This is an Accepted Manuscript of a book chapter published by CRC Press in Emerging Technologies in Healthcare : Interpersonal and Client-Based Perspectives on 28th March 2024, available online: https://www.routledge.com/Emerging-Technologies-in-Healthcare-Interpersonal-and-Client-Based-Per/Gordley-Smith-Hackett-Hayre-Muller-Scherer/p/book/9781032215785

Emerging Technologies in Healthcare: Interpersonal and Client Based Perspectives

Clare Killingback and John Naylor

Health technology: a person-centred perspective

Abstract

Modern healthcare has made substantial achievements in improving the health and wellbeing of people through technological advances. Despite such progress, there remains a sense that something may be missing. For example, there have been growing calls from patient organisations for transformational change toward a more humanised healthcare that places people at its heart. It is precisely these personalised approaches that healthcare providers should be prioritising over impersonal, automated procedures, which can often result from a growing reliance on technology.

The aim of this chapter is to open a discourse on the interplay between emergent health technology and its human operators and recipients, with the hope of raising awareness of some possible limitations. Some forms of healthcare technology clearly offer more efficiency, but this may be at the expense of the more qualitative aspects of care; those that can add value and meaning to many people's lives. It is the view of the authors that healthcare cannot and should not be reduced to a narrow range of objective measures and quantifiable outcomes, since this would be to relegate the importance of human lived experience, detaching individuals from the context of their being a whole person.

The authors feel it important to remind fellow healthcare professionals that health is not simply about addressing a body's physical dysfunction: Health is about wholeness, and healthcare is about people. This should not be taken as a Luddite stance, since we do not

necessarily regard technology as inherently bad, but more from the perspective that technology plays a role, positively or negatively, in shaping healthcare. What we have sought to do here is to highlight the importance of championing healthcare professionals who can harness technology while preserving a person-centred approach.

Keywords

Person-centred practice, patient-centred practice, humanised healthcare, healthcare technology

Health as wholeness

We shall later go on to define our understanding of the terms technology and person-centred practice in the context of healthcare, but will begin by discussing what we mean by health. The word 'health' has its etymological roots in the old English word 'hælth' and closely relates to the 'whole' as 'a thing that is complete in itself' (Brüssow, 2013). However, this historical view, that to be healthy is to be whole, does not necessarily encompass the 'complete wellbeing' aspects of the World Health Organisation (1948) definition as it alludes instead to a person as a whole entity. Yet in the context of healthcare, medicine and medical research has tended to be disease focused rather than holistic. Health in the modern world has been particularly focused on a biomedical approach which has its origins in the 17th century.

The body and mind divided

The 17th century philosopher Rene Descartes played a formative role in the development of what we now consider modern medicine. Descartes posited that the body and mind exist as separate entities. In essence, the mind is the core of the human being, and the body is a

machine-like vessel for the mind (Keller, 2020, Magee, 1987). This dualistic view has had a profound impact on healthcare which often sees the body as a machine in need of repair (Keller, 2020). This metaphor bears heavily upon the question of what is meant by health and healing (Berry, 1994) and creates a division (the antithesis of wholeness or health) by falsifying the process of healing and the nature of the one needing to be healed (Berry, 1994).

Healing the body / mind divide

20th century phenomenologist