Development and initial validation of the staff perception of residential care environments (SPORE) instrument

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Abstract
Background: The impact of the physical environment on healthcare staff well-being and work performance is well recognised, yet there is a lack of instruments assessing environmental features from the perspective of staff working in residential care facilities (RCFs) for older people.

Objectives: To develop and provide initial validation of the instrument Staff Perceptions Of Residential care facility Environments (SPORE).

Design: An instrument development and psychometric evaluation study.

Methods: Based on material from a British project, items were translated and adapted for Swedish residential care facilities as SPORE. Care staff (N=200), recruited from 20 Swedish RCFs, completed a questionnaire-based survey containing the SPORE instrument and two other instruments selected as suitable for use in the validation. In addition, an environmental assessment instrument was used for further validation. Analyses were performed at individual (staff) level and home (RCF) level.

Results: The SPORE subscales demonstrated good internal consistency reliability and were moderately to strongly correlated at the individual level with the subscales of measures of person-centred care, and strongly correlated with the same measures at the home level. The SPORE subscales were also highly correlated with the total score of the instrument used to assess the quality of the physical environment.

Conclusion: The initial validation indicates that the SPORE instrument is promising for measuring care staff perceptions of environmental features in care facilities for older people. SPORE can be a valuable instrument for use in research and in practice to evaluate the environment as part of working towards high-quality care.

Implications for Practice: The design of the physical environment within RCFs can affect the staff's health and work performance. The instrument is useful for evaluating the environment and informing decisions about design solutions that support staff in their important work.

Keywords: care environment, evidence-based design, healthcare staff, instrument development, nursing, older people, person-centred care
1 | INTRODUCTION

Policies at the international level and in many countries require that healthcare services be person-centred (World Health Organization, WHO, 2017), that is based on an individual’s needs, preferences and resources (Koren, 2010; McCormack, 2004). This applies to healthcare environments in general, but also more specifically to care environments for older people (Joseph et al., 2015), which we refer to in this article as residential care facilities (RCFs). The terminology used to describe RCFs varies between disciplines and geographical contexts and includes terms such as assisted living facilities, nursing homes, nursing facilities and care homes (Freeman et al., 2017; Siegel et al., 2019). In the present study, a RCF refers to a special residence for older persons that offers 24-hour health and social care services, guided by the Swedish national values of living with dignity and a sense of well-being (National Board of Health and Welfare, 2012).

In Swedish RCFs, the direct care staff consists primarily of licensed practical nurses and nursing assistants, but there are also healthcare providers such as registered nurses, occupational therapists and physiotherapists (National Board of Health and Welfare, 2023). Older people who live in RCFs are characterised by a great diversity in health status, functional abilities and needs (Schweighart et al., 2022). A trend found in several European countries is for an increase in the complexity of health conditions among older people in RCFs, with a consequent rise in the need for qualified staff to work in these facilities (Barker et al., 2021; Spasova et al., 2018). However, working in RCFs can be demanding and stressful, and staff face considerable challenges if they are to provide care that meets the diverse needs of the older persons (European Commission, 2021).

To provide high-quality care, a well-functioning physical care environment is a prerequisite (Anåker et al., 2017; Nordin et al., 2021; Ulrich et al., 2008), with research indicating that the physical care environment impacts on staff health, well-being, comfort, job satisfaction, efficiency and productivity (Mourshed & Zhao, 2012; Ulrich et al., 2008). Thus, a positive work environment for staff is important for quality care and, in turn, the well-being of the older persons (Edberg et al., 2008; Hannan et al., 2001). Despite this importance of the physical environment for quality health care, there is a lack of validated instruments for assessing staff perceptions of the environment of RCFs for older people, preventing the accumulation of evidence that could inform the design of high-quality RCFs and support person-centred care. This paper reports the results of a study to develop and validate an instrument assessing staff perceptions of the environment of RCFs for older people.

1.1 | Care of older persons

For the most part, older people living in RCFs are in frail health with significant levels of functional and cognitive disabilities (Sørbye et al., 2018) requiring help during meals, assistance with hygiene and support to enable participation in activities. Care staff thus need to be available around the clock with responsibility for providing good and safe nursing care. Working in RCFs entails high demands, and studies have shown that staff experience a heavy physical and mental workload with a risk of burnout (Fjelltun et al., 2009), which in turn may be related to the provision of lower quality care and negligent behaviour (Cooper et al., 2018; Woodhead et al., 2016).

Today, person-centred care is considered essential for high-quality care, and this is represented in governing documents, guidelines and legislation (Rosengren et al., 2021). Person-centred care has been found to be related to patient health, well-being and satisfaction with care (Epstein et al., 2010; Sjögren et al., 2017) and could have positive effects on job satisfaction among staff working in RCFs (van den Pol-Grevelink et al., 2012). However, providing person-centred care requires a high level of commitment and sensitivity, and cannot be delivered without motivated staff. If staff working in RCFs do not receive sufficient support and do not perceive the environment as a resource, their ability to provide

What does this research add to existing knowledge in gerontology?

• A new, 33-item instrument assessing staff perceptions of care environments was developed, the Staff Perceptions Of Residential care Facility Environments (SPORE).

• The SPORE instrument had good psychometric properties and its subscales demonstrated a range of associations with staff perceptions of person-centred care and with physical environment assessments.

What are the implications of this new knowledge for nursing care with older people?

• We consider the SPORE to be used to assess and design care environments to improve care staff satisfaction and contribute to their ability of providing high-quality care and person-centred care in a residential care context.

