

Expert-Derived Components of Person-Centred Nursing Intervention for People with Dementia and/or Cognitive Impairment in a Hospital Experiencing Distress

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Abstract

Background

Hospital admissions among people living with dementia are rising across the UK, with distress, often intensified in acute settings, contributing to poorer outcomes (Abbott et al., 2022; Brontsema et al., 2025). This study took place in an acute hospital featuring a Meaningful Activities Centre (MAC), established by a Dementia Nurse Specialist (DNS).

Aim

To identify expert-derived components of person-centred nursing interventions delivered by a Dementia Nurse Specialist to reduce distress in hospitalised people with dementia and/or cognitive impairment.

Methods

A qualitative approach was employed involving six patients and five relatives referred to the DNS. Data sources included clinical record review; observation of 12 episodes of care; and 28 interviews with patients (n=5), relatives (n=5) and the DNS (n=18). Qualitative data were analysed using Colaizzi's (1978) seven-step method.

Results

The findings from this study describe the DNS's intervention for reducing the distress of PLWD/C in acute clinical areas in one hospital. They demonstrate that the core element of the intervention was a holistic assessment, focused on identifying underlying contributors to distress, which were then recognised as unmet needs. This assessment frequently identified previously unrecognised symptoms or unmet needs that were often biological in nature, as evidenced by the variation in symptoms reported before and after the DNS's intervention. Although the assessment process was person-centred, it followed a clear linear structure with defined components that contributed to building a comprehensive understanding of the individual and their distress.

Conclusion

Thorough and structured assessment is essential for identifying unmet needs and managing distress in people with dementia in acute hospitals. An individualised, assessment-driven approach supports targeted use of pharmacological and non-pharmacological interventions, reducing reliance on non-specific treatments, improving care quality, and promoting person-centredness.

1. Background

The hospitalisation of people living with dementia (PLWD) in the UK has increased, with approximately two-thirds of hospital admissions being older adults, nearly half of whom have dementia [1], and demand for acute beds is projected to rise 43% by 2040 [2]. Distress is a common experience for PLWD during hospital admission [3], frequently labelled as the behavioural and psychological symptoms of dementia (BPSD), including agitation, aggression and low mood [4, 5]. We use the term distress behaviours

throughout in this paper, as BPSD is widely regarded as a derogatory term that frames PLWD as problematic rather than recognising behaviour as a form of communicating unmet need [6].

Up to 90% of PLWD experience distress behaviours during their lifetimes [7], with an estimated 75% prevalence during acute admission [8], and these symptoms are associated with adverse outcomes including increased mortality, prolonged stays, higher readmission rates and reduced likelihood of discharge home [1, 9]. Hospitalisation itself may aggravate distress through ward noise, rigid routines, lack of stimulation, and absence of family and familiar surroundings [10, 1], while inadequate staffing, medication changes and variable staff expertise can further exacerbate symptoms [11, 7], inhibiting effective assessment and management in acute settings.

Person-centred care (PCC) is consistently highlighted as foundational to good dementia care, including the management of distress behaviours [12–14], emphasising personhood, the individuality of the dementia experience, and individualised care [15, 16]. PCC practices minimise distress for PLWD on admission to unfamiliar environments, as staff better understand how dementia affects behaviour [1] and can more effectively support personhood in care delivery [17]. Within a PCC framework, distress behaviours are viewed not merely as inevitable consequences of neurodegeneration but as meaningful expressions likely underpinned by unmet needs [18, 19], and the literature suggests distress should be framed as ‘unmet need’ to encourage thorough, person-centred assessment and intervention [20, 21].

National guidance recommends a balance of pharmacological and non-pharmacological strategies tailored to fluctuating individual need [12, 5], with non-pharmacological approaches such as music therapy, reminiscence and physical activity recommended first-line [12]. Evidence indicates these can reduce agitation and may lower antipsychotic prescribing [22, 23], though most research derives from long-term care and implementation in acute hospitals remains difficult [24, 7]. Meanwhile, over-reliance on pharmacological strategies persists [25, 26], despite antipsychotics’ association with adverse events and increased mortality [27, 28]. National guidance recommends their use only once non-pharmacological approaches have been attempted or where risk of harm is significant [12, 25], yet staff report difficulty achieving person-centred care in acute settings [17], which may partly explain overprescribing. Task-oriented ward environments, time pressures and prioritisation of routine tasks act as barriers to care that meets both physical and psychosocial needs [29, 30].

