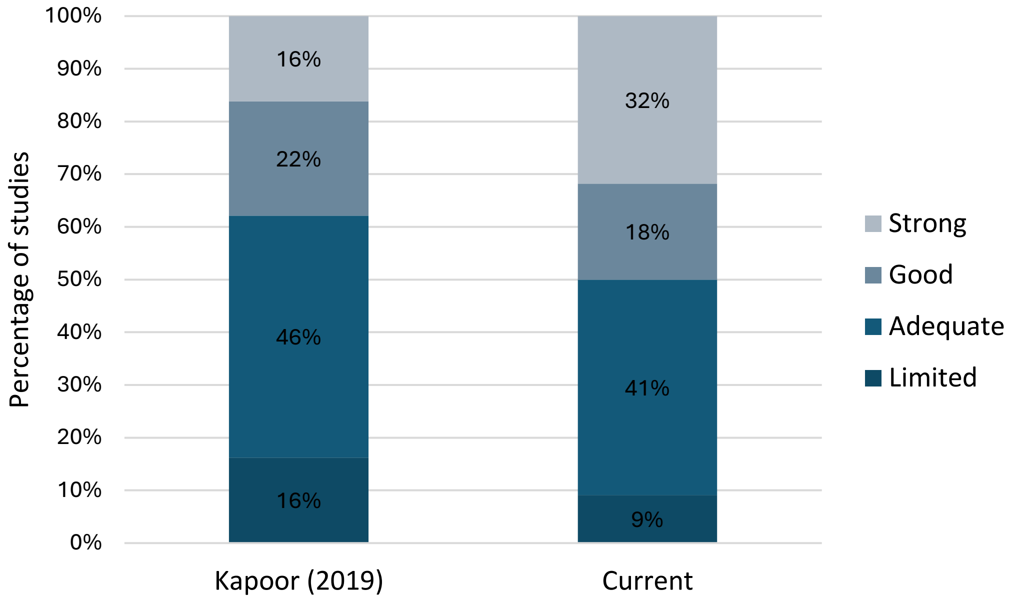
Ratings on the QualSyst Measure

The methodological quality assessment conducted for each study indicated they ranged from strong (>80%) to limited (<50%). Most studies (*n* = 9) were rated as adequate. Seven were rated as strong and four as good. The remaining two articles were rated as limited.

Kapoor (2019) rated 37 studies on the QualSyst. Figure 1.5 illustrates the quality ratings for both reviews, which have been converted to percentages to assess any changes in methodological quality. This demonstrates that 50% of the studies rated in the current review were either good or strong, compared to 38% rated by Kapoor (2019). Furthermore, only 9% of the studies in the current review were rated as limited, in contrast to the 16% in the original review.

Figure 1. 5

Comparison of QualSyst ratings between Kapoor (2019) and the current review



Ratings on the DeBs

The extent to which each study adhered to the person-centred principles of care was measured by the DeBs and ranged from good (70-80%) to limited (<50%). Studies with more than one RST type were rated independently and given an overall score. As shown in Table 1.1, most of the studies were rated as limited (*n* = 14). Four studies were rated as adequate. Three were rated as good. No studies were rated as strong.

Table 1.2 highlights the average scores for each item of the DeBs, which ranged from 1.13 to 3.46. Higher scores were achieved on items such as ‘does the approach advocate and facilitate access to meaningful activities?’ (Q6, *m* = 3.33), ‘is the approach focused on enabling the person to live lives that are meaningful and satisfying?’(Q8, *m* = 3.13), and ‘does the approach promote social inclusion and involvement in valued roles and activities?’(Q10, *m* = 3.46), compared to items such as, ‘is the approach advocating individualised care, taking into account the person's individual needs?’(Q1, *m* = 2.21) and ‘is the approach person centred taking account the dementia journey and person identity?’(Q2, *m* = 2.50). The lowest scoring items were ‘does the approach involve listening to people with dementia and ensuring their voice is heard? (Q3, *m* = 1.96)’, ‘does the approach advocate support for the person with dementia to exercise choices and control?’(Q5, *m* = 1.92), ‘does the approach advocate involving the person with dementia in decision-making regarding their care?’(Q4, *m* = 1.67), ‘does the approach promote participation in local communities that are dementia friendly?'(Q7, *m* = 1.33), and 'does the approach consider the impact on the stigma of dementia?'(Q9, *m* = 1.13).

Table 1. 2

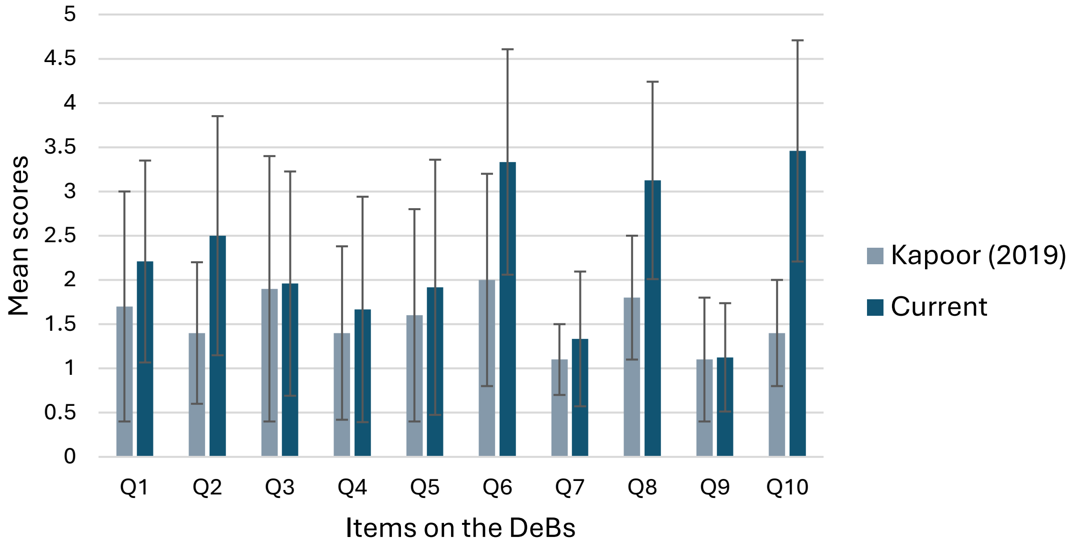
Range, mean and standard deviations for each item on the DeBs

Question	Item	Range	Mean	SD
1	Individualised	1 - 5	2.21	1.14
2	Identity	1 - 5	2.50	1.35
3	Voice	1 - 5	1.96	1.27
4	Decision-making	1 - 5	1.67	1.27
5	Choice	1 - 5	1.92	1.44
6	Activities	1 - 5	3.33	1.27
7	Community	1 - 3	1.33	0.76
8	Meaningful	1 - 5	3.13	1.12
9	Stigma	1 - 4	1.13	0.61
10	Roles	1 - 5	3.46	1.25

Figure 1.6 below illustrates the mean scores and standard deviations for each item of the DeBs for the Kapoor (2019) and current review. The figure depicts the most substantial increases for items 2 (identity), 6 (activities), 8 (meaningful), and 10 (roles) in the current review compared to the previous review.

Figure 1. 6

Comparison of item-level means on the DeBs between Kapoor (2019) and the present review



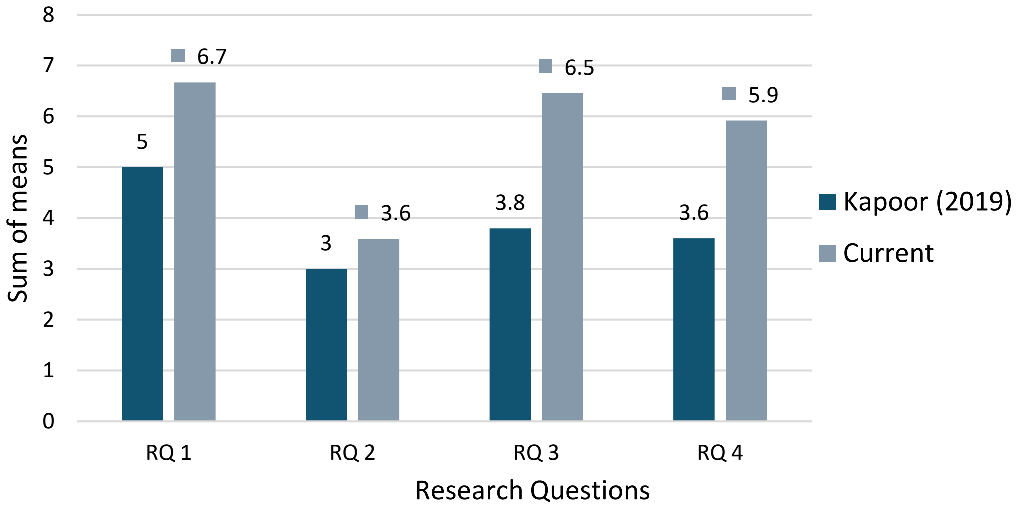
Note. error bars represent ±1 standard deviation.

To determine whether these observed differences between both reviews were statistically significant, ten one-tailed independent samples t-tests were calculated using a p-value calculator (Georgiev, 2017) and effect sizes were calculated using pooled standard deviations (see Appendix G, p.113). This demonstrated statistically significant increases for several items. For Q2 ‘identity’, scores increased significantly $t(46.38) = 2.47$, $p = .009$, with a large effect size (Cohen’s $d = 1.07$). Q6 ‘activities’ also showed a significant increase $t(39.74) = 3.91$, $p < .001$, with a large effect size (Cohen’s $d = 1.09$). Significant improvements were found for Q8 ‘meaningful’ $t(29.06) = 4.92$, $p < .001$, with a large effect size (Cohen’s $d = 1.52$). The most substantial improvement was demonstrated in Q10 ‘roles’ $t(25.33) = 7.10$, $p < .001$, with a very large effect size (Cohen’s $d = 2.32$). The remaining items did not reach statistical significance.

In relation to the objectives of this review, items on the DeBs have been mapped to the four primary research questions (RQ). Items 1-3 correspond to RQ1 ‘are robotic interventions for dementia person-centred?’. Items 4 and 5 correspond to RQ2 ‘do robotic interventions foster independence in people with dementia by offering them choice and control?’. Items 6 and 8 correspond to RQ3 ‘do robotic interventions help people with dementia live more meaningful and fulfilling lives?’. Items 7, 9 and 10 correspond to RQ4 ‘do robotic interventions promote social inclusion in people with dementia, tackling loneliness and isolation?'. Figure 1.7 presents the mean DeBs scores for the items grouped by research questions, demonstrating an overall increase in ratings for each item. Of note, there was an increase of 2.66 for RQ3 items, and 2.32 for RQ4 items.

Figure 1. 7

Bar graph illustrating differences in the summed DeBs mean scores for each research question between Kapoor (2019) and the present review



Ethical Considerations

Information on the consent processes and transparency of RST data storage and usage was extracted from each study. Informed consent was obtained from participants or their legal guardians verbally or in writing (n = 15; Chen, Jones, et al., 2024; D'Amico et al., 2023; Dinesen et al., 2022; Harris et al., 2021; Ikeya et al., 2018; Inoue et al., 2021; Inoue et al., 2022; Lancioni et al., 2018; Mizuno et al., 2021; Pu et al., 2023; Pu et al., 2019; Pu et al., 2020; Shoesmith et al., 2024; Stoddart & Galvin, 2019; Tummers et al., 2020) or both (n=5; Blindheim et al., 2023; Fogelson et al., 2022; Hung et al., 2021; Jøranson et al., 2021; Whelan et al., 2020). One study did not report the consent process (Chen, Lin, et al., 2024). Seven studies acknowledged the capacity of participants or assessed capacity as part of the consent process (Feng et al., 2020; Harris et al., 2021; Pu et al., 2023; Pu et al., 2019; Pu et al., 2020; Shoesmith et al., 2024; Stoddart & Galvin, 2019; Whelan et al., 2020). One study excluded those with dementia 'stage 7' (Fogelson et al., 2022).

Concerning transparency of data usage and storage, only two studies addressed this explicitly, stating the RST did not record, register or transmit data outside of its use context (i.e., cloud-based storage; Blindheim et al., 2023), or that the RST was not connected to the internet due to European General Data Protection Regulation (GDPR), and to avoid data being stored on a foreign server (Dinesen et al., 2022).

Discussion

This systematic review evaluated whether RST interventions in dementia care align with the person-centred care principles outlined by the British Psychological Society (BPS, 2016). Building upon the findings of Kapoor (2019) this review provides an updated synthesis of the literature from October 2018 to March 2025, encompassing 21 studies (22 articles) that explored a diverse range of RST applications. These included socially assistive robots, communication humanoids, and technology-aided prompting systems. The findings indicated that the overall methodological quality of studies has improved, with a higher proportion rated as good or strong than in the earlier review. However, adherence to core person-centred care principles remains inconsistent. Despite notable improvements in social inclusion and meaningful activity, most interventions continue to show limited alignment with elements such as autonomy, identity, and decision-making involvement. Furthermore, ethical reporting, particularly regarding informed consent and data transparency, remains under-addressed across the literature.

The DeBS ratings revealed substantial variability across domains, with many studies partially aligning with person-centred care values in some areas, but not in others. This supports the view that person-centredness is best understood as a continuum, rather than an absolute quality. As such, the findings should be interpreted not as confirming or rejecting person-centredness, but rather as reflecting degrees of alignment with these values.

To what extent are RSTs for dementia person-centred?

Most RSTs demonstrate only limited alignment with person-centred care principles. While there is evidence that RSTs can improve aspects of psychosocial wellbeing, such as increasing engagement or reducing distress, the deeper aspects of person-centred care, including promoting individual identity, acknowledging the voice of PwD, and tailoring care to personal needs, are frequently overlooked or insufficiently addressed.

