



Service evaluation of Staff, Patient and Carer's experiences of Oxehealth

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1. Background

- 1.1. As part of our work to increase patient safety Oxehealth has been introduced to 11 wards within TEWV. Oxehealth is a Vision Based Patient Monitoring System and provides an additional option for observation and engagement procedures within the ward environment. Based on algorithmic software, Oxevision analyses the video data to estimate pulse rate and breathing rate as well as physical movement and then alerts staff members via a monitor in the staff office and a control panel on tablet devices (McDuff, 2023). The video-data is stored for a rolling 24 hour period before being deleted. If an alert is sounded, staff are then required to do an in-person check to see if everything is alright with the patient.
- 1.2. Operational procedures state that use of the Oxevision system should not replace the usual care rounds, rather, that it should be used as an additional monitoring tool that alerts staff in case of incidents outside the normal observation and engagements. Additionally, staff can choose to stand in front of a patient's room and use the Oxevision tablets as a non-invasive observation, e.g., at night so as not to disturb patients while they are sleeping. Bathroom activities are not monitored. However, the system sends out an alert when patients stay too long in the bathroom as this could potentially indicate an incident such as a fall or a self-harm.
- 1.3. Previous evaluations of Oxehealth systems are led by the Oxehealth team and the company have been working closely with TEWV with the implementation and consideration of benefits for the trust.
- 1.4. Acknowledging a gap in our understanding of the effectiveness and efficiency of the system within the clinical areas, we set up the current project within TEWV using qualitative methodology in order to add to our understanding of how the system is working in practice.
- 1.5. We therefore undertook a rigorous qualitative investigation of Oxevision (a vision based patient monitoring system VBPMS) within the Trust. Previous quantitative evaluations indicated the usefulness of VBPMS in increasing patient tracking rates and reducing rate of serious incidents such as severe self-harm and suicide. However, current data is still very limited and sophisticated research qualitatively assessing how stakeholders view this new technology is almost non-existing. The latter is crucial to identify problems and success factors that cannot be identified using quantitative means, and also to explore the experience of stakeholders who are directly affected by the system. Previous research has repeatedly highlighted the importance of including services users and people with lived experience in the



implementation and evaluation of digital technologies in healthcare (CR Research references).

- 1.6. Therefore, we will conduct a qualitative investigation using focus groups to understand staff members, patients, and carers/peer support workers experience of Oxehealth across different mental health wards within TEWV. Our research will address the question “What is the experience of staff, carers, and patients with VBPMS and how do they feel about it?” Results will inform measures to ensure that the VBPMS is used appropriately and ethically.

2. Methodology

- 2.1. The service evaluation was designed in discussion with key stakeholders, i.e., nursing and governance team, psychologists, and peer workers. The service evaluation was approved by Nursing and Governance Team.
- 2.2. Participants in the groups are anonymous and the results are presented to ensure no-one is identifiable.
- 2.3. Focus groups were held with staff, patients and carers for all wards that have Oxehealth technology except for one which had to be excluded due to a COVID outbreak on the ward at the time of data collection. Staff include all those professional groups who are present on the ward either on the Nursing shift, in management roles, Peer Workers, Assistant Psychologists, Medical staff and AHPs.
- 2.4. Wards that were included; PICU wards, male and female adult mental health wards, older people wards, and organic wards trust-wide.
- 2.5. To obtain a representative and reflective understanding of the use of Oxehealth and its impact on involved stakeholders, separate focus groups with staff members, patients, carers were conducted. A separate focus group was held with the Peer Support Workers staff given their unique position within the organisation and their shared understanding of patients across services.
- 2.6. Whilst we aimed for service users with a diverse range of diagnoses and backgrounds, we had to adapt to current realities on wards given the regular frequency of patients being admitted to hospital and discharged. Patients were mostly recruited on the day by ward staff and inclusion was informed by a patient's mood and motivation to take part in the study at the time of the focus group.
- 2.7. Carers were informed by staff several days prior to our evaluation taking place so that we could ensure to speak to as many carers as possible. Therefore, 11 carers from 5 different wards took part in the focus groups.
- 2.8. Based on related evaluation studies (e.g., Ivanova et al., 2022) and conversations with key stakeholders, open-ended focus group questions were established (see appendix 1). After providing a brief context about the study, participants were invited to share their views and discuss their experience in relation to the questions. Responses were audio-recorded for transcription purposes only. For patient focus groups, we had members of staff available to support and debrief in case of any discomfort experienced during the interview.
- 2.9. Focus groups were not time-limited and lasted on average 15-20 minutes. On some occasions, there were significantly shorter groups (8 Minutes) when only one participant was involved or significantly longer groups (50 minutes) when there were at least 3 participants involved and when more elaborate discussions between participants took place.