There is a growing need to strengthen the evidence base on how person-centred interventions can be effectively implemented and evaluated in routine acute practice, and to define exactly how person-centred principles apply to managing distress, whether pharmacologically or non-pharmacologically. This paper presents findings from a study in one acute Scottish hospital, examining person-centred interventions combining expert nursing and access to an adapted environment to reduce distress and improve outcomes for PLWD and/or cognitive impairment.

2. Study Aims and Objectives

Aim: To understand the expert components of a person-centred nursing approach to reducing distress for people living with dementia and/or cognitive impairment in the acute hospital.

Objectives:

- Describe and identify the core components of the person-centred approach to distress developed and implemented by the DNS.
- Describe the demographics and characteristics of people receiving the intervention and reasons for referral.
- Understand the potential impact and outcomes of the approach to inform future study.
- Understand the contextual issues influencing delivery of the approach.

3. Methods/Methodology

3.1 Design

This study adopted a combined qualitative and descriptive statistical approach to understand what happened, why, and how, building an evidence base for the intervention [31]. Examining the processes involved and their meaning for those providing and receiving the intervention allowed observation of systematic patterns in unmet needs alongside rich, in-depth understanding of the DNS's intervention [32].

3.2 Study Setting

The study took place in an acute hospital in Scotland between February and May 2025. Convenience and purposive sampling were used [33]: all patients referred to the DNS during data collection were screened for eligibility by a research nurse (RA), and eligible participants purposively selected for likely rich, meaningful insight. Observations and interviews took place on the ward and in the Meaningful Activity Centre (MAC), depending on participant comfort, noise and distraction. The MAC comprises a faux 'shop', a 'living room', a 'bedroom' and a games area, designed to engage the senses and promote interaction through memorabilia chosen to engage older people's memories. The DNS leads the MAC, supported by a clinical support worker (Monday–Friday) who delivers DNS-prescribed social interventions.

3.3 Participants

Participants comprised the DNS, inpatients referred to the DNS meeting inclusion criteria (people living with dementia and/or cognitive impairment, 'PLWD/C'), and their relatives/next of kin. Relatives were included to provide insight into intervention impact and contextual information. Table 1 summarises sampling, sample size and eligibility criteria.

Table 1
Sampling strategy and inclusion/exclusion criteria

Participant	Sampling	n	Inclusion	Exclusion
DNS	Purposive	1	–	–
PLWD/C	Opportunity/purposive	6	Dementia/cognitive impairment diagnosis; age > 60; good English comprehension; admitted > 12 hrs; medically stable; able to consent (or NOK/guardian consent under AWI (Scotland) Act 2000)	Absence of diagnosis; age < 60; poor English; admitted < 12 hrs; medically unstable; unable to consent
Relative	Opportunity/purposive	5	Contactable via RA; visited PLWD/C weekly before/after DNS involvement; able to meet RA; good English	Not contactable; insufficient visiting; unavailable; poor English

3.4 Descriptive Data

A structured tool, developed with the DNS, captured demographics, medical history, admission medications, admission reason, dates, medications prescribed during admission, DNS referral, manifestation of distress, DNS interventions (pharmacological/non-pharmacological), investigations, and family involvement. The RA completed this using patient records, discussion with the DNS and medical staff, and direct patient/family input. Analysis characterised the sample and catalogued physical, behavioural, and cognitive symptoms as well as unmet needs before and after intervention, examining frequencies and retaining individual profiles to capture diversity. Descriptive analysis was undertaken to characterise the sample and systematically document patient-reported outcome associated with the DNS intervention. The purpose of the analysis was not to make inferential claims, but rather to provide a person-centred descriptive account of what occurred within the sample at both individual and group levels. These descriptive findings were subsequently integrated with the qualitative data to support comparison and richer interpretation of patient experience.

3.5 Qualitative Approach

3.5.1 Data collection

The RA conducted observation and face-to-face interviews [34]. An observation tool, informed by Phillippi and Lauderdale [35] and Dewing, McCormack and Titchen [36], was developed following two weeks' immersion with the DNS. Over three months, 12 observation episodes (10–60 minutes) were conducted involving five patients and two relatives (Table 2); no observations occurred for one patient (P006), captured instead via retrospective DNS interview.

