

Creating Healing Environments to Improve Residents' Quality of Life

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Abstract

A supportive soundscape in nursing homes design has the potential to promise quality of life improvement among dementia residents. Another type of environmental sound, which is often ignored in the care setting, is important in developing mood, behavior, and cognitive involvement. This paper discusses the possible role of therapeutic soundscapes in reducing agitation, promoting relaxation, and helping people with dementia engage socially. The research was based on environmental psychology, dementia care, and sound design principles and provides a set of strategies aimed at designing person-centered auditory environments that can satisfy their sensory, emotional, and cognitive requirements. The supportive soundscapes can help to provide more humane and efficient dementia care by including the evidence-based methods, including the use of biophilic sound elements and customized musical interventions.

Keywords: Supportive soundscapes, Dementia care, Nursing homes, Environmental psychology, Therapeutic design, Biophilic sounds, Person-centered care, Music intervention, Cognitive well-being, Elderly care.

1. Introduction

1.1 Ageing and the Challenge of Dementia

The accelerating global ageing of the world population has changed dementia into a personal health concern to one of the most burning in the contemporary world, both socially and medically. In contrast to the ordinary age decline, dementia is marked by deep imbalances in memory, reasoning, orientation, and communication which cumulatively result in dependency and disability. As a clinical problem, dementia is not only a major challenge to families, caregivers, and healthcare systems with over 55 million affected persons worldwide and an annual prevalence of close to 10 million cases. Nursing homes are critical settings of care and well-being because the residents affected with dementia usually enter them as soon as community living is not safe and appropriate anymore(1).

1.2 Nursing Homes as Complex Care Environments

The purpose of nursing home is two-fold: they combine medical and physical attention, and also serve as housing facilities in which elderly people spend the majority of their life. They are usually privately or semi-privately roomed, communal facilities, daily routine and structured support. The sensory variety of the nursing home, however, is frequently constrained by the institutional character of the environments, which makes the nursing homes seem monotonous, noisy or affectually one-dimensional. In the case of people with dementia, who closely connect perceptual, cognitive and behavioral responses with the environmental stimuli, these limitations may aggravate confusion, agitation, or withdrawal. Making nursing homes look like a healing environment, hence requires consideration not only of architecture and lighting but also of the acoustic aspect of everyday life.

1.3 The Role of the Sonic Environment

Sound is a distinct attribute in human experience. Beyond its physical qualities, sound influences perception, cognition, and emotion. Soundscape concept, which is the acoustic environment as perceived or experienced by the people in the situation is further developed beyond the measurement of decibel and frequency, to its interpretation in the way people experience the sound stimuli(2). In the case of people with dementia, this difference is essential: their ability to process, interpret and respond to sound can also be distorted and they become susceptible to negative sounding and receptive to positive environments. Auditory cues unlike visual cues are not usually compromised by the aging process and thus can counter the losses of other sensory cues.

1.4 Dementia, Sound, and Behavioral Outcomes

The most difficult issues of care are behavioral and psychological symptoms of dementia (BPSD), such as agitation, aggression, apathy, wandering, or hallucinations. Although there are pharmacological treatments, these are usually risky and have side effects. Non-pharmacological therapy (sensory stimulation with either music or exposure to nature) is becoming more accepted as safer and more holistic. However, most interventions do not

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consider the daily soundscape of nursing homes, which has been an effective but underused tool of affecting mood, cognition and social interaction. When used purposefully, supportive soundscapes can also help one feel relaxed, engage, agitate less, and feel safer.