• The SPORE instrument has the potential to increase our understanding of how care facilities can affect the work of staff and the quality of care that residents receive.

How could the findings be used to influence policy or practice or research or education?

• The SPORE can be a valuable instrument for use in research and in practice to evaluate the environment as part of working towards high-quality care.

• More knowledge about environmental factors from the staff’s perspective can help managers, planners and designers make informed decisions about appropriate design solutions to create functional care environments that support staff in their important work.
the best care for older persons in frail health may be adversely affected (Rajamohan et al., 2019). The design of the physical care environment is important for person-centred care as it is considered to have the potential to meet individual needs and facilitate care processes (Edwardsson et al., 2008). In recent years, investigating the physical environment in relation to person-centred care approaches has attracted increasing interest, not least in RCFs for older people (Chaudhury et al., 2018; Nordin et al., 2017; Sun & Fleming, 2018). For example, a Swedish study showed that person-centred care in RCFs was associated with how well environments were adapted to the needs and preferences of the older persons (Sjögren et al., 2017). In a Canadian study, the dining room design was found to impact the older persons’ independence, where, for example, an open kitchen contributed to increased participation in dinner preparations (Hung et al., 2016).

1.2 | Environmental factors and user outcomes

The importance of the physical care environment has its roots in Florence Nightingale’s pioneering work on the relationship between environmental factors and patients’ health and recovery (Nightingale, 1860/1980). The environment is one of four key components of the nursing metaparadigm and thus plays a key role in nursing theory (Fawcett et al., 2001; Kim, 2010). Despite this, the importance of the environment for persons in need of care, their relatives and healthcare professionals has been neglected (Lindahl, 2018).

Different ways of describing and defining the physical environment can be found in the literature. A commonly used description is that given by Harris et al.’ (2002), in which the physical environment is argued to have three dimensions: architectural features (e.g. spatial layout, building material), ambient features (e.g. temperature, lighting and sound levels) and interior design features (e.g. furniture and equipment). Environmental factors play an essential role in providing supportive workplaces for staff and promoting health and well-being for care recipients in healthcare settings (Joseph et al., 2015; Ulrich et al., 2008).

Studies in hospitals have shown that well-designed physical environments positively impact work effectiveness and comfort among staff and minimise their stress (Ulrich et al., 2006), where adequate ventilation and noise levels, thermal comfort, natural daylight, access to outdoor environments, appropriate furniture and equipment are factors that are considered important (Sadatsafavi et al., 2015; Salonen et al., 2013). In contrast, non-supportive environments can contribute to staff stress, fatigue, ineffectiveness in delivering care and poor health outcomes (Zimring et al., 2004). For instance, everyday stressors in the care environment such as high noise levels were found to be significantly related to perceived stress and job satisfaction (Applebaum et al., 2010). Indeed, there is a great need to evaluate the work environment within healthcare settings from the staff perspective. However, environmental features important for staff work and satisfaction may differ from features supportive of person-centred care in RCFs. For instance, architectural aspects such as unit layout that facilitate staff oversight of people’s safety may limit the older persons’ choice of spaces in which to spend the day (Torrington, 2007). Also, the needs and preferences of staff and older persons may differ with regard to ambient aspects of the environment such as indoor air temperature (Tartarini et al., 2018). This demonstrates the complexity of designing care environments that meet the divergent needs of different users (Joseph et al., 2015).

However, what is interesting in this context is that more personalised and less institutional RCFs seem to have a positive impact on staff (Choi et al., 2021; Parker et al., 2004; Torrington, 2007), where factors such as homelike ambience and open unit layout were found to increase staff job satisfaction (Choi et al., 2021). In summary, there is a growing body of literature on the importance of well-designed care environments as a prerequisite for the application of person-centred care.

1.3 | Evidence-based design

Evidence-based design (EBD) has developed out of an awareness of the impact of the environment on human health and well-being. EBD is a critical process where current evidence and experiences from existing environments are used (Stanks & Schwarz, 2007), and users’ needs are identified (Hamilton & Watkins, 2009). However, such evidence is not always transferred to building standards and regulations for care environments (Vischer, 2008), and there is limited feedback on how the environment works for its users, for example staff and care recipients, after a new facility has been commissioned (Leaman et al., 2010; Vischer, 2008). This lack of evidence certainly applies to RCFs, where more knowledge is required on how environmental properties affect person-centred care from staff and older persons.

1.4 | Assessing care and care environments for older persons

In a systematic review, Elf and colleagues identified instruments for assessing the physical environment of healthcare buildings (Elf et al., 2017). Of these instruments, some were directed to care environments for older persons. For instance, two well-established instruments were developed for the range of RCFs in the United States: the Professional Environmental Assessment Protocol, PEAP (Lawton et al., 2000) and the Multiphasic Environmental Assessment Procedure, MEAP (Moos & Lemke, 1984). Both instruments involve extensive estimates of the quality of the physical environment and can demonstrate some degree of validity and reliability. Another comprehensive instrument is the Sheffield Care Environment Assessment Matrix, SCEAM, which was developed for RCFs for older people in the UK (Parker et al., 2004). The instrument assesses the physical environment from a person-centred perspective where the user’s needs are represented by domains theorised as central in the occupancy of such environments. Given that SCEAM
had a strong theoretical basis and a person-centred perspective as well as evidence for its validity, the original instrument has been translated and culturally adapted for use in Swedish RCFs, known as the Swedish version of the Sheffield Care Environment Assessment Matrix (S-SCEAM) (Nordin et al., 2015). Although the instruments mentioned above were developed for care environments for older persons, the staff perspective was largely missing from the environmental assessment. With regard to assessing person-centred care in RCFs for older people, the Person-centered Care Assessment Tool (P-CAT) (Edvardsson, Fetherstonhaugh, et al., 2010) and the Person-centered Climate Questionnaire (PCQ) (Edvardsson, Koch, & Nay, 2010) are two of the most well-documented instruments available (Wilberforce et al., 2016). However, the physical environment is only marginally addressed by these instruments.