Across the reviewed studies, mean scores for DeBs items 1–3 indicated minimal consideration of these principles. Specifically, few studies provided evidence of individualised intervention planning based on personal history or preferences. Most interventions were applied uniformly to all participants, regardless of dementia type, stage, or background. For example, while robotic animals like PARO were found to be comforting or engaging, the rationale for their use was rarely tied to a person's individual life story or psychosocial needs (e.g., Chen, Jones, et al., 2024; Stoddart & Galvin, 2019). Only one PARO study indicated they were guided by individual preferences and considered pet ownership, ‘animal lovers’ and fear of animals when identifying participants suitable for their intervention (Shoesmith et al., 2024).

Furthermore, the capabilities of the RST device may significantly impact the ease of accommodating individual preferences. Whelan et al. (2020) utilised MARIO, which permits the customisation of numerous applications. For instance, MARIO can play the user’s preferred music, present news headlines related to their interests, and display images from their lives to stimulate conversation. Dinesen et al. (2022) utilised LOVOT, which could be programmed to have a specific personality (e.g., shy or outgoing); however, no consideration was given to how this may be adapted or personalised to the PwD. As this RST was not designed with PwD in mind, future applications of LOVOT in dementia care may wish to consider appropriate adaptations.

A similar pattern emerged regarding the acknowledgement of identity and the voice of PwD. Only a minority of studies included participants in intervention evaluation through qualitative methods or self-report measures. Even when PwD were involved, their contributions were often supplemented or interpreted by staff or carers, limiting the authenticity of their voice. For instance, Pu et al. (2023) explored participant perceptions, but acknowledged they did not use a reading level to assess the interview questions and check understanding. Future qualitative research in this area should involve PwD in developing interview questions for better understanding.

These findings echo concerns raised by Kubota et al. (2021) and Daly Lynn et al. (2019) who caution that many RSTs are designed from a technology-first rather than a person-first perspective. This leads to interventions that may be clinically effective in specific areas (e.g., reducing agitation) but do not sufficiently empower the person with dementia as an active participant in their care.

In comparison to earlier findings by Kapoor (2019), there is a modest upward trend in mean DeBs scores for items 1–3, with statistically significant improvements for item 2 (identity). This suggests awareness of person-centred principles may be growing. A shift toward co-design approaches, involving PwD in development and evaluation stages, may be necessary to embed person-centred values meaningfully into technological innovation. This should be a key focus for RST at the design stage.

To what extent do RSTs foster independence in people with dementia by offering them choice and control?

A fundamental component of person-centred dementia care is promoting independence through autonomy, choice, and shared decision-making. However, this review found that RSTs rarely prioritise these aspects. Ratings for DeBs Items 4 and 5 relating to involvement in decision-making and support for exercising choice and control were among the lowest across all domains.

Participants passively experienced most interventions. For instance, socially assistive robots such as PARO were typically introduced according to pre-set schedules or externally driven protocols, often facilitated by staff without user input (e.g., Chen, Lin, et al., 2024; Jøranson et al., 2021). While such approaches may be practical in care home or hospital settings, they undermine the agency of people with dementia and risk treating them as recipients rather than partners in care.

Only a small number of studies demonstrated technology-facilitated autonomy. The work by Harris et al. (2021) using a personalised prompting tool, offered a more participatory model. In this study, people with dementia could engage with goal-directed tasks using tailored reminders, and the intervention incorporated individual preferences and feedback. The PwD set their own goals, alongside their caregiver, who also identified their goal for the PwD. Similarly, the prompter-based interventions by Lancioni et al. (2018) supported self-initiated engagement with daily activities, showing the potential of RST to enhance independence rather than just supplement care.

Stoddart and Galvin (2019) emphasised the importance of allowing PwD to assert their independence and choose whether to engage with PARO. They allowed the PwD to interact with and engage with PARO in any way that seemed appropriate to them rather than having a set interaction format. Nevertheless, this presents methodological challenges concerning replicability and evaluating effectiveness within a research context.

In contrast to Kapoor (2019) there was only a marginal improvement in this domain, indicating that future research must involve PwD in decision-making and allow choice relating to using RST in their care.

To what extent do RSTs help people with dementia live more meaningful and fulfilling lives?

Among the domains assessed in this review, the most encouraging findings emerged regarding how RSTs support PwD in accessing meaningful activities and promoting a sense of fulfilment.

Studies generally scored higher on DeBs items 6 and 8, representing the strongest performance across the scale.

This finding reflects a growing recognition in the field that technology should not only address clinical needs but also enhance emotional, social, and quality aspects of living with dementia. Many interventions reviewed reported positive impacts on mood, engagement, and social participation, particularly through activities involving interactive or socially assistive robots. For instance, studies using the PARO robot found participants more likely to display positive affect and initiate interaction (Inoue et al., 2021; Pu et al., 2019; Pu et al., 2020; Shoesmith et al., 2024). These engaged interactions often led to enjoyment, reminiscence, and connection with others, which have been identified as key aspects of meaningful activity (Tierney & Beattie, 2020).

While activities may be described as meaningful in a general sense, it was often unclear whether they were tailored to individual life stories, values, or roles. In their concept analysis, Tierney and Beattie (2020) highlight the term "meaningful activity" often lacks clear and consistent definitions in the literature. They outline key aspects beyond enjoyment and engagement, including alignment with individual goals, values and abilities. Without this depth, interventions risk becoming simply engaging rather than personally significant.

Other studies used adaptive prompting systems or group interventions that embedded RSTs into goal-oriented or familiar activities. D'Amico et al. (2023), for example, demonstrated how a voice-assisted prompter application encouraged music selection and participation in simple routines, reinforcing not only activity engagement but also personal preference and expression. Similarly, the use of MARIO in Whelan et al. (2020) was associated with increased resilience and self-esteem, particularly through its customised applications as previously described.

These findings are in keeping with previous research (Kapoor, 2019) which identified a shift from RSTs focusing only on assistance with ADLs to addressing broader issues associated with well-being and quality of life of PwD.

To what extent do RSTs promote social inclusion in people with dementia, tackling loneliness and isolation?

The ability of RSTs to promote social inclusion in people with dementia remains underdeveloped. In the current review, mean scores on DeBs Items 7, 9, and 10 included the lowest (stigma) and the highest (social roles) rated items across the scale. This presents a complicated picture in which RSTs may reduce immediate feelings of loneliness and isolation yet have not addressed broader societal issues (i.e., stigma).

The highest of these, item 10, suggests that some interventions foster involvement in valued roles or interactions, particularly within the structured context of residential care or activity groups. For instance, studies using companion robots (e.g.,Fogelson et al., 2022; Shoesmith et al., 2024) described increases in social interaction and emotional reciprocity, with reports of participants taking on nurturing roles (e.g., “caring” for PARO p.8 Shoesmith et al., 2024). This echoes findings from Jung et al. (2017), which linked robotic companionship to stimulation of social behaviours and communication. The findings from this review contribute to the previous debate on whether RST exacerbates loneliness and isolation (Kapoor, 2019; Sharkey & Sharkey, 2010). For instance, it has been suggested that if a companion robot meets an older person’s needs, then families or caregivers may spend less time with their loved one (Sharkey & Sharkey, 2024). On the contrary, this review found that pet or companion robots did not replace staff, carers or relatives, but were often used alongside them, or provided a topic of conversation. Nevertheless, the concern raised by Sharkey and Sharkey (2024) has not been empirically evaluated and is an area for future research.

Overall, meaningful community participation—in the broader, societal sense—was rarely a goal or measured outcome. Most studies were conducted in institutional environments, such as long-term care facilities or hospital wards, which inherently limited opportunities for integration into dementia-friendly communities.

The issue of stigma remains particularly neglected, and this domain was the lowest rated across the entire DeBs scale. Few studies explicitly considered whether their interventions challenged stereotypes about dementia or technology use, or if the design of the RSTs reflected inclusive and dignified principles. Concerns have been raised that encouraging PwD to interact with robots is infantilising and demeaning, an issue that initially rose from the use of dolls in reducing stress and distress in dementia (James et al., 2006; Sharkey & Sharkey, 2024). However, this issue was not considered in the RST interventions included in this review. This is concerning given that stigma is a well-documented barrier to help-seeking and quality of life (World Health Organization, 2021).

Therefore, in comparison to Kapoor (2019), there has been little to no change in terms of increasing participation in dementia communities or tackling stigma; however, there has been a positive shift towards social inclusion and involvement in valued roles and activities.

Have there been improvements in the quality of studies?

This review found that the overall quality of research on RSTs in dementia care has improved since the earlier review by (Kapoor, 2019). The methodological quality, assessed using the QualSyst tool, showed a positive trend with half of the studies rated as good or strong, compared to only 38% in the previous review. At the same time, fewer studies were rated as limited in quality. This suggests that researchers are now applying more rigorous designs and methods.

Some studies stood out for their strong designs, including randomised controlled trials and mixed-methods approaches (e.g., Chen, Lin, et al., 2024; Pu et al., 2019; Pu et al., 2020). Many studies still had small sample sizes, lacked long-term follow-up, and used different outcome measures, which made comparisons difficult.

In contrast, improvements in how well studies followed person-centred care principles, assessed using the DeBs tool, were more limited. While there were higher scores in areas like promoting meaningful activity and supporting social roles, most studies were rated as limited overall. Items related to autonomy, decision-making, and reducing stigma received particularly low scores. Notably, no study was rated as “strong” in person-centred care, and only three reached a “good” level.

These findings suggest that although the technical and scientific quality of research is improving, there is still a gap in how much studies focus on the needs, identities, and voices of people with dementia. Future research should not only aim for rigorous methods but also ensure that interventions reflect ethical, person-centred values, especially by involving people with dementia in designing and evaluating the technologies intended to support them.

How transparent are robotic interventions in dementia care regarding data usage and ethical considerations (e.g. consent)?

Informed consent practices varied in detail across the studies. Most research projects involving PwD reported using written informed consent procedures either directly from participants or, where appropriate, from legally authorised representatives such as family members or guardians. However, there was considerable variation in how capacity to consent was assessed.

Some studies demonstrated ethical rigor and best practice. For instance, Whelan et al. (2020) who engaged participants through repeated visits, rapport-building, and custom-designed information sheets adapted for cognitive impairment. This was supplemented with verbal consent checks at each interaction, reflecting adherence to the British Psychological Society’s guidelines on research with vulnerable adults. Similarly, Shoesmith et al. (2024) adopted a legal-ethical framework rooted in the Mental Capacity Act, with a clinical psychologist assessing capacity and personal or nominated consultees involved in cases of incapacity. Hung et al. (2021) emphasised ongoing assent, checking for signs of consent or dissent at each session, thus acknowledging the fluctuating and relational nature of consent in dementia care contexts.

However, several studies lacked clarity in their ethical reporting. For example, Chen, Lin, et al. (2024) provided no detail on consent procedures, while D'Amico et al. (2023) noted that participants could not read or sign consent forms but "appeared willing", raising concerns about voluntariness and comprehension.

Overall, while consent was broadly implemented, only a minority of studies explicitly incorporated recommended dynamic consent models (Ienca & Fosch-Villaronga, 2019) or addressed the complexity of cognitive decline in decision-making.

Most studies lacked transparency regarding the data collection, storage, and security practices of RSTs. Studies such as Mizuno et al. (2021) which used the cloud-connected PaPeRo robot, and which employed the PainChek app, did not offer any details on how these systems handled sensitive or biometric data. The lack of information on encryption, access control, or participant data rights signals a critical oversight in digital ethics, supporting concerns raised by researchers in this field (Kubota et al., 2021; Sharkey & Sharkey, 2024).

In contrast, Blindheim et al. (2023) clearly stated that the Pepper robot did not record or transmit audiovisual or sensor data. Dinesen et al. (2022) also demonstrated commendable practice by disabling LOVOT's internet connectivity and facial recognition features to remain compliant with GDPR and prevent the transfer of participant data to external servers. However, these studies represented the exceptions and not the norm.

Clinical Implications

This review highlights several important clinical considerations for the use of RSTs in dementia care. While RSTs show promise in enhancing engagement, emotional wellbeing, and activity participation, their application often lacks alignment with person-centred care principles, particularly in promoting autonomy, identity, and shared decision-making. Clinicians should prioritise personalised implementation by tailoring RSTs to individuals' life histories, values, and preferences, and where possible, involve PwD in care planning and technology use decisions.

Ethical practices such as dynamic consent processes, capacity assessment, and transparent data governance should be standardised to protect users' rights and dignity. Moreover, RSTs should complement, not replace, human interaction. Interdisciplinary collaboration and co-design with PwD are essential to ensure RSTs are both clinically effective and ethically sound.

Strengths and Limitations

A strength of this review is its comprehensive and up-to-date synthesis of recent literature, building upon a previous review (Kapoor, 2019) and reflecting on key developments. The use of a validated quality appraisal tool with excellent inter-rater reliability testing enhances the methodological quality of this review. The inclusion of a range of study designs (i.e., quantitative, qualitative, and mixed) provides a holistic picture of research on RST in dementia care, capturing important insights that may have been missed if limiting the designs. The inclusion of an exploratory question on ethics and consent provided a new contribution to the evidence base and is highly relevant in the current era, which has seen huge expansion in the capability of AI and related technologies, and widespread public adoption of them.

This review utilised the relatively novel DeBs tool, of which the psychometric properties have not yet been evaluated. While the current study did not encounter any major discrepancies, only a small proportion of the studies were rated by a second reviewer, and larger discrepancies or issues may have been highlighted if a larger proportion or all papers had been rated. To address this, the DeBs tool could benefit from the development of an administration and scoring manual, and further validation work. Despite these limitations, this study contributes to the evidence base regarding its preliminary validity and potential further applications in dementia research.