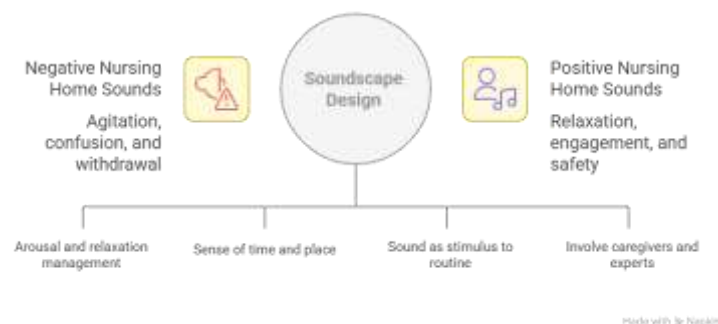


FIGURE 1 Supportive Soundscapes for Dementia Care

1.5 Towards Supportive Soundscape Design

The new scientific area of soundscape studies provides the means of redefining the restructuring of auditory environments in nursing facilities to suit dementia patients. Instead of background silence or the occasional application of music therapy, soundscape design involves the use of pre-determined acoustic stimuli, (birdsong, recognisable tunes, low-key environmental sounds, etc.), which act predictably and in a continuous manner throughout the day. These sound components may be adjusted to fulfill three main purposes: (1) mood control, to make residents move between arousal and relaxation; (2) safety, to give residents a sense of time and place; and (3) behavioral cues, to have the residents guided by sound as a stimulus to routine(3).

1.6 The Need for Awareness and Co-Creation

Although such benefits may be significant, caregivers and institutional designers are not yet fully aware of the significance of sound. Employees tend to pay attention to the practicality of care, such as feeding, washing, medical supervising, etc., and forget about such significant detail as sound. Nonetheless, care givers hold tacit knowledge of how residents respond to sound based on their day to day experiences. Involving them, as well as families and acoustic experts, in co-creation activities helps to make sure that soundscapes are not foisted upon anyone but co-created through joint efforts. Personalization in such participatory approaches is necessary because dementia can appear in different ways in people and sound associations are personal.

2.The latest developments

2.1 Understanding Sonic Environments and Soundscapes

The difference between the sonic environment and the soundscape is important in order to design supportive soundscapes to nursing home residents with dementia. The sonic space denotes the actual assembly of sounds within a specific location- all the way to footsteps and talking, all the way to machine noises. What is known as the soundscape is, however, the experience of sounds, perceived and interpreted. Two individuals can even be in the same sonic setting and feel entirely different soundscape, based on their level of cognition, past experience, and their emotional background(4). This perceptual divide is especially pronounced to the residents with dementia due to the fact that the cognitive deterioration changes the processing, recognition, and appraisal of auditory information.

2.2 Mechanisms of Auditory Attention and Salience

Sound perception under human means presupposes selective attention: the possibility to concentrate on auditory signals that are meaningful and to prevent irrelevant noises. This process is based on bottom-up mechanisms, in which sound characteristics such as loudness or sharpness capture attention in a more automatic fashion, and top-down mechanisms, in which the individual goals, expectations and learned associations influence perception. As an example, an abrupt loud crash can automatically capture the interest, whereas the voice of a caregiver can be prioritized because it is more relevant. These processes tend to be disturbed in dementia. The residents might find it difficult to filter background noises, with the resulting overstimulation and confusion, or they might hear the

sounds that would normally give them an orientation. Therefore, to create favorable soundscapes, salience, complexity, and predictability have to be carefully balanced.

2.3 Emotional Meaning and Associations of Sound

Sound is not only a carrier of physical information, but also emotion and symbols. Music, sounds of nature, even the ordinary noises, can be remembered, triggering a mood, and a cultural respect. An example of this is that birdsong is commonly associated to vitality and morning renewal whereas church bells could be seen as indicating safety and time orientation. Notably, the associations are not universal and are influenced by individual histories. The long term memory of some with dementia can be strong in contrast to short term recollection which is an ongoing effect of familiar sounds which serve as anchor to recognize and biography. Nevertheless, the same sound can create a positive or negative connotation based on the context: wartime songs can calm down one of the residents and upset another. The issue with this is how to create soundscapes that are both emotionally supportive and without any unintended triggers(5).