1.5 | Rationale

In summary, there is a growing basis of evidence for informing the design of the physical environment in a wide range of care buildings, not least within RCFs for older people. For care staff, the design of the environment can affect their physical and mental health as well as their work performance, while a well-designed physical care environment is an essential resource that provides the conditions for better, and person-centred care. In contrast, poorly designed environments can be stressful for staff and negatively affect their work. Gaining more knowledge about the staff’s perception of environmental factors can inform the design of new care environments and, in the long run, contribute to staff being able to perform their jobs better and with greater satisfaction. However, knowing which aspects of the environment are essential for staff is difficult if validated instruments for measuring their perceptions are unavailable. The aim of this study was to develop and provide initial validation of the instrument Staff Perceptions Of Residential care facility Environments (SPORE).

The primary purpose of SPORE is to assess staff views on the quality of environmental features of a RCF in terms of their support for providing care.

2 | METHODS

2.1 | Study design

This validation study consisted of a cross-sectional questionnaire-based survey of staff recruited from a sample of Swedish RCFs. The survey included three instruments: SPORE, P-CAT (Edvardsson, Fetherstonhaugh, et al., 2010) and the Person-centered Climate Questionnaire—Staff Version (PCQ-S) (Edvardsson, Koch, & Nay, 2010). These instruments are further described below. The latter two instruments were included in the study for the purpose of validating SPORE. In addition, data collected from the sampled RCFs in a previous study using an environmental assessment instrument, S-SCEAM (Nordin et al., 2015), were also used as the basis of further validity analyses.

2.2 | Participants

As data were to be collected at both individual level (from staff, using SPORE, P-CAT and PCQ-S) and home level (from the RCFs, the environmental assessment instrument S-SCEAM), the study sampling strategy was guided by the requirement for samples of both RCFs and staff sufficient to provide adequate power for analyses at both home (RCF) and individual (staff) levels. The sampling frame for RCFs was based on a national classification of municipalities (Swedish Association of Local Authorities and Regions, 2010). From this frame, RCFs were purposively sampled to ensure a high level of variation in their physical characteristics, considering factors such as urban–rural location, building design, year of construction, size and type of organisation. Of the 27 RCFs initially selected for the study, permission for data collection was received from the managers of 20, a recruitment rate of 74.1%. From each participating RCF, n = 10 staff were recruited, providing a staff sample of N = 200 (see Procedure and Data Analysis sub-sections, below, for more details).

2.3 | Data collection

Participants completed a questionnaire containing three instruments. One of the instruments was SPORE. The two other instruments were the Person-centered Care Assessment Tool (P-CAT) (Edvardsson, Fetherstonhaugh, et al., 2010) and the Person-centered Climate Questionnaire—Staff version (PCQ-S) (Edvardsson, Koch, & Nay, 2010). The latter two validated instruments were selected as they were judged suitable for testing the convergent validity of SPORE due to the theorised connection between staff perceptions of the physical environment of RCFs and their perceptions of the quality of person-centred care such environments can facilitate or hinder. The questionnaire also contained items on demographic data such as age (years), gender, length of time working in healthcare (months) and working within care for older people (months). As part of a separate study, each participating RCF underwent an environmental assessment using S-SCEAM (Nordin et al., 2015), and the S-SCEAM data from that study were used in additional analyses of the convergent validity of SPORE due to the theorised link between subject perceptions and objective evaluations of the physical environment of RCFs.

2.4 | Instruments—Staff survey

2.4.1 | The development of SPORE

SPORE was developed by the current research team, using as source material a 23-item questionnaire used in the DICE study carried out...
in the United Kingdom (Parker et al., 2004). During the SPORE development, we followed recommendations in the literature (Rodiek et al., 2016) that the instrument should be Comprehensive—address the full range of physical environmental aspects; Observational—focused on observable physical functions; Empirically derived—based on empirical support for items; User-centred—focused on supporting the use and satisfaction among those using the environment; Interdisciplinary—can be used by suppliers, researchers, designers and consumer advocates, without specialised expertise; and Generally applicable—suitable for the provision of living environments.

The development of SPORE started with the translation and adaptation of the items from the source material. The process followed recommendations in methodological literature (Maneesriwongul & Dixon, 2004; Wild et al., 2005) and included forward-translation, back-translation, user feedback and pre-testing the final version. The research team performed the forward-translation. For the back-translation, a native English-speaking academic colleague of the research team fluent in Swedish was consulted. The translated items were pilot tested at an RCF local to the research team’s institution, where the staff was tasked with responding to the items and giving their comments. The results and feedback from this testing process and research literature on environmental factors were discussed within the research team, leading to the development of further closed-ended items that addressed environmental quality issues that were not covered by the original items. Additionally, two of the original open-ended items were dropped as they were found to be of little value.

