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What affects physical activity in a rehabilitation centre? Voices of patients, nurses, therapists, and activity trackers

Purpose: In the context of rehabilitation, research shows a close connection between patients' physical activity, care culture, and the built environment. As these three impact on patients' rehabilitation process, we aim to understand what affects physical activity in a particular rehabilitation centre. *Materials and methods*: We combine insights from literature with a qualitative study informed by quantitative data. Semi-structured and walking interviews with 16 patients were supported by output from activity trackers. Two focus-group interviews with respectively four nurses and two therapists provided extra perspectives. *Results*: We found that patients interpret physical activity rather narrowly, equating it with therapy. Yet, the data of the activity trackers show that daily activities are often as active as therapy, as confirmed by nurses and therapists. Motivation was found in setting clear goals, social interaction, allowing choice and control to achieve a sense of normality, and the built environment. How patients act in and interact with the built environment are closely related to how staff approaches and communicates care. *Conclusion:* The focus on what affects -defines, hampers or supports- physical activity in a rehabilitation centre allowed developing a better understanding of how care culture and the built environment relate.

Keywords: built environment, care, physical activity, rehabilitation

Introduction

Physical activity, defined as "any bodily movement produced by skeletal muscles that requires energy expenditure" [1], is beneficial to functional recovery and symptom management for a variety of rehabilitation patients, be it people with Multiple Sclerosis (e.g. [2]), stroke (e.g. [3]), or locomotor issues (e.g. [4]). This definition suggests that it can be broadly interpreted as a combination of intended and unintended movement, being part of a therapeutic program or resulting from common activities, like household chores, using stairs, recreational or transportation activity [1,5].

Studies conducted in hospital settings show a clear impact of care culture on patients' physical activity during their stay [6]. Although patients are allowed to move independently, they often rely on care professionals for instructions and support, also for non-therapeutic activities. A significant difference can be noted between nursing staff and therapists. Whereas the former consider themselves guardians of patients' rest, the latter are primarily concerned with their physical activity [7]. A study about older people's preferences in a post-acute rehabilitation context shows that patients and care professionals consider individualized, patient-centered care by engaged staff and social contact with fellow patients and relatives equally important as -or more important than- functional, physical improvement and clinical outcomes [8]. This seems to reflect a shift in emphasis between acute and rehabilitation care.

A recent study on users' perspectives in three rehabilitation centres foregrounds four key aspects through which the built environment adds to patients' well-being: the importance of choice in activities and spaces, access to outside areas, opportunities for socialization, and a ward configuration that aligns with the model of care [9]. Studies about the built environment in relation to patients' physical activity point at its potential to support or hinder rehabilitation [10,11]. A comparison between an old and new rehabilitation facility for stroke patients indicates that patients in single rooms with a faraway communal area, spend more time in their room, are less active, and have fewer interactions with staff and relatives than those in multi-bed rooms [12]. Being served food in the room reduces patients' physical activity compared to eating in a communal area [13]. Whereas hallways are mostly designed to allow moving between destinations (rooms, therapy, communal areas), they play an important role in patients' and staff's experience and use of a rehabilitation centre [14]. These examples demonstrate how (un)availability and (in)accessibility of facilities impact on patients' physical activity in rehabilitation.

Despite varieties within and between patient groups, patients in a rehabilitation centre seem to experience common issues in relation to being physically active, such as the need to balance activity and rest [5–7], staff and management playing a vital role in patients' motivation [2,3,5–7], and the built rehabilitation centre impacting on moving independently [6,7]. These challenges point at a connection between physical activity and care vision – how patients should be taken care of – and/or care culture – how they are taken care of – and between physical activity and the built environment in which they reside during rehabilitation. With the latter we refer to the building of the rehabilitation centre, including both its indoor environment and its surroundings as defined by participants' activities. Additionally, previous research shows a connection between hospitals' care vision, based on concepts like person- and patient-centred care, and the built environment [15,16]. As physical activity, care vision and/or culture, and the built environment impact on patients' rehabilitation process, we aim to understand what defines, hampers or supports physical activity in a rehabilitation centre. To this end, we combine insights from literature with a qualitative study informed by quantitative data exploring what patients in a rehabilitation centre consider physical activity and what hampers or supports them to be physically active during their stay.

Methods

Study design and setting

Patients' experience of their physical activity in relation to the built environment is personal and constructed through their interactions with others and the environment. Our study therefore inscribes itself in a constructivist paradigm [17], as it focuses on interactions –in this case between patients' experience of physical activity, their actual activity, and the built environment. Instead of beginning with a theory and testing a clear hypothesis, we begin with an examination of the empirical world [18].

The study took place in a free-standing rehabilitation centre situated in a green environment (Figure 1), affiliated with a general hospital in a nearby town. Originally, the centre started as a care facility for people with Multiple Sclerosis (MS). Currently two of the four wards still house patients with MS (floor 3 and 4), a third and fourth accommodate neurological and locomotor rehabilitation patients (respectively on the first and second floor). The centre is surrounded by housing of different types for people with an impairment (mostly Multiple Sclerosis), ranging from group residences to family houses. Residents of these surrounding dwellings were not included in the study. Near the centre there is an animal park with farm animals and a small forest with paved tracks.