A significant challenge in this review was the interpretive conflict between employing a person-centred framework (i.e., the DeBS) and assessing studies that might not primarily focus on person-centred care. Only one study clearly indicated that its research design was based on a person-centred approach. For the other studies, it remains unclear how much person-centred care was intended, prioritised, or simply not reported. This ambiguity raises questions about whether the absence of DeBS criteria signifies a true clinical omission or reflects a varying reporting focus, such as emphasising efficacy. This highlights a limitation of applying the DeBS tool retrospectively as it cannot fully account for the researcher’s intent or editorial constraints. For instance, the absence of material on identity or autonomy in a paper may reflect a limitation in the research design, or it may result from space constraints, audience targeting, or publication conventions. As such, the findings should be interpreted not as absolute judgements about the ‘person-centredness’ of interventions, but rather as an assessment of the extent to which person-centred features were visible and prioritised in published accounts.

Further limitations of this review include the inclusion of English-language only publications, as potentially valuable research may have been excluded from non-English-speaking countries. Most studies reported positive effects of RST, indicating potential risk of publication bias, as these studies may be more likely to be published than those with null or negative findings. Due to heterogeneity in interventions, outcomes, and study designs, the review did not include a quantitative synthesis of effect sizes. However, the effectiveness of RSTs was not the focus of this review, as it has already been extensively examined. Additionally, many studies relied on small samples, proxy reporting, and occurred mainly in institutional care settings, reducing the generalisability and applicability of findings to other settings (i.e., home-based RST).

Conclusion

This systematic review aimed to examine whether RSTs in dementia care align with the person-centred care principles outlined by the BPS (2016), focusing on five key research questions. The findings indicate that although RSTs have progressed in supporting meaningful activity and social interaction, they remain limited in their ability to promote autonomy, enable shared decision-making, and recognise individual identity. Improvements in methodological quality were evident, with a greater number of studies meeting higher appraisal standards than in the previous review. However, person-centred values were inconsistently integrated across interventions. Ethical reporting, including informed consent and data governance, also varied significantly. Therefore, while RSTs demonstrate potential to complement dementia care, future research and practice must more explicitly address person-centred design and robust ethical safeguards to ensure these technologies genuinely serve the needs and rights of people with dementia.

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Chapter 2 Major Research Project

Case formulation in older people's services: Associations with psychological mindedness and attitudes towards dementia

Prepared in accordance with the author requirements for the Journal 'Dementia'.

Submission Guidelines

Keywords: dementia, case formulation, attitudes, psychological mindedness, insight, caregiving, staff

Plain Language Summary

This study explored how healthcare professionals working with older people with dementia understand and explain challenging behaviours. The research focused on case formulation. This is a method for making sense of a person's difficulties. This research also examined whether professionals' psychological mindedness (the ability to understand people's thoughts and feelings) or their attitude towards dementia (their beliefs and views about dementia) influenced the quality of their case formulations.

A total of 47 staff members from community and inpatient mental health teams in NHS Greater Glasgow and Clyde participated. They completed questionnaires measuring their psychological mindedness and views about dementia. They read about a case study about a fictional person with dementia who was having difficulties and created a formulation by filling in a structured document.

The findings indicated that participants who were more reflective and better at understanding mental states produced higher quality case formulations. Positive attitudes towards dementia did not relate to the quality of case formulations, nor did it relate to the levels of psychological mindedness. However, there was no significant relationship between positive attitudes towards dementia and either the quality of case formulations or levels of psychological mindedness. Additionally, those with less work experience scored higher on the case formulation task than more experienced colleagues, which may be due to the influence of more recent training.

Overall, the study suggests that developing a reflective approach could help healthcare professionals better understand and manage challenging behaviours in dementia care. These insights may be valuable in designing training programmes that support ongoing professional development in this area.

Abstract

With dementia affecting over 57 million people worldwide (Nichols et al., 2022) and stress and distress behaviours posing significant challenges for both individuals and care teams, equipping healthcare professionals with effective case formulation skills is crucial for delivering person-centred interventions and improving outcomes. This study therefore examined the association between case formulation skills, psychological mindedness and attitudes towards dementia among healthcare professionals working with older adults with dementia. A cross-sectional, correlational design was employed with 47 staff members recruited from the community and inpatient mental health teams across NHS Greater Glasgow and Clyde. Participants completed self-report measures assessing psychological mindedness and attitudes towards dementia, and a case formulation task based on a hypothetical case of stress and distress in dementia. Case formulation skills were evaluated using a Newcastle Model based template, with scores derived by comparing participant formulations to an expert benchmark.

Analyses revealed a statistically significant moderate positive correlation between psychological mindedness and case formulation skills, suggesting that a higher capacity for reflective thinking is linked to improved ability to make sense of complex behaviours in dementia care. In contrast, no significant relationships were found between attitudes towards dementia and either case formulation skills or psychological mindedness. Further analyses indicated that while staff training in psychological interventions did not significantly influence formulation quality or attitudes, less experienced staff achieved higher formulation scores than their more experienced counterparts. These findings may reflect the influence of more recent, up-to-date training among newer staff members.

Overall, the results emphasise the potential importance of psychological mindedness in enhancing case formulation skills in dementia care. The findings also highlight the need for ongoing training and reflective practice, particularly among experienced staff, to maintain high-quality case formulations in the context of dementia care.

Background

In the 1950s, behaviour theory offered a framework for understanding an individual's problematic behaviours, which evolved into a highly valuable approach called case formulation (Bruch, 2015). Although no consensus on the meaning of formulation has been reached, in clinical psychology, it has been described as a process of “ongoing collaborative sense-making” (Harper & Moss, 2003, p. 8). Case formulation is now widely used in the majority of one-to-one psychological therapies, including Cognitive Behavioural Therapy (CBT) and Cognitive Analytical Therapy (CAT), and is progressively being used in clinical settings within multidisciplinary teams (Short et al., 2019).

Case formulation skills are one of the core competencies of clinical psychology training programmes in the UK (Division of Clinical Psychology, 2011) and a key role of the applied psychologist is to work psychologically across multidisciplinary teams (Geach et al., 2018). The Division of Clinical Psychology (2011) recommend the sharing of formulations within teams as best practice and highlight a range of benefits for both the service user and staff, including a better understanding of service user needs; reduced negative perceptions, particularly towards those deemed ‘challenging’; increased empathy and reflective thinking; and higher staff morale. The use of case formulation in teams is relatively well established in mental health services and, to a lesser degree, in settings working with the older adult population (Dexter-Smith, 2015).

The Newcastle Model (NM) was developed by the Newcastle Challenging Behaviour Team (NCBT) to address the lack of formulation-driven work in older people’s mental health services (James, 2011; James & Birtles, 2020). The NM is now the most widely used formulation by clinicians across the UK who work with stress and distress behaviours in dementia (James et al., 2021). People living with dementia (PwD) experience several changes in their mood and behaviour as a result of dementia itself and the impact of interactions with others and the environment (Patterson et al., 2018). Some of the terminology used to describe these behaviour changes include ‘challenging behaviour’, ‘behaviour that challenges’ (BtC), ‘behavioural and psychological symptoms of dementia’(BPSD), and ‘stress and distress’. Language is powerful and can perpetuate negative stereotypes and stigmatisation towards PwD. For example, BtC and challenging behaviour were described by PwD as terms that felt very blaming towards the individual (Wolverson et al., 2021). One theoretical approach that attempts to conceptualise these behaviours using non-blaming language is the Progressively Lowered Stress Threshold (Hall, 1987) model. The model posits that adults typically have a set threshold for stress;

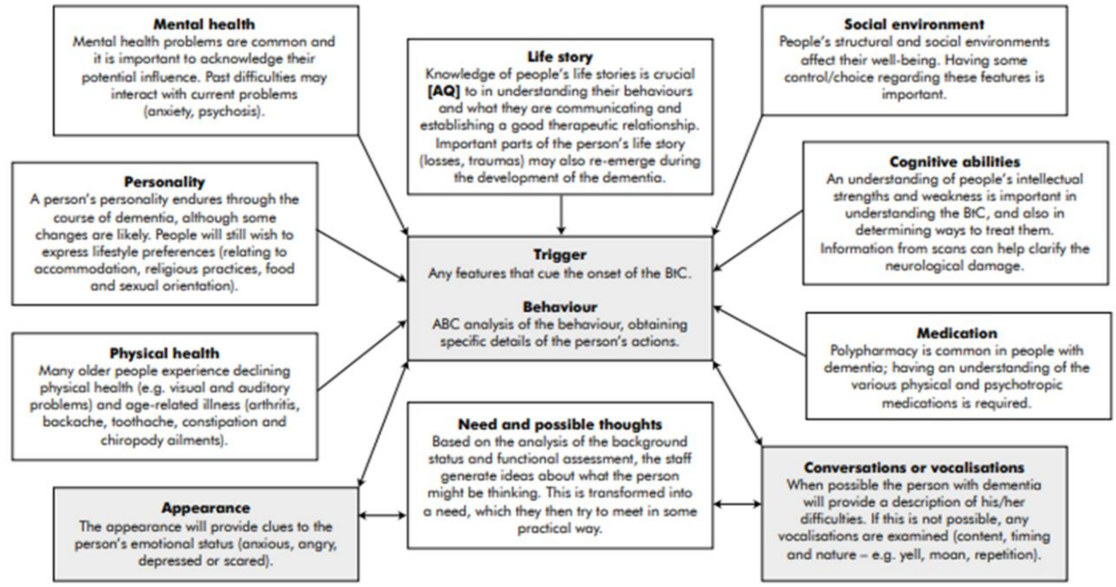
however, PwD experience cognitive changes which lower this threshold. As a result, they have a reduced capacity to cope with stress, struggling to adapt to environmental changes and effectively communicate their needs. The term ‘stress and distress’ will be used throughout this paper to describe the behaviours stemming from these changes, with the understanding that no universally preferred terminology exists.

The NM is underpinned by biopsychosocial theories, including the Unmet Needs Model (Cohen-Mansfield, 2000), cognitive theory (Beck, 1979) and Kitwood’s (1997) pioneering work on person-centred dementia care. Using an example of a PwD pacing and making agitated vocalisations, the unmet needs model views the behaviour as an attempt to communicate or express boredom, as their need for stimulation is not being fulfilled. Cognitive theory focuses on their thoughts and feelings, which are represented in the NM by recording and analysing the vocalisations and appearance (e.g. the PwD is visibly frustrated and shouting “the cobbles”). Person-centred care emphasises the unique attributes of the PwD, focusing not on their diagnosis and loss of abilities, but on their strengths, likes, and dislikes (e.g. the PwD is a soap fan and Coronation Street is their favourite), using this information to inform interventions (e.g. putting on Coronation Street and guiding the PwD to where the TV is).

Outlined by James and Jackman (2017), the NM utilises a systematic process led by the clinician alongside relevant staff, family members, and caregivers. Initially, information is collected and clarified to conduct a comprehensive assessment. Next, an Information Sharing Session (ISS) occurs, lasting one hour and facilitated by the clinician, during which unmet needs are identified and agreed upon, and interventions are discussed. Subsequently, the clinician creates a formulation in the A4 summary sheet format; Figure 2.1 shows the details that will be included. Person-centred and formulation-driven interventions are then documented, implemented, and monitored. The final Newcastle formulation is a dynamic document that should be regularly reviewed and updated as necessary.

Figure 2. 1

Overview of the Newcastle formulation (James & Jackman, 2017)



Mental health
Mental health problems are common and it is important to acknowledge their potential influence. Past difficulties may interact with current problems (anxiety, psychosis).

Life story
Knowledge of people's life stories is crucial **[AQ]** to in understanding their behaviours and what they are communicating and establishing a good therapeutic relationship. Important parts of the person's life story (losses, traumas) may also re-emerge during the development of the dementia.

Social environment
People's structural and social environments affect their well-being. Having some control/choice regarding these features is important.

Personality
A person's personality endures through the course of dementia, although some changes are likely. People will still wish to express lifestyle preferences (relating to accommodation, religious practices, food and sexual orientation).

Cognitive abilities
An understanding of people's intellectual strengths and weakness is important in understanding the BtC, and also in determining ways to treat them. Information from scans can help clarify the neurological damage.

Trigger
Any features that cue the onset of the BtC.

Behaviour
ABC analysis of the behaviour, obtaining specific details of the person's actions.

Physical health
Many older people experience declining physical health (e.g. visual and auditory problems) and age-related illness (arthritis, backache, toothache, constipation and chiropody ailments).

Medication
Polypharmacy is common in people with dementia; having an understanding of the various physical and psychotropic medications is required.

Need and possible thoughts
Based on the analysis of the background status and functional assessment, the staff generate ideas about what the person might be thinking. This is transformed into a need, which they then try to meet in some practical way.

Appearance
The appearance will provide clues to the person's emotional status (anxious, angry, depressed or scared).

Conversations or vocalisations
When possible the person with dementia will provide a description of his/her difficulties. If this is not possible, any vocalisations are examined (content, timing and nature – e.g. yell, moan, repetition).

Note. A diagrammatic representation of the Newcastle model and formulation. From chapter 10 of "Understanding behaviour in dementia that challenges: A guide to assessment and treatment" by I.A. James and L. Jackman, Jessica Kingsley Publishers, Figure 10.1, p156. Copyright by Jessica Kingsley Publishers 2017.

For a formulation to be useful, it must be of good quality; however, this is not always the case. Flinn et al. (2015) systematically reviewed the inter-rater and test-retest reliability of case formulations in adult and child cases. They found that although reliability could be achieved, the inter-rater levels of reliability varied widely. Reliability was influenced by various factors, including the theoretical modality of the formulation and the level of training held by the clinician carrying out the formulation. Furthermore, clinical experience and training have also been shown to be related to the quality of case formulations, with higher levels of training linked to better quality of psychotherapy case formulation (Kendjelic & Eells, 2007). Contrary to this, Spector et al. (2016) found that years of experience did not correlate with the quality of dementia case formulations using a biopsychosocial approach. The authors hypothesised that staff who trained many years ago may have been more heavily influenced by the medical model of dementia and less informed of the biopsychosocial model.