2.10. Numbers of participants summary table.

Type of ward	Staff	Patients	Carers	Total
AMH	31	21	4	56
MHSOP	24	7	7	38
Peer Workers (all services)	15			15
Total	70	28	11	109

3. Focus Group Schedule

3.1. A copy of the focus group schedule may be viewed as Appendix 1 of this report.

4. Data Analysis/Results

4.1. Thematic analysis

Data was analysed using thematic analysis (TA). TA was guided by Braun and Clarke's (2006) six-step approach and was performed in NVivo 14. To achieve a rich and broad overview of the data, we adopted a contextualist stance and applied inductive coding. However, due to logistical and timely constraints we had to adopt some level of pragmatism and changed the approach to a mix of an inductive and deductive approach. The main researcher (MD) achieved an in-depth understanding of the data by conducting all focus groups, recording the focus groups as well as taking comprehensive notes. Audio files were transcribed using the transcription function of NVivo. To cross-check accuracy of the transcription, the main researcher also manually went through all transcriptions which further facilitated a strong understanding of the data. After initial coding took place, initial themes of the analysis were discussed during a triangulation meeting with the team [I/S]. Then the lead researcher refined the themes during the further coding process. Final themes were discussed in a second triangulation meeting with core research team and peer support workers ([I/S]). A summary table of themes, subthemes and supporting comments from participants were circulated for agreement to the second triangulation group.

4.2. Analytic stance and neutrality

We tried to adapt a very neutral position in approaching the interviews and analysing the data as the goal was to understand the unique experiences of what different stakeholders feel about Oxehealth rather than guiding them in a certain direction. Discussions within the focus groups included information which was potentially distressing. In recognition of the trust placed in us through this work, we wanted to ensure that the work was summarised and presented in a way which would influence our work positively to improve patient care. A reflective research log



and regular discussions between the researchers helped us to maintain methodological rigour and integrity within our approach. All of the project group are explicitly motivated to improve patient care and to make the best use of the technology available.



Summary of Themes

Theme		Description	Examples
1. Trauma-informed culture and human rights (the recognition of distress that can be caused by the system)	Consent or opt-in/opt-out options	There is a blanket approach to use of Oxehealth where it is present. Consent and opt in/out processes not available.	<i>Staff; There was definite sort of anxiety among clinicians around giving people that informed choice, they actively didn't want that to happen. So that there was the sense ... if we tell people, it will cause further distress, so it's better not to tell them. And that's just so against the principles of trauma informed care and people having choice and autonomy.</i> <i>Patient: "I have no history of self-harm. I am not on medication. I have no medical condition. It's intrusive. I am not here for anything like that. I have got no history of self-harm".</i>
	No local control	Staff members or ward managers cannot make changes to the system in terms of its specifications or turning it off for certain patients if needed. Staff cannot react to immediate needs for individual patients as they have to go through a process via the provider company.	<i>Staff: "We cannot just turn it off. You need to get in contact with them."</i> <i>Staff: "See I wouldn't have known that. No, I've never done that. So we need to think."</i> <i>Staff: "Because you can we cannot ring can't we. Yeah. So if we got someone that is particularly paranoid or strongly against it, they may have that right to turn it off. I have heard as well you cannot get it turned off like 24 hours."</i>
	Absence of co-creation	Participants who shared feeling uncomfortable and other negative	<i>Staff; "it feels like all of the concerns around this have not been taken seriously. And in sort of the last 12 months I've had lots of conversations with really angry patients saying how can you tell us that you've co-created when you know, we're seeing Oxehealth and</i>



		emotions around the lack of co-creation in the process of how Oxehealth was implemented, current practice, and concern about future work.	<i>we're saying this is not what we want? It feels like it's really hard to have integrity in that in that position."</i>
2. Communication and knowledge The theme is characterised by inconsistent communication practices across wards as well as within the same wards which suggests a corresponding inconsistency in knowledge and understanding around Oxehealth (for both patients and staff).	Inconsistent communication	Staff members on the same wards gave conflicting responses regarding their communication practices. None of the patients who joined the focus groups said they had been told about Oxehealth. Most of the staff said that they told all the patients about it.	<i>Patient: "Well, I wasn't told about it when I came here. But when I was laying down and I looked up then I was seeing it by myself.</i> <i>Patient: "I didn't know what these lights were there which were shining in the nights. I asked one of the night staff. I can't remember what he said about it. He mentioned that there was a camera that they didn't use."</i> <i>Staff: I don't think that the staff team is very good at always telling people that we've got it and what it is when they come in. And people don't always go round and read signs that are on the walls, or you'll get people coming down and saying "what is this thing in my room?". Because we haven't really explained it very well. And that's our mistake really.</i>
	Lack of transparency	There was much evidence of a lack of clarity and consistency with the information provided which made patients angry and left them confused about what it is which might negatively affect their	<i>Patient; Staff confused me because they gave different stories. And I don't know why they gave different stories because neither of them are particularly."</i> <i>Patient: "Erm I was then told by one member of staff that it monitors then your heart rate and stuff, so if you were to like fall or go unconscious or something then they would know"</i> <i>Patient: "And I said How did you know I thought the cameras were just to monitor our heart rate and stuff and not a picture and she went, Oh, it's just all blurry, It's buzzed out and then I go a bit like ah</i>