A decision was also taken to alter the original yes/no response option format of the closed-ended items and replace it with a more sensitive four-point ordinal response format measuring the respondent’s agreement with the items, with the points labelled Completely Agree (coded 4), Strongly Agree (coded 3), Partly Agree (coded 2) and Disagree (coded 1). After further pilot testing in the local RCF, the instrument, now comprising 33 items structured in five sections (Staff Facilities; Day Room and Dining Areas; Corridors and Circulation Spaces; Caring for Residents; and General Care Environment) and one open-ended question was judged to be ready for validation testing.

2.4.2 Person-centered care assessment tool (P-CAT)

P-CAT assesses how staff in RCFs for older people perceive their settings to be person-centred (Edvardsson, Fetherstonhaugh, et al., 2010). It comprises 13 items composed of statements about the person-centred quality of the care provided. The respondents rate their agreement on a five-point ordinal scale, with higher scores indicating higher levels of agreement. The items are structured within two subscales, Amount of Organisational Support and Extent of Personalising Care. The scale has been used and validated in several studies (e.g. Wilberforce et al., 2016). Internal consistency reliability (Cronbach’s α) in our sample was acceptable for both subscales, 0.78 and 0.76, respectively.

2.4.3 Person-centered Climate Questionnaire—Staff Version (PCQ-S)

PCQ-S assesses the extent to which the care climate within a facility is perceived by staff to be person-centred (Edvardsson, Koch, & Nay, 2010). It comprises 14 items composed of statements about the care climate. The respondents rate their agreement on a six-point ordinal scale, with higher scores indicating higher levels of agreement. The items are structured within three subscales: Safety, Everydayness and Community. This scale has been used in several studies (e.g. Wilberforce et al., 2016). For our sample, internal consistency reliability (Cronbach’s α) for the three subscales was good, 0.88, 0.85 and 0.83, respectively.

2.5 Instruments—RCF environmental assessment

2.5.1 Sheffield Care Environment Assessment Matrix (S-SCEAM)

S-SCEAM is based on a theoretical model of environmental quality for RCFs that considers quality not only in terms of accepted building regulations and guidelines but also and primarily in terms of the environment’s capacity to support the needs of frail older people, conceptualised in terms of eight domains: cognitive support, physical support, safety, normalness, openness and integration, privacy, comfort and choice (Nordin et al., 2015).

The instrument contains 215 items that describe individual elements of the physical environment, structured into sections reflecting the central locations of an RCF: overall layout, entrance and external area, garden, lounge, dining area, private apartments and communal bathroom. An assessor scores S-SCEAM via a walk-through of the care facility during which each item is observed and indicated as present (1) or absent (0). Item scores are added together to provide an overall score, and also within domains and within specific sections of the RCF to provide domain and location scores, standardised to a range of 0–100, with higher scores reflecting greater environmental quality. S-SCEAM has been shown to have good test–retest and inter-rater reliability and validity.

2.6 Procedure

The manager of each participating RCF was asked to distribute information letters to all healthcare staff in their facility, containing an invitation to participate in the study. The single exclusion criterion for participation was being unable to read and complete a questionnaire in Swedish. Of those indicating a willingness to participate, personnel from each RCF were randomly drawn and recruited.
by the manager. The RCF manager then distributed the staff questionnaire (containing SPORE, P-CAT, PCQ-S, plus additional background questions) to participating staff. In a letter accompanying the questionnaire, staff were given information on how to complete it and instructed to fill it in individually. Then, they returned the completed questionnaire in a sealed envelope to the RCF manager. The completed questionnaires were collected by a researcher (SN) from the RCF manager. The exact number of information letters distributed to staff could not be determined, and so it is not possible to calculate a response rate for the proportion of staff willing to participate in the study. Similarly, there is no information on how many of those staff who initially indicated a willingness to participate and were invited to do so subsequently declined the invitation. Nevertheless, the target of \( n = 10 \) staff from each RCF was met.

### 2.7 | Data analysis

Data were coded and analysed using the IBM Statistical Package for Social Science (SPSS) for Windows v. 28.0. Descriptive statistics such as frequencies, counts, means and standard deviations, as appropriate, were produced for all key study variables. Internal consistency reliability (Cronbach’s \( \alpha \)) was computed for SPORE, P-CAT and PCQ-S subscales. Standardised scores for the S-SCEAM domain and location subscales were calculated. Convergent validity is a fundamental aspect of construct validity and refers to how closely a new instrument is related to other measures of the same or a similar construct (Streiner et al., 2015). To examine the convergent validity of the SPORE subscales, Pearson product-moment correlation coefficients were calculated for associations between the SPORE subscales and the P-CAT and PCQ-S subscales at both individual and home levels. At the home level, Pearson product-moment correlation coefficients were calculated for the associations between the SPORE subscale scores of staff aggregated within each RCF and the S-SCEAM domain and location standardised scores. Bivariate associations between staff characteristics (individual level) and home characteristics (home level) and SPORE subscale scores were also explored. Statistical significance was set at \( p < .05 \) for individual-level analyses. Due to the small sample size (\( N = 20 \)) for home-level analysis inflating the risk of Type II errors, \( p < .10 \) was selected as the appropriate significance level for these analyses. When interpreting test results, the effect size and level of significance should always be considered in combination.

### 2.8 | Ethical considerations

The study was performed following the ethical guidelines of the Declaration of Helsinki (World Medical Association, 2013), and approved by the Regional Ethical Review Board for research in Sweden. Written informed consent was obtained from care home managers and the staff.