Hartley et al. (2016) explored the association between case formulation skills and staff attributes, including psychological mindedness. Psychological mindedness is an abstract process which can be difficult to define (Rai et al., 2015). Someone may be considered psychologically minded due to their ability to make links between thoughts, feelings, and behaviours, and their willingness and interest in understanding the meaning and causes of their own, and other's behaviour (Appelbaum, 1973; Rai et al., 2015). The study showed psychological mindedness to be a strong predictor of case formulation skills (Hartley et al., 2016).

Another factor which may impact case formulation skills, specifically focusing on stress and distress behaviours, is the individual's attitude towards dementia. As previously mentioned, people with dementia are subjected to discrimination and stigmatisation. An integrative review by Digby et al. (2017) demonstrated that this stigmatisation is also prevalent in care settings, with healthcare professionals displaying negative attitudes towards those with dementia. The authors suggested possible contributors to these attitudes, such as poor knowledge and training on dementia and interpersonal factors, such as reduced empathy and emotional understanding. Although in the minority, one study reported positive experiences of care (Scerri et al., 2015). Positive attitudes and experiences were linked with relationship-centred care, and nursing staff who spent quality time with the PwD getting to know them felt they understood their behaviour better.

Current Study Aims

This study explored the association between case formulation skills, psychological mindedness, and attitudes towards dementia. Cole et al. (2015) noted that team formulation research has mainly occurred within adult and older adult (functional) inpatient and rehabilitation settings, highlighting the need for further research in various settings. Evidence suggests that people with dementia are doubly stigmatised due to both ageism and their dementia diagnosis (Evans, 2018). This is observed both at an individual level and in the limited funding directed towards research aimed at enhancing the quality of life for individuals with dementia (Evans, 2018).

The current study focused on dementia care in older adult community and inpatient mental health teams and primarily aimed to answer the following questions:

1. Is psychological mindedness associated with case formulation skills?
2. Is attitude towards dementia associated with case formulation skills?
3. Is psychological mindedness associated with attitudes towards dementia?

Secondary to the above questions, the study also explored the following:

4. Do staff with dementia training produce higher quality formulations than those without/less training?

5. Do staff with dementia training have a more positive attitude towards dementia than those without/less training?
6. Do staff with more years of experience produce higher quality formulations than those with less experience?
7. Do staff with more years of experience have a more positive attitude towards dementia than those with less experience?

Methodology

Design

The study was cross-sectional and correlational in design. Participants completed three self-report questionnaires and a case formulation task. This study followed the STROBE reporting checklist (Appendix H, p.114).

Ethical Approval

Approval was sought and obtained from the University of Glasgow College of Medical, Veterinary and Life Sciences ethics committee (200230308) and the NHS Greater Glasgow and Clyde Research and Innovation department (UGN23MH520). For further information, see Appendix I (p. 117).

Recruitment Sample

Participants were recruited from Older People's Community Mental Health Teams (OPCMHT) and Older People's Inpatient Teams across NHS Greater Glasgow and Clyde (NHSGGC). Inclusion criteria were employment in one of these teams and working directly with people with dementia. Disciplines not directly involved in treating stress and distress (e.g., dietetics, administration) were excluded. NHSGGC staff bank employees were eligible to participate; however, agency staff were excluded as the NHS did not directly employ them.

A method of convenience sampling was utilised. Staff were informed of the study through their local team psychologist, subsequent to obtaining permission from team managers. Information sheets (appendix J, p.120) containing details of the principal researcher were distributed to all staff members who expressed interest. Written Informed consent, including around the right to withdraw, was obtained (Appendix K, p.121). As part of the consent process, it was emphasised that their decision to participate or decline would bear no repercussions on their standing within NHSGGC. Staff members indicated their interest in participating in the study to their team psychologist, who relayed their contact information, or they may have reached out to the principal researcher directly. Written informed consent was secured prior to participation

The sample size estimate was guided by prior research examining the association between psychological mindedness and formulation quality (Hartley et al., 2016; Roberts, 2013) which also recruited staff members within the NHS. Considering the current staffing pressures in healthcare settings, a target sample size of 50 was set. Due to time constraints during recruitment, the final sample size for this study was 47.

Demographic and professional characteristics of participants

A total of 47 healthcare professionals participated in the study, with a mean age of 40.53 years (SD = 10.9, range = 25–59) and a median age of 42 years. The majority of participants identified as female (n = 36, 76.6%), while 11 (23.4%) identified as male. Professional characteristics are shown in Table 2.1.

Table 2.1

Professional characteristics of participants

Characteristic	Response	n (%)
Job Discipline	Psychology	14 (29.8%)
	Psychiatry	4 (8.5%)
	Nursing	17 (36.2%)
	Occupational Therapy	5 (10.6%)
	Physiotherapy	7 (14.9%)
Employment Contract	Permanent full-time	40 (85.1%)
	Permanent part-time	4 (8.5%)
	Temporary full-time	3 (6.4%)
Work Setting	Community	26 (55.3%)
	Inpatient	16 (34.0%)
	Both inpatient & community	5 (10.6%)
Experience in Dementia Care	<6 months	1 (2.1%)
	6 months to 1 year	5 (10.6%)
	1 to 3 years	8 (17.0%)
	3 to 5 years	5 (10.6%)
	>5 years	28 (59.6%)
Time in Current Team	<6 months	4 (8.5%)
	6 months to 1 year	8 (17.0%)
	1 to 3 years	11 (23.4%)
	3 to 5 years	12 (25.5%)

	>5 years	12 (25.5%)
Training in Psychological Interventions in Response to Stress and Distress in Dementia	Completed Level 1 course	24 (51.1%)
	Completed Level 2 course (Trainer for Trainers)	16 (34.0%)
	Not completed	7 (14.9%)

Measures

Participant Characteristics Questionnaire

A questionnaire was developed to gather the demographic and professional characteristics of participants as described above (Appendix L, p.122).

Attitudes towards Dementia

The Dementia Attitudes Scale (DAS; O'Connor & McFadden, 2010) consists of 20 items categorised into dementia knowledge and social comfort. Respondents rate their agreement on a 7-point Likert scale. The DAS is a valid and reliable tool with reported Cronbach's alpha values of 0.83-0.85 (O'Connor & McFadden, 2010).

Psychological Mindedness

The Psychological Mindedness Scale (PMS; Conte et al., 1990) is a self-report measure consisting of 45 items that cover various aspects of the construct, such as access to one's feelings and interest in the motivations of others. A coefficient alpha of 0.86 during tool development indicated high reliability (Conte et al., 1990) and further research supports its validity in both clinical and non-clinical samples (Conte & Ratto, 1997; Shill & Lumley, 2002).

Case Formulation

Case formulation skills were measured following the method established in previous research in psychosis populations (Dudley et al., 2010; Hartley et al., 2016; Roberts, 2013) whereby participants complete a formulation based on a case example. In the current study, a case study was developed based on a hypothetical service user experiencing stress and distress in dementia. The case study comprised five documents to create realistic sources of information clinicians would utilise in a clinical setting (see Appendix M, p.123). The formulation was completed using a template based on the NM, and possible unmet needs were ranked on a scale of one to eight.

Participant formulations were coded against a benchmark formulation (Appendix N, p.124) developed by an expert panel. The panel consisted of four clinical psychologists in the Older People's Inpatient Psychology Service, NHSGGC. Panel members independently completed their case study formulations and rankings. These were then compiled and agreed upon to create the final benchmark template and rankings. Following this, a scoring manual (Appendix O, p.125) was developed based on Dudley et al. (2010). Each item on the participant's template that matched the expert formulation was scored on a scale of 0 to 2. Participants received a score of 2 if they identified a theme present in the benchmark (e.g., routine is important to Elizabeth and she likes to shower in the evenings before bed). The wording did not have to be exact, but had to have an equivalent meaning. A score of 1 was assigned if the participant identified the item correctly, but it was more vague (e.g. Elizabeth likes routine). A score of 0 was given if the item was not present. False positives were also included if a formulation contained irrelevant information. A score of 1 was assigned to these items without thematic links to the expert formulation and was deducted from the total score. The benchmark formulation contained 33 hits and allowed a maximum score of 73. The unmet needs ranking allowed a maximum score of 8. A total case formulation score (CFS) was calculated for each participant by adding their Newcastle formulation score and unmet needs ranking score, giving an overall scoring range between 0 and 81. The primary researcher completed the scoring for the case formulations, while a second rater from the OPIP team, who did not participate in the creation of the vignettes or the scoring manual, independently rated five cases (10%). An intraclass correlation coefficient indicated excellent interrater reliability (ICC = .99, *p* = <.001).

Research Procedure

Participants completed the study with the researcher present at their place of work or over MS Teams. Those who participated on MS Teams were provided with a participant pack containing all required documentation in advance. Participants were provided with the three questionnaires (i.e., the participant questionnaire, DAS, and PMS), case study documents, and a case formulation answer booklet (Appendix P, p.126). Prior to completing these, participants were provided with instructions on each step and had the opportunity to ask questions. They were allowed to complete the tasks in any order they wished and were advised that participation should take no more than 90 minutes, although no strict time limit was enforced.

Data Analysis

Analysis was carried out using IBM SPSS Statistics 29.0.2.0. Descriptive statistics were used to summarise participant characteristics and were computed for all measures. The raw data set was examined to identify missing data, outliers, and assess normality. There was one extreme outlier for the DAS measure, which was removed from the dataset as it was deemed not representative of the sample. There was one missing data point for case formulation, and five missing data points for unmet needs rankings. Pairwise exclusion was used for these cases. Scatterplots were used to assess linearity between measures. The assumption of linearity was not met for any measure. Therefore, Spearman’s rank-order correlations were conducted. Although distribution was normal, Levene’s test for homogeneity of variances was violated, and so non-parametric analysis (i.e. Kruskal-Wallis H test) was conducted to answer the secondary research aims. Syntax for data analysis can be found in Appendix Q (p. 131) and the full research proposal in Appendix R (p.132).

Results

Measures

The mean (*m*), standard deviation (*SD*), and range of scores for each measure are reported in Table 2.2. The mean score for the DAS was 127.2 out of a potential 140, ranging from 106 to 139. This indicates that the sample had positive attitudes towards dementia. The average score for the PMS was 142.9 out of a maximum of 180, ranging from 109 to 169. This is similar to previously reported means (Bourne et al., 2014; Hartley et al., 2016). The mean CFS was 35.9 out of a possible 81, ranging from 13 to 58. While no formal classification exists, based on previous interpretations (Hartley et al., 2016), this indicates a moderate level of case formulation skill within the sample.

Table 2. 2
Descriptive statistics for measures

Measures	N	Mean	SD	Min-Max
DAS	46	127.2	7.4	106-139
PMS	47	142.9	12.8	109-169
CFS	46	35.9	9.7	13-58

Psychological mindedness and case formulation

A Spearman's rank correlation was conducted between PMS and CFS. Preliminary analysis showed the relationship to be monotonic, as assessed by visual inspection of a scatterplot. The results indicated a statistically significant, moderate positive correlation between PMS and CFS, $r_s(46) = .348$, $p = .018$.

Attitudes towards dementia and case formulation

A Spearman's rank correlation was conducted between the DAS and CFS. Preliminary analysis showed the relationship to be monotonic, as assessed by visual inspection of a scatterplot. There was no meaningful or statistically significant correlation between CFS and DAS, $r_s(45) = .005$, $p = .974$.

Psychological mindedness and attitudes towards dementia

A Spearman's rank correlation was conducted between PMS and the DAS. Preliminary analysis showed the relationship to be monotonic, as assessed by visual inspection of a scatterplot. There was a weak positive correlation between psychological mindedness and attitudes towards dementia, but this was not statistically significant, $r_s(46) = .163$, $p = .280$.

Table 2.3

Spearman's rank correlation coefficients

Measures	PMS	CFS	DAS
PMS	-	-	-
CFS	.348*	-	-
DAS	.163	.005	-

*values reached statistical significance

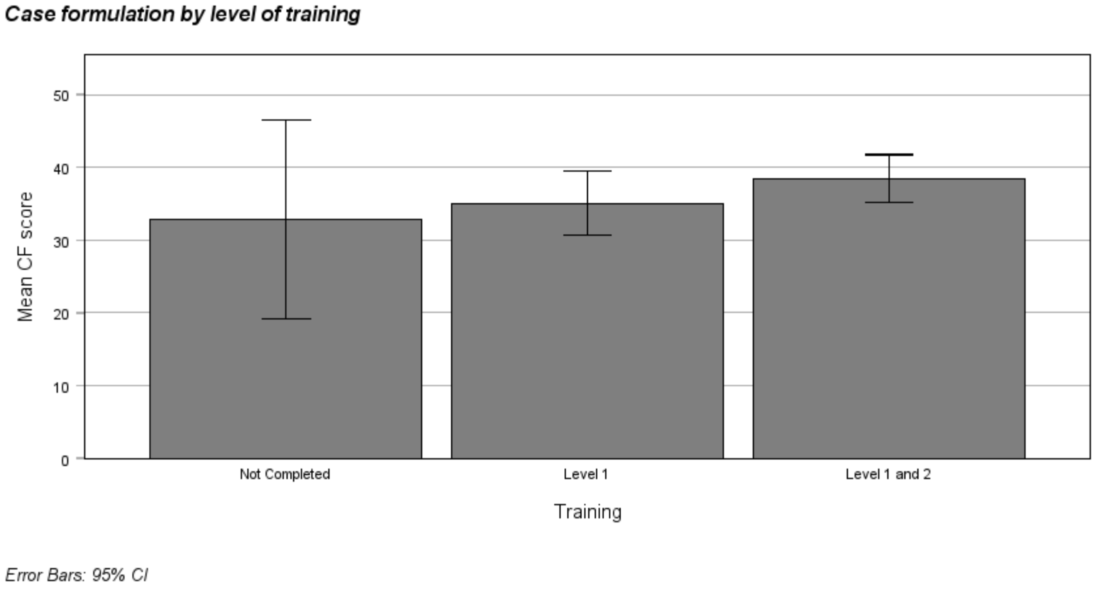
Note: PMS: Psychological Mindedness Scale; CFS: Case Formulation Score; DAS: Dementia Attitudes Scale

Case Formulation and staff training

Figure 2.2 illustrates the mean CFS for each training group. A Kruskal-Wallis H test was run to determine if there were differences in CFS between the three training groups: "Not completed" (*n* = 7, *Mdn* = 37), "Level 1 only" (*n* =23, *Mdn* = 36), and "Level 1 & 2" (*n* = 16, *Mdn* = 38). Distributions of CFS were not similar for all groups, as assessed by visual inspection of a boxplot. In particular, the "Not completed" group scores were highly variable. Due to failing the assumption of similarity, mean ranks were computed instead. CFS were similar for those who had not completed training (mean rank = 22.9) and Level 1 (mean rank = 21.33) and somewhat increased for those who had completed Level 2 training (mean rank = 27.16), however the differences were not statistically significant, $\chi 2$ (2) = 1.853, p = .396. The effect size, calculated using eta squared ($\eta^2 = 0.041$), indicates a small effect.

