Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Subjective sensory sensitivity in healthcare settings: a qualitative investigation of aversive experiences and barriers to access care

Adam Gilani
Cardiff University
Alice Price
Cardiff University
Rebecca Oates
Cardiff University
Georgina Powell
Cardiff University
Petroc Sumner
sumnerp@cardiff.ac.uk

Cardiff University

Research Article

Keywords: hyperacusis, sensory discomfort, sensory over-responsivity, visual stress

Posted Date: September 18th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10803648/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

People who experience subjective sensory sensitivity may report distress or unease in response to sensory stimuli such as loud noises and bright lights. Healthcare settings can have many such stimuli which may trigger aversive reactions in sensory sensitive individuals.

Methods

This qualitative study used a sensory screening tool to identify sensory sensitive individuals who were then invited to complete an online questionnaire relating to their lived experience of sensory sensitivity in a range of healthcare settings (N = 69). Carers of sensory sensitive individuals were also invited to answer similar questions (N = 8). Template analyses were used to derive themes for each participant group.

Results

Themes were organised around: Features that trigger sensory sensitivity; emotional, cognitive and physical impact; impact on individuals' healthcare; mitigation approaches; understanding and accommodation by staff; suggested Improvements. Overall, our participants described sensory sensitivity having a detrimental impact on healthcare experiences across varied settings, notably in causing distress, interference in healthcare participation, and reducing access to care. Additionally, participants reported a perception of staff lacking the ability to help, which in turn impacts disclosure or help-seeking behaviour.

Conclusions

These findings highlight a need for raising awareness about sensory sensitivity to encourage help-seeking behaviour and provide a more sensory-inclusive environment.

Background

Sensory experiences shape our engagement with different environments and our social participation. Evidence has recently begun to emerge that aversive sensory experiences may impact an individual's ability to access, or fully participate in, healthcare. Sensory stressors are known to impact wellbeing and behaviour (e.g. U Leonards, et al. [1]) and many healthcare environments can have a high sensory load. For instance, noise levels in hospitals frequently exceed the World Health Organisation recommended standards and may impact patient recovery and staff performance [2]. Emergency departments can also present significant sensory challenges due to lighting and noise, specifically within waiting areas [3].

Additionally, research in critical care settings has found that sensory stimuli have a negative influence on adult patient and staff outcomes, such as causing sleep disturbance, communication problems and stress [4].

The sensory environment is particularly influential for the 10–20% of the population who experience sensory hypersensitivity [5–7]. Such sensitivity is often present in a range of conditions, as well as in the general population [8, 9]. These conditions include neurodevelopmental diagnoses such as autism and ADHD [10], psychiatric conditions including anxiety and depressive disorders [11], neurological disorders such as migraine [12] and chronic pain syndromes such as fibromyalgia [13]. Increasing evidence points towards the transdiagnostic nature of sensory hypersensitivity [14–16].

As such, we may expect relatively high prevalence of sensory hypersensitivity among people who need healthcare appointments, while at the same time healthcare environments are often loud, bright, and cluttered [17]. For example, such sensory features in primary care or in emergency departments are reported to generate distress and interference with care for autistic adults [3, 18]. In mental health in-patient settings for autistic children and young people, sensory difficulties were shown across all sensory modalities, particularly towards sounds, including unexpected alarms, doors shutting and other people [19]. Beyond autism, research also finds that the noise and business of waiting room environments can elicit anxiety in individuals with severe mental illness and may act as a barrier to physical healthcare [20].

Throughout this literature, improvements to the sensory environment of healthcare facilities have been suggested. For example, the use of a sensory-needs specific pathway for children and young people, involving sensory toolkits, and continuous involvement with parents, has resulted in positive feedback from both parents and healthcare staff [21]. Specific recommendations for improving the built environment of community-based healthcare settings [22] and healthcare improvement frameworks for autistic individuals that intend to improve sensory experiences have also emerged [23].

However, there is more to learn. As sensitivities occur both across a broad range of diagnoses and in the general population [8, 9], research exploring the impact of sensitivities in healthcare settings from a diagnosis-independent perspective is lacking. One such study involved children and young people with self-identified, or healthcare-staff-recognised, sensory needs, in which they described hospital environments as areas with many sensory challenges that create anxiety and stress [24]. It is not yet known whether similar effects are common in adults, and in other healthcare settings (e.g., primary care).

Furthermore, existing work relies on self-identified sensory sensitivity, yet individuals with sensory sensitivity do not always identify as such (as this requires knowing that your experiences differ from other people's). Here, a novel approach is taken to identify sensory sensitive adults by use of an online sensory screening tool. Selected participants then answered qualitative questions about their lived experience of sensory sensitivity across a range of healthcare settings, with responses analysed using template thematic analysis [25]. Our main research questions were whether aversive sensory

experiences are common in healthcare settings, and whether they disrupt the optimal provision of care. We had a particular focus on identifying triggers, patients' reactions towards stimuli, the impact on healthcare experiences and access, and identifying ways to mitigate this impact.

In light of recent research that aims to gain carer or supporter perspectives (e.g. L Bray, et al. [24], N Gupta, et al. [21] ,C Nicolaidis, et al. [26]), we also recruited a subset of participants who were carers and explored their experiences of supporting individuals with sensory sensitivity in healthcare settings.

Materials and Methods

Lived-experience participants

427 adults completed screening (202 via online recruitment platform Prolific, and 225 students at Cardiff University). 18 were excluded for failing attention checks and 4 for not completing screening. 107 participants met criteria for high sensory sensitivity and a health care visit in the last 2 years, and were invited to participate in the qualitative survey. 69 participants completed it (61 Prolific, 8 students; 50 female, 16 male, 3 non-binary; age range 18–70, mean 40.7). 11 participants reported a diagnosis of autism, 13 of migraine, 16 of anxiety, and 4 of fibromyalgia, all of which are known to strongly associate with sensory sensitivities [15]. Other diagnoses included depression, IBS, restless leg syndrome, cancer, endometriosis, neck or back injury (most of which have some correlation with sensory sensitivities). 13 participants did not have a diagnosis nor self-identify with a diagnosis.