### Table 1 | Characteristics of residential care facilities (\( N = 20 \)).

<table>
<thead>
<tr>
<th>Sizea</th>
<th>Small</th>
<th>Medium</th>
<th>Medium</th>
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<tbody>
<tr>
<td>( n = 3 )</td>
<td>( n = 8 )</td>
<td>( n = 4 )</td>
<td>( n = 5 )</td>
</tr>
<tr>
<td>Type of ownership</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipality</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Private</td>
<td>0</td>
<td>2</td>
<td>0</td>
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<tr>
<td>Foundation</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Year built</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre 1960</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1960–1991</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>1992–2014</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Cities</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Urban municipalities</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Semi-rural municipalities</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Rural municipalities</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

\( a \) Size is determined by number of beds, small (<33), medium small (33–42), medium large (43–52) and large (53–68).

### 3 | RESULTS

#### 3.1 | Characteristics of the RCFs and staff

The characteristics of the RCFs are presented in Table 1. The length of time since the facilities had been built ranged from 1 to 117 years (\( M = 43.85 \) SD = 29.96). The number of older persons living in the RCFs ranged from 23 to 68 (\( M = 45.40 \) SD = 11.96), and the number of staff working in the RCFs ranged from 15 to 72 (\( M = 40.25 \) SD = 14.58). The number of units within each RCF ranged from 2 to 7 (\( M = 3.70 \) SD = 1.66), and the number of floors ranged from 1 to 7 (\( M = 2.95 \) SD = 1.50).

The mean age of the participants was 45.4 years (SD = 11.59, range = 22–66), and the majority was female (n = 176, 92.1%). The mean number of years working within the healthcare profession was 17.3 (SD = 10.7, range = 0.5–44) and within care for older people 16.9 (SD = 9.58, range = 1–43). Concerning staff grade, licensed practical nurses were in the majority (n = 146, 79.8%), with nursing assistants the second largest group (n = 29, 15.8%), followed by a smaller number of registered nurses (n = 7), and one care staff member with an unknown grade.

The staff reported person-centred care as high (see Table 2). There were high scores particularly on the P-CAT Personalising
Care subscale (M = 4.21, SD = 0.65) and the PCQ-S subscales Safety (M = 5.25, SD = 0.79) and Community (M = 5.38, SD = 0.73). Univariate analyses of the standardised S-SCEAM scores by resident need domain and facility location for the 20 RCFs are also presented in Table 2. The highest mean score was on the Safety domain (M = 80.35, SD = 6.77), while the lowest mean scores were for the Cognitive Support (M = 60.05, SD = 12.75) and Privacy (M = 60.59, SD = 12.18) domains. For S-SCEAM locations, the highest mean scores were found for Private Apartments (M = 85.37, SD = 5.18) and Dining Areas (M = 83.42, SD = 8.81), while the mean score for Overall Layout was considerably lower (M = 61.09, SD = 6.22). The lowest mean score was for the Garden area, although there was a wide range of scores across RCFs with four RCFs not providing a garden.

3.2 | SPORE analyses

Table 3 presents the univariate statistics and Cronbach's alpha internal consistency reliability of the SPORE subscales. All SPORE subscales were normally distributed with good internal consistency reliability (Cronbach αs = 0.85–0.88).

### TABLE 2

<table>
<thead>
<tr>
<th>Staff perceptions of care</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>P-CAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent of personalising care</td>
<td>4.21</td>
<td>0.65</td>
<td>1.29–5.00</td>
</tr>
<tr>
<td>Amount of organisational support</td>
<td>3.41</td>
<td>1.05</td>
<td>1.00–5.00</td>
</tr>
<tr>
<td>PCQ-S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>5.25</td>
<td>0.79</td>
<td>1.17–6.00</td>
</tr>
<tr>
<td>Everydayness</td>
<td>4.60</td>
<td>1.08</td>
<td>1.75–6.00</td>
</tr>
<tr>
<td>Community</td>
<td>5.38</td>
<td>0.73</td>
<td>1.00–6.00</td>
</tr>
<tr>
<td>S-SCEAM Domains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Support</td>
<td>60.05</td>
<td>12.75</td>
<td>43.56–86.67</td>
</tr>
<tr>
<td>Physical Support</td>
<td>73.95</td>
<td>6.89</td>
<td>63.94–89.34</td>
</tr>
<tr>
<td>Normalness</td>
<td>73.59</td>
<td>11.91</td>
<td>45.83–95.24</td>
</tr>
<tr>
<td>Privacy</td>
<td>60.59</td>
<td>12.18</td>
<td>41.13–88.28</td>
</tr>
<tr>
<td>Comfort</td>
<td>76.67</td>
<td>8.64</td>
<td>53.03–90.79</td>
</tr>
<tr>
<td>Choice</td>
<td>71.07</td>
<td>9.64</td>
<td>51.04–87.50</td>
</tr>
<tr>
<td>Openness &amp; Integration</td>
<td>74.39</td>
<td>7.18</td>
<td>60.00–86.67</td>
</tr>
<tr>
<td>Safety</td>
<td>80.35</td>
<td>6.77</td>
<td>65.55–93.33</td>
</tr>
<tr>
<td>S-SCEAM Locations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Layout</td>
<td>61.09</td>
<td>6.22</td>
<td>47.69–79.10</td>
</tr>
<tr>
<td>Entrance/External</td>
<td>72.62</td>
<td>9.51</td>
<td>47.62–85.71</td>
</tr>
<tr>
<td>Private Apartment</td>
<td>85.37</td>
<td>5.18</td>
<td>74.83–94.56</td>
</tr>
<tr>
<td>Lounge</td>
<td>69.40</td>
<td>19.55</td>
<td>0–95.00</td>
</tr>
<tr>
<td>Dining area</td>
<td>83.42</td>
<td>8.81</td>
<td>65.38–100</td>
</tr>
<tr>
<td>Garden</td>
<td>57.78</td>
<td>31.70</td>
<td>0–94.44</td>
</tr>
<tr>
<td>Total</td>
<td>71.61</td>
<td>7.73</td>
<td>54.94–83.73</td>
</tr>
</tbody>
</table>

Note: Due to missing data, for all P-CAT and PCQ-S subscales n = 186.