Figure 2. 2

Bar graph of mean CFS by level of training



Staff training and attitudes towards dementia

Figure 2.3 illustrates the mean DAS scores for each training group. A Kruskal-Wallis H test was run to determine if there were differences in DAS scores between the three training groups. DAS score distribution was relatively similar for all groups, as assessed by visual inspection of a boxplot. Median DAS scores increased as level of training increased, those who had completed level 1 and 2 training scored highest (*Mdn* = 130), followed by level 1 (*Mdn* = 128) and those who did not complete the training scored lowest (*Mdn* = 119); however, the differences were not statistically significant between groups, $\chi^2(2) = 5.742$, $p = .057$. The effect size ($\eta^2 = 0.128$) suggests a moderate-to-large effect.

Figure 2. 3

Bar graph of mean DAS scores by level of training

Years of experience

Prior to exploration of the data, the planned analysis was to explore differences between the five experience groups: “less than 6 months” (*n* = 1), “6 months to 1 year” (*n* = 5), “1 year to 3 years” (*n* = 8), “3 years to 5 years” (*n* = 5), and “over 5 years” (*n* = 28). However, due to the large variance in group numbers, data was merged to create two experience groups: “less than 5 years” (*n* = 19) and “over 5 years” (*n* = 28). These two groups were used for the remaining analysis looking at years of experience.

Years of experience and case formulation

Figure 2.4 illustrates the mean CFS for each experience group. A Mann-Whitney U test was run to determine if there were differences in CFS between those who had less than 5 years of experience (*n* = 19, *Mdn* = 42), and those who had over 5 years of experience (*n* = 28, *Mdn* = 33). Distributions of the CFS for each group were not similar, as assessed by visual inspection. CFS for the “less than 5 years” group (mean rank = 29.45) were statistically significantly higher than the “more than 5 years” group (mean rank = 19.31), U = 143.5, z = -2.5, *p* = .012. The effect size, calculated using the rank-biserial correlation, was r = .37, indicating a moderate effect.

Figure 2. 4

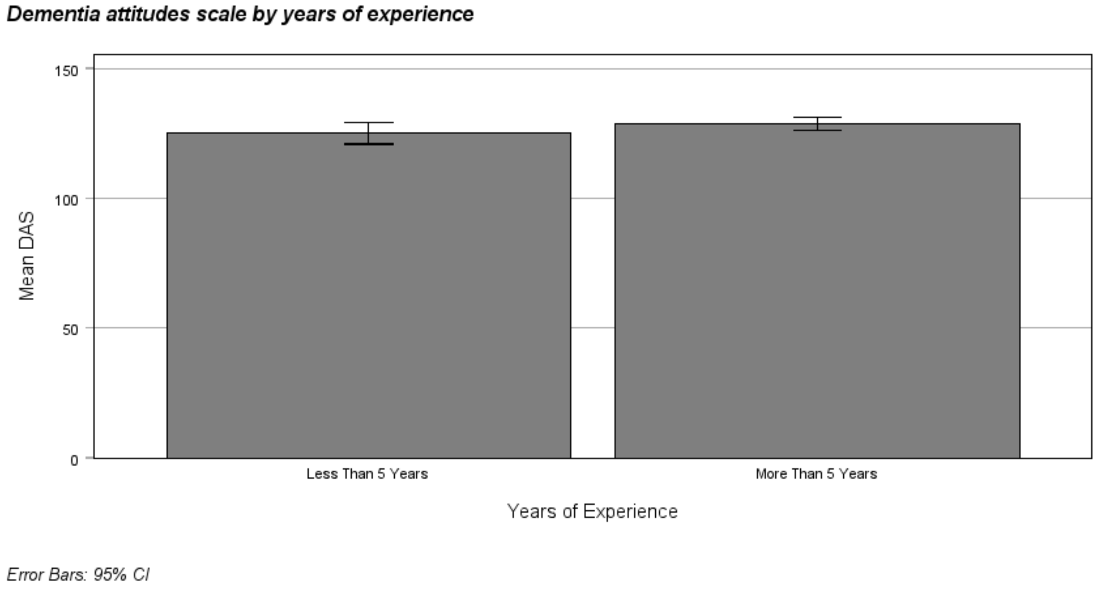
Bar graph of mean CFS by years of experience working with PwD

Years of experience and attitudes towards dementia

Figure 2.5 illustrates the mean DAS scores for each experience group. A Mann-Whitney U test was run to determine if there were differences in DAS scores between those who had less than 5 years of experience (*n* = 19, *Mdn* = 126) and those who had over 5 years of experience (*n* = 27, *Mdn* = 130). Distributions of the DAS scores for each group were not similar, as assessed by visual inspection. There were no statistically significant differences between the “less than 5 years” group (mean rank = 20.05) and the “more than 5 years” group (mean rank = 25.93), U = 322, z = 1.46, *p* = .143, r = .22.

Figure 2. 5

Bar graph of mean DAS scores by years of experience working with PwD



Discussion

Key Findings

This study primarily explored the relationship between case formulation skills, psychological mindedness, and attitudes towards dementia. The results indicated a significant positive correlation between psychological mindedness and case formulation skills. However, no significant relationships were found between psychological mindedness and attitudes towards dementia or between case formulation and attitudes towards dementia. Second, this study explored the impact of staff training and years of experience on case formulation skills and attitudes towards dementia. The results indicated no significant differences between those who had completed training and those who had not for either case formulation or attitudes towards dementia. The results indicated that those with less experience had better case formulation skills than those with more experience. No differences were found between years of experience and attitudes towards dementia.

Psychological Mindedness and Case Formulation

This study found a positive relationship between PMS and CFS. Psychological mindedness encompasses the willingness to understand oneself and others, but also take an interest in the meaning and motivation behind one's own and others' thoughts, feelings, and behaviours (Conte & Ratto, 1996). Similarly, case formulation in the context of stress and distress in dementia involves making sense of someone's behaviours to understand better their motivation (i.e., the need they are trying to meet). The overlap in cognitive processes in understanding behaviour may account for the observed association.

These findings align with previous research (Hartley et al., 2016; Roberts, 2013) and demonstrates the applicability of previous research findings in adults with psychosis to a different population (i.e., older adults with dementia) across various settings (i.e., community and inpatient). Grant (2001) conceptualises psychological mindedness as a predisposed form of metacognition comprised of motivations (i.e. interests) and abilities (i.e. skills). A related but distinct construct, mindfulness, is theorised as a precursor to psychological mindedness, with higher levels of self- and other-awareness associated with increased psychological mindedness (Beitel et al., 2005). This suggests that individual differences may play a more significant role than population-specific factors, as individuals engage in similar cognitive processes regardless of the group they work with.

These findings have important implications for clinical practice, highlighting the potential value of integrating metacognitive approaches into staff development. Specifically, mindfulness-based interventions and reflective practice sessions may foster psychological mindedness, enhancing case formulation skills. Future research should explore the effectiveness of mindfulness and reflective practice groups in improving PM among healthcare professionals.

Attitudes Towards Dementia and Case Formulation

The present study found no relationship between the DAS and CFS. This suggests that having a positive attitude towards dementia does not necessarily lead to a better ability to make sense of behaviour and distress. The NM has been termed the "Columbo approach" due to the investigative role played by the clinician in developing a formulation (Rickardsson & Crooks, 2021) and may be thought of as a problem-solving-based approach. According to the elaboration likelihood model (ELM; Petty & Briñol, 1975; Petty & Cacioppo, 2012), attitudes are influenced by emotions through different cognitive pathways moderated by motivation, ability, and depth of processing. Case formulation is a cognitive, structured process, whereas attitudes are shaped by emotional experiences, biases, and broader societal influences. While there is no existing research specifically examining the relationship between attitudes towards dementia and case formulation, insights from attitude formation models may help contextualise these findings. It could be hypothesised that the differing processes between case formulation and attitudes allow for strong case formulation skills independent of an individual's emotional involvement or attitude towards dementia. Further research is needed before drawing firm conclusions, but this may suggest that improving case formulation skills alone is unlikely to result in attitude changes or vice versa.

Notably, the current sample had positive attitudes towards dementia. The mean score was significantly higher with a narrower range than that of previous studies involving American college students, Maltese nursing students, and Chinese healthcare professionals working in an acute hospital (O' Connor & McFadden, 2010; Scerri & Scerri, 2013; Zhao et al., 2022). Unlike previous research, the participants in this study were all healthcare professionals working directly with PwD. Therefore, the greater familiarity with, and professional knowledge of dementia in this sample may have contributed to the highly positive attitudes observed in this study.

Psychological Mindedness and Attitudes Towards Dementia

There was no relationship found between the PMS and DAS. Given that PM involves the ability and motivation to reflect on one's and others' mental states, this finding challenges the assumption that higher self-awareness and cognitive insight naturally lead to more positive attitudes towards individuals with dementia. While this study used the total DAS score as an overall indicator of attitudes toward dementia, this approach may obscure important distinctions between its two subscales, 'comfort' and 'knowledge'. Summing the subscales provided a convenient global measure of attitudes, but it assumes that these dimensions contribute equally and unidirectionally to formulation skill. This assumption may not be a meaningful way to understand the interaction in practice. For example, it is plausible that greater emotional comfort with PwD enables more empathetic, person-centred formulations, while knowledge may relate more to technical or diagnostic accuracy. Analysing the subscales separately in future work could help clarify whether they show differential relationships with formulation quality. This distinction could be clinically meaningful, informing whether training should prioritise empathy-building, knowledge enhancement, or both.

Similarly to the lack of association between case formulation and attitudes discussed previously, a possible explanation may be related to the distinct processes involved in psychological mindedness and attitudes towards dementia. In addition, the current study did not account for levels of burnout which have been associated with PM. Preliminary analyses conducted by Hartley et al. (2016) found that the emotional exhaustion (EE) component of the Maslach Burnout Inventory Human Services Survey (MBI-HSS; Maslach & Jackson, 1981) negatively correlated with psychological mindedness. The authors theorise that higher levels of psychological mindedness could protect against EE, or alternatively, high levels of emotional burnout in staff may reduce their ability to engage in psychologically reflective thinking. The limited research investigating burnout in dementia care staff indicates moderate to high levels of burnout and stress in staff working with this population (Duffy et al., 2009; Todd & Watts, 2005). Further research is needed to explore whether burnout mediates the relationship between psychological mindedness and attitudes, particularly in high-stress dementia care settings. If EE impairs cognitive reflection and emotional engagement, interventions aimed at reducing burnout, such as mindfulness, reflective practice, or staff support programmes (Johnson et al., 2018), may enhance both psychological mindedness and attitudes towards dementia.

Staff Training

Those who had completed the *Psychological Interventions in Response to Stress and Distress in Dementia* training course, and those who had not, scored similarly in CFS and DAS. This suggests that completion of the training did not lead to higher-quality formulations or more positive attitudes. This is not in line with previous research (Kendjelic & Eells, 2007). One possible explanation for this finding is the unequal distribution of participants across training groups, which may have limited the sensitivity of the analysis. Most participants had completed either Level 1 or both Levels 1 and 2 of training, with only a small proportion reporting no prior training. This imbalance may have limited the statistical power of the analysis. Although the differences were not statistically significant, the effect size was moderate to large, suggesting a potentially meaningful impact of training on attitudes toward dementia that the present study may have been underpowered to detect. Future research employing larger and more evenly distributed samples is recommended to more robustly assess the influence of training.

It is also noteworthy that the sample as a whole demonstrated high levels of psychological mindedness and positive attitudes towards dementia. This suggests that participants may have already possessed strong reflective abilities and favourable attitudes prior to training, potentially minimising the observable impact of the course. If participants were already well-disposed towards dementia care and demonstrated high case formulation competency, the training may have reinforced existing knowledge rather than introducing substantial new skills. Future studies could explore whether training has a greater impact on individuals with lower baseline psychological mindedness or more neutral or negative attitudes towards dementia.

Years of Experience

The results found no differences between less experienced and more experienced staff in relation to attitudes towards dementia. This suggests that the length of time working with PwD does not necessarily lead to positive attitudes towards dementia. As already highlighted, the sample showed overall positive attitudes towards dementia, suggesting that participants may have entered their roles with pre-existing positive perceptions that were not significantly altered by years of experience. This finding contrasts with previous research, which found that more experienced staff were less likely to hold positive and person-centred attitudes towards dementia than less experienced staff (Zimmerman et al., 2005). One possible explanation may be linked to organisational factors. A systematic review by Surr et al. (2017) suggested that professionals with higher levels of job satisfaction and workplace support are more likely to maintain positive attitudes towards dementia, regardless of experience level. This aligns with previous research, highlighting the importance of stress, role satisfaction and exhaustion in staff's attitudes and person-centredness in dementia care (Brodaty et al., 2003; Willemse et al., 2015). Future research should explore the longitudinal development of dementia attitudes, examining whether specific workplace environments, role changes, or staff support structures mediate the relationship between experience and attitudes.