All procedures were approved by the Cardiff University School of Psychology Ethics Committee. Prolific participants received £6 for the screening and £6 for the survey, students received course credit for the screening and the option of course credits or £6 for the survey.

Carers

The 202 participants recruited through Prolific were also asked if they had accompanied an individual they cared for in a healthcare setting in the past two years. In this case, sensory sensitivity was identified by the carer with the question: "Some people experience strong or distressing reactions to everyday sensory experiences such as noise, bright lights, touch, smells or certain textures. Does the person you care for experience this?" On this basis, 11 participants were invited to participate in an amended qualitative survey focused on the sensory experiences of the cared-for individual. Responses were provided by 8 carers (for 7 children, one parent; 6 also took part in the main survey). Two parents reported that they had discussed their answers with their child.

Screening

We used the Cardiff Hypersensitivity Scale (CHYPS), which has 62 questions on experiences and functional impact of subjective hypersensitivity with subscales for auditory, visual, tactile, taste and

smell hypersensitivity [27, 28]. The criterion for lived experience of ‘high sensitivity’ was set as scoring at or above the upper quartile score (for the current cohort) for at least one of the sensory subscales. These criterion scores were: Auditory 17, Vision 22, Tactile 19, Smell 10, Taste 7 (note that the number of questions varies across senses).

Survey design

The qualitative survey questions are provided in Table 1. They included both open-ended and closed-ended questions, adapted and extended from A Price, et al. [16]. We selected an online survey over focus groups and interviews to enable accessible anonymous participation with greater reach [29]. Demographic information was also collected, including age, self-reported gender and self-reported diagnosis. The survey for carers involved the same questions adapted to ask about the carers' perceived experience of the cared-for individual’s sensory experiences and consequences (supplementary information S1). All questionnaires were delivered through Qualtrics [30].

Table 1
List of questions in the lived experiences survey

0	**Lived experiences survey**
	These questions are about your experiences with different sensory stimuli in a healthcare setting such as a general practice (GP), hospital or other healthcare environment. Sensory stimuli can be anything in your environment that you can touch, smell, taste, see or hear. It can also be things that might affect your movements or balance. We are interested in how you react to these stimuli. The reactions may be physical or emotional and can be positive or negative. There are no right answers - everyone responds differently to sensory stimuli and we would like to hear about your individual experience. Please answer the following questions in as much detail as you feel comfortable with.
1	How would you describe your sensory experience in a healthcare setting such as a GP, hospital or other healthcare environment? Please indicate which healthcare settings you are referring to in your response. You may find it helpful to think about different senses, such as what you see, hear, smell and feel. You might also consider different parts of your visit. For example, if you visited a GP, you could describe the waiting area and your experience in the healthcare professional's room.
2	Can you describe the kind of reactions you have or behaviours related to sensory stimuli in healthcare settings? Please also provide any examples of particular types of sensory stimuli, scenarios or environments which make you react this way.
3	In what ways, if any, have sensory experiences or sensitivities affected your experience of healthcare?
4	Do you find yourself having to cope with your sensory experiences? If so, how do you cope with them?
5	Have healthcare staff, or anyone else, done anything that has influenced how you manage your sensory experiences in healthcare settings? If so, please describe.
6	Have you shared information about your sensory experiences or sensitivities with healthcare staff? If so, how did staff respond? If not, were there particular reasons you chose not to share?
7	Have your sensory experiences affected your access to healthcare? If so, in what ways have they done this?
8	Can you think of any changes that would improve healthcare experiences for people with different sensory needs or sensitivities?
9	Is there anything else that you would like to share about your sensory experiences in healthcare settings?

Analysis

Template thematic analysis [25] was used, with *a priori* themes reflecting the research aims as embodied in the questions asked (Table 1), whilst retaining flexibility for refining and developing new themes through engagement with the data. The initial template was developed after coding was complete for 20 participants. Two authors (AG,PS) then read all the responses from every participant. Other authors

discussed and helped refine the themes to minimise conceptual overlap. The approach combined inductive and deductive element, with a mix of semantic and latent coding to stay close to participant descriptions, whilst also allowing the derivation of interpretations with greater depth. The epistemological approach was critical realism. NVivo version 15 [31] was used to organise the coding. Throughout coding, the main coder maintained a reflexive journal to reflect on their own experiences with sensory sensitivities (manly visual and auditory) and knowledge of healthcare settings and how this may influence the interpretation of others' experiences through the coding process (see supplementary information). Other members of the research team also reflected on how their own experiences of sensory sensitivity may have guided thematic discussions and development. For example, one team member experiences migraine and visual sensitivity, and they considered how their own experiences of lighting in healthcare settings may have led to greater empathy and attention to responses highlighting this same experience.

Content analysis was used as a follow-up to assess the most common types of trigger reported by participants (we counted the number of participants who mentioned each type of stimulus, ignoring repeat mentions by the same participant) [32]. After initial categorisation, two authors (AG and PS) discussed and reduced the number of categories from 43 to 17, combining conceptually related trigger types. We also combined the carer reports with the main data for this analysis.

Results

Levels of sensory hypersensitivity in the sample

CHYPS scores showed that auditory sensitivity was most common amongst the participants, and taste sensitivity was the least. Although the recruitment criteria only required participants to have upper quartile sensitivity in one sense, many scored highly across multiple senses. The proportions of survey participants who scored in the upper quartile for each sense were: Auditory 58%, Vision 57%, Tactile 48%, Smell 55%, Taste 45%.