[insert Figure 1. Location of the rehabilitation centre and its surroundings]

The rehabilitation centre provides both residential and ambulatory care. This care is being financed through a rehabilitation agreement between the care organization and the Flemish government [19]. Organizations that have such an agreement invoice patients' health insurance funds. For people with MS, a residential stay of three months per year can be reimbursed under this agreement. For other patients the reimbursement depends on the kind of injury and the considered need as judged by physicians.

People's experience of physical activity does not always coincide with their actual activity level. To explore whether and how both relate to each other and to the built environment, we identified a qualitative research approach informed by quantitative data as holding the most potential. To achieve the aim - to understand what defines, hampers or supports physical activity in a rehabilitation centre - on the one hand, it was key to understand the (care) culture and community in the centre to explore how this impacts on and is impacted by patients' physical activity, hence the adoption of qualitative methods. On the other hand, measuring when and how patients are physically active was needed to understand physical activity according to its initial definition [1], hence the use of activity trackers.

The study was set up in multiple steps. Prior to the interviews the first author (henceforth 'the researcher') spent several days observing in the rehabilitation centre, both as an external observer and by following patients throughout the day. The interviews were conducted in three rounds. After a brief introduction of the aim and set-up of the research, a first explorative semi-structured interview was conducted with each participating patient. This interview focused on patients' perception of physical activity and the built environment. At the end of the interview patients were invited to wear an activity tracker for 48 hours, measuring the amount and intensity of their activity. The 48 hours period was defined to cover both day and night and allow differences in therapy schedules - for example when patients had alternating therapies or rest days - to be covered. During these days participants were provided with the opportunity to keep a diary (written or based on pictograms) to document their (physical) activity. After two days, the researcher retrieved the activity tracker to read out the measurements and consecutively conducted a follow-up interview discussing participants' activity in the past days. The graphs showing the measured activity (Figure 2) were used as a probe for a detailed interview about participants' activity. The diaries and measures complemented each other as the former gave insight into perceived activity whereas the latter showed, in detail, what participants had done. To facilitate talking about the built environment, participants were asked to guide the researcher through the building to show the spaces discussed during the interviews. During this guided tour, the participating patient took the lead.

[insert Figure 2. Graphs showing outcomes of the activity trackers]

Additionally, two focus-group interviews were conducted with care professionals, one with the head therapists (from physiotherapy and ergotherapy), the other with the head nurses of the four wards. In these interviews the focus on physical activity in relation to the built environment was extended with specific attention for the care culture.

The type of centre was selected for its population and programme and pragmatically chosen based on a prior connection with the affiliated hospital in the context of another research project. The hospital board approved of the study yet was not involved in its aim or setup. The authors do not have any affiliation with the rehabilitation centre.

Approval for the study was obtained from the Social and Societal Ethics Committee of KU Leuven (Belgium) and the hospital's ethics committees. An information sheet explaining the study was distributed in advance at each ward or amongst participating staff members, and the researcher always orally introduced herself to the participants. Written consent was obtained from all participants.

Participants

Participants were recruited between October and December 2019 among patients from all four wards of the centre. We applied purposeful sampling to ensure a mixture of age, sex, and levels of mobility. Inclusion criteria were being inpatient in the centre for at least a week and able to participate in a face-to-face interview. Only significant aphasia or cognitive communication difficulty were reason for exclusion, minor difficulties were not. Based on these criteria head nurses provided a list of possible candidates after which the researcher approached each of them, briefly explained the aim and approach of the study and, if a patient agreed, organised the further steps of the study in dialogue with the participant.

In total 16 patients were recruited (Table 1), from all four wards. Seven were staying at the centre for MS treatment, four were there for locomotor rehabilitation, and five were recovering from a stroke. For each group both people staying in a single and people staying in a multiple (double or triple) room were interviewed. The combined interviews lasted per participant between 30 minutes and 1 hour and 21 minutes with an average of 58 minutes. Eleven participants gave the researcher a guided tour of the building. The focus-group interviews with therapists and nurses took respectively 39 and 70 minutes.

Data collection

Patients' participation in the study required a rather extensive engagement: a semi-structured interview about their physical activity and the built environment, wearing an activity tracker for 48 hours, (optionally) keeping a diary or documenting their physical activity and/or the built environment through pictures, a follow-up interview based on information from the activity tracker (and the dairy and/or pictures), and (also optionally) giving a guided tour to show the researcher the places discussed during interviews. Individual interviews with participating patients took place during their stay in the rehabilitation centre. The interview guide for the first semi-structured interview was based on previous experience (with qualitative research about the built environment in other (health)care contexts), insights from preparatory observations, and relevant literature. The guide covered three parts: expectations and first impressions; specific spatial and social aspects; and participants' priorities and own topics of interest.