2.4 Complexity, Predictability, and Appraisal

One of the most important lessons of soundscape studies is that human beings tend to like moderately complex environments. Very simple sound environments are monotonous and too dull; very complicated environments are confusing and stressful. Sometimes referred to as the Wundt curve, this principle indicates that an ideal balance can help to promote an engagement without excessive thoughts. In the case of dementia residents who tend to have lower ability to analyze auditory scenes, the limit to complexity becomes even smaller. Sounds must be distinct, predictable and clear. Moderate newness is thought to be stimulating, but uncertainty must be avoided. This insight supports the fact that structured soundscape design is necessary, and supportive sounds are planned and incorporated in accordance with everyday activities.

2.5 Perceived Safety and Stress Reduction

Soundscapes also create the sense of safety beyond cognition. Recent types of stress theory like the Generalized Unsafety Theory propose that human beings revert to a vigilant state unless there are cues to safety. The residents can not feel safe in nursing homes because of new environments, isolation, or confusion. Auditory signals may either increase or decrease this stress. Unstructured noise, especially harsh alarms, echoing corridors or unstructured noise can be cues of danger whereas monotonous, familiar, and community-related cues (e.g., distant conversations, natural sounds or clock chimes) could increase a sense of safety. It is thus possible to reduce chronic stress in dementia care through the provision of consistent auditory cues to convey a sense of security and availability.

2.6 Subliminal Versus Attended Sound

Sound has the capacity to affect behavior in either an attended or a subliminal manner: in the first case, sound requires conscious attention; or in the latter case, sound acts unconsciously. Observed sounds consist of music therapy sessions, instructions to the caregiver or voices that the child is familiar with. Background instrumental music, soft wind or ambient birdsong can be considered subliminal sounds. It has been shown that the two levels are significant. Sound, when listened to actively can elicit action, recalling of events and expression of feelings. Meanwhile subliminal sounds perform the same functions of mood regulation, agitation reduction and the making of calm atmospheres without demanding active attention(6). This stratification of audible levels is essential to dementia residents, whose attention can be overwhelmed by too much work demand, and whose emotional stability can be supported by small scaffolds of subliminal signals.

2.7 The Restorative Potential of Natural Sounds

Psychological restoration has been linked to exposure to the natural environment. Elements of nature presented through sound, like streams, rustling leaves, or bird sounds, are the main components used to decrease stress and replenish attention. These restorative effects may be recreated indoors by the use of soundscapes that replicate the outdoors in dementia care. It has been proposed that the sound of birds and especially, brighten mood recovery and give orientation cues but soft wind sounds induce relaxation. Noteworthy, such sounds should be of high quality, contextual and timely to have the desired restorative impact.

2.8 Age-Related Changes in Auditory Processing

Ageing in itself is a challenge to auditory processing. Presbycusis or age related hearing loss is a condition of hearing that impairs the high frequency perception and speech understanding in noisy conditions. The elderly have difficulty in sound localization, time processing, and in the ability to separate speech and background sounds. Such changes, together with deficits linked to dementia, radically transform the perceptions of soundscapes by the

residents. Sounds can be muffled, distorted and confusing and this causes social withdrawal and difficulties in communication. Any supportive soundscape should thus keep in consideration the cognitive as well as the sensory limitations and should modify the volume, clarity, and frequency ranges to enable the hearing impairments.

3. Sonic Environment to the Sounds

3.1 Distinguishing Physical Sounds from Perceived Soundscapes

Perception is fundamental in terms of the connection between objective sonic environment and subjective soundscape. The sonic environment is the quantifiable set of sound cues that are found in a particular space: footsteps, falling papers, traffic sounds outside, or background music. The soundscape on the other hand is how these sounds are received by listeners. Such a difference is vital in the care of dementia patients, since what a caregiver may hear as background noise may be perceived very differently by the residents who do not have the same level of cognitive filtering. Soundscape is not merely what we hear, but how we make sense of it, and this is determined by memory, attention and emotional state.