Abbreviations: P-CAT, Person-centred Care Assessment Tool; PCQ-S, Person-centred Climate Questionnaire—Staff version; S-SCEAM, Sheffield Care Environment Assessment Matrix—Swedish Version.

3.2.1 | Bivariate analyses: Individual-level

There were no significant associations between any staff characteristic (age, number of years working within the healthcare profession, number of years working within care for older people, grade) and scores on the SPORE subscales. In Table 4, the correlations between SPORE subscales and the P-CAT and PCQ-S subscales are presented. The correlations between SPORE and P-CAT subscales ranged from 0.30 to 0.50, and between SPORE and PCQ-S subscales from 0.35 to 0.56. The intra-correlations for the SPORE subscales ranged from r = 0.51 to r = 0.93. All correlations were significant at p < .05.

3.2.2 | Bivariate analyses: Home-level analyses

Of the 25 bivariate associations analysed between home characteristics and SPORE subscale scores, only two were significant (p < .10): the age of the home was negatively associated with the Working and Caring for Residents subscale (r = −0.39, p = .094). In contrast, the number of units was positively associated with the Day and Dining Areas subscale (r = 0.42, p = .069).
Table 5 presents the home-level correlations between the SPORE, P-CAT and PCQ-S subscales. All SPORE subscales were significantly associated with all P-CAT and PCQ-S subscales (except the SPORE General Care Environment was not significantly associated with P-CAT Personalising Care). The significant correlation coefficients for SPORE subscales with P-CAT ranged from $r=0.51$ to $r=0.86$, and SPORE subscales with PCQ-S from $r=0.51$ to $r=0.88$. The intra-correlations for the SPORE subscales ranged from $r=0.57$ to $r=0.97$.

Home-level analyses of the associations between S-SCEAM domain and location scores with SPORE subscales (Table 6) indicated that S-SCEAM overall environment quality scores correlated significantly with all SPORE subscales (range=0.50–0.70). The S-SCEAM Comfort subscale was correlated with all SPORE subscales (range=0.51–0.72), while the S-SCEAM Privacy subscale was correlated ($r=0.43$) with the SPORE Staff Facilities sub-scale. The SPORE Working and Caring for Residents subscale was correlated...
<table>
<thead>
<tr>
<th>S-POR subscale</th>
<th>S-SCEAM domain/location</th>
<th>Staff facilities</th>
<th>Day and dining areas</th>
<th>Corridors and circulation spaces</th>
<th>Working and caring for residents</th>
<th>General care environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive support</td>
<td>0.18</td>
<td>0.27</td>
<td>0.28</td>
<td>0.50**</td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>Physical support</td>
<td>0.31</td>
<td>0.12</td>
<td>0.16</td>
<td>0.57***</td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>Normality</td>
<td>0.23</td>
<td>0.19</td>
<td>0.22</td>
<td>0.06</td>
<td>-0.07</td>
<td></td>
</tr>
<tr>
<td>Privacy</td>
<td>0.43*</td>
<td>0.30</td>
<td>0.22</td>
<td>0.08</td>
<td>-0.12</td>
<td></td>
</tr>
<tr>
<td>Comfort</td>
<td>0.51**</td>
<td>0.63***</td>
<td>0.65***</td>
<td>0.72**</td>
<td>0.72***</td>
<td></td>
</tr>
<tr>
<td>Choice</td>
<td>0.22</td>
<td>0.14</td>
<td>0.04</td>
<td>0.20</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>Openness &amp; Integration</td>
<td>-0.07</td>
<td>-0.27</td>
<td>-0.14</td>
<td>0.02</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>0.22</td>
<td>0.15</td>
<td>0.21</td>
<td>0.36</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>Overall Layout</td>
<td>0.12</td>
<td>-0.03</td>
<td>-0.03</td>
<td>0.40*</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>Entrance/External area</td>
<td>0.10</td>
<td>-0.13</td>
<td>-0.14</td>
<td>0.19</td>
<td>-0.03</td>
<td></td>
</tr>
<tr>
<td>Private Apartment</td>
<td>0.66***</td>
<td>0.64***</td>
<td>0.63***</td>
<td>0.75***</td>
<td>0.46**</td>
<td></td>
</tr>
<tr>
<td>Lounge</td>
<td>0.44*</td>
<td>0.38*</td>
<td>0.35</td>
<td>0.30</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>Dining area</td>
<td>0.38*</td>
<td>0.39*</td>
<td>0.31</td>
<td>0.37</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>Garden</td>
<td>0.29</td>
<td>0.33</td>
<td>0.37</td>
<td>0.48**</td>
<td>0.73**</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.57**</td>
<td>0.50**</td>
<td>0.50**</td>
<td>0.70**</td>
<td>0.65**</td>
<td></td>
</tr>
</tbody>
</table>

Note: *p < .10; **p < .05; ***p < .01.