Participants' physical activity was registered with Axivity AX3 activity trackers [20]. These were selected based on the specificities of the research population and setting, combining insight into the experience of wearing the trackers, the process of working with them (positioning, application) and registered data (programming) [21]. To allow capturing the difference between bodily positions (sitting versus laying down), trackers were placed on participants' lower back. They were programmed to register x, y, and z coordinates with intervals of 3 seconds for 48 hours, starting midnight after the introduction interview and ending midnight before the follow-up interview.

Due to the Covid-19 restrictions, the focus-group interviews with staff members, planned in the spring of 2020 were postponed. Eventually, they were organised online with a reduced number of participants. This resulted in two online (focus-group) interviews with two therapists and four nurses in respectively July and December 2020.

Data analysis

Interviews and guided tours were audio-recorded, transcribed verbatim and pseudonymised. The data of the activity trackers were processed in MATLAB 2019b [22]. Participants' bodily position was derived from the registered angle of their back. From this position we then derived their type of movement (laying down, sitting up, walking) and its intensity. These were represented in two graphs respectively showing type and intensity of movement over time.

Transcripts and accompanying images (pictures and/or scans of participants' notes, and graphs from the activity trackers) were inductively analysed guided by the principles of the Qualitative Analysis guide of Leuven (QUAGOL), a grounded-theory based approach which starts from short summaries of the interviews to identify overall themes and evolves towards specific coding in the light of the research questions [23]. Themes were identified by the researcher and discussed with the third author.

Transcripts and complementary material were imported into qualitative data management software NVIVO 12 to support the data analysis.

Quotes were translated from Dutch to English by the authors.

Findings

Patients, nurses, therapists, and activity trackers provided insight into patients' physical activity to identify what is, can, or should be considered physical activity and what hampers or supports it.

What is considered physical activity?

Patients initially interpret physical activity rather narrowly, equating it with therapy

Patients seem to have a very goal-oriented view on physical activity. When they are asked what it means to them, they unanimously refer to therapy-related activities, both formal and informal. What this therapy consists of varies largely between (groups of) patients. For Christine, who is confined to her bed and electric wheelchair, this is the physiotherapist who comes to her room. For Jenny, who is completely mobile and very active, the cognitive tasks she has to perform while walking through a course and back, make her physically tired.

Therapists and nurses agree that physical activity can and should not be equated with therapy. Both point out that it starts from the moment patients open their eyes. Nevertheless, they put a different emphasis on the role of therapeutic activities in patients' daily program.

> [Therapist] Care, that's often a difficult topic. Nurses consider it taking care of a patients, and for us it's more like getting them back to independence, to proper

> functioning, as far as possible, so they have the opportunity to return to their home situation.

Therapists prefer patients to be in the therapeutic area all day, spending also their free time supervised and/or guided by them. Nurses on the other hand would prefer more therapists on the ward so therapy would become an integrated part of patients' life. As the centre is currently managed, patients tend to return to the ward between therapy sessions. Some actually do so to spend the remaining time in the room or adjacent corridor, others use their room as a basis to go the toilet with help from the nurses (as they are unable to use the toilet in the therapeutic area due to a lack of support), drink something, and store or pick-up cigarettes, money, or paperwork before setting off for a next destination, often the smoking lounge. Both therapists and nurses consider the spatial division between the therapy area and the wards problematic. Yet, the solutions they suggest differ.

> [Therapist] If we say "customised care" then that means from the early morning, from the moment someone wakes up till the evening. So, *we* prefer to have them downstairs, that they don't always return to their room, that they join the activities downstairs, and that they find meaningful daytime activities themselves. The nurses on the other hand, they find it normal that the patient comes back up after therapy, whereas we'd prefer them to go to the toilet, to do everything downstairs, all day long, and that they'd only go upstairs to eat.

> [Nurse] The building is already twofold. The therapy area is completely different from the wards, so that's a contradiction that's very hard to solve. What I'd like is that the therapists come on the wards to practice. Now we separate the two, you go downstairs to practice, and you live upstairs. Actually, you should practice and live upstairs. The therapy area should only be complementary, now it's the other way around. Yes, that's something that hampers us, at least me, but others as well, I think.

This different stance towards what is or should be subordinate to what colours almost every conversation about the meaning and affordance of physical activity in the centre.

Activity tracking suggests that daily activities are often as active as therapy

Patients' activity measurements show that many daily actions and tasks involve physical activity and amongst the most intense of the day. The efforts made by transferring in and out a wheelchair, getting dressed and ready in the morning, or taking a trip to the smoking lounge exceed those during therapy, but do not seem to be experienced as such. Whereas patients, when reflecting on their physical activity tend to elaborate on big events or actions, the outcomes of the trackers allow shifting the focus to small, but frequent, activities. Even those who are not so eager to take up extra therapy, often have established routines that involve being active: walking to the end of the hallway to get a coffee or a magazine, or checking in on fellow patients for a chat.

> [Sharon] You get tired from what you do, even if it's just walking down the hallway to get a cup of coffee, [because then] you also have to return. And then you go there quickly to get some books, it keeps you busy, you go into the coffee room for a little while, chatting and telling stories with the other patients.