		well-being and recovery. Some staff members feeling as though information is being withheld. Requests for information materials that are easier to understand and more accessible for staff and patients.	<i>so staff can see, so then I started to get a bit annoyed because I'd been given, not false information but I was under the impression it was just a blank, no cameras and it was literally just to measure our like body whatever is going on."</i> <i>Staff: "we wanted to put down that this was a camera system but there was a pushback to say no its a sensor."</i> <i>Staff: Yeah. And I think which is that, you know, on that note it might be helpful to have like an easy to read like information booklet to explain to the patients what it is and what it does. And because then obviously they're fully aware, right?</i>
	How understanding (or lack of understanding) impacts on patient care	For patients, the lack of understanding led to a lot of guess work around what the system could do. Some patients then felt very scared about their ideas what the system might do them and how staff might be sitting there and watching them. Staff reported patients proactively asking them to use Oxehealth to not interrupt sleep. Patients sharing that after understanding what the system was during the focus group,	<i>Patient: "Because it's very important because now that you've explained it to me, I now understand more and it makes more sense as to why its there."</i> <i>Patient: "At first, I found it intrusive. But then when I found out about what it actually did, I was all for it."</i> <i>Staff: "We've taken patients in my office to show them the main screen or we've shown them the tablet and said this is what we can see and we'll click onto their bedroom for them so that they can see and they recognise it's only for 10s. And, and then the one patient that we have had that we want to get it disabled for actually said, Oh if that's what it is then that's fine. Okay. And then we didn't need to actually disable it in the end."</i> <i>Patient: , "if you do have a heart attack they can save you". [the system would not do this]</i> <i>Patient: "Well, I don't mind having it. As long as everything is shared with me and it is protecting me, which I agree with "</i>



		that they felt more at ease and would be more accepting of it.	
3. Application in practice Overview of how the system is used by staff members in clinical practice, functionalities of the system alongside technical issues and general user experience, as well as indicators for inappropriate use of the system.	Clinical use -Remote physical observations and rapid tranquilisations	The most frequently mentioned benefits was in the context of remotely taking vital signs when patients refuse them to be taken, especially after rapid tranquilisations.	<i>Staff: "But it's very rare, after you have had someone in restraint and given them medication against their will, that 10 minutes later they're going to comply with a full set of physical observations. It just very almost never happens. So, Oxehealth is giving us that what we wouldn't otherwise have."</i>
	- Night-time use	Oxehealth provides a way of conducting routine observations during the night without the person being woken up. Achieving good sleep patterns is a key clinical benefit for people with mental health difficulties. Staff also note the potential for over-reliance on the system.	<i>Staff: "Quite helpful for patients who don't like night checks, where we shine a torch through the window and there are some patients that request that we don't do that and then we can just change their care plan. Just check on Oxehealth at night-time."</i> <i>Staff: "I think there's a possibility it could be used too often at night"</i>
	-Opportunities to intervene to prevent self-harm and suicide	Staff shared ambivalent views about it being used to prevent incidents. There is evidence that Oxehealth prevented incident being more	<i>Staff: "Yeah. Yeah. Well, or maybe not - enabled us to intervene quicker than we would have done if it hadn't been there."</i> <i>Staff: "And I think this is kind of heading in completely the opposite direction. And it sets a precedent that environmental safety and the removal of our privacy and dignity is how we prevent suicides... for me, this is just heading us completely in the wrong direction."</i>



		serious, the theme was less prominent than expected	
	-Incident review	Strong theme of finding the system useful to review falls and using this to inform care. Limitations to this are that staff need to make the request to Oxehealth within 24 hours.	<i>Staff: "You can review the last alert on and on there, but it's really blurry. But you'd be able to tell if someone fell. You just won't be able to tell how or why or whatever. But you can also request (the last 24 hours recorded)."</i> <i>Staff "Used if somebody has a fall You know, you use you have you use you intend to go through the mechanics of the fall".</i> <i>Staff: "you have to ring within 24 hours, which is quite difficult, because we don't work every weekend and then if a fall happens on a Saturday...."</i>
	-Activity reports	Staff members reported that activity reports were helpful in determining how much a patient actually would have slept or much they would have moved in their rooms.	<i>Staff: "We use it quite often in looking at activity reports and sleep patterns, That's quite useful, isn't it?"</i>
	-Busy times	Monitoring patient safety during busy times such as shift handovers, or if the ward is short of staff.	<i>Staff: "I think what you said with the handover, there obviously is alerts that go off and, you know, that allows the staff on the ward to go and check up room. So yeah, I think it's been quite helpful."</i>
	Ensuring the system is used appropriately. This overlaps with the clinical use theme;	Where the technical benefits of the Oxehealth system can be used in way that is not aligned with good	<i>Patient: "If it is used appropriately, I feel yes. I would feel safe just because the way my head was in. So basically, it's alright for me. [...] If it is used appropriately, it is beneficial for everyone. but if is use inappropriately, it's not beneficial."</i> <i>Staff : "It's like giving us the easier, less disruptive option. And I think also, like we do get patients that can act differently when they're</i>