Qualitative themes.

The themes and subthemes with illustrative quotes are presented in Table 2. Participants mainly described their sensory experience across general practices and hospitals. General practices had varied descriptions, from low stimulation to overwhelming. Hospital settings were perceived as the most sensory stimulating. A small number of participants described other locations, such as dentists and a phlebotomy clinic. Dentists were described as quiet, warm and having a strong, distinct smell. The phlebotomy clinic had similar sensory features as hospitals or GP surgeries.

Theme 1

Features that trigger sensory sensitivity

Common auditory, visual and tactile challenges in both settings were noise created by other patients, staff, or medical equipment, bright lighting, crowding, hard seating and the smell of disinfectant. For some participants, the simple intensity was prominent (bright, loud, strong), while for others it was the interaction of stimulation across multiple senses. Lack of structure, control or warning about the sensory stimuli was the third sub-theme developed.

Theme 2

Emotional, cognitive and physical impact

Participants reported a range of reactions, which broadly grouped into subthemes of 1) emotional distress characterised by feelings of anxiety, frustration, overwhelm, and symptoms akin to panic ('can't breathe'); 2) Cognitive consequences including mental exhaustion and difficulty in concentration during consultations; 3) Physiological reactions, such as headache, fatigue, nausea or faintness. These emotional, cognitive and physical reactions were also reported to be exacerbated by already feeling unwell, tired, or anxious/stressed, which is common when seeking healthcare.

A small number of participants also shared positive reactions such as a feeling reassured by the sterile smell.

Theme 3

Impact on individuals' healthcare

Participants noted various ways in which sensory sensitivity affected their ability to engage in healthcare. The main subthemes were reduced quality of the consultations, mainly due to reduced ability to concentrate and communicate with professionals. As a consequence, some participants highlighted direct reductions in the quality of care, such as inadequate pain management.

The second subtheme was that sensory stimuli act as a barrier to attending consultations at all, through generating a desire to leave settings or avoid attending appointments. While a minority of participants reported no impact, especially for remote appointments, many participants described avoidance, delay or hesitation in accessing care due to dread or expectation that it will be an aversive experience. Some described leaving appointments due to the sensory stimuli present.

There was a commonly expressed preference for remote care, but some noted that this can limit the care they receive. Some participants expressed the view that sensory stimuli had to be endured to access care, and that they were tolerated because, without doing so, they could not access care.

Theme 4

How individuals mitigate sensory sensitivity

Participants described a preference for appointments at less crowded times or remote consultations. They also described methods of reducing sensory input, such as wearing eye masks or sunglasses, sitting at a distance from stimuli, pinching their nose, or wearing headphones. A second type of coping technique was self-regulation, with strategies including breathing techniques, cognitive distraction, fidgeting or other sensory stimulation (e.g. causing minor pain). A final approach was bringing others with them to appointments to help them feel more supported and, at times, act as a distraction from the environment.

Theme 5

Understanding and accommodation makes a difference

Several participants discussed times when staff communicated supportively and offered reassurance; that clear and calm communication, showing understanding of sensory difficulties (validation), and a friendly attitude from staff all helped greatly with coping. Some staff offered accommodations or adjustments such as alternative rooms, alternative appointment times, or dimming lights.

Many participants reported poor experiences with staff, including perceived dismissal or invalidation, resulting in distress. Examples were staff not listening, being reductive, worsening sensory distress through their actions or ignoring previously agreed upon plans. Participants felt there is a lack of understanding, creating an impression that many healthcare staff do not have time or capacity to care, or do anything about sensory sensitivities.

Some participants disclosed their sensory sensitivities through asking for adjustments, such as dimming bright lighting, as mentioned above. Methods to communicate included verbal communication, sharing through a survey and through a healthcare passport. Positive responses to disclosures included times where staff would change their communication approach, offer alternative spaces and form a plan to help. Negative responses were staff not taking helpful action despite being informed.

Participants expressed various reasons for non-disclosure, especially fear of being judged, embarrassment, or being perceived to make a fuss. Some participants did not wish to burden busy staff or perceived that disclosure was futile, given low likelihood or possibility for adjustments.

Theme 6: Suggested improvements

Participants recommended various practical changes to the sensory environment, such as separate quiet waiting areas or quiet rooms, lighting adjustments, enabling headphone use through patient calling screens (so that calling does not need to be by voice), having sanitised sensory stimulating items and methods to reduce noise, including silence policies. Accommodations through flexibility were also suggested, such as allowing people to wait outside, remote appointments and enabling patients to pick less busy times for appointments.

Participants also suggested improvements in communications and information regarding sensory needs and expected sensory experiences (for example a guide that depicts common healthcare sensory experiences with images). Participants expressed wishes for greater staff understanding and awareness, associated with more positive attitude towards sensory sensitivities.