Abbreviations: S-POR, Staff perception of residential care facility environments; S-SCEAM, Sheffield Care Environment Assessment Matrix—Swedish Version.
with S-SCEAM cognitive support \( r = 0.50 \) and physical support \( r = 0.57 \) subscales.

4 | DISCUSSION

This study reports on the development and initial validation of a new instrument assessing staff perceptions of the care environment in RCFs for older people. The instrument's psychometric properties, including reliability and convergent validity analyses, meet generally accepted standards. The SPORE subscales had good internal consistency reliability and were moderately to strongly correlated at the individual level with the subscales of the measures of person-centred care, and strongly correlated with the same measures at the home level. All the SPORE subscales were also strongly correlated with the overall environmental score of S-SCEAM, the instrument that provided an objective assessment of the quality of the RCFs' environment. Thus, SPORE provides an assessment of staff perceptions of the environment of RCFs which is (a) related to the objective care environment and (b) the potential for high-quality, person-centred care being delivered within that environment. At the same time, SPORE subscales were selectively associated with the individual domain and location scores of S-SCEAM, suggesting a sensitivity to variations in RCFs' internal design and function. Scores on SPORE were also unassociated with broader staffing and structural characteristics of RCFs, suggesting that it has suitability for use in RCFs of diverse architecture and purpose. Our initial testing thus indicates that SPORE is promising as a measure of staff perception of environmental factors relevant to the quality of care delivered in RCFs. These results are encouraging and justify additional development and testing of the instrument.

This study responds to the recent trend of highlighting the physical environment as an essential factor for high-quality care (Brambilla et al., 2019; Elf et al., 2020). Many care home managers struggle to retain their staff as working in RCFs can be demanding and stressful. For instance, according to a Swedish report on working conditions in the care of older people, around 50 percent of the care staff had considered terminating their employment due to poor working conditions (Szebehely et al., 2017). Additionally, research shows that healthcare staff are sensitive to the quality of the care facility where high staff turnover is associated with low quality (Castle et al., 2006). Therefore, an emphasis on the design of the healthcare environment in RCFs for older people can be an important factor to increase staff work satisfaction, and a way to attract new staff members.

The results of our study support the preliminary use of SPORE to evaluate and study environmental factors in RCF organisations, and we suggest that the instrument can be used for various purposes including pre- and post-occupancy evaluations, design guidance, stakeholder dialogues and in research. Construction and renovation of RCFs for older people involve large financial costs for society and must be sustainable for a long period of time (Swedish Association of Local Authorities and Regions, 2018). The layout of a care facility is determined early in the design process (Steinke et al., 2010), and consequently, more knowledge is required about which environmental factors are important for providing high-quality care, so that these factors can be addressed in the planning of new buildings and in renovation projects. This is related to EBD, and our results make a valuable contribution to that process. For instance, SPORE can be used to collect baseline data before renovating an RCF, or be applied to make comparisons between care facilities, with, for example varying environmental characteristics. The results from such assessments can be used to provide feedback to various stakeholders as part of guiding design decisions to improve new RCFs, which is essential for EBD (Zimmerman & Martin, 2001). Further, in the effort to achieve the best possible outcomes, the views of care staff are of great value and constitute an important aspect of EBD where the perspectives of different professions are recognised (Kasali & Nersessian, 2015).

The SPORE instrument is a self-report instrument that is easy to use and compared to more comprehensive environmental assessment instruments such as S-SCEAM it is more straightforward and can provide faster assessments with limited resources and time frames. Therefore, we suggest that care home managers can use SPORE to obtain knowledge about their staff’s perception of the healthcare environment which, as indicated by our findings, is likely to be a relatively accurate indication of the objective quality of the environment. The results can be discussed among staff and used in strategic planning to develop the organisation’s goals to provide high-quality care and person-centred care, where the environment plays an essential role (Martin et al., 2021). When creating and implementing new designs and solutions in the environment, SPORE can be re-administered to evaluate the new design.

The use of SPORE can also lead to ground-level action to change both working practices and environmental characteristics in order to overcome challenges to delivering high-quality care in the facility. Staff working in healthcare buildings spend their working hours in different places within the building, and the subscales in the instrument are an attempt to represent these different spaces. The instrument can be used to provide an overall assessment of staff perceptions of the entire RCF, but also identify quality aspects related to specific areas. For instance, low scores on the subscale measuring possibilities to provide care for persons living in the facility can prompt more careful consideration of the scores on the other subscales. It might be of interest to investigate how staff perceive areas dedicated to them, that is the staff facilities with items covering for instance changing rooms, toilets and showers, office premises and parking facilities, in case dissatisfaction with these features is demotivating staff. Alternatively, low scores for lighting and noise levels in the day and dining areas might indicate issues that can be addressed to promote higher quality care. Hence, the results from administering SPORE to staff can be used as a basis for discussions among staff and managers to improve or adapt environmental features in the RCF. However, this requires that the staff have a mandate in position and have the authority to adapt the environment in their daily work.