In an exploratory analysis, the present study found significant differences in years of experience and CFS. This indicated that less experienced staff produced higher quality case formulations than more experienced staff. This contradicts previous findings (Kuyken et al., 2005) where years of experience were positively correlated with the quality of CF, or no association was found at all (Hartley et al., 2016). One possible explanation for this is the recency in which staff completed their professional training and the shift from the medical model of care focusing on risk and safety to more biopsychosocial and person-centred approaches (Kendjelic & Eells, 2007; Ljubič & Kolnik, 2021). These advances mean newer staff may have more up-to-date training in structured formulation frameworks and have a more refined theoretical understanding of formulation. A systematic review of medical physicians revealed that more clinical years of experience were associated with less adherence to care standards, less up-to-date current knowledge, and, as a result, poorer patient outcomes (Choudhry et al., 2005). The authors hypothesise that it may be harder for those who trained many years ago to incorporate new practices or innovations with preexisting knowledge. This may be related to an individual's tendency to accept their initial mental model and reliance on heuristic-based reasoning (Rousseau & Gunia, 2016).

The analysis regarding years of experience should be considered exploratory in nature. The unexpected finding that less experienced staff had higher CFS requires cautious interpretation and highlights the need for replication in future studies. Should the effect appear robust, research could investigate whether this effect is attributable to the recency of training or other factors related to professional development in dementia care. Furthermore, research should examine whether support, such as ongoing supervision, reflective practice, or case discussion groups, helps maintain case formulation quality in experienced staff. This has implications for clinical practice as these findings suggest that ongoing training and structured case discussions should not be limited to early-career professionals but should also be integrated into continuing professional development (CPD) for experienced staff.

Strengths and Limitations

A major strength of this study lies in the ecological validity of the research design. In contrast to previous research which was reliant on samples where participants reported their attitudes based on indirect or limited experiences, such as through media exposure or hypothetical scenarios, this study involved professionals with direct, hands-on experience in dementia care. This real-world involvement may account for the more positive attitudes observed in the present sample. However, future studies should also consider the potential impact of varying levels of direct experience on reported attitudes and case formulation skills.

Another key strength is the authenticity of the case formulation task. The vignette documents used in the study were developed to closely replicate the type of clinical documentation and case materials that staff would typically encounter in their roles. Many participants commented [informally] while completing the formulation task that the case accurately reflected real-life practice. This improves the external validity of the findings, as the study measures how staff apply case formulation skills in a realistic context rather than assessing abstract theoretical knowledge. In addition to their use in this research context, the vignettes may have practical value as training or supervision tools. Their structure and realism make them well-suited for use in staff development sessions or existing training courses focused on reducing stress and distress in dementia settings. Re-purposing these vignettes offers a meaningful and practical implication of the current study.

The present study has contributed to the emerging literature on case formulation and psychological mindedness, providing further support for the relationship between the two constructs. Nevertheless, the methodological weaknesses of this study must also be acknowledged. Firstly, a correlational design was used, which prevents causal directions or conclusions from being drawn about the association found between the PMS and CFS. Furthermore, there may have been unspecified confounding variables or biases that influenced the results. Social desirability is the tendency for research participants to choose the most socially desirable choice rather than their true feelings (Edwards, 1957). It is possible that this bias influenced ratings, particularly as participants were aware that their line managers approved the study. To reduce this, it was made clear that responses would be anonymised and not accessible to anyone beyond the researcher.

Participants in this study already exhibited high levels of psychological mindedness and positive attitudes towards dementia, which may have created a ceiling effect, limiting the ability to detect differences related to training or experience. A more diverse sample, by recruiting from a wider range of health care service settings, might provide greater insight into how these constructs interact in different populations. Furthermore, recruiting frontline NHS staff for this study posed significant challenges, mainly due to time pressures and competing service demands. These factors impacted both recruitment rates and the completeness of submitted data, with some participants only partially completing the CF task. It is also possible that those who did participate were disproportionately staff with a greater interest in dementia care or psychological approaches. This may have introduced a self-selection bias, limiting the generalisability of the findings. Future studies may benefit from stronger institutional support to ensure that protected time for staff participation is not only allocated but also upheld in practice.

The current study drew upon the NM and utilised the Newcastle formulation template. However, it did not fully adhere to the structured process typically employed in NM-based practice. For example, it was not feasible to facilitate the Information Sharing Session between multidisciplinary staff as part of this research due to workforce constraints in the staffing climate at the time. Nonetheless, efforts were made to incorporate multidisciplinary perspectives by ensuring the vignette documents included assessment information from various professional disciplines and family, to reflect real-world clinical practice. Future research could examine team formulation and the role of the ISS in enhancing case formulation quality and explore whether this differs from individual formulation processes.

Future research directions

Future studies should aim to clarify whether factors such as practice setting (e.g., inpatient vs community) or professional role (e.g., nursing, occupational therapy, psychology) are possible moderators of the main effects highlighted in the current study. Determining whether these variables influence the strength or direction of the observed effects would inform how best to tailor training interventions across different care contexts. Additionally, longitudinal or intervention studies could establish whether improvements in formulation ability are sustained over time and whether they translate into measurable benefits in care quality or patient outcomes. Exploring the perspectives of PwD and their families on how staff formulation influences their experience of care could also enrich understanding and ensure future work remains grounded in person-centred values.

Conclusion

The current study explored the association between case formulation skills, psychological mindedness, and attitudes towards dementia. It has provided further evidence for the relationship between psychological mindedness and case formulation skills. However, no significant associations were found between attitudes towards dementia and either case formulation or psychological mindedness, emphasising the complexity of factors influencing attitudes in dementia care. The findings also challenge previous assumptions regarding staff experience, with less experienced staff demonstrating higher-quality case formulations than their more experienced counterparts. Although further research is needed, these findings have important implications for dementia care practice, staff training, and professional development.

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Appendix A: PRISMA 2020 Main Checklist

Topic	No.	Item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 11
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Page 15
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 15
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 16
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 16
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Page 16, Appendix A
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 16-17

Topic	No.	Item	Location where item is reported
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Page 17
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 17
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 17
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 17
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Page 17-18
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item 5)).	Page 16-17

Topic	No.	Item	Location where item is reported
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Page 17
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Page 18
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Page 17
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Page 17
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Page 17-18
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 19

Topic	No.	Item	Location where item is reported
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 19
Study characteristics	17	Cite each included study and present its characteristics.	Page 21-32
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Page 21-32
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Page 36
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Page 21-32
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Page 36-38
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Page 35-36

Topic	No.	Item	Location where item is reported
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/A
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Page 40-45
	23b	Discuss any limitations of the evidence included in the review.	Page 45
	23c	Discuss any limitations of the review processes used.	Page 45
	23d	Discuss implications of the results for practice, policy, and future research.	Page 45
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Page 16
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page 16
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	N/A
Competing interests	26	Declare any competing interests of review authors.	N/A

Topic	No.	Item	Location where item is reported
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Appendices

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. MetaArXiv. 2020, September 14. DOI: 10.31222/osf.io/v7gm2. For more information, visit: www.prisma-statement.org

Appendix B: Search Strategy

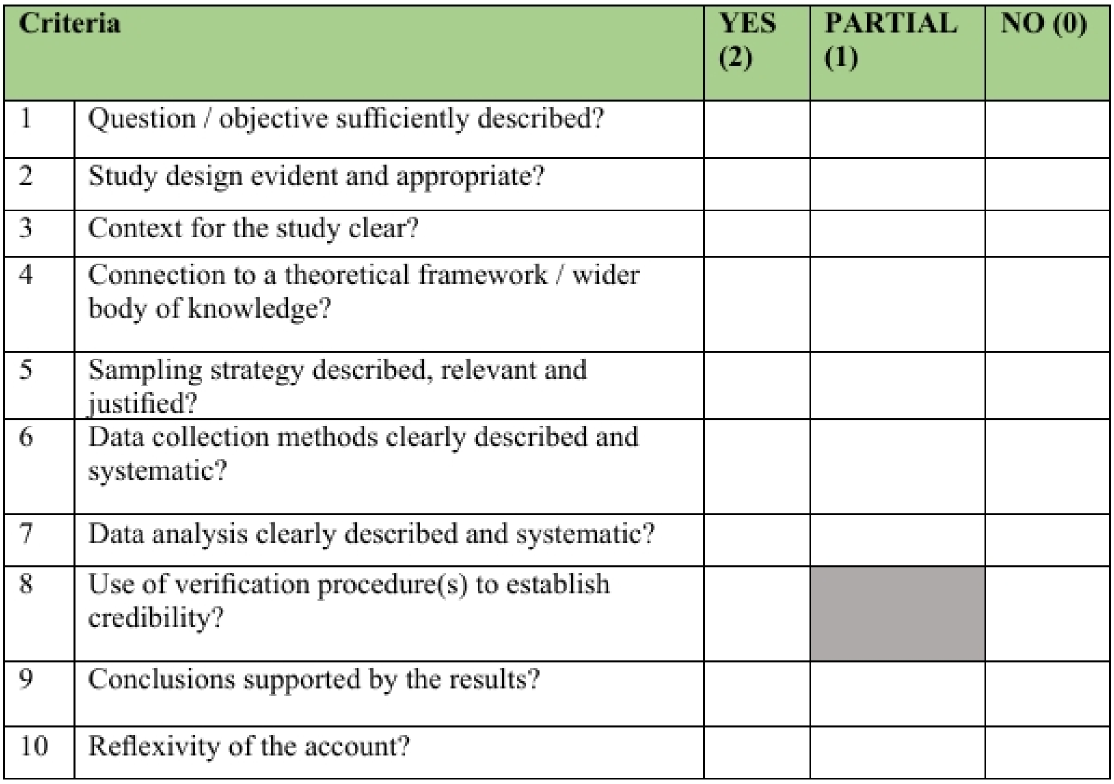
Database	Index terms and keywords	
PubMed	#1	"dementia"[MeSH Terms]
	#2	"dementia"[Title/Abstract]
	#3	"Alzheimer Disease" [MeSH Terms]
	#4	"Alzheimer Disease" [Title/Abstract]
	#5	"Lewy Body Disease" [MeSH Terms]
	#6	"Lewy Body Disease"[Title/Abstract]
	#7	"Mixed Dementias" [MeSH Terms]
	#8	“Mixed Dementias” [Title/Abstract]
	#9	#1 OR #2 OR #3 OR #5 OR #6 OR #7 OR #8
	#10	"robotics” [MeSH Terms]
	#11	“robot*”[Title/Abstract]
	#12	"self-help devices"[MeSH Terms]
	#13	"self-help devices" [Title/Abstract]
	#14	“digital health” [MeSH Terms]
	#15	“digital health” [Title/Abstract]
	#16	"Biomedical Technology" [MeSH Terms]
	#17	“Biomedical Technology” [Title/Abstract]
	#18	“Telemedicine” [MeSH Terms]
	#19	“Telemedicine” [Title/Abstract]
	#20	#10 or #11 OR #12 OR #13 OR #15 OR #16 OR #17 OR
	#21	#18 OR #19
	#22	#9 AND #20 Filters: from 2018 – 2025
		1097results 13/03/2025
CINAHL (Via EBSCO)		(((MH "Dementia" OR MH "Alzheimer's Disease" OR MH "Lewy Body Disease" OR MH "Mixed Dementia" OR "dementia*" OR "Alzheimer*" OR "Lewy Body Disease" OR "Mixed Dementia")) AND ((MH "Robotics" OR MH "Self-Help Devices" OR MH "Biomedical Technology" OR MH "Telemedicine" OR

		robot* OR "self-help device*" OR "digital health" OR "biomedical technology" OR "telemedicine"))) Limiters 2018-2025, English Language 634 results 14/03/2025
Embase (Via Ovid)	1	exp Dementia/ or exp Alzheimer Disease/ or exp Lewy Body Disease/ or exp Mixed Dementia/ or dementia*.tw. or alzheimer*.tw. or "Lewy Body Disease".tw. or "Mixed Dementia".tw.
	2	exp Robotics/ or exp Self-Help Devices/ or exp Biomedical Technology/ or exp Telemedicine/ or robot*.tw. or "self-help device*".tw. or "digital health".tw. or "biomedical technology".tw. or "telemedicine".tw.
	3	1 and 2
	4	Limit 3 to (english language and yr="2018-2025") 1608 results 13/03/2025
PsycINFO (via EBSCO)		(MH "Dementia" OR MH "Alzheimer's Disease" OR MH "Lewy Body Disease" OR MH "Mixed Dementia" OR dementia* OR alzheimer* OR "Lewy Body Disease" OR "Mixed Dementia") AND (MH "Robotics" OR MH "Self-Help Devices" OR MH "Biomedical Technology" OR MH "Telemedicine" OR robot* OR "self-help device*" OR "digital health" OR "biomedical technology" OR "telemedicine") Limiters 2018-2015, English Language 592 results 14/03/2025

Psychology and Behavioural Sciences Collection (Via EBSCO)	(MH "Dementia" OR MH "Alzheimer's Disease" OR MH "Lewy Body Disease" OR MH "Mixed Dementia" OR dementia* OR alzheimer* OR "Lewy Body Disease" OR "Mixed Dementia") AND (MH "Robotics" OR MH "Self-Help Devices" OR MH "Biomedical Technology" OR MH "Telemedicine" OR robot* OR "self-help device*" OR "digital health" OR "biomedical technology" OR "telemedicine") Limiters 2018-2015, English Language 90 results 14/03/2025
Web of Science Core Collection Editions: Science Citation Index Expanded, Social Science Citation Index, Conference Proceedings Citation Index - Social Science and Humanities Emerging Sources Citation Index (Via Web of Science)	TS=(dementia* OR alzheimer* OR "Lewy Body Disease" OR "Mixed Dementia") AND TS=(robot* OR "self-help device*" OR "digital health" OR "biomedical technology" OR "telemedicine") Limiters Publication date 2018-01-01 to 2025-03-14, English Language 1159 results 14/03/2025
Google Scholar	("dementia" OR "Alzheimer’s disease" OR "Lewy body dementia") AND ("robotic technology" OR "assistive technology" OR "smart technology" OR "telemedicine") 30 results 14/03/2025