		practice or appropriate clinical care.	<i>around staff members compared to when they're on the own. So it also allows us extra opportunity to like, monitor how people are presenting when they're alone in that room." [this is not following guidance for use]</i>
	-Being used as a substitute for personal care	Discussions around the possibility of this and that staff were assertive in stating that they were actively ensuring the system was not being used as a substitute for personal care. One staff member mentioned usage reports that evidence how staff are using the system.	<i>Staff: "It affects my work experience in terms of fact that I'm constantly able to tell new staff that they can't use it instead of observation and engagement.... when you get temporary staff through who don't understand ... and it's had to go in handover multiple times."</i> <i>Carer: "... my concerns it that is can probably subconsciously be replacement for the care."</i> <i>Staff: "There's also a risk of people becoming reliant on Oxehealth and using it for the wrong reasons. So instead of doing like the care round observations properly and actually engaging in communication and assessment and all the things that we meant to be doing. Just having a quick look on Oxehealth and seeing that they're okay and breathing, and they are not actually doing the care round properly"</i> <i>Staff: "And I think that's what we backed up with the Oxehealth reports, because I get some usage reports, so I could break down every time wards are using it, how many times they look at a patients, taking Obs [observations], things like that. ..[if someone was] just tap it on screen to do everyone's Obs, to check them, not do the care. That would alert on the statistics that I get."</i>
	-Inconsistent Use	Some patients spoke about feeling they are constantly checked by the system, even if	<i>Patient: "See, I've got very different experience. I was in the bathroom for two hours. On Sunday trying to kill myself. And it didn't go (on). Nobody came. And it just heightened feeling that I am worthless".</i>



		there would be no good reason to do so. Other patients on the ward spoke about no one checking on them and no one intervening during self-harm or suicidal attempts.	<i>Patient: "So somebody should have come to you.."</i> <i>Patient: "Also think, yeah, somebody should have come to me."</i> <i>Patient: "So why do they observe some people and not us?"</i>
	-Functionality WiFi	The large screen in the nursing office functions well however, if staff are not in the office they use the tablets to check the alerts. On every Oxehealth ward, staff members mentioned problems with the Wi-Fi connection and that the tablets were not working or often needed charging. Tablets also need to be unlocked with a code before identifying the room number relating to the alert and this delays response time. The combination of connectivity and	<i>Staff: "And it would be so because it's quite dangerous if you've got somebody who has ligatured and you can't say what room it is, by the time you've sorted out, what room it is, you could be talking like a good minute to a couple of minutes. Yeah. And that could be quite detrimental as opposing to what it is it actually should do."</i> <i>Moderator: "The tablet doesn't say which room it is?"</i> <i>Staff: "It does eventually. But when it works..."</i> <i>Staff: "It will eventually. But then if the delay of the WiFi is left too long, then it doesn't say anywhere, does it. You just guessing as to which room maybe is on amber and not on green. But then there could be another one to flash upon red. And you think, well, was it that one? Or was it that one? Yeah. And you could miss an opportunity."</i>



		requiring the code causes sufficient delay that at times, the alert has stopped (timed out) and the staff cannot then identify the room.	
	-Alert System	This theme relates to complaints by staff about the high number of alerts, the sound of the alerts, and that alerts might be not meaningful/adapted to the needs and population group of the ward.	<i>Staff: "Well it goes 'Oxehealth alert' very loudly. Constantly enough because it's, like, edge of bed."</i> <i>Staff: "But they that sometimes there's a lot of red flashing lights and you just turn them off, obviously to check they're all right as well. But then they just all come back on again. And it's like this person has moved."</i> <i>Staff: "Yeah, basically they've gone. They've rolled over a little bit to get to their bed and then it sets off again."</i> <i>Staff: "Or person is in their room and they're not in the room. I think it's a lot. I find my eyes actually have red flashing any time you do stuff. Obviously it's there for a reason, but I think some of the alerts are a bit and intense."</i> <i>Staff: "We did we did get told that we could get the sensitivity turned down in terms of their edge of the bed stuff which may make us use it more effectively."</i> <i>Staff: "Ours is just constantly red, you know, like. And then it just gets a little bit like white noise. It doesn't mean anything anymore because it's just always red all the time. You just you just resetting them all the time just to stop it flashing. Like I say, we silence the siren on it. It's just really annoying."</i> <i>Staff: "Yeah, ours is absolutely silenced."</i> <i>Staff: "... I just don't think the alerts are very useful because I think if we're worried about somebody, then would be looking actively anyway without needing the system to tell us that someone's stood at</i>



			<i>their bedroom door or that someone was on the toilet. Well, I think and I think personally I think they are excessive."</i>
	-Accuracy (Vital signs, locations, activity reports)	Overall, the Oxehealth system is mostly accurate. However, there have been also regular concerns expressed that the system would not provide accurate data on vital signs or locations of patients or that the activity reports might be flawed. The technology is not guaranteed to be completely accurate and this uncertainty raised issues for staff using the system especially when used for patient safety.	<i>Staff: "Sometimes it struggles to pick up accurate physical health observations, it gives you a randomly very high or very low breath rate or struggle to find a breath rate or find a pulse rate. And that could be improved."</i> <i>Staff: "It's not always accurate either. Quite often it says patients are in the bedroom and when you check on it, there is no one there. So it doesn't always work."</i> <i>Staff: "And also the concern around how it's not exact with the physical observations and that we need to be aware that that can sometimes be the case."</i>
	-Delays	Staff reported that there can be delays between what is happening on Oxevision and what is happening in real life. For instance, there would have been cases where alerts would go	<i>Staff: "But it tends to be a little bit of a delay in the getting out of bed sense that. And so from that aspect, you're not there in time sometimes to prevent, a fall."</i> <i>Staff: "Main concern is that it doesn't always have the reliability. Yeah, The tablets, sometimes when we've had the tablets working, there's been a significant delay on them .. like 20 30s sometimes .."</i>