Table 2

Themes, common subthemes and representative quotes derived from template analysis of lived experiences. Quotes are lightly edited to correct spelling and punctuation whilst maintaining original meaning. Participants are denoted as *(LX)*

Themes	**Representative quotes**
Theme 1: Features that trigger sensory sensitivity	
Subthemes	
Intensity	*-"Loud noises in hospitals make me tense."(L66)* *- "While in the waiting room … the smell which reminds me of the dentist was very strong." (L42)* *- "I can be quite sensitive to bright, white lighting due to getting migraines and find that often this is a bit of an issue in healthcare settings - especially my GP." (L5)*
Multi-sensory Overwhelm	*- "It turns into a bit of a sensory overload, with the machines beeping, the smell of cleaning products, kids crying, people coughing." (L12)* *- "I remember the constant lights and noise in hospital. Even at night the emergency lights used to bother me." (L14)* *"The last time I was in a health care setting I was in A&E, it was busy, there was a lot of noise talking from other patients, it was busy and I saw a lot of people moving and walking around." (L45)*
Unpredictability or lack of control	*- "From personal experience at a recent GP visit, the waiting area is cluttered and chaotic, there is little structure to it and people are crammed into every bit of space." (L39)* *- "Screen beeps for no apparent reason making everyone look up thinking it's announcing something or calling someone in." (L50)*
Theme 2: Emotional, cognitive and physical impact	
Subthemes	
Anxiety, panic or arousal	*"My heart rate and anxiety levels I instantly feel are rapidly raised. This makes me feel increasingly nervous. I become very restless, often tapping myself or moving my legs and also generally moving in my current seating position to get comfortable."(L69)* *"My heart beats faster, I have trouble breathing and I want to run away. I clench my jaw. I don't have any behaviours, but I am exhausted after." – (L50)* *"When a smell such as the cleaning products overwhelms me it makes me feel like I can't breathe." (L65)*

Themes	Representative quotes
Distraction and cognitive exhaustion	*- "The bright, flickering fluorescent lights in the clinic give me headaches or make it hard for me to focus on what the doctor is saying." (L31)* *"Background noises like ringing phones, coughing etc make it hard for me to concentrate and be at ease."(L15)* *"At the GPs I fidget a lot - which leaves me tired and anxious." (L48)*
Headaches	*- "The perfumes and other strong smells make me feel nauseous and give me a headache." (L30)*
Theme 3: Impact on individuals' healthcare	
Subthemes	
Diminished quality of consultation	*- "It affects my ability to communicate with health care provider. because I am often using so much mental energy to cope with the noise and people. I find it hard to process complex information." (L33)* *- "I find they make me tired before the appointment has even started and they have an effect on how well I can listen and also contribute inside the actual appointment." (L48)* *-"I will often shut down inwardly which means it is then hard for professionals to understand my pain levels or my symptoms as I struggle to verbalise what is wrong or I sit very still and quiet distracting myself on my phone even if I can hardly focus on what is on the screen, it seems like I am calmer or suffering less than I truly am so I miss out on pain management or proper sympathetic care at times." (L49)*
Avoidance in seeking healthcare	*-"If I know I will have to wait in a bright waiting room for too long I tend to avoid going as I really hate the feelings it gives me in my eyes." (L6)* *-"My sensory experiences have sometimes affected my access to healthcare. For example, busy, noisy, or uncomfortable environments can make me feel anxious or tense, which occasionally makes me delay appointments or prefer quieter times of day." (L13)* *-"The triggers that cause headaches and nausea are really extreme to a point where I have physically left appointments/waiting areas and sacrificed my appointments." (L54)* *-"The smells in hospitals make it nearly impossible for me to want to go, I usually request a phone call instead because then I don't have an overload of different senses reacting."(L12)*
Theme 4: How individuals mitigate sensory sensitivity	
Subthemes	
Setting preferences	*- "I only go if I really need to and try to avoid busy times and the claustrophobia and smell triggers are less then."(L30)* *"I always request phone appointments and sometimes it's not ideal to get all the reassurance I need without being seen face to face." (L12)*

Themes	Representative quotes
	"I do try to avoid where possible going to appointments, but it is completely unavoidable if I need to stay in the hospital. I will ask for video calls where possible so I can stay in the comfort of my own space."(L54)
Limiting sensory input	*- "I tend to take an eye mask / sunglass to hospitals where I can to dim the brightness of the lights and save myself from a migraine type headache and eye strain." (L54)*
Self-regulation strategies	*-" I cope by taking deep breaths, focusing on calm thoughts."(L66)* *-"I kind find the stimuli overwhelming and often have to remind myself that I'm there for a specific purpose and not for any form of enjoyment. This takes a reasonable amount of mental effort." (L36)* *-"Fidgeting is a bit coping mechanism for me. I guess it's a way of trying to distract my mind and have an output for the frustration, anxiety and stress of too many different sensory experiences." (L65)* *-"I often pick at my skin as it allows me to distract myself by causing pain. I have tried to replace this with fidget toys." (L48)*
Social Support	*-"I try to go to appointments with someone I trust, which makes me feel a little better." (L7)* *-"I prefer to travel with a partner (child etc) to act as a distraction." (L62)*
Theme 5: Understanding and accommodation makes a difference	
Subthemes	
Validation by staff	*-"I explained my sensitivity to bright lights and noise to the GP, and they responded understandingly by dimming the lights once and speaking more gently during the appointment."(L15)* *-"Feeling understood and supported by healthcare staff makes a big difference in managing sensory sensitivities."(L13)*
Dismissal by staff	*-"They were quite reductive and put it [sensory sensitivity] down to anxiety and then sent me a link for self-directed CBT." (L4)* *-"Health care staff I have tried to explain my distress to have not been understanding or helpful. If I ask them to switch off the bleeping they say they are too busy. Even when I have been found crying in the corridor or outside staff have been unsympathetic and don't seem to understand why the noise upsets me so much."(L59)*
Disclosure of sensory sensitivity	*-"I often choose not to share because I worry about being perceived as fussy or difficult." (L33)* *-"I haven't shared because I do not see the point as they can't do anything. I would speak up if it meant getting moved to a room that was quieter etc but there is nothing that can be done." (L29)* *- "With my community mental health team I have an autism passport, which details what I may struggle with and how best to help me/what not to do to me." (L19)*