Table 2
Observation episodes

Participant	Type	Observations
P001	PLWD/C	2
P002	PLWD/C	2
P003	PLWD/C	1
P004	PLWD/C (+ 1 Relative)	2 / 1
P005	PLWD/C (+ 1 Relative)	3 / 1
P006	PLWD/C	0

Twenty-eight interviews were conducted and transcribed verbatim: five with patients, five with relatives, 18 with the DNS (Table 3), audio-recorded with field notes taken by the RA. DNS interviews were semi-structured ('tell me about your input with participant X...'), conducted at referral and follow-up, to expand on and verify observations, and to retrospectively capture interventions the RA could not observe. Patient/relative interviews explored perceptions of distress since admission and perceived intervention effectiveness, guided by a flexible, study-objective-informed framework. Interview length ranged from 1–22 minutes (Table 4).

Table 3
Interviews per participant

Participant	DNS	PLWD/C	Relative
P001	2	1	1
P002	2	2	0
P003	1	1	0
P004	4	0	0
P005	7	0	2
P006	2	1	2

Table 4
Interview duration

Type	Range	Average
DNS	2m17s–16m04s	8m38s
PLWD/C	1m03s–13m38s	6m31s
Relative	9m01s–21m46s	13m44s

A reflexive diary was maintained throughout, given the RA’s prior clinical role at the site, with regular team discussion supporting awareness of positionality [37].

3.5.2 Data analysis

Analysis followed phenomenological principles to reach the essence of the DNS’s intervention and its lived impact [38, 39], using a hermeneutic approach [40]. Data were analysed manually using Colaizzi’s [41] seven-step method (Table 5): familiarisation; extracting significant statements; formulating meanings; organising into themes; developing an exhaustive description; producing the fundamental structure; and validating findings with the DNS.

Table 5
Implementation of Colaizzi’s [41] method

Step	Implementation
1. Familiarisation	RA and PIs read and re-read all anonymised transcripts and observations to become immersed in the data.
2. Extracting significant statements	Relevant statements linked to each study objective were highlighted, colour-coded and verified by PIs.
3. Formulating meanings	Colour-coded statements organised per participant and considered for what they revealed about the DNS’s intervention, with reflexive team discussion.
4. Organising into themes	Meanings clustered into themes; raw data re-read to ensure all relevant data captured.
5. Exhaustive description	Narrative description of the essence of the DNS’s intervention written for each participant.
6. Fundamental structure	Narratives compared across participants; similarities clustered to produce the final essence of the intervention.
7. Validation	Findings presented to the DNS.

4. Ethical Considerations

Ethical approval

was obtained from an NHS Research Ethics Committee, with all governance procedures and site permissions followed. Participants gave informed consent, were informed of their right to withdraw, and data were handled in accordance with data protection regulations, with identifiable information removed and data stored securely. A situated, relational ethics approach was adopted, given the practice-based nature of the study, recognising the need for ongoing reflexivity [42].

5. Results

The combined analyses showed the DNS's intervention consisted of a systematic, person-centred assessment process that effectively identified underlying unmet needs contributing to distress behaviours. The subsequent intervention centred on meeting these identified needs. Although the specific intervention offered to each participant varied, reflecting its person-centred nature, a clear pattern and structure was evident across both the assessment process and the interventions delivered.

5.1 Descriptive Results

Six PLWD/C participated (four male, two female, aged 67–89). Socio-demographic data were obtained for five; one participant (P004) withdrew due to clinical deterioration, with consent retained for phenomenological data already collected (Table 6).

Table 6
Participant characteristics

Patient	Age	Gender	Occupation
P001	67	Male	Painter/decorator (retired)
P002	86	Female	Retired
P003	88	Male	Miner (retired)
P005	78	Male	Retired
P006	89	Male	Bus driver (retired)

Five participants were admitted following an observed or expected fall; one following confusion and increased oxygen need. Five had pre-existing neuropsychiatric symptoms (three with a dementia diagnosis, two Alzheimer’s Disease; one post-infection delirium; one alcohol dependency syndrome). Length of stay ranged 41–92 days (average 58 for five patients). Referral reasons included aggressivity, general distress, falls, and (for one participant) sexual disinhibition, constipation and advanced dementia. Referral timing ranged 6–74 days post-admission (average 22); DNS assessment occurred the same or following day. Proposed interventions per participant ranged from one to seven.