		off with a 30 second delay and the incident, e.g., self-harm or someone leaving the room, would have already happened. The staff are unclear regarding the reasons for the delays in the system.	
	Good idea in general	This theme summarises how staff generally appreciate having an additional tool and backup to support patient safety and aid them in their work of monitoring and protecting patients. Specifically, supporting sleep, preventing self-harm or suicide on the ward.	<i>Staff: "And it does allow us to take a step back and give patients a little bit more space and they probably feel a little bit more independence and they can probably sleep better. So I think tools like that are quite useful. I also find it quite useful for sleep patterns as well because it's remarkable the number of people who stay just up all night or just don't sleep and actually having the availability of their sleep pattern and their movement in the room I think is really, really helpful."</i> <i>Staff: "Yeah, I do think it's helpful because of a number of occasions where it's helped us to prevent things happening."</i>
4. Staff Experience	Frustration	Staff members shared their frustration and feeling annoyed about the system not working properly. Parts of that were due to the system not fulfilling its expectations, not matching the needs of	<i>Staff: "Where do we start? I think it's been a piece of equipment that hasn't properly fulfilled our expectations."</i> <i>Staff: "You should be able to stop the edge the bed one for people who aren't at falls risk as well. Yeah. Because that's ultimately what that helps with isn't it. You know."</i> <i>Staff: "Just people have that foot on the edge of the bed and they sleep and that just keeps going off."</i> <i>Staff: "Or when they laying on the side."</i>



		specific wards, and the system not being reliable or accurate. Additionally, the frequency and sound of the alerts, especially when they were perceived as not meaningful, acted as a substantial source of frustration.	<i>Staff: "Yeah. And some things triggered. Yeah. I get that because then."</i> <i>Staff: "Yeah. I have to agree. "Oxehealth alert". That's so annoying."</i> <i>Staff: "... Because we spent a lot of time talking about Oxehealth, piloted in places saying "oh yeah it's really good". And we've not had the same experiences".</i> <i>Staff: "Yes, I suppose we were able to detect when patients have fall on the floor. It doesn't do that. I just [gives] some video playback of incidents. ... It's not very reliable as a system for its alerts. Which is a shame because obviously it's very intrusive for our patients to have camera that can be accessed at any point. And I think it probably blurs a bit of a boundary with some of the patients who are already paranoid or suspicious of what we're up to."</i>
	Handy and useful	Staff found the system to be a useful tool beyond that related to preventing self-harm/suicide and promoting sleep. Staff felt most supported in their work by Oxehealth being able take vital signs/physical observations, especially in situations where someone was likely to refuse but these are required for their physical safety	<i>Staff: "Largely positive from our perspective, they're very helpful in supporting observations and engagements. We use them to monitor how much people are sleeping, catching physical health observations, if a patient has received rapid tranquilisation medication - It can be very helpful and not disturbing the patient to collect the data that we need to ensure that their physical health isn't compromised."</i> <i>Staff: "I think when there's patients who are quite... that can be quite disturbed and they don't want people going in checking on them every 15 minutes. You know, you are able to see that they're safe in the room without needing to open the door. If they're expressing that, they really don't want you to do that."</i>



		(rapid tranquilisations). Additionally, staff felt peace of mind when being able to double-check remotely whether someone was safe.	
	Staff anxiety, discomfort, and trust	Staff describing their heightened level of anxiety due to technical issues of the system (inaccuracies and unreliability); concerns how the system is used and communicated; concerned about intrusiveness, patients' understanding of the system; and patients' privacy. Accumulation of concerns affect staffs trust in the system.	<i>Staff: "Well, I also think it would negatively impact the patients, because the more anxious you get from the machine, the more you are going to go down there and embarrass. They could be using that time to self-soothe or learn the coping strategies that we put in rather than us running down to save them as such. So I think it could be a disadvantage in that sense.</i> <i>Staff: "I think it would be good if it still did all the monitoring things, but not necessarily seeing them. I don't feel that there's much benefit from it."</i> <i>Staff: "I'm in two minds about it."</i> <i>Staff: "I am too. But I wouldn't want it to be taken away. But I also don't like to rely on it, you know?"</i> <i>Staff: "Yeah. I suppose no one in their personal life has a camera in their bedroom where other people could watch them. I think we bring people into hospital generally against their will. And then we kind of overly have an opportunity to observe them, don't we. Which is difficult when you're trying to build a good relationship with someone. That's already difficult to do."</i>
	Importance of perceived meaningfulness	Staff experience is based on whether the system is configured in	<i>Staff: "No, not at this stage. It's early days yet. It can be a useful, useful tool, but it just needs to not drive the staff mad in order for it to be left on. So we can use it."</i>