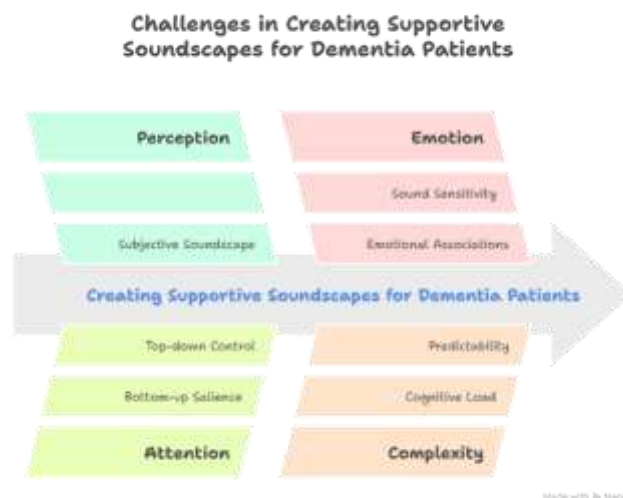


FIGURE 2 Challenges in Creating Supportive Soundscapes

3.2 The Role of Attention in Auditory Experience

Sounds of all kinds constantly attack human beings, although not all of them come to the conscious level. The visual system has attentional mechanisms to allow it to focus on some sounds and inhibit others. The voice of a caregiver could be heard in a noisy dining hall due to selective listening attention. Two processes interact in this filtering, where bottom-up saliency, or particular acoustic features such as sudden loudness requiring attention and top-down control, where listening is directed by the goals or expectations of a person. In the case of dementia, the two processes are impaired(7). The bottom-up filters can easily prove too sensitive and thus all noises become disruptive, whilst top-down activities can also fail, and the residents will not be able to concentrate on meaningful voices. This disintegration tends to express in the form of agitation or withdrawal when in the presence of noise.

3.3 Sound Recognition and Meaning-Making

People hardly hear without associating sounds with their origin, activity, and autobiographical memory. The sound of knives and forks may announce lunch or dinner, a doorbell may announce a visitor. These associations form meaning thereby enabling sounds to make people oriented in time and space. In the case of residents with dementia, recognition may collapse. A daily sound will be no longer related to its origin so the listener is left puzzled or in panic. On the other hand, some of the sounds of long term memory such as child songs or cultural sound marks can be preserved and provide very strong anchors to identity. This discriminatory retention of auditory meaning is what can be understood to create soundscapes that are reassuring and not disorienting.

3.4 Sound Emotions

Sound is emotive as well as recognitive. The effect of music, especially, is well-known to evoke either a feeling of joy, sadness or nostalgia, based on the tempo of the music, the pitch of the music, and the mode of the music. However, even plain surrounding noise may help to change mood: birdsong tends to make people feel calmer, whereas loud alarms make them feel stressed. In the case of dementia in residents, sound sensitivity can be overblown or distorted. There is even the likelihood of some growing very averse to sounds that would be deemed

soothing by a caregiver and others can exhibit increased enjoyment or obsessive fascination with music. Such inconsistency highlights the importance of flexibility: positive soundscapes should be customized to allow generating positive emotions without stimulating the participants too much.

3.5 Complexity, Predictability, and Cognitive Load

Patterns in sound are natural in the brain. Simple environments are monotonous and complex environments are stressful. Moderate complexity is usually the kind of thing that healthy listeners love; something that is neither too difficult nor too easy. For dementia residents, however, tolerance narrows. There are cognitive deficits that make it hard to distinguish between overlapping sounds, as well as predict the next thing to happen. A world with loud competing voices, television, and clattering cutlery can easily turn into an environmental overload. In this way, the design of soundscapes in dementia care is aimed at simplifying sound input, making it predictable, and preventing abrupt and unpredictable sounds that may trigger anxiety.

3.6 The Influence of Expectation and Surprise

Perception is not reactive, but anticipatory. Individuals develop opinions on how a soundscape ought to happen: a church bell striking the hour, or the birds singing in the morning. All these expectations influence the emotional reactions. Unobtrusive variations in expectation, e.g. a new, yet compatible sound, may be delightful, whereas radical breaches are distracting. In the case of dementia, the expectations can be weak among residents. Strange or discrepant sounds tend to cause stress but not curiosity. This emphasizes the need to integrate soundscapes into daily activities, therefore, sound signals support predictability and safety instead of a sense of surprise.