5.1.1 Symptoms before and after intervention

Clinical record and DNS interview data show systematic differences in symptoms reported before and after the DNS’s first intervention (Tables 7–8). Verbal/physical aggressivity was reported for all patients pre-intervention; agitation and confusion/disorientation in four of five. Confusion/disorientation fell from four to two patients post-intervention, and aggressivity was no longer recorded for two patients – though agitation persisted across both timepoints. Documented ‘distress’ rose from one to three patients post-intervention, suggesting a possible reframing of behaviour by staff following DNS involvement rather than genuine symptom change. Constipation emerged prominently post-intervention despite being unrecorded beforehand, alongside newly reported limb pain and purposeful wandering in

three patients likely reflecting improved detection following DNS assessment. Conversely, sleeplessness and refusal to eat, present pre-intervention, were no longer reported afterward, suggesting the DNS's input addressed these issues. Overall, these shifts suggest the DNS's assessment prompted more comprehensive symptom identification, while alleviation of some symptoms (e.g., pain, sleep disturbance) may have unmasked others (e.g., increased mobility manifesting as wandering).

Table 7
Symptoms before DNS's first intervention

Symptom	P001	P002	P003	P005	P006
Fall/loss of balance		X		X	
Lung infection		X		X	
Verbal/physical aggressivity	X	X	X	X	X
Agitation	X	X		X	X
Disinhibition				X	X
Not eating	X				X
Not taking medication		X		X	X
Sleepless night		X	X		X
Confusion/disorientation	X	X	X		X

Table 8
Symptoms after DNS's first intervention

Symptom	P001	P002	P003	P005	P006
Constipation	X	X		X	X
Fall/loss of balance			X		X
Limb pain			X	X	X
Verbal/physical aggressivity	X			X	X
Agitation	X	X		X	X
Distress		X	X		X
Not taking medication				X	X
Refusing hygiene-related care				X	X
Wandering/walking with purpose		X	X	X	X
Confusion/disorientation	X	X			

5.2 Phenomenological Findings

Four themes captured the essence and impact of the DNS's intervention: (1) assessment of physical condition; (2) assessment of behaviour; (3) 'entering their world'; and (4) multidisciplinary working. As noted above, while person-centred in nature, the interventions followed a consistent, structured pattern across participants.

5.2.1 Assessment of physical condition

The DNS's engagement began with systematic review of the clinical record to identify physical contributors to distress, including pain (four patients) and constipation (four patients), with overlap in three.

Pain was the most frequently identified biological contributor (four participants). For three, 'as required' (PRN) analgesia was inadequately administered:

"So the PRN usage they'll use is a way of reducing the agitation but that included some diazepam or whatever which all that did was stick a plaster on it [distress] because this man was in pain like any of us would be with a fractured [dislocated] finger." (DNS, P001)

Moreover medication reviews played a central role in identifying under- or overuse of medication.

"And I feel that that's the difficulty with PRN [as required] medications that it can get missed completely or overused..." (DNS, P002)

The DNS liaised with medical and nursing teams to ensure adequate analgesia, including twice recommending a change from oral to subcutaneous/transdermal routes:

"I went back to speak to the doctor, and I said, this lady is in pain... we need to think about subcutaneously... because she must get pain relief, she is very distressed." (DNS, P004)

The DNS's input was consistently received favourably by clinical staff, reflecting trust in her expertise.

Constipation emerged as another significant biological contributor to distress. For example constipation, lasting 4–5 days for two participants, had not been identified as a potential contributor before DNS involvement. The DNS advised regular bowel care regimens or less invasive laxatives; for one participant, resolving constipation produced a marked reduction in distress:

"He wasn't really accepting of his oral medications. So we gave him an enema. By the next day, the patient was a different man... If he gets a bit of distress, it's simply because his bowels have not moved." (DNS, P006)

In addition to the identification of pain and constipation the DNS identified distress associated with personal care and nocturnal distress. On two occasions the DNS delivered personal care herself to assess for pain or aggression, finding none where staff had reported it:

"So the whole reason for me going up was to carry out the personal care, so I could see for myself if there was any pain, or what the aggression looks like...I explained to him, fairly up close. I had to tell him a couple of times throughout the care that he was covered up and he was fine...because he was trying to, what I took as cover himself up, but I reminded him he was covered up and he was safe and nobody could see anything, that he was happy with that...I didn't find that there was any aggression there whatsoever." (DNS, P005)

For one participant, nocturnal distress linked to family departure disrupted the sleep-wake cycle; the DNS recommended low-dose melatonin and timely PRN lorazepam, with subsequent improvement documented on a behavioural frequency chart.