Themes	Representative quotes
Helpful accommodations and adjustments	*-"A nurse once offered to turn off the overhead fluorescent lights because I told her they gave me a headache. It made the appointment much easier to handle."(L31)* *- "At the GP I have longer appointments and a different space to wait. I've been told when the first slot after lunch is so there is limited waiting etc."(L57)*
Theme 6: Suggested Improvements	
Subthemes	
Changing the sensory environment	*-"A separate waiting area or small individual cubicles for people with sensory issues, maybe soundproof with the option of having like a buzzer so you know when you are being called through."(L12)* *-"I think hospitals etc. could find ways of turning down the brightness or making more use of natural light."(L6)* *-"Crowd control and silence policy in hospitals."(L33)*
Improvements in communication and information provided	*-"One of the best improvements would be for staff to use clear, literal language and provide visual guides of what to expect during an appointment. It helps to explain exactly what a sensation—like a cold stethoscope or a sharp pinch—will feel like before it happens, so there are no sensory surprises." (L31)*
Increased recognition	*-"More understanding and not dismissing people who might not present a certain way due to these difficulties."(L49)* *-"Clear communication and staff awareness of sensory needs would help." (L66)*
Increased flexibility and control over appointments	*-"For more sensitive sensory needs, maybe having the option to wait alone e.g. outside, in their own car, etc. could be helpful."(L1)* *-"I think having video appointments as a more widely available option would be hugely helpful, as often an in person assessment isn't needed." (L17)*

Carer experiences

Themes and subthemes constructed from carer reports (Supplementary Table S2) were similar to those constructed from responses of adults with sensory sensitivity. Even stronger reactions to sensory stimuli were reported, including agitation, anger, anxiety, rocking, pulling hair, squeezing fingers, and in one case, a tonic-clonic seizure. Carers reported an important role in supporting coping mechanisms, such as by providing headphones or ear defenders, distractions or sensory stimulating items (e.g. fidget toy, chewing toy). This was achieved through advance preparation for sensory overwhelming locations, including informing staff beforehand of how the cared-for person may react to sensory stimuli. There was also a preference expressed for continuity of care with professionals who demonstrated understanding towards sensory sensitivities.

There was a common difficulty encouraging the person they care for to attend, negotiating and explaining the reasons for the appointment. Sometimes care was blocked by leaving an appointment, or inability to complete the appointment, such as obtaining a blood pressure reading or a blood test. Refusal to attend follow-ups was also reported. Importantly, it was also reported that individuals can hide health problems from their carer due to fear of healthcare appointments.

In contrast, one positive report highlighted service access support through the provision of a hospital-at-home team.

Follow-up analysis.

In order to help inform future mitigation approaches and awareness-raising, we conducted two follow-up analyses. First, a simple content analysis of the different reported stimuli in healthcare settings showed that the most commonly reported triggers were bright lighting, people talking, sanitiser smell and crowding/busy multisensory environments. See Table 3 for more details.

Second, we further analysed the proportion of people who expressed avoidance or major barriers to accessing healthcare, and compared their sensory and diagnosis characteristics with participants who did not report major barriers or avoidance behaviour. 29 participants (42%) stated sensory sensitivity had affected access to care. Total CHYPS scores and age were not significantly higher than other participants (80.0 vs 71.6; 42.9 vs 39.1). Similarly, average auditory, visual, tactile and smell sensitivity, while numerically higher, were not significantly so (after multiple comparisons correction). Neither was there any association with commonly disclosed diagnoses (autism, 7 vs 4 reporting/not reporting major barriers; migraine 5:7, anxiety 6:8; depression 10:10). Therefore, we detected no easily identified differentiating characteristics between those reporting or not reporting sensitivity as a practical barrier to care. A small number of participants (n = 6) explicitly stated that they perceived sensory sensitivity had no impact on their experience of receiving healthcare, and the most common sensitivity among these participants was taste (which was never reported as a trigger in healthcare settings, for understandable reasons).

Table 3
Results of the content analysis showing the number of participants reporting common triggers in each sense, with illustrative quotes. Carer reports were combined with the main data.

Stimuli (frequency)	**Representative quotes**
Visual	
Bright lighting (33)	"When I first go in I feel a bit overwhelmed by the bright lights, I try to sit somewhere less bright if there is somewhere." – L19
Clutter (e.g. posters, colour schemes, mess) (6)	*"in the waiting area the sight of cluttered health posters made me feel kind of fear." – L33* *"I think that many patients dislike clashing, bright colour patterns or certain patterns on tiles" – L47.*
Tactile	
People sitting close by or brushing past (7)	*"In the waiting room I try to sit apart from people, so I don't feel they are too close which I find difficult - I don't like the possibility of someone accidentally touching me." – L19*
Hot/warm temperature / poor ventilation (9)	*"Waiting area far too hot, with no ventilation" – L10*
Uncomfortable seating (5)	*"uncomfortable seating can add to the discomfort and make waiting longer feel more challenging" – L13*
Touch during examinations (human/needles) (4)	*"I don't like being touched so examinations are unpleasant" – L27;* *"I flinch a little at feeling of the prick of the needle" – L19*
Cold temperature (2)	*"I find that healthcare settings are always really cold" – L26*
Smell	
Smell of sanitiser/cleaning products/disinfectant (30)	*"The sharp smell of disinfectant can give me a slight headache and make me feel restless" – L15*
Other smells (13)	*"I don't like sitting near anyone who smokes or wears perfume or uses strong washing powder" – L30* *"smell of soaps or cooked food or even cleaning agents adds to my unease." – L41* *"In the hospital there is also smells of food or other clinical practices, such as waste/blood etc" – L36*
Auditory	
Others talking (27)	*"People talking makes it hard to relax" – L31*
People coughing/sneezing/crying/sniffling (15)	*"I have had panic attacks in hospital waiting rooms, in bays as well, especially if there is a lot of machines beeping, people talking loudly, things clattering, children crying," – L12*