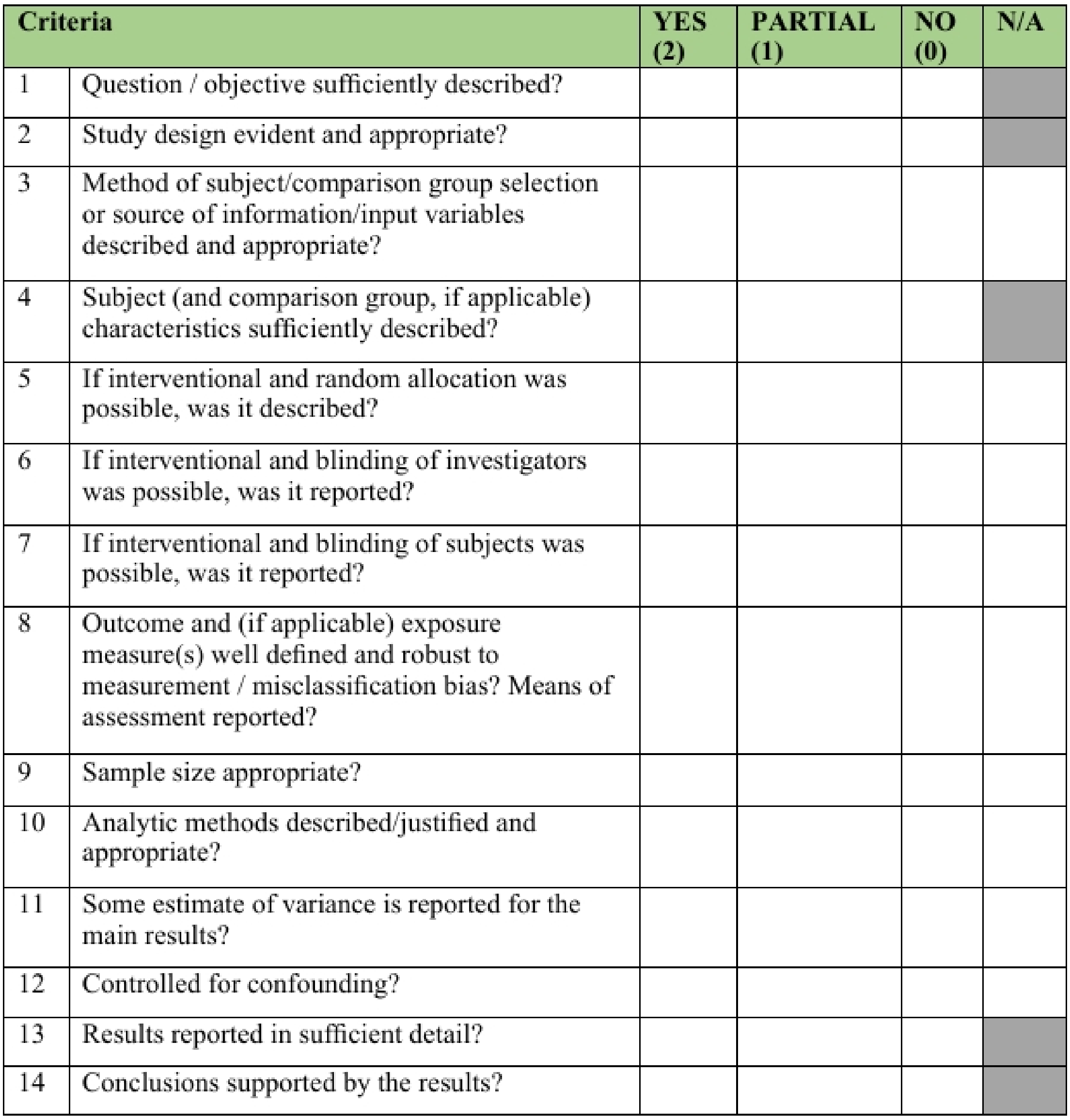
Appendix C: QualSyst Tool

Qualitative



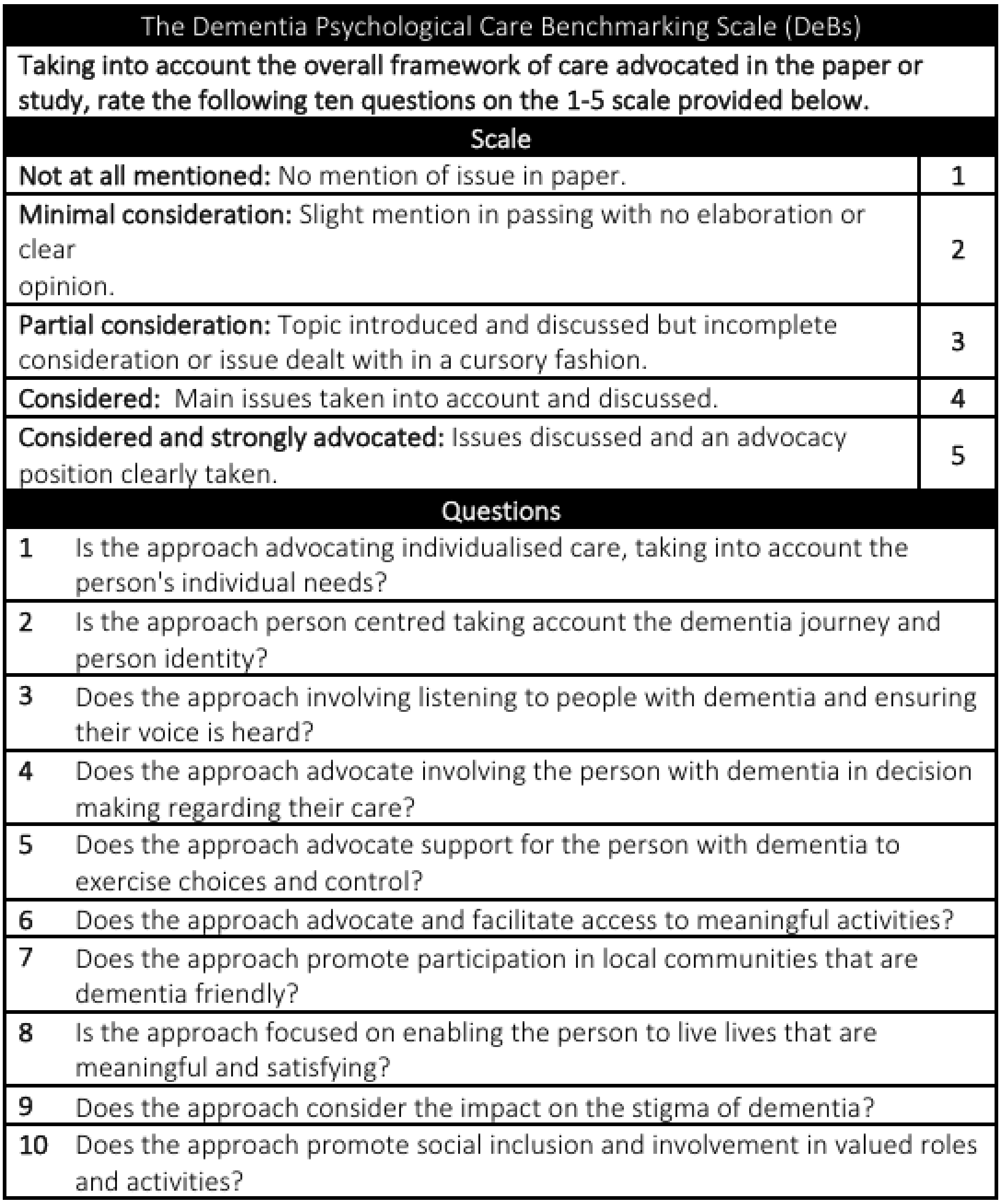
Criteria		YES (2)	PARTIAL (1)	NO (0)
1	Question / objective sufficiently described?			
2	Study design evident and appropriate?			
3	Context for the study clear?			
4	Connection to a theoretical framework / wider body of knowledge?			
5	Sampling strategy described, relevant and justified?			
6	Data collection methods clearly described and systematic?			
7	Data analysis clearly described and systematic?			
8	Use of verification procedure(s) to establish credibility?		▨	
9	Conclusions supported by the results?			
10	Reflexivity of the account?			

Quantitative



Criteria		YES (2)	PARTIAL (1)	NO (0)	N/A
1	Question / objective sufficiently described?				▨
2	Study design evident and appropriate?				▨
3	Method of subject/comparison group selection or source of information/input variables described and appropriate?				
4	Subject (and comparison group, if applicable) characteristics sufficiently described?				▨
5	If interventional and random allocation was possible, was it described?				
6	If interventional and blinding of investigators was possible, was it reported?				
7	If interventional and blinding of subjects was possible, was it reported?				
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?				
9	Sample size appropriate?				
10	Analytic methods described/justified and appropriate?				
11	Some estimate of variance is reported for the main results?				
12	Controlled for confounding?				
13	Results reported in sufficient detail?				▨
14	Conclusions supported by the results?				▨

Appendix D: The Dementia Psychological Care Benchmarking Scale (DeBs)



The Dementia Psychological Care Benchmarking Scale (DeBs)	
Taking into account the overall framework of care advocated in the paper or study, rate the following ten questions on the 1-5 scale provided below.	
Scale	
Not at all mentioned: No mention of issue in paper.	1
Minimal consideration: Slight mention in passing with no elaboration or clear opinion.	2
Partial consideration: Topic introduced and discussed but incomplete consideration or issue dealt with in a cursory fashion.	3
Considered: Main issues taken into account and discussed.	4
Considered and strongly advocated: Issues discussed and an advocacy position clearly taken.	5
Questions	
1	Is the approach advocating individualised care, taking into account the person's individual needs?
2	Is the approach person centred taking account the dementia journey and person identity?
3	Does the approach involving listening to people with dementia and ensuring their voice is heard?
4	Does the approach advocate involving the person with dementia in decision making regarding their care?
5	Does the approach advocate support for the person with dementia to exercise choices and control?
6	Does the approach advocate and facilitate access to meaningful activities?
7	Does the approach promote participation in local communities that are dementia friendly?
8	Is the approach focused on enabling the person to live lives that are meaningful and satisfying?
9	Does the approach consider the impact on the stigma of dementia?
10	Does the approach promote social inclusion and involvement in valued roles and activities?

Appendix E: Item-by-item ratings on the QualSyst and DeBs

QualSys (Qualitative)

Paper	Aims	Design	Context	Theory Link	Sampling	Data Collection	Analysis	Verification	Conclusions	Reflexivity	Total
Blindheim et al (2023)	2	2	2	1	2	1	1	0	2	0	13
Dinesen et al (2022)	2	1	2	0	1	1	2	2	2	0	13
Fogelson et al (2022)	2	1	2	2	1	1	1	0	1	0	11
Hung et al (2021)	2	2	2	2	2	2	2	0	2	1	17
Inoue et al (2021)	2	2	2	1	1	2	1	0	2	0	13
Pu et al (2023)	2	2	2	1	1	2	2	2	2	0	16
Pu et al (2019)	2	2	2	1	1	1	2	2	2	1	16

Shoesmith et al (2024)	2	2	2	2	2	1	1	0	2	0	14
Stoddart & Galvin (2019)	1	2	1	1	0	0	0	0	1	0	6
Tummers et al (2020)	2	2	2	2	1	1	0	0	1	1	12
Whelan et al (2020)	2	2	2	2	2	2	1	2	2	0	17

QualSyst (Quantitative)

Paper	Aims	Design	Selection	Subjects	Random Allocation	Investigator Blinding	Subject Blinding	Outcomes	Sample size	Analysis	Variance	Confounding	Results	Conclusions	Total
Chen Jones et al (2024)	2	2	1	1	2	0	N/A	2	1	2	2	2	2	2	21
Chen, Lin et al (2024)	2	2	2	2	2	1	1	2	2	2	2	2	2	2	26
D'Amico et al (2023)	2	2	1	1	N/A	N/A	N/A	2	1	2	0	0	2	1	14
Dinesen et al (2022)	2	1	1	2	N/A	N/A	N/A	1	1	1	0	N/A	1	2	12
Feng et al (2020)	2	2	1	1	1	1	0	2	0	1	1	1	1	2	16

Fogelson et al (2022)	2	1	1	2	N/A	N/A	N/A	2	1	2	1	N/A	1	1	14
Harris et al (2021)	2	1	1	2	N/A	N/A	N/A	2	1	2	1	1	2	2	17
Ikeya et al (2018)	1	1	1	0	N/A	N/A	N/A	1	1	2	0	0	1	1	9
Inoue et al (2021)	2	2	1	2	N/A	N/A	N/A	2	1	2	1	0	1	1	15
Inoue, Yatsu et al (2022)	1	2	1	2	N/A	N/A	N/A	1	2	2	0	1	2	2	16
Jøranson et al (2021)	2	2	1	1	1	0	N/A	2	1	2	1	1	2	2	18
Lancioni et al (2018)	2	2	1	1	N/A	N/A	N/A	2	1	2	0	0	1	2	14
Mizuni et al (2021)	2	2	1	1	N/A	N/A	N/A	2	N/A	2	2	N/A	2	2	16

Pu et al (2020)	2	2	2	2	1	0	0	2	1	2	2	2	2	2	22
Whelan et al (2020)	2	2	2	1	N/A	N/A	N/A	2	2	2	1	N/A	2	2	18