		meaningful way or not for the ward. If the system is matching requirements on a ward, it is viewed as a very meaningful and useful tool. However, if not then the staff experience is negative and the alerts are experienced only as a source of stress.	<i>Staff: (on alerts): "I don't think it's a useful feature that we need here on AMH. I've used it on MHSOP and it's really brilliant at that. Because you want, their system it tells when one of the patients sits on the edge of the bed and have an alert for that sort of thing on like an elderly frail patient is really useful. But I think for generally our patients it's not."</i>
	Peace of mind	Staff members shared that the system would give them some additional peace of mind as the system enables them to double-check whether a patient would be safe.	<i>Staff: "And I suppose the other positive is that it can help and assure us that patients are safe during heightened times of sort of distress and self harm, it will alert us where needed really?"</i> <i>Staff: "Two staff members could have a 1-1 with patients. Yeah. And a nurse will come and say, Look, you need to go check them, so you can prioritize straight away, when I go tell the patient or sit with them. And so it's just something like having that extra person like, Yeah"</i>
	Feeling Safe	Responses were characterised by demographic differences, i.e., it was mostly carers and older people who reported on safety benefits. These groups also seemed to be the ones who were most accepting of the	<i>Patient (MSHOP): "Yeah. It's there if you fell out of bed or you got stuck in the bathroom."</i> <i>Patient (MHSOP): I think it makes people feel safe and that. Hmm.</i> <i>Carer: "I think there are, to benefit to us as a family, having that peace of mind with the comfort of knowing that."</i> <i>Carer: To us, we have not really asked what it is really. We just presumed it was something to do with safety.</i> <i>Carer: Me and (name) spotted it and we knew that it would be</i>



		system (independent from communication and levels of understanding) and were more concerned about safety than about any risks or privacy concerns due to the system.	<i>something like a monitoring system.</i> <i>Carer: Something to do with the monitoring thing. That's what we thought.</i> <i>Carer: Gave us peace of mind really that he was being monitored. So we've sort of felt like that it was extra care that he was getting. Yeah. But no one informed us.</i> <i>Carer: Yeah, we just. We just assumed. Yeah. And we didn't ask, but I should imagine if you'd asked, somebody would have explained.</i> <i>Patient (AMH): "So, like keeping patients safe. Yeah. Make them feel safer? Yeah. Yeah."</i> <i>Patient (AMH): "Just like in your bedrooms, I do understand like its to try and keep you safe and stuff but why does it, its kind of like a breach of privacy to be watching you all the time from a camera in your bedroom when that's meant to be your own personal space."</i> <i>Patient (AMH): "I mean, it is good for sort of your safety and stuff but yeah, I mean, yeah good for safety. I mean if you fall out of bed or doing something or"</i> <i>Moderator: "For yourself, personally does it makes you feel safer?"</i> <i>Patient: "No."</i> <i>Moderator: "Hmm. What would you say about it? That it doesn't make you feel safer."</i> <i>Patient: "It's just that i'm on a camera all the time and its a bit erm and how accurate is it? Mm hmm. Like how can you rely on a little machine."</i>
5. Impact on patient experience	-Harm prevention	Some patients reported that the system would keep people safe because	<i>Patient: "I think it's, it's good as a whole because there's been many times I've tried to kill myself. And obviously your heart rate goes down, you know, whatever. So they click on it and check on you."</i>



Detailed and transparent communication with a clear rationale seemed to have increased acceptance and reduced feelings of distress whereas the absence of these factors often caused the opposite.		there would have been occasions where staff would have intervened during a self-harm/ suicidal attempts for themselves or for another patient they would have heard about.	<i>Patient: See, I've got very different experience. I was in the bathroom for two hours. On Sunday trying to kill myself. And it didn't go (on). Nobody came. And it just heightened feeling that I am worthless. Because I have been left for two hours in the bathroom. And it didn't go on.</i> <i>Patient: "So, I mean, apart from the bits that we have highlighted, the only good thing is that like when I'm well, I've said that it if it's it's a good idea because it has saved my life. I had this thing a couple of times where I have tried to kill myself and it must have gone off and people have come running. So obviously it helps to save a life. Just when you feel not so good, then you don't want it to save your life. But is there designed to save your life and it has."</i>
	Distress	Patients experiencing elevated feelings of distress, particularly anxiety and paranoia, due to the system. Distress was triggered by different factors with the camera unit itself and the lack of knowledge/ understanding about the system.	
	-Anxiety and paranoia about camera	Staff and patients shared about significant concerns and lived experience of elevated patient paranoia and anxiety due to the camera of	<i>Patient: "Sometimes it makes me feel nervous."</i> <i>Patient: "It is, and sometimes it feels like it's a strip room, like a stripping your brain without your knowledge, it is hard to explain it."</i> <i>Staff: "We get a lot a lot of patients who are very paranoid about it, who really don't like being recorded, don't like the cameras in their</i>



		Oxevision. Staff also expressed patterns of frustration as they are concerned that the system could be intrusive and the camera would make paranoid patients feel worse and would not provide the safety they would aim to provide in a hospital. Anxiety and especially paranoia was a distinct patterns across all Oxehealth wards who took part in the this evaluation study.	<i>rooms, and it can end up impacting the staff in the sense that the levels of agitation around it can be quite elevated and we can be dealing with a lot of shouting and verbal aggression around it. And the only way that is being resolved with some people is when they've sprayed shaving foam or something over it and it can't record anymore because they wouldn't accept reassurance around it. So I suppose it just depends on the patients at the time."</i>
	-Potential for re-traumatisation		<i>Staff: "Um, retraumatizing as well. If a person finds out that that actually has happened. And, um, I'm saying, lady, because most of these systems are installed in female wards. Um, but if a lady has had, um, traumatic experiences in the hands of men and she finds out this has been happening, that can be very distressing. Retraumatizing. Harmful to the person."</i> <i>Staff: ".. I was abused as a child, but I don't know if there's video of that around. For me, if I'm in a position of crisis, I'm taken to a place against my will and in the corner is something that's potentially monitoring me I don't think that's something that's going to help my sense of safety.."</i>