Stimuli (frequency)	Representative quotes
Noise caused by children (10)	*"I react to noise, in particular overlapping conversations, children's babbling and crying, and phones ringing in the waiting area quite badly -- they make me feel confused, frustrated and sometimes even angry (particularly screaming children, I'm sorry to say)" – L47*
Ringing reception phone (9)	*"I hear people coughing and the phone in reception ringing, the sounds of staff talking to each other and answering the phone" – L11*
Sound of medical machines (10)	*"I can often hear the sounds of the machines beeping and alarming" – L16*
Sound of TV/radio (10)	*"I got called through an A&E department it had the triage section to have blood pressure done and it had a radio blasting out Ariana Grande which was overwhelming after you've just sat for 6 hours." – L29*
Other sounds (5)	"The corridor was long, with laminate flooring and the extra noise that that generated and amplified made me tense" – L42
Multisensory	
Crowding and busy sensory environments (23)	*"When the hospital or GP is very crowded I can feel anxious… If it was overly crowded at the hospital, then I may choose not to wait." – L32* *"I am more aware of noise, movement, and crowding, announcements, staff moving equipment, and people walking by all create a busier sensory environment" – L13*

Discussion

We found that for people with sensory hypersensitivities, healthcare environments contain many features (mainly visual, auditory and smell) that commonly provoke adverse reactions, including overwhelm, anxiety, cognitive exhaustion and headaches. These aversive sensory experiences can interfere with the ability to participate in appointments, detrimentally impacting the quality of care and sometimes acting as barriers to seeking healthcare at all.

Reports by carers showed most of the same themes, with even stronger reactions in some cases (emotional 'meltdown', seizure), and an additional theme around preparation, including negotiating participation in healthcare. Carers also highlighted a concern that individuals who find healthcare visits distressing can conceal illnesses, pain, injuries or other need for healthcare from their carers.

Our findings in adults broadly align with L Bray, et al. [24], who explored hospital experiences amongst children and young people with sensory needs. Our findings also mirror and extend work on barriers to care that are experienced by autistic adults (e.g. LI Stein Duker, et al. [18]). Many of the impacts reported, as well as coping strategies and exacerbating factors (that reactions are exacerbated by feeling unwell,

tired, anxious or stressed, which commonly accompanies healthcare appointments) are consistent with those highlighted by A Price, et al. [16] for other environments, though here with further specificity for healthcare settings.

Of all the findings, the reported avoidance of healthcare, acting as a barrier to access, could have the most severe consequences for conditions where timely diagnosis and intervention are needed. It is difficult to judge from this kind of qualitative study how commonly such adverse consequences are influenced by sensory sensitivities.

Importantly, the themes identified here support the equal importance of addressing aspects of the built environment alongside improvements in staff understanding of sensory sensitivity. This is consistent with national built environment guidelines aimed to inform architectural practise when designing for neurodiversity, which state that '*design and management measures are often inseparable*' [33]. The benefit of combined adjustments to sensory environment and staff understanding has been shown in a specific care pathway for children and young people with sensory needs [21], although this pathway was more resource intensive than most services would find possible. However, one benefit stated by parents was simply feeling that sensory needs had been understood and taken into account, rather than dismissed. One relevant model of implementing change is the autistic SPACE framework, which includes sensory needs, predictability, acceptance, communication, and empathy as key actionable domains [23]. Despite this approach being tailored towards autistic individuals, the findings of this study and previous literature (e.g. L Bray, et al. [24] ; N Gupta, et al. [21]) suggest it may have broader relevance towards supporting sensory sensitive individuals.

Many suggested changes to the sensory environment can be costly to retrofit, such as dimmable lighting, visual calling notifications and physical noise dampening, but may make sufficient difference to be considered when budgets allow updating or redecoration. They are less costly to incorporate into original design. However, our participants also highlighted ways in which knowledgeable staff can support low-cost accommodations that make a large experiential difference, such as being allowed to wait outside or wear noise cancelling headphones, reducing visual clutter, or turning off bright lights in the consulting room. Our participants also noted that simply showing understanding or explaining upcoming sensory experiences makes a difference, echoing reports in N Gupta, et al. [21].

Many participants showed awareness of the constraints and pressures healthcare services and staff are under, and this is one reason why most reported not disclosing sensory sensitivities. This is a chicken-and-egg problem for promoting awareness, and may necessitate a staff training initiative. Whilst additional staff training can be onerous in a busy healthcare setting, the return on investment can be substantial with far reaching positive effects for service users [34, 35]. Change initiatives in healthcare can be difficult for staff to juggle alongside day-to-day responsibilities but the majority of staff strive to deliver change, driven by a desire to improve patient experience [36]. Therefore, staff can be the key to unlocking local initiatives to improve sensory understanding and put in place simple environmental changes [35] .

However, for staff to behave compassionately, the clinical environment and management culture need to be addressed together [37]. Building on the work here, future research would benefit from understanding more about the staff experience in relation to sensory sensitivity; how they themselves may be affected and how they believe any changes could be best implemented. Research already suggests that sensory sensitivity contributes to burnout in a range of clinical personnel [38–40]. Further, there is evidence that a calmer sensory environment for staff can have the additional benefit of improving patient safety [41, 42]. Taken with the results here, it is clear that understanding more about the burden of sensory sensitivity on staff, both for themselves and their service users, could unlock multiple benefits.

Limitations

Retrospective surveys have a general limitation of relying on memory for past experiences. Further, in some cases it was difficult to determine the extent to which negative experiences were specifically related to sensory sensitivity or associated traits related to neurodivergence or mental health. Interaction is likely given the breadth of conditions and areas of neurodiversity that correlate with sensory sensitivities (e.g. A Price, et al. [15]). Exacerbating and relieving factors were noted by participants, however these were not directly prompted. Had they been prompted, more factors may have been noted.