DeBs

Paper	Individualised	Identity	Voice	Decision-making	Choice	Activities	Community	Meaningful	Stigma	Roles	Total
Blindheim et al (2023)	3	3	2	3	1	4	3	3	1	4	27
Chen Jones et al (2024)	2	3	1	1	1	3	1	2	1	5	20
Chen, Lin et al (2024)	1	1	1	1	1	3	1	3	1	3	16
D'Amico et al (2023)	1	4	3	1	1	4	1	3	1	5	24
Dinesen et al (2022)	1	1	1	1	1	2	1	4	1	4	17
Feng et al (2020)	1	2	1	1	1	3	1	3	1	2	16

Fogelson et al (2022)	1	2	1	1	1	1	1	3	1	4	16
Harris et al (2021)	2	1	3	2	4	4	3	3	1	2	25
Hung et al (2021)	3	5	5	4	2	4	1	4	4	5	37
Ikeya et al (2018)	1	2	1	1	1	3	1	1	1	3	15
Inoue et al (2021)	3	3	3	1	4	5	3	5	1	5	33
Inoue, Yatsu et al (2022)	1	3	2	1	1	5	1	4	1	4	23
Joranson et al (2021)	1	2	2	1	1	3	1	4	1	3	19
Lancioni et al S1 (2018)	2	2	1	1	3	5	1	3	1	3	22

Lancioni et al S2 (2018)	2	2	1	1	3	5	1	3	1	3	22
Mizuni et al (2021)	3	3	1	1	1	3	3	3	1	3	22
Pu et al (2023)	3	3	2	2	1	3	1	4	1	4	24
Pu et al (2019)	3	1	1	1	1	1	1	4	1	1	15
Pu et al (2020)	3	1	1	1	1	1	1	4	1	1	15Q2
Shoesmith et al (2024)	5	5	4	2	5	4	1	3	1	5	35
Tummers et al S1 (2022)	3	1	1	1	1	2	1	1	1	2	14
Tummers et al S2 (2022)	3	1	1	1	1	3	1	1	1	3	16

Stoddart (2019)	1	4	4	5	5	4	1	2	1	4	31
Whelan et al (2020)	4	5	4	5	4	5	1	5	1	5	39

Appendix F: Main outcome measures categorised by type

Appendix: *Main outcome measures categorised by type*

Study	Psychological/ Emotional	Cognitive	Physical/ Autonomic	Behavioural/ Functional	Qualitative/ Observational
Blindheim (2023)					X
Chen & Moyle (2024)	X				
Chen Lin et al. (2024)	X	X	X		
D'Amico (2023)				X	
Dinesen (2022)	X				X
Feng (2020)	X				
Fogelson (2022)	X				X
Harris (2021)		X		X	
Hung (2021)					X
Ikeya (2018)				X	
Inoue (2021)	X	X		X	X

Study	**Psychological/ Emotional**	**Cognitive**	**Physical/ Autonomic**	**Behavioural/ Functional**	**Qualitative/ Observational**
Inoue (2022)	X				X
Jøranson (2021)	X		X		X
Lancioni (2018)		X	X		
Mizuno (2021)		X	X		
Pu (2023)					X
Pu (2019) (2020)	X	X		X	X
Shoesmith (2024)	X				X
Stoddart (2019)					X
Tummers (2020)					X
Whelan (2020)	X				X

Appendix G: Effect sizes and t-test results

DeBs Item	Kapoor mean	Kapoor SD	Current mean	Current SD	Mean difference	Pooled SD unequal samples	Cohen's d (unequal samples)	p-value	Degrees of freedom	T-score	SE	CI (Lower)	CI (Upper)
Q1 Individualised	1.70	1.30	2.21	1.14	0.51	1.25	0.41	.064	46.38	1.56	0.28	-0.01	0.85
Q2 Identity	1.4	0.8	2.5	1.35	1.10	1.03	1.07	.009*	46.38	2.47	0.29	0.28	1.70
Q3 Voice	1.9	1.5	1.96	1.27	0.06	1.42	0.04	.253	47.62	.67	0.27	-0.14	0.23
Q4 Decision-making	1.4	0.98	1.67	1.27	0.27	1.09	0.25	.205	33.67	.84	0.27	0.01	0.47
Q5 Choice	1.6	1.2	1.92	1.44	0.32	1.29	0.25	.200	35.78	.86	0.27	0.01	0.48
Q6 Activities	2	1.2	3.33	1.27	1.33	1.23	1.09	<.001*	39.74	3.91	0.29	-0.06	2.21
Q7 Community	1.1	0.4	1.33	0.76	0.23	0.56	0.41	.106	26.42	1.29	0.28	0.02	0.73
Q8 Meaningful	1.8	0.7	3.13	1.12	1.33	0.87	1.52	<.001*	29.06	4.92	0.30	-0.07	2.92
Q9 Stigma	1.1	0.7	1.13	0.61	0.03	0.67	0.04	.433	46.60	.17	0.27	0.00	0.09
Q10 Roles	1.4	0.6	3.46	1.25	2.06	0.89	2.32	<.001	25.33	7.10	0.34	-0.28	4.48

*values reached statistical significance

Appendix H: STROBE checklist

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	61
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	61
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	62-65
Objectives	3	State specific objectives, including any prespecified hypotheses	65-66
Methods			
Study design	4	Present key elements of study design early in the paper	67
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	67
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	67
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	N/A
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	69-70
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	67-68

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	70-71
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	70-71
		(*b*) Describe any methods used to examine subgroups and interactions	70-71
		(*c*) Explain how missing data were addressed	70-71
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	70-71
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	68
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	68
		(b) Indicate number of participants with missing data for each variable of interest	71
Outcome data	15*	Report numbers of outcome events or summary measures	72-76
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	72-76
		(*b*) Report category boundaries when continuous variables were categorized	72-76

		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	72-76
Discussion			
Key results	18	Summarise key results with reference to study objectives	77
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	81-82
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	77-82
Generalisability	21	Discuss the generalisability (external validity) of the study results	82
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Appendix I: Ethics approval documents

Personal data removed

Appendix J: Participant Information Form

Accessible from this link:

https://osf.io/9nbj2/files/osfstorage/67a4be392c87eb3410cc93bd

Appendix K: Participant Consent Form

Accessible from this link:

https://osf.io/9nbj2/files/osfstorage/67a4be399bd439b511cc922b

Appendix L: Participant characteristics questionnaire

Accessible from this link:

https://osf.io/9nbj2/files/osfstorage/6803cb63b81d3c4896c108d5

Appendix M: Case study vignette documents

Accessible from the following links:

https://osf.io/9nbj2/files/osfstorage/6803cc9fd3a97c276d763da8

https://osf.io/9nbj2/files/osfstorage/6803cca022d1ab4b95d563d4

https://osf.io/9nbj2/files/osfstorage/6803cca25356193b0fcc476b

https://osf.io/9nbj2/files/osfstorage/6803cca2b95b08333f763abe

https://osf.io/9nbj2/files/osfstorage/6803cca53166e76b93fe2bb0

Appendix N: Benchmark formulation

Accessible from this link:

https://osf.io/9nbj2/files/osfstorage/6803ccd67e4000acc4fe2c0c

Appendix O: Formulation scoring manual

Accessible from this link:

https://osf.io/9nbj2/files/osfstorage/6803ccd5fa01df3aa7d56521

Appendix P: Formulation answer booklet

Newcastle Formulation Information and Answer Sheet

Please read the following information and follow the steps. Please ask the researcher if you are unsure about any of the instructions.

Vignette Information

Patient name:

Elizabeth Smith

Patient age:

82 years old

Current circumstances:

Elizabeth is an inpatient in an organic elderly ward (Ward D).

Background:

Elizabeth's daughter first noticed her mum's memory problems in 2018. Since then she has been diagnosed with dementia. Elizabeth was living at home with support from her family and carers. In 2024, she began displaying signs of stress and distress in dementia to the extent it was no longer safe for her to stay at home, and she was admitted to hospital.

Task:

The ward has contacted you for help and asked you to complete a Newcastle Formulation.

Step 1

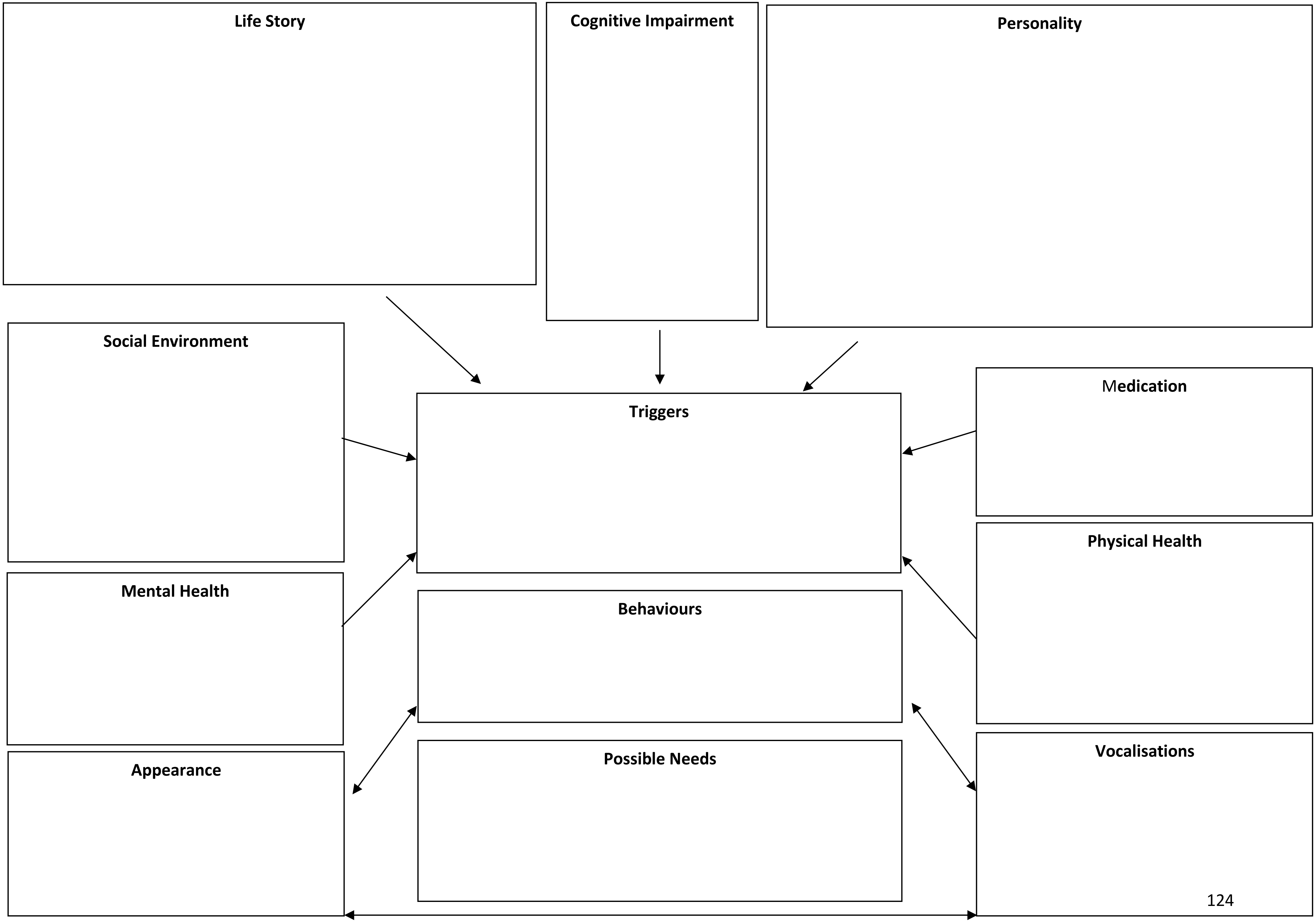
You have been provided with the following sources of information which you should read carefully and draw upon to develop your formulation:

Vignette	Date	Name of document	Details
A	25th-26th August 2024	Emis notes	Emis is the healthcare record system. It can be used to record daily progress notes while a patient is in hospital. There are three entries completed by nursing staff.
B	25th August 2024	ABC chart	An ABC chart is an observation tool which helps identify the possible causes and functions of behaviour and help guide responses to the behaviour. An ABC chart has been completed by a member of staff following an incident on the ward.
C	15th July 2024	Getting to Know Me	This is a document aimed at helping patients with dementia feel better understood when they are coming into hospital. Elizabeth's daughter completed it on her behalf.
D	4th July 2024	Psychiatry letter	This is a liaison summary letter from the inpatient psychiatrist who has assessed Elizabeth for admission to the ward.

E	3rd September 2018	SCI Gateway – GP referral	SCI Gateway is the system used to integrate primary care and secondary care services. This is a referral from Elizabeth’s GP (Dr Brown) to the secondary care team (Older People Community Mental Health Team).

Step 2

To the best of your ability with the information available, please complete the blank Newcastle Formulation template on the following page.


Life Story
Cognitive Impairment
Personality
Social Environment
Triggers
Medication
Physical Health
Mental Health
Behaviours
Possible Needs
Appearance
Vocalisations

Step 3

Once you have completed the formulation template, please answer the following questions:

1. Based on your formulation, which of the following best describes the unmet need in this case study?

   Please rank 1-8 in order of importance to the case study

   (1 – most relevant to 8 – least relevant).

   - Physical comfort ☐
   - Positive touch ☐
   - Control over environment/possessions ☐
   - Self-esteem ☐
   - Perception of safety ☐
   - Occupation and exploration ☐
   - Love and belonging ☐
   - Fun ☐

2. How confident are you in completing stress and distress formulations?
   Please tick one option.

☐ Not confident at all
☐ A little confident
☐ Confident
☐ Very confident

Appendix Q: SPSS Syntax

Accessible from this link:

https://osf.io/9nbj2/files/osfstorage/6803fcf9b9cfd12f22fe29ec

Appendix R: Major Research Project Proposal

Accessible from this link:

https://osf.io/9nbj2/files/osfstorage/67a4ce35d661bb28a50c5757