3.7 Multisensory Integration and Auditory Dominance

It is true that although sound is one of the channels of perception, it seldom functions independently. Auditory information is combined with visual, tactile and contextual information in everyday life. In people with dementia, sound is even more dominated as an environmental awareness pathway, however, since visual impairments are frequent in such cases. As the vision decreases, auditory cues are important tools of orientation, security, and social interaction. This is why supportive soundscapes cannot be regarded as peripheral accessories but as the main elements of care setting.

3.8 Cultural and Personal Frames of Reference

One does not hear a sound in a vacuum. Interpretation is a matter of cultural origin and own biography. What seemed to be a lullaby to one resident will seem meaningless or even disturbing to the other resident who did not grow up with the lullaby. On the same note natural sounds can make someone familiar with rural environment and an outsider to the world of urban living. These frames of reference can be long-lasting, whereas other memories are short-lived, in dementia care. This means that planning supportive soundscapes must include not only some general guidelines but specific knowledge about the past and preferences of residents and their sensitivities.

4. Discussion

Sound in most nursing homes is a secondary consideration--something to be suppressed when it becomes noise. This view does not consider the active involvement of sound as it forms the experiences of residents. When individuals have dementia and face visual impairment, auditory signals are their main means of interpretation of their surroundings. Noise is not neutral: it will either increase agitation or bring relief. The discourse here rebrands soundscapes as therapeutic tools and not passive background conditions. Nursing homes can improve the quality of life through enhancement of the auditory environment by carefully arranging its elements, which complement medical and social care(8).

A balance between stimulation and simplicity is one of the main problems associated with soundscape design as a dementia-care solution. The residents will need enriching to prevent any form of boredom but are also very susceptible to sensory overload. Additional sounds are supposed to be within the familiarity and the clarity range. Sounds that are too complex or intrusive can be a danger to added confusion or even stress. Conversely, orienting signals such as the careful selection of sound spaces, such as mellow bird sounds in the morning, low-key instrumental noise during dining, or recognizable cultural sounds can be very helpful without straining the memory. This balancing act needs to be constantly checked and corrected.

Timing is another important factor. Nursing homes are run based on daily schedules: meals, medication rounds, social activity and bedtime. The combination of soundscapes with such rhythms confirms predictability and safety. The sounds in the morning can make people alert and awake, and in the evening, the sound should relax and guide the residents to sleep. The day/night rhythm of sound when used consistently not only organizes the day but also

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lessens anxiety due to a sense of being lost. In this respect soundscapes are considered the auditory timekeepers that tie the residents to activity-rest cycles.

The right soundscape design is not the work of external specialists. Nursing personnel are the health workers that work with residents on a daily basis and have tacit knowledge of what residents prefer, what they are sensitive to, and what triggers them. Families also introduce powers of personal past and helpful resonances. The collaboration with these stakeholders via co-creation sessions guarantees the soundscapes to be contextually relevant and personally meaningful. In addition, engaging employees leads to ownership, thus increasing their chances of sustaining and upholding interventions. Cooperation thereby makes the soundscape design more of a shared and dynamic practice grounded on lived experience than a top-down intervention.

One issue in ongoing soundscape interventions is that of habituation. With time, residents will lose awareness of the additional sounds, and this can cast doubts on effectiveness. Nonetheless, habituation does not have to be negative. Once a soundscape is integrated into the aural norms, it stabilizes the environment, and it offers a uniform feeling of security. Indicatively, the constant call of a church bell or the gentle murmur of natural noises can be lost to conscious attention but will still sooth subconsciously. What should be avoided though is the sudden eradication of these noise signals and this can be disturbing to the resident, resulting in agitation. Slow changes and close observation are necessary(9).