In this study, there were no reported stimuli relating to taste, but five participants were recruited based on high taste hypersensitivity. This may have slightly diluted the findings as those participants are likely less prone to aversive sensory experiences in healthcare contexts. For example, among the six participants explicitly reporting no impact, taste was the most common sensitivity domain.

A clear limitation for the carer reports in our study is the small N of the carer responses. However, we felt it was useful to include these perspectives to provide some degree of insight into the experiences of cared-for individuals who may not access research for themselves. Since it was reported that adverse sensory experiences can motivate cared-for individuals to conceal health concerns from their carers, this could result in potentially serious outcomes, and justify including these reports despite low N.

Conclusions

Adults with sensory sensitivities, and carers who support individuals with sensory sensitivities, reported that sensory challenges in healthcare settings evoke distress and can be a barrier to seeking care or receiving full care. Suggested adjustments provide practical and feasible mitigation approaches, but offering these, and encouraging patients to disclose their sensory challenges, relies on improving awareness and recognition amongst healthcare staff.

Declarations

Ethics approval and consent

All procedures were approved by the Cardiff University School of Psychology Ethics Committee, in accordance with the British Psychological Society (BPS) Code of Human Research Ethics. All participants provided informed consent to take part and for anonymised data to be published.

Consent for publication

Not applicable; no identifiable information.

Availability of data and materials

Data (full text of anonymised participant responses) are available at: https://osf.io/e3vg8/overview

Competing interests

The authors have no conflicts of interest.

Funding

PS was funded by Wellcome grants [104943/Z/14/Z] and [097824/Z/11/Z] for part of this research. GP was funded by Health Care Research Wales (grant number SCF-18-1504). For the purpose of open access, the authors have applied a CC BY public copyright licence to any Author Accepted Manuscript version arising from this submission.

Author Contributions

AG and PS conceptualized and designed the study, collected and analysed the data and wrote the manuscript. AP, RO and GP contributed to motivating the study, organising and interpretating results and improving the manuscript.

Acknowledgements

We would like to thank all the participants involved in the qualitative surveys, and the following who provided peer support and discussion: India Bamrah, Ella Griffiths, Emily Hiden, Amy Jocelyn, Amaree Johns, Rosie Moore, Ania Musset, Amy Taylor, Leah Thomas. Additional discussion was provided by: Eloise Crossman, Pauline Hegner, Rebecca Taylor, Jake Bussell, Krish Singh, George Tackley.

References

1. Leonards U, Davies J, Ross J, Talas L, Stevanov J. Putting the sensory individual at the centre of architectural design. Architectural Sci Rev. 2025;68(5):392–401.
2. de Lima Andrade E, da, Cunha e Silva DC, de Lima EA, de Oliveira RA, Zannin PHT, Martins ACG. Environmental noise in hospitals: a systematic review. *Environ Sci Pollut Res Int* 2021, 28(16):19629–19642.

3. Litwin S, Sellen K. Designing a Sensory Kit to Improve the Environment for Children with Autism Spectrum Disorder in the Pediatric Emergency Department. J Autism Dev Disord. 2023;53(9):3369–79.
4. Bayramzadeh S, Ahmadpour S, Aghaei P. The relationship between sensory stimuli and the physical environment in complex healthcare settings: A systematic literature review. Intensive Crit Care Nurs. 2021;67:103111.
5. Carpenter KLH, Baranek GT, Copeland WE, Compton S, Zucker N, Dawson G, Egger HL. Sensory Over-Responsivity: An Early Risk Factor for Anxiety and Behavioral Challenges in Young Children. J Abnorm Child Psychol. 2019;47(6):1075–88.
6. Powell G, Derry-Sumner H, Rajenderkumar D, Rushton SK, Sumner P. Persistent postural perceptual dizziness is on a spectrum in the general population. Neurology. 2020;94(18):e1929–38.
7. Tyler RS, Pienkowski M, Roncancio ER, Jun HJ, Brozoski T, Dauman N, Coelho CB, Andersson G, Keiner AJ, Cacace AT, et al. A Review of Hyperacusis and Future Directions: Part I. Definitions and Manifestations. Am J Audiol. 2014;23(4):402–19.
8. Marzolla MC, Hurks P, Borghans L, van Heugten C. Hypersensitivity to noise and light: A multifactorial framework of attention, personality, and mood. Curr Psychol. 2026;45(2):183.
9. Robertson AE, Simmons DR. The Relationship between Sensory Sensitivity and Autistic Traits in the General Population. J Autism Dev Disord. 2013;43(4):775–84.
10. Rani I, Agarwal V, Arya A, Mahour P. Sensory Processing in Children and Adolescents with Attention Deficit Hyperactivity Disorder. J Atten Disord. 2023;27(2):145–51.
11. van den Boogert F, Klein K, Spaan P, Sizoo B, Bouman YHA, Hoogendijk WJG, Roza SJ. Sensory processing difficulties in psychiatric disorders: A meta-analysis. J Psychiatr Res. 2022;151:173–80.
12. Price A, Sumner P, Powell G. Subjective sensory sensitivity and its relationship with anxiety in people with probable migraine. Headache. 2021;61(9):1342–50.
13. Quodling N, Hoffman N, Carrick FR, Jemni M. Sensory processing in medically unexplained pain syndrome. A systematic review. Front pain Res (Lausanne Switzerland). 2025;6:1584227.
14. Jussila K, Korkiakoski A, Jussila A, Kuusikko-Gauffin S, Joskitt L, Mäntymaa M, Moilanen I, Mattila ML. Sensory over responsivity (SOR) as a transdiagnostic marker of neurodevelopmental risk. An epidemiological birth cohort study. Nord J Psychiatry. 2025;79(8):632–41.
15. Price A, Sumner P, Powell G. The subtypes of visual hypersensitivity are transdiagnostic across neurodivergence, neurology and mental health. Vis Res (Oxford). 2025;234:108640.
16. Price A, Oates R, Sumner P, Powell G. They Impact My Life Daily and Greatly: A Qualitative Exploration of How Subjective Sensory Sensitivities Are Experienced, Exacerbated, and Coped With. Neurodiversity 2025, 3.
17. Clapton G, Reid L. Neglected spaces: UK general practice surgery waiting rooms. BJGP Open. 2017;1(1):bjgpopen17X100641.