"So I say to the nurses, when she becomes distressed, when her relatives are in.. so check with the family, and about half an hour before they leave, administer PRN...And then I went to approach the doctors and asked them if they would consider prescribing a low-dose melatonin, because melatonin doesn't have the same negative effects as what a sleeping tablet would...So what has happened since then is the melatonin has been working. She's been predominantly settled overnight." (DNS, P002)

5.2.2 Assessment of behaviour

Where clinical record review did not identify biological causes (two participants), the DNS initiated a behavioural frequency chart and in addition to this conducted unstructured in-person assessment combining observation and conversation.

"I started her on a behavioural frequency chart, which is very easy to use, it doesn't give the nurses a lot of work, and it's just simply like a tab system, you just draw lines for how often it happens." [DNS, P002]

Focused observation for environmental contributors also led to identification of stress factors, for example one participant's distress was worsened by proximity to other distressed patients, prompting the DNS to offer the participants quieter space in the MAC.

"So what I'd done was I took him out of the ward because I felt the ward, there was similar type patients in that bay and they were bouncing off each other, so I removed him, took him down the stairs to the MAC centre." [DNS, P001]

For another participant a low-rise bed intended to reduce fall risk instead restricted independent mobility causing distressed behaviour.

Person-centred conversation elicited further insight, for example one participant described missing home as a cause of night-time distress.

"The first thing I done was spoke with her. She did have some insight into her being upset when her son went away, but she really misses home. So really understandable why she was upset, and she believes that wakes her up at night." [DNS, P002]

Another conversation with participants revealed sore feet, leading to discovery of overgrown toenails causing pain and limiting mobility, with immediate improvement following treatment. Across participants, these components identified contributing factors including other patients' distress, poor bed setup, dehydration, pain, over-sedation, low mood, poor hearing, and embarrassment relating to personal care. These were all factors not detectable from clinical records alone.

5.2.3 'Entering their world'

The DNS prioritised getting to know the person, not only the patient, exploring likes, dislikes and personal history, an approach she termed 'entering the person's world':

"I belong to the same village as him so I was able to talk to him about certain places in that village... so I suppose we understood what mattered to him." (DNS, P001)

The MAC supported continual, holistic, in-person assessment through activity-based observation of physical and cognitive function, and reframed behaviour previously labelled 'agitation' as a response to lack of social stimulation. Patients valued this engagement:

"Oh yes. Aye, it's quite nice... Just the fact that somebody speaks, initiates seeing you and they're actually genuinely interested in what you're doing... Somebody actually who knows the personal...one to one...It's nice... Good conversation." (P002)

"I mean I like coming down, I like the company in here. [MAC] Coffee's good too." (P001)

For two patients, regular social engagement was formally 'socially prescribed' within the medication system to reinforce consistency and legitimacy as part of the treatment plan.

5.2.4 Multidisciplinary working

The DNS worked closely with nursing and medical staff for all six participants:

"When I work alongside the staff, when I get referred anybody, I will always involve the staff because at the end of the day, they're maybe not included much as the expert, but they know the patient better than I do... There's no 'I' in team." (DNS)

For two participants, the DNS recommended referral to additional healthcare professionals to maximise multidisciplinary input. Collectively, holistic assessment combined with coordinated multidisciplinary input ensured identified needs were comprehensively addressed.

6. Discussion

This study describes the DNS's intervention to reduce distress among PLWD/C in acute clinical areas. Its core element was holistic assessment identifying underlying contributors to distress as unmet needs, frequently uncovering previously unrecognised, often biological, symptoms. Although person-centred,

the assessment followed a clear, linear structure, with the overall effect across all participants of reduced distress behaviours and increased social engagement.

This approach accords with NICE [12] guidance recommending thorough assessment of pain, delirium, inappropriate care and environmental factors before initiating treatment. Notably, NICE frames distress behaviours as ‘non-cognitive symptoms of dementia’ of which agitation, aggression and distressed are listed [12]. By labelling distressed behaviour as symptom of dementia may inadvertently discourage thorough assessment by locating distress within dementia itself rather than unmet need, potentially leaving needs unaddressed.