	Guess Work	Guessing about the system when communication is inconsistent and unclear.	<i>Patient: "Erm, initially overwhelming. I found it and it was quite, because we, we weren't told really what they are. We just get put in a room and no one really explains what they are. Erm it took me to ask staff what exactly those cameras are doing are they monitoring, can they see me, can they, you know, know what exactly are we doing? Did you feel the same, yeah"</i> <i>Patient: "So, yeah, it can be very intimidating. Cause you think oh my god what can they see in the office there? .."</i>
	Red Lights	Patients commonly shared that the red lights of the system would irritate them and would make them feel paranoid, particularly at night. Furthermore, some patients also shared that the red lights were the first thing they would have noticed about the system because they would have not or only partially told about the system.	<i>Patient: ".. When the red light comes on as well at night above on the ceiling, I don't like it".</i> <i>Staff: "Yeah, I think it's just because that's like the reflective red dots sometimes that you can see when the room is really dark and they don't seem to love that if the patient is like more paranoid"</i> <i>Staff: "I think some of the ladies get very paranoid by it, yeah, and they get very focused on it because they think they're being watched constantly. Even though we do explain what its there for, but they think it's, obviously they see the red light and if they think that they're being spied on, especially with the ladies that come in with extreme paranoia."</i>
	Accuracy concerns	Patients fearing that staff would rely on the system which made them doubt that staff would use the system appropriately and negatively affected	<i>Patient: "So by the time that flags up and they watch you for 15 seconds it could be too late to help them but they could be put on like where someone's with them all the time and like checked more regularly instead of relying on a screen."</i> <i>Patient: "But if I'm in the bathroom for over half an hour. Surely someone should be knocking on the door"</i>



		trust in staff as well as the system.	<i>Patient: "Then they rely on the system. I know. I have witnessed that. Will the system even be right?"</i>
	Design of system	Staff and patients expressed that the design of the system made participants feel anxious and intimidated on some occasions. Most concerns were around the size of the system.	<i>Patient: I would change the size of it?</i> <i>Patient: I would just change the size. It's unnecessarily.</i> <i>Patient: Large.</i> <i>Patient: Large it's very intimidating the rooms small as it is, and it takes away the room.</i> <i>Patient: Not knowing the information.</i> <i>Patient: Yeah. So just make it smaller and make people aware of exactly what it does and why and why.</i> <i>Staff: "And just because it's quite a big system, it's not a discrete kind of little box in the corner. It's quite a decent size."</i> <i>Staff: "Yeah, cause it's like, quite a chunky thing in the corner of the room, and it's got bright red light on it. Yeah, I."</i>
	Contagion of staff anxiety	Some staff reported that they felt anxious about the system and their anxiety could be projected onto the patients. Particularly, regarding technical issues of the system, (reliability and accuracy).	<i>Staff: "Well, I also think it would it would negatively impact the patients, because the more anxious you get from the machine, the more you are going to go down there and embarrass. They could be using that time to self-soothe or learn the coping strategies that we put in rather than us running than us running down to save them as such. So I think it could be a disadvantage in that sense. So kind of you could project that nervousness on them?"</i>
	Privacy and intrusiveness	The system was designed as a less intrusive or disruptive	<i>Patient: "I don't know. I just thought, I just thought that a camera being in your bedroom and sort of personal space is a bit, I know obviously safety and all that but still, you still should be able to have</i>



		way for patient monitoring, however, there were frequent concerns about the potential for invasion of privacy.	somewhere you can go where you know you're not being watched all the time." <i>Patient: "Just like in your bedrooms, I do understand like it's to try and keep you safe and stuff but why does it, it's kind of like a breach of privacy to be watching you all the time from a camera in your bedroom when that's meant to be your own personal space".</i> <i>Staff: "Because essentially this the only place they could go and not to be able to be viewed. There is essentially toilets and community bathroom. Yeah. So, if you knew you are on CCTV in communal areas and essentially in your bedroom, the only place you can get some privacy is the toilet"</i>
6. Dignity and Privacy Whilst some staff members emphasis that Oxehealth would allow less intrusive observations and could therefore improve patients' privacy, there were also significant concerns raised about having a camera in the bedroom, the potential for misuse and patients fearing or perceiving that they	Getting dressed	Concerns raised on female wards regarding getting dressed and what may be seen on the Oxehealth camera. The majority of female patients who spoke about this concern dressed in the bathroom where there are no cameras.	<i>Patient: "Soaking Legs and soaking feet trying to get my like leggings on in the bathroom. So I'm not seen on camera. And it is a juggle. And it's like such an effort."</i> <i>Staff: "So, for example, on a female ward, if you have male members of staff looking into a female's bedroom, um, when she's getting dressed and undressed and she doesn't understand the full capabilities of the system, then that's a risk."</i>
	Human rights	Some patients and staff members felt that the Oxevision system could violate their rights. A particular concern would be the camera and they would	<i>Patient: And we don't know to what degree, maybe that needs to be in that booklet, or somewhere just to say that this is a risk that could happen. Because in the in the world outside you have privacy. Yeah. And privacy is huge isn't it? And you agree and disagree to what you allow. Because still we still got rights even in hospitals.</i> <i>Staff: "Not everybody is informed that there's a camera in the room</i>