In addition, SPORE can make it easier to study healthcare environment concepts in relation to different care models and designs. For example, the instrument may offer insights on how units can be adapted SPORE to staff can be used as a basis for discussions among staff and managers to improve or adapt environmental features in the RCF. However, this requires that the staff have a mandate in position and have the authority to adapt the environment in their daily work.
develop a work environment based on person-centred care. This links to the importance of how the care is organised. To achieve person-centred care environments, efforts are required at several levels where collaboration between organisations, conscious leadership and staff competence are of great importance (McCormack & McCance, 2006). Managers and leaders of RCFs have a crucial role in maintaining good environments and providing support to enable staff to carry out their work efficiently and facilitating person-centred care (Backman et al., 2020; McGilton et al., 2012). Theoretical models have also described the importance of supportive leadership, where responsibility for an influential, person-centred care culture in RCFs has been emphasised (Lynch et al., 2011; McCormack & McCance, 2010). We argue that SPORE is a beneficial tool for managers in RCFs to identify facilitators and barriers to the care environment from the viewpoint of staff. The outcome can be used as part of improvements and in creating person-centred care environments.

Results from this study also support the use of SPORE in health-care research. Since the instrument measures significant environmental factors associated with good quality care, researchers can use SPORE to study how, when and under what circumstances certain aspects of the environment cohere with other quality and staff-related aspects. For instance, it might be interesting to determine associations between staff perceptions of the care environment and staff outcomes such as well-being and job satisfaction. Rigorous research in this area will help managers in health care, planners and designers make informed decisions about appropriate design solutions for creating inclusive work environments that are supportive to both staff and older persons.

In sum, a well-designed physical care environment can be a resource that provides the staff with supportive work conditions, and thus opportunities for performing good and safe care. Despite this, research is limited in terms of care staff’s perception of the physical environment in the facility where they work (Eijkelenboom & Bluyssen, 2022; Salonen et al., 2013). This is noteworthy because staff play a key role in these facilities as they are expected to provide high-quality care to persons in frail health, work that has been reported to be increasingly demanding and stressful. Compared with the number of instruments available to assess, for example staff job satisfaction and workload, few instruments focus on the physical care environment (Maassen et al., 2020). The SPORE instrument is considered an essential step towards operationalising the concepts that make up the physical environment within RCFs. It can be a valuable tool for evaluating staff perceptions of environmental factors to provide high-quality nursing care to older persons. In comparison with other fundamental nursing components, the environment tends to be neglected (Lindahl, 2018). Therefore, we believe that results from SPORE evaluations can contribute to new knowledge within the nursing metaparadigm.

4.1 | Strengths and limitations

Due to the lack of a gold standard instrument for measuring staff perceptions of RCF environments, our selection of instruments for our validation analyses was guided by theory and empirical evidence that link our behaviour to how we perceive our environment (in this study, the delivery of person-centred care to perceptions of the physical care environment) and how we perceive our environment to objective qualities of that environment. Consequently, we used well-established and validated instruments that measure person-centred care and the physical environment of RCFs. Nevertheless, this approach is open to arguments related to the appropriateness of the constructs and instruments that we used to demonstrate the validity of SPORE. Standard procedures were carefully followed for the translation and adaptation of the original source material, staff working in RCFs were consulted as part of this process, and the instrument was pilot tested before the validation work commenced (Maneesriwongul & Dixon, 2004; Wild et al., 2005). However, other procedures that might have indicated the need for different or better items, such as calculating a content validity index, were not used. Our sample size provided adequate power for our individual-level analyses, but pragmatic restraints on our study’s resources meant that a sample of 20 RCFs was the best that could be achieved for our home-level analyses. Importantly, however, our sampling frame for RCFs provided a high level of variation in terms of geographical location, building design, year of construction, size and organisational ownership to ensure adequate representation of the diverse extent stock of such care environments in Sweden.

We elected to retain the subscale structure of the original source material for SPORE, which was based primarily on functional aspects of the care environment, such as locations for older people’s dining, day-time activity and circulation, or for staff use. The correlations we obtained between some SPORE subscales were higher than would be wished for from a psychometric perspective, suggesting a lack of separation between the constructs the subscales are measuring. However, given that the subscales assess objectively separate locations within most RCFs and can therefore offer important information to staff and care managers concerning those specific areas, we have decided to retain all subscales. An alternative approach might be to analyse responses to determine underlying dimensions to the physical environment that intersect locations and areas. S-SCEAM, for example, provides scores both for the quality of specific locations and areas of care environments and for domains of quality, such as comfort, cognitive support, physical support and so forth. We welcome research that explores other ways of utilising SPORE data, as well as its appropriateness for assessing other forms of care environments and RCFs in different countries and cultures.

5 | CONCLUSIONS

The SPORE instrument is the first self-report instrument for the assessment of staff perceptions of the care environment in RCFs in a Swedish care context. The instrument demonstrated good psychometric properties and its subscales an excellent range of associations with staff perceptions of person-centred care and with objective
The study was performed following the ethical guidelines of the Declaration of Helsinki (World Medical Association, 2008) and approved by the Regional Ethical Review Board for research in Sweden. Written informed consent was obtained from all participants. Written informed consent was obtained from the care staff involved in the patient care and the work of staff and the quality of care in RCFs for older people.

AUTHOR CONTRIBUTIONS

The authors are grateful to the care staff who were involved in the pilot testing of the SPORE instrument and provided their feedback on validation of the instrument. The authors declare that they have no conflicting interests.

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**How to cite this article:** Nordin, S., Elf, M., & McKee, K. (2023). Development and initial validation of the staff perception of residential care environments (SPORE) instrument. International Journal of Older People Nursing, 00, e12596. https://doi.org/10.1111/opn.12596