18. Stein Duker LI, Giffin W, Taylor EE, Shkhyan L, Pomponio Davidson A, Mosqueda L. Barriers and facilitators to primary healthcare encounters as reported by autistic adults: a qualitative study. Front Med. 2025;12:1481953.
19. Williams G, Corbyn J, Hart A. Improving the Sensory Environments of Mental Health in-patient Facilities for Autistic Children and Young People. Child care practice: North Irel J multi-disciplinary child care Pract. 2023;29(1):35–53.
20. Happell B, Scott D, Platania-Phung C. Perceptions of barriers to physical health care for people with serious mental illness: a review of the international literature. Issues Ment Health Nurs. 2012;33(11):752–61.
21. Gupta N, Brown C, Deneke J, Maha J, Kong M. Utilization of a Novel Pathway in a Tertiary Pediatric Hospital to Meet the Sensory Needs of Acutely Ill Pediatric Patients. Front Pead. 2019;7:367.
22. Pierce M. Designing Spaces That Support Health For The Whole Person A Sensory Processing Perspective Of Healthcare Design In Community-Based Settings. *Master's Thesis.* University of Oregon; 2019.
23. Doherty M, McCowan S, Shaw SCK. Autistic SPACE: a novel framework for meeting the needs of autistic people in healthcare settings. *British journal of hospital medicine (London, England*: 2005) 2023, 84(4):1–9.
24. Bray L, Kiernan J, Neilson S, Cooper L, Mulvey-Oates M, Wright M, Phipps D, Knighting K. It is Noisy, Busy and Smells Weird: Sensory Friendly Environments for Children and Young People Visiting Health Care Settings. Child care practice: North Irel J multi-disciplinary child care Pract 2025:1–16.
25. Brooks J, McCluskey S, Turley E, King N. The Utility of Template Analysis in Qualitative Psychology Research. Qualitative Res Psychol. 2015;12(2):202–22.
26. Nicolaidis C, Raymaker DM, Ashkenazy E, McDonald KE, Dern S, Baggs AE, Kapp SK, Weiner M, Boisclair WC. Respect the way I need to communicate with you: Healthcare experiences of adults on the autism spectrum. Autism. 2015;19(7):824–31.
27. Crossman E, Powell G, Price A, Wright K, Sumner P. The subtypes of sensory hypersensitivity and their cross-modal relationships: a platform for transdiagnostic understanding. In.; 2026.
28. Price A, Sumner P, Powell G. Understanding the subtypes of visual hypersensitivity: Four coherent factors and their measurement with the Cardiff Hypersensitivity Scale (CHYPS). *Vision research (Oxford)* 2025, 233:108610.
29. Thomas SL, Pitt H, McCarthy S, Arnot G, Hennessy M. Methodological and practical guidance for designing and conducting online qualitative surveys in public health. Health Promot Int 2024, 39(3).
30. Qualtrics. In. Provo, UT; 2026.
31. NVIVO. In., 15 edn. Lumivero; 2024.
32. Elo S, Kyngäs H. The qualitative content analysis process. J Adv Nurs. 2008;62(1):107–15.
33. Hewitt J. Design for the mind : neurodiversity and the built environment. guide. In.; 2022.

34. Jin H-Y, Gold C, Cho J, Marzban F, Lim L. The Role of Healthcare Facility Design on the Mental Health of Healthcare Professionals: A Literature Review. HERD. 2023;16(1):270–86.
35. Quon S, Truong I, Moroz L, Zheng K. Staff Training on Sensory Accommodations in Acute and Inpatient Care: A Scoping Review. Occup therapy health care 2026:1.
36. Arsenault Knudsen ÉN, King BJ, Steege LM. The realities of practice change: Nurses' perceptions. J Clin Nurs. 2021;30(9–10):1417–28.
37. Tehranineshat B, Rakhshan M, Torabizadeh C, Fararouei M. Compassionate Care in Healthcare Systems: A Systematic Review. J Natl Med Assoc. 2019;111(5):546–54.
38. Redfearn RA, van Ittersum KW, Stenmark CK. The Impact of Sensory Processing Sensitivity on Stress and Burnout in Nurses. Int J stress Manage. 2020;27(4):370–9.
39. Meyerson J, Gelkopf M, Eli I, Uziel N. Burnout and professional quality of life among Israeli dentists: the role of sensory processing sensitivity. Int Dent J. 2020;70(1):29–37.
40. Pérez-Chacón M, Chacón A, Borda-Mas M, Avargues-Navarro ML. Sensory Processing Sensitivity and Compassion Satisfaction as Risk/Protective Factors from Burnout and Compassion Fatigue in Healthcare and Education Professionals. Int J Environ Res Public Health. 2021;18(2):611.
41. Mazuch R, Stephen R. Creating healing environments: humanistic architecture and therapeutic design. J Public Mental Health. 2005;4:48–52.
42. Mourshed M, Zhao Y. Healthcare providers' perception of design factors related to physical environments in hospitals. J Environ Psychol. 2012;32(4):362–70.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Supplementaryinformation.docx