Institutional noise takes over many nursing homes: clattering equipment and overlapping conversations, alarms and echoing corridors. These sonic environments are said to be monotonous but invasive, and these put stress on the residents and staff. Positive soundscapes help provide an alternative to this issue by drowning out unwanted sound and adding positive sound. As an example, the natural sounds may be used to alleviate the dilapidation of the mechanical noise, the familiarity of cultural sounds may stand in the place of the sterile environment of the institution. An important step in changing care environments is to reframe the soundscape as something familiar and human-centered instead of chaotic and clinical.

The use of soundscapes in nursing homes brings about ethical issues. Patients with dementia are not always capable of expressing their preferences and discomfort. This renders it vital that soundscapes are considerate of dignity and autonomy, as well as, individuality. What comforts one occupant can bother another. Ethical design then involves the need to pay close attention to personalization, flexibility and responsiveness to the feedback by the residents as well as caregivers. In addition, sound must never be manipulatively implemented to instill compliance or keep behavior silent but to help facilitate well-being and social involvement.

Technology is significant in installing soundscapes, whether it is in the playback or monitoring apparatus. However, the technological remedies need to be straightforward, not flashy and simple to use by staff. Too complex systems may be abandoned because of absence of trainings and technical support. Preferably, soundscape technologies ought to be incorporated in the daily life, as the staffs will be able to modify time and volume intuitively. New innovations, like adaptive sound systems reacting to the conditions of residents, are promising, but have to be tested thoroughly and tested to maintain reliability and acceptability.

5.Conclusion

As has been highlighted in the current study, nursing homes are more than architectural spaces, but they are sonic environments. To the dementia residents, sound does not exist as an element of the background of perception but a significant mediator of perception, orientation and emotional health. In identifying the nursing home as a soundscape, or an environment that can be experienced and interpreted through hearing, the care institutions can shift the emphasis through noise control to a more constructive sound design. This re-framing is a change of paradigm: it is no longer suppressing the unwanted sounds but the choice and active organization of the audible experience.

The results may indicate that soundscapes that support each other are a therapeutic addition to traditional medical and social care. Continuous interventions of soundscape, unlike medication, which is usually associated with side effects, or single-located music therapy, which can last only a certain amount of time, offer a permanent source of stability. Well-constructed soundscapes are capable of alleviating anxiety, enhancing mood, and making a person feel safer, which may decrease the need to resort to pharmacological methods. This not only helps the residents but also helps in putting a burden on caregivers who tend to have a lot of trouble dealing with behavioral and psychological signs of dementia.

One of the main contributions of this study is the discovery of three major routes by which soundscapes can affect the residents: mood changers, safety enhancers, and response triggers. They have different, yet complementary functions. Mood modulators, like calming sounds of nature or wake-up sounds of morning birds, are in tune with the emotional cycles of residents. The stress-reducing effects of safety enhancers, such as recognizable sounds in the community or time-markers, place residents in space and time. There are response triggers, which include signals like meal time to guide behavior and routines. The combination of these categories offers a feasible model of designing soundscapes that are useful as well as aesthetically pleasing.

Dementia is not a homogenous disorder; it is different in different individuals and it yields different auditory profiles. Music can be soothing to some residents, but will cause agitation in others. This is why it is necessary to personalize. To create positive soundscapes, the cultural background of residents, their individual histories, and present sensory abilities must be taken into account. It is possible to have personas or profiles to generalize the needs, but flexibility and adaption are essential. There is no single soundscape that will fit all residents and constant assessment is required to make the interventions beneficial in the long run.

Soundscape design cannot disregard the moral aspect of the matter. The residents might not be capable of expressing preferences at all times, which increases the chances of foisting on them the unwanted or unpleasant sounds. In order to protect the dignity and autonomy, the interventions must be worked out in collaboration with staff and families who are able to interpret the reaction and the past of the residents. In practice, it also should be implemented considering the load of the staff and the technological comfort. In case systems are too complex, they become abandoned. Ease, functionality and being able to be integrated into everyday lives are thus instrumental in the long term sustainability.

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Conflicts of interest

The authors have no conflicts of interest to declare

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