Staff members acknowledge daily activities being a determining factor in patients' physical activity, yet at the same time, they cannot always fully support patients in undertaking them. Both therapists and nurses are very enthusiastic about the idea to offer patients a buffet breakfast in the downstairs cafeteria. Nevertheless, the initiative never passed the test phase due to practical issues (e.g. regarding the administering of medication) and misunderstandings (e.g. who is responsible for what?). Also on the wards, the need for control to assure patients' safety is a thorny issue.

> [Nurse] Sometimes you experience that [patients] aren't capable of walking independently or that they can't oriented themselves enough […] so we can't let them walk freely, they get lost, they end up in the basement, everywhere, they'd go outside, and get lost driving. So yes, there are some issues that make it hard to allow them to move freely.

Rest in relation to physical activity

Participating patients often mention physical activity in the same breath as rest. A balance between both is essential over the course of a day at the centre as well as throughout their lives.

> [Kelly] At the good moments I try to walk with the walker to see if I manage, and if it really doesn't, I take the scooter. It depends on how much I rested. That's why it's there [on the activity graphs and in the diary] so much, because I want to rest so I can take the walker. […] In the morning I have more energy. In the afternoon I have to rest much more to be able to walk.

Also, mobility choices are part of participants' activity management.

> [Antonio] Walking with crutches for three hours straight, nobody does that. Even if you go shopping on crutches, you sit down somewhere to drink a coffee or so. Here they say that you should be walking on those crutches all day, but I've told them in the morning I come [to the therapy downstairs] in the wheelchair and in the afternoon on crutches.

Apart from physical rest, many participants, especially MS and neurological rehabilitation patients, mention the need for mental rest between activities. Whether a stay at the rehabilitation centre in its entirety is considered a period of rest or intense activity is debatable, and seems to depend on participants' home situation. Sharon finds it a relief to be at the centre since it releases her of household chores and childcare. Others want to squeeze every last drop out of their stay, sometimes overdoing themselves due to training outside the therapy sessions.

> [Eddy] …since I have everything here at hand, I want to get the best, really everything out. Yet this is limited, if my body says that it has had enough, then it's enough.

Therapists and nurses tend to disagree on the role of rest in relation to physical activity. For therapists, the former is -generally speaking- subordinate to the latter. For nurses, they are two sides of the same coin.

> [Therapist] Considering rest, we find it important that patients actually consider rehabilitation as priority and that after that, rest is planned, as needed. But they [nursing staff] consider rest time from this hour till that hour and you have to plan the rehabilitation therapy around it.

Regarding mental rest, nurses, possibly due to their closer and long-standing connection with patients, mention how important it is to take care of people's problems and issues.

> [Nurse] you have to build a relationship [with patients] otherwise you're not suited to work here. […] It's very important that patients are welcomed.

What hampers or supports physical activity?

Goal-oriented motivation

Participants' goal-oriented mind-set is an important motivator to be physically active. The majority mentions as their main motivation preserving the physical abilities they still have, or regaining the ones they lost. The opportunity to follow therapy sessions and make use of therapeutic equipment is considered essential to achieve the goals they set for themselves. A stay at the centre is considered the ideal way to obtain the best therapy possible due to the available guidance and equipment.

> [Eddy] You can come here three months a year, the other nine months you can train three times a week with a physiotherapist, but those physiotherapists don't

> have all this equipment, so I come here three months a year. Here I have all the machines that I like to do. […] Here you have everything, at home you have none of it.

Both during and in between therapy sessions, participants testify going to the limit. Even outside the therapy context, they set themselves explicit activity goals. Dora explains how she has made herself a schedule to manage rest and movement throughout the day and also Alma consciously walks the hallway to become fit again. Whereas these two are working towards full recovery, MS and stroke patients, rather focus on smaller improvements.

Staff is mostly supportive of patients' ambitions, yet they stress the importance of breaking down goals in smaller parts to maintain the motivation.

> [Nurse] They tend to refer to the end goal, but no, in between goals, what you're going to do to reach the end goal. As care staff you have to understand how people are, what they have to do to reach a goal. Then you have to talk to them. Everyone in the organization has to realize that and motivate them to do so. These people already have to walk so many tracks and it's our job to prepare these tracks.

Although only occasionally mentioned by the participating patients, sometimes it is hard to stay motivated to be physically active and take part in therapy.

Social interaction

Social interaction is an important incentive to be physically active. This can entail actually establishing and maintaining social contact with fellow patients, friends or family, putting one's own situation in perspective through being confronted with others', or simply finding a purpose in caring for neighboring animals. Smokers go out of their way to be able to get to the smoking lounge. Apart from the addictive stimulus, all mention the encounters with like-minded people as their main motive to go there.