would be watched/spied on.		feel that it would be unethical from staff to “watch” them. Additionally, there were complaints about the way Oxevision would be communicated and the lack of choice patients would have in the process.	<i>and, and also, have they got the right to refuse for that to be there because it's invading their privacy. Isn't it?"</i> <i>Patient: “Because I do believe it is a breach of human rights, not to not have the option to consent out of something like this, you know, especially when it's being used inappropriately as well.”</i>
	Improving Sleep	Staff members reported that they would be able to support patients’ sleep by using Oxehealth at night as a less intrusive way of monitoring. Some patients would proactively ask to be checked by staff using Oxehealth at night. Positive comments from carers relate to this theme.	<i>Staff: “So that's probably why we were a bit more pragmatic with that. Let's use it as opposed to disturbing that poor soul who hasn't slept for five nights by going in or shining a torch.”</i> <i>Carer: “I think it's a good idea. I really do. So you say that especially if they're not 100% well, it means, you know, you can keep an eye on them, without as you say having to wake them up because there's nothing worse than being in hospitals and someone says can I need to take your blood pressure, you'd be like not really I'm just going to sleep. So I think that's brilliant.”</i> <i>Carer: “So then I couldn't sleep. So I know that when he's here, that I can sleep a little bit better.”</i>
7. Sleep	Impairing Sleep	A significant number of patients reported to have trouble sleeping due to the Oxehealth system. Especially the red lights of the system would scare them at	<i>Patient: “Because I have been waking up now at certain times although my sleep pattern is normal. But I feel like it is attacking me in my sleep. Yeah.”</i> <i>Patient: “The actual size of it, lying in bed at night you can't sleep cause you're looking up at it”</i>



		night and would make them feel intimidated. It appears that the design of the system and the lack of knowledge around what the system would be resulted in a scary combination for patients leading to anxiety at night and disrupted sleep.	<i>"Patient: I find the light at night and I look at it and I don't really understand it. Patient: Yeah. Patient: And I think what the ****. Patient: Yeah. Patient: .. Go to bed. It adds to the mental distress. Patient: That you were already in. Patient: You're already in the mental ward in the night".</i>



4.3. Summary of Themes

The themes are included in the table with examples from the transcriptions to elaborate in order to provide a depth of understanding.

5. Summary of Issues Identified

- 5.1. There are both some clear benefits and clear harms described within the evaluation, Further development of the system and the way it is implemented in practice is required to ensure we are realising the opportunities presented for increasing patient safety while also minimising harms.
- 5.2. Different services and individual wards have differing requirements and ensuring that these differences are recognised in future developments is essential for the on-going benefits realisation. Ward managers are key to the development work and should therefore also be included as a matter of routine.
- 5.3. Our findings help to understand how Oxevision is experienced by key stakeholders. This allowed us to investigate strengths and weaknesses of both the system and how it is embedded in the trust processes. These findings are essential to make informed decisions about measures so that Oxevision is used in an appropriate and ethical way in the Trust to realise its intended purpose of maximizing patient safety and well-being.

6. References

- 6.1. Braun and Clarke (2006)
- 6.2. Ivanova, J., Tang, T., Idouraine, N., Murcko, A., Whitfield, M. J., Dye, C., ... & Grando, A. (2022). Behavioral Health Professionals' Perceptions on Patient-Controlled Granular Information Sharing (Part 1): Focus Group Study. *JMIR mental health*, 9(4), e21208.
- 6.3. McDuff, D. (2023). Camera measurement of physiological vital signs. *ACM Computing Surveys*, 55(9), 1-40.



Appendix 1 – Focus Group Structure

Focus Group Questions – Patients/Carers:

1. Can you tell me about your experience as a patient/carer during the current hospital stay?
2. How do you feel about our Oxehealth camera-based patient monitoring system?
3. How does the Oxehealth system influence your experience as a patient/carer?
4. How do you feel about the communication and consent regarding Oxehealth?
5. What are your concerns regarding the Oxehealth system?
 - 5.1 How are the concerns/questions handled/addressed by staff?
6. What are your perceived benefits of the Oxehealth system?
7. If there is anything you could change about the system or the way it is used, what would you change?
8. Anything else you would like to share?

Focus Group Questions – Staff:

1. How do you feel about our Oxehealth camera-based patient monitoring system?
2. How does the Oxehealth system influence your experience as a member of staff?
3. How do you feel about the consent process in relation to Oxehealth?
4. How do you feel about the communication and consent process around Oxehealth towards patients?
5. What are your concerns regarding the Oxehealth system?
6. What are your perceived benefits of the Oxehealth system?
7. If there is anything you could change about the system or the way it is used, what would you change?
8. Anything else you would like to share?