The DNS’s assessments were markedly more comprehensive, holistic and individualised than routine ward-based assessment, which tends toward standardised risk-assessment tools. This may reflect differences in dementia-specific education, role structure, time allocation and service pressures, consistent with wider literature citing poor dementia knowledge, low confidence, staff shortages and time constraints as barriers to implementing NICE guidance in acute care [43, 44]. There is also a general lack of UK assessment tools designed to detect contributors to distress in acute settings [45]; existing tools largely measure frequency and severity of distress behaviours rather than their causes, or focus on single domains (e.g., pain) rather than comprehensive biopsychosocial unmet need, and tools addressing environmental contributors are validated primarily in long-term care [46, 47]. Given strong evidence that person-centred assessment reduces antipsychotic use in care homes [48, 45], this study suggests comparable value for structured, person-centred unmet-needs assessment in acute hospitals, and highlights a pressing need for tools that support this in practice [49, 50].

The DNS’s approach closely aligns with person-centred care principles [51]: intervention choice was determined by individual need identified through thorough assessment, with the PLWD/C and relatives actively involved. The effectiveness of psychosocial interventions is well reflected in the wider literature [22, 4]; this study extends this by showing that intentionally ‘entering the person’s world’ functions as both an intervention in itself through making the person feel seen and valued and as an assessment mechanism, revealing specific contributors to distress not accessible through clinical records alone, consistent with [45]. Importantly, psychosocial interventions were most effective once biological needs had been addressed first, reflecting genuine person-centredness guided by the individual’s current, holistic need rather than a generic sequence of care.

These findings echo Griffiths et al. [52], who similarly found that specialist dementia nursing input guides ward staff toward timely, person-centred assessment. However, such specialist input is not consistently available across acute areas, underscoring the need for accessible resources to support assessment and management of distress more broadly [43, 45]. The assessment approach used by the DNS in this study was effective, time-efficient, and applicable across acute settings.

7. Limitations and Future Directions

This study was conducted in one acute hospital in a specific context, limiting generalisability. The descriptive component was exploratory, intended to characterise rather than evaluate the intervention's effectiveness. Future work should validate the intervention's core components toward developing a comprehensive, sequential assessment tool for identifying unmet needs among PLWD/C experiencing distress, ahead of larger-scale testing of effectiveness across varied acute contexts.

8. Conclusion

Thorough, holistic and individualised assessment is fundamental to meeting the needs of PLWD/C and managing distress in a genuinely person-centred way in acute clinical areas. The DNS demonstrated that interventions must be tailored to each individual's needs as identified through structured, person-centred assessment, in contrast to both routine pharmacological reliance on antipsychotics and generic non-pharmacological approaches that may not address the underlying cause of distress.

The DNS's approach positions behaviours such as aggression or distress as expressions of unmet biological, psychological or social needs, with pharmacological and non-pharmacological strategies selected according to assessment findings rather than applied by default. These findings reinforce the importance of embedding comprehensive assessment into routine acute dementia care, and point to a need for further development and testing of holistic, systematic, person-centred assessment frameworks, examining their feasibility, acceptability, and impact on patient outcomes and staff decision-making, and how they might be embedded within multidisciplinary practice to reduce unmet need and improve care experience for patients and families.

Abbreviations

DNS Dementia Nurse Specialist

PLWD People living with Dementia

PLWD/People living with Dementia and/or cognitive impairment

BPSD Behavioural and psychological symptom of Dementia

RA Research Assistant

PRN When Required

MAC Centre Meaningful Activities Centre

NICE National Institute for Health and Care Excellence

UK United Kingdom

Declarations

Ethics approval and consent to participate:

Ethical approval for this study was obtained from an NHS Research Ethics Committee (study no 330589 on 16th July 2024), with all relevant governance procedures followed. Our study adhered to the Declaration of Helsinki regarding research carried out on humans and/or human data. All necessary site permissions were secured before data collection. Participants received detailed information about the study and provided informed consent before participation. They were informed of their right to withdraw at any time without consequence. All data were handled in accordance with relevant data protection regulations, ensuring confidentiality and anonymity. Identifiable information was removed during data processing, and data were stored securely.

Consent for publication:

Not applicable

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Author Contribution

Conceptualization EH, JM, GM, KR Methodology EH, JM, CH, KR Data curation IR, CH, KR Formal Analysis EH,IR,CH,KR Writing original draft EH, IR , Review and Editing EH, IR, JM, CH, KR, GM. All authors have read and agreed to the published version of the manuscript.

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Data Availability

Due to the sensitive nature of the data and the risk of participant identification, the datasets generated during this study are not publicly available.

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