Also having a coffee with fellow patients or friends from outside stimulates participants to leave their room. Although most of them mention the day-activity room as a place to be active, only a few make use of it. Reasons mentioned include a lack of interest in imposed activities and the confrontation with others who are worse off. At the same time, care for others who need help, both physically and mentally, stimulates participants' physical activity. Jenny, recovering from a stroke, but physically in good shape, has made it her task to wheel less mobile fellow patients around. Dora finds it important to be sensitive to others' needs for mental support and, if necessary, signal it to the nurses. She claims the encounter with others' problems motivates her to nuance her own issues and be as active as possible. Finally, the opportunity to interact with animals is an important incentive to be active. Ronny and Kelly consider it their responsibility to feed the neighbourhood cats. Whether by themselves, with visitors, or as part of therapy or day-activities, most participants have been to the animal park to pet and feed the donkeys. Breathing fresh air is mentioned as a nice side effect.

Overall, patients' initiatives for social interaction are highly supported by staff. In reality however, small acts can counteract this general attitude. Smoking is for obvious reasons not encouraged. During the Covid-19 pandemic entrance to the smoking lounge was reduced to allow more control.

> [Nurse] The smoking lounge is now closed between certain hours. We always had a hard time to keep patients in bed for five to six hours, now that the lounge is closed till 8AM, they sleep five to six hours, so their drive was so big that they woke up at night to go smoking. Now they can't anymore. We have four patients that sleep way better now. Is that right, I don't know, but I observe what's happening.

Social gatherings and corresponding physical activity are sometimes discouraged by staff members.

> [Jenny] Monday night we were sitting here [in the dining room] having a coffee and chatting and the night nurse starts complaining. That we needed to practice the next day, that we had had therapy, that we had to go to bed. So I say: "you consider us little children, right?" So he says: "I'm going to report it." So I said: "Do what you want." […] "No one has said something for an entire week. They've always entered, the nurses and they've never said anything." And the next day he asked the head nurse. "No," she said, "that's not a problem at all."

Although staff have the best intentions, patients experience these actions as patronizing, discouraging them to leave their room and take initiative.

Choice and control add to a sense of 'normality'.

For most participants being able to move around as independently as possible is an expression of normality through the regained feeling of choice and control it establishes. Independent mobility can be experienced at different levels. Almost daily Bill takes his scooter to visit stores and coffee bars in a range of 25 kilometer as an escape from the centre.

> [Bill] The feeling here? A little bit a small prison actually. […] you can't go away, there is nothing to do. […] I always leave when possible, now I'm looking forward to the afternoon, then I'm fee, I'll be gone. […] I have a GPS, so I can always return.

Ronny undertakes small trips to the neighbouring grocery store to buy "normal food" that is unavailable in the centre. For Suzanne, who is just learning how to drive a scooter, being able to do so is the ultimate expression of regained freedom. Also a short stroll in the vicinity of the centre, with the animal park as a preferred destination, is considered an important achievement on the road to normality. Especially for those with children being able to join in family activities without being a burden to others motivates them to maintain or regain mobility.

At the same time, personal choice and control can also hamper patients' physical activity, as they are not always in the mood to undertake initiatives and for some even the scheduled therapy sessions can be a bridge too far. Staff stresses this contradiction in putting the responsibility with the patients. On one hand, they long for normalized circumstances and the ability to be physically active. On the other hand, they like comfort and safety, which sometimes results in missing therapy or undertaking less challenging therapeutic activities because of a reduced engagement to go outside especially in bad weather. Sporadically staff's responsibility for care and recovery can clash with patients' right to self-determination, which is of paramount importance.

> [Nurse] With patients with MS the right of self-determination is priority, but that can conflict with the rehabilitation. We now have a patient who's here for two or three weeks, who doesn't always feel like going to therapy [for various reasons]. And then you have the doctor who says, we have to prepare her to be discharged so she has to practice. Yes, that's contradictory, because she didn't have any therapy for at least two or three days because she didn't want to go. Then you can make the therapist come to the ward, but will that help? Is that better? […] You have certain rights but also obligations

Nurses point at how their interaction with patients can vary slightly between the wards, because of the more longitudinal and personal engagement they have with some patients compared to others. Therapists stress not to distinguish between how they approach patients from the different wards.

The built environment

A supportive built environment - ranging from therapy rooms, over wards, to outdoor areas - plays an important role in achieving participants' self-imposed goals. A therapy room that is easily accessible also outside therapy hours allows patients to plan additional training sessions, but also accessible and inviting hallways and outdoor facilities can support them to make spontaneous trips. An essential requirement for them to undertake such endeavours, is to feel safe, physically and mentally. The experience of falling or the idea that it could occur keeps participants from being physically active. Although the centre is surrounded by mostly accessible outdoor space, participants mention its actual use is hampered by the lack of visual control (i.e., the possibility to be seen by staff). For some moving through the building independently is already challenging because of navigation difficulties. This results in being confined to the ward since controlling their movement in the rest of the building is almost unachievable.

Only a minority considered the outside areas a proper equivalent for inside spaces. Cold, but more importantly a feeling of unsafety because of the risk of falls, withholds patients to make use of it by themselves. When with visitors, this burden is overcome, and outside walks become more common. Under these circumstances, they are by some even preferred over spending time in the cafeteria, at hours intended to receive visitors, because of the overcrowded and loud atmosphere.

The centre lacks (safe) spaces for uncontrolled, spontaneous activities. Inside the building, the traditional wards with long corridors full of care equipment (wheelchairs, walkers, lifts, medication trolleys) can discourage patients to leave their room. In the one common room on the ward, euphemistically called the dining room, a selected group of patients can eat lunch together. However, this is rather perceived as a care and therapeutic need, than as a daily activity.

> [Mary] Here's the dining room, here you can eat together, but I always eat by myself in my room.
> [researcher] and who's eating here and why do they?
> [Mary] Patients. I've done it once, but those patients were in very bad shape, they had to feed them. […] I couldn't stand that.

Outside lunch hours, patients can get coffee here. This sometimes results in informal chats, yet the room’s atmosphere does not make it feel as a place to truly reside as, at least on some floors, it is used for private conversations between patients and nurses, as a storage place, or to house therapy cabins for those who cannot receive physiotherapy downstairs.

The built environment provides only little variety in destinations. Within the building the smoking lounge is the only informal, clearly defined space where patients can retreat while still feeling safe due to social and visual control. The only possible alternative for non-smokers, is the downstairs cafeteria. Here patients can read the newspaper or drink coffee, also outside opening hours. During visiting hours, it is open to the public. This difference in programs over the day results in unclarity amongst patients on its status. As such, it is not considered an equivalent informal space by non-smokers.

Whereas the centre as a whole is considered a place of rest by some, its spatial facilities do not provide any rest areas except for the patient rooms. Neither the day-activity room, where therapists expect patients to spend their free time during the day, nor the cafeteria where they can spend non-designated time outside their room are equipped with any easily accessible and relaxing furniture. Mental rest is even harder to find. Participating patients in both single and double rooms mention a quiet place to retreat as an important advantage of a single room. Many other places are referred to as sensory stimulating. Although generally considered a pleasant environment, the therapy area is constantly bustling with voices, providing too many stimuli for some. Also the lights in the hallways are mentioned as disturbing because of their brightness. The green surroundings of the centre are, by those who are able to enjoy them independently highly appreciated as a place to find peace of mind.

The centre's location, in a green environment, rather far from a town centre, is peaceful and quiet. While a nurse claims that patients frequently wander in the neighbourhood, especially with nice weather, only a minority of the participants actually did so. This could be due to the period in which the study took place (October-December), yet at least part of the time the weather was as warm as a nice spring day. Participants indeed mentioned a lack of useful destinations and bad weather as threshold to go outside. The nearby animal park was highly appreciated as a destination yet those who visited it often mentioned that such a park would not be their preferred destination outside a rehabilitation context (Figure 1.).

Both therapists and nurses refer to the therapy flat -a fully equipped apartment in the therapy building- as the ideal location to prepare patients for life outside the centre. This flat was originally intended for patients at the end of their stay to reside in by themselves or with relatives to experience living independently. It never worked out due to a lack of staff, difficulty to (visually) control the spaces, and insurance issues. The underlying idea however is highly valuable, as the size and equipment of a space considerably impact on what it affords for patients.

In this respect Mary points out how the built environment at her home, due to its small scale, actually better supports her to move independently. In the rehabilitation centre due to the large distances she needs to travel, the lack of suiting furniture in her room, and the fact that she does not want to bother nurses, she spends the majority of the day in her electric wheelchair. At home, the small distances allow her to use a triple ("normal" chair with wheels) to move between the furniture and from the couch to the kitchen, which supports her much more to be physically active throughout the day.

Discussion

The original definition of physical activity referring to bodily movement produced by skeletal muscles that requires energy expenditure [1] starts from the individual. How physical activity is defined in our study and what hampers and supports it, makes clear that it should be considered rather as a social phenomenon. The combination of an qualitative study foregrounding the culture and community of the rehabilitation centre with a detailed view on patients' physical activity allowed placing the individual in context, connecting people to their social and physical environment and explicating interactions between the three. Being physically active during a stay in a rehabilitation centre is not merely a personal decision. On one hand, there are the organized and almost mandatory therapeutic physical activities. On the other hand, the (lack of) interactions -visual and/or social- with nurses, therapists, fellow patients, and relatives highly impact on when, where, and how patients are truly physically active. Both are impacted on by explicit and implicit messages communicated through the social and built environment.

The results of our study confirm the goal-oriented focus patients put forward and the importance of sub-goals mentioned by staff. [2]. To achieve these goals, therapy is considered essential and thus stands central in patients' interpretation of physical activity. Staff broadens this interpretation by stressing the importance of being physically active throughout the day to regain or preserve physical abilities. Therapists and nurses agree that the pursued goals should be adjusted to a particular patient, which aligns with the care organisation's aim to create a patient-centred environment. Yet, whether therapy or daily life should be given priority is subject for debate. Patients and staff interpret the spatial organisation –with the therapy area in a recently built, light, and vibrant part of the building and the wards and other not-therapy-related areas (such as the cafeteria and entrance) in an old traditional hospital-style building – as reflecting the emphasis on therapy.

How physical activity is perceived by patients and staff reflects the goals they like to achieve through rehabilitation; in this goal setting, fellow staff members and management play an essential role [2,3,5–7]. Even though therapists claim to start from the patient as a person with a specific history and social context, they tend to set functionally oriented goals rather than social or mental ones. Nurses agree that therapy is an essential part of rehabilitation yet consider it subsidiary to getting patients' lives as a whole back on track. This observation suggests respectively a patient- and person-centred view [24] on rehabilitation. Håkansson Eklund et al. (2019) synthesized various reviews on both concepts. Starting from an overview of definitions, they reveal how person-centred care is a further development of patient-centred care with more attention for the uniqueness of persons behind the illness, with a history, a family, and individual strengths and weaknesses. Yet, most reviews hardly differ in the themes they address for each. The synthesis shows many similarities, but also highlights an important difference. Especially the goals of patient- and person-centred care differ in a decisive way. Although similar on the surface, the concepts differ on a deeper level in the light of these goals, this is reflected in striving for a functional versus a meaningful life and in how empathy, communication, and a holistic view on care are explicated. Depending on the specific context and population, care organisations could pursue one or the other. Understanding the difference between them, seems helpful to frame the implicit resentment between both and to frame nurses' and therapists' preferences with regard to spatial organisation.

Patients' daily lives and activities happen on the wards, their rehabilitation program takes place in this new therapy building, creating a physical and mental distance between the two. The spatial distance between the wards and the therapy building seems to hamper continuous and spontaneous communication and collaboration between nurses and therapists. Although initiatives to bring them closer - like a breakfast buffet in the downstairs cafeteria, which has shown to be effective to stimulate physical activity [13]- are supported by nurses and therapists alike, they easily fail due to misunderstanding, assumptions, and preconceptions. A better spatial organization, allowing more (visual) control throughout the building, would increase patients' sense of safety and could as such support them to undertake more activities on their own initiative.

Raising awareness of the subtle difference between person- and patient-centered care could improve mutual understanding between nurses and therapists, which could benefit a more holistic view on the merit of physical activity amongst patients. For the hospital management, it could lead to better informed and more nuanced decision-making process for new building projects. As the current center is located in a green, wooded area, far from stores, bars, and restaurants, voices are raised for a more central urban location. From a goal-oriented, functional perspective, such a location can better facilitate real-life learning settings, e.g. going to the store or riding a wheelchair or scooter in traffic as part of therapy. For patients' mind-set the green environment can be argued to be more beneficial, providing safe streets and peaceful surrounding to recover in a quite setting. In this respect, the current building's goal-oriented focus on therapy is not innocent as it may impact on the preferences patients and staff express when asked about requirements for a new building.

Limitations and opportunities

Although family members can have a significant impact on patients' physical activity [6], the reality of the rehabilitation centre made us decide to refrain from involving them for multiple reasons. The preparatory observations suggested that relatives were involved only marginally in people's daily physical activity as we understood it at that point, many participants hardly ever received visitors, and those who did could do so only between certain hours which limited our possibilities as we did not want to interrupt valuable private time. In hindsight, this decision could be questioned in the light of the current analysis. Involving relatives would have shed an additional light on what patient- or person-centered care entails in the context of rehabilitation. Especially, with regard to the return to daily life at home, relatives play an important role in restoring and maintaining being physically active and returning to “normality” [3]. Taking their perspective into account would have contributed to the quality of our analysis.

Generally, the study would have benefitted from a more extended member checking. As agreed on in the informed consent, we only provided the final findings to participants who indicated that they wanted to be kept informed. Two participating patients and all staff members did. The credibility of the research was assured through the triangulation of complementary methods. Our research approach responds to Koenders (2020) suggestion to make use of activity trackers to be able to accurately and continuously measure all types of physical activity. This indeed allowed providing an accurate estimate of patients’ physical activity. By complementing the measures with interviews and diaries, we also gained a better understanding of why and how vision of care and care culture played a role in it.

The findings as presented above are of different nature. Some insights are specific to the location, others are more generalizable, e.g. on how physical activity is perceived by patients and staff. We acknowledge and embrace this difference. The particularities of the location allowed pointing out specific building qualities that impact on patients’ physical activity, like the spatial distinction between both parts of the building. At the same time, studying the care culture and the built environment together foregrounded a phenomenon transcending this location, namely how a (dis)connection between (care) culture and space can very concretely impact on patients' physical activities and more abstractly broaden our understanding of it.

Conclusion

Identifying what patients in a rehabilitation centre considered physical activity and what hampers or supports them to be physically active during their stay, allowed us to develop a better understanding of how care culture and the built environment relate. As shown in other studies [15,16], the built environment can communicate an organisation's care vision. In the rehabilitation centre under study, the investment in and attention for the therapy building seems to reflect the goal-oriented vision of the organisation and general idea about patients' physical activity. When we consider daily activities, how they are approached and perceived by patients and staff, it becomes clear that being physically active entails much more than goal-oriented, therapeutic activities, and even includes rest. In this sense, how physical activity is perceived could be considered an amplifier of how care is approached. The care culture set up front by therapeutic staff tends to resonate with a patient-centred care approach, whereas nursing staff seems to lean more towards a person-centred approach. At the same time, our research confirms the many overlaps between patient- and person-centred care. Specific attention for patients' physical activity, combined with insight into both care concepts adds to our understanding of care culture as a driving force in rehabilitation. It also allows identifying how the built environment, sometimes differently used and perceived than intended, both steers and undergoes (physical) activity through location, spatial organisation, material details, atmosphere, and use.

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Declaration of interest statement

The authors report no conflicts of interest.

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Table(s) with caption(s)

Table 1. Characteristics on participating patients at time of interview

Pseudonym	**Age bracket**	**Sex**	**Length of stay (at time of first interview)**	**Diagnosis**	**Ward**	**Optional documentation**
Mary	60+	F	1 month (comes yearly)	Multiple Sclerosis	MS ward, single room	Guided tour
Eddy	45-60	M	3 months	Multiple Sclerosis	MS ward, single room	Diary
Bill	60+	M	3 months (comes yearly)	Multiple Sclerosis	MS ward, double room	Guided tour
Kelly	30-45	F	6 months	Multiple Sclerosis	MS, double room	Diary and pictures
Sharon	30-45	F	6 weeks	Multiple Sclerosis	MS, double room	Guided tour
Christine	60+	F	11 months	Multiple Sclerosis	MS, double room	/

Ronny	45-60	M	5 months	Multiple Sclerosis	MS, double room	Guided tour
Alma	60+	F	2 weeks	Knee surgery	Loco, 3-person room	Guided tour
Dora	60+	F	2 weeks	Knee surgery	Loco, single room	Diary and guided tour
Bob	30-45	M	3 months	Foot amputation	Loco, single room	Diary and guided tour
Antonio	60+	M	3 months	Shoulder, arm and leg injuries	Loco, double room	Guided tour
Fred	60+	M	3 weeks	Stroke	Neuro, double room	Guided tour
Steven	45-60	M	8 months	Brain tumour and Parkinson	Neuro, single room	/
Suzanne	60+	F	13 months	Stroke	Neuro, double room	/

Michelle	45-60	F	5 weeks	Stroke	Neuro, double room	Diary and guided tour
Jenny	45-60	F	3 weeks (after 8 months in a hospital	Stroke	Neuro, double room	Diary and guided tour

Figures

Figure captions (as a list)

Figure 1 Caption: Location of the rehabilitation centre and its surroundings

Figure 1 Alt Text: Aerial view of the surroundings of the rehabilitation centre with the location of the centre and the animal park indicated in text.

Figure 1 Long description: Aerial view of the surroundings of the rehabilitation centre: small scale buildings in the first buildings blocks to the north, east and south, all surrounded by woods in the north, south and west and agriculture in the east. Text on the image indicates the location of the centre and the animal park.

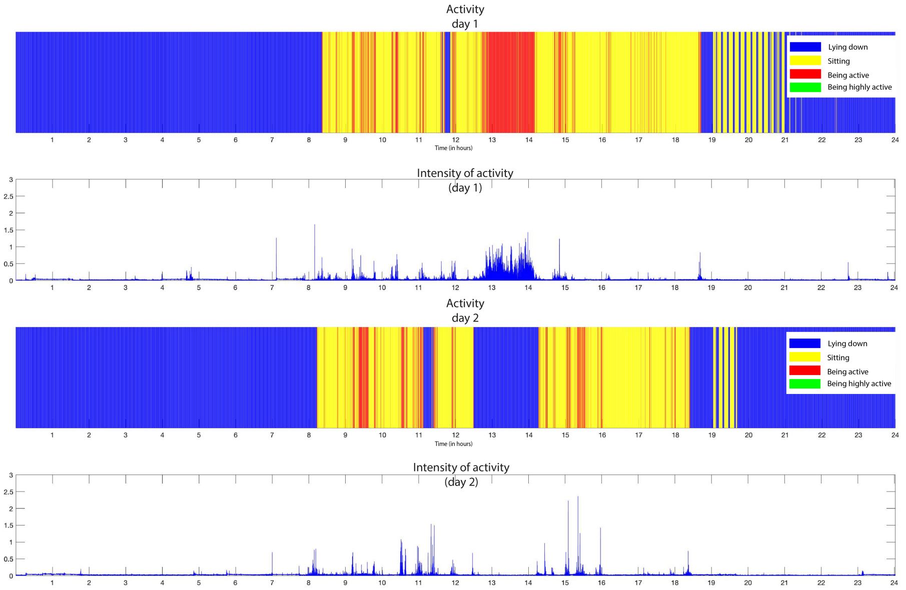

Figure 2 Caption: Graphs showing outcomes of the activity trackers

Figure 2 Alt Text: Four graphs showing the type of activities (lying, sitting, being active) and intensity over 48 hours.

Figure 2 Long Description: Four graphs showing the type of activities and intensity over 48 hours. The first shows through a colour code, over the first 24 hours of the measures (on X-axis), which activity (lying, sitting, being active) someone is undertaking. The second shows, over the first 24 hours of the measures (on X-axis), the intensity of the movement by indicating a line on the Y axis. The third and fourth graphs show respectively the same for the next 24 hours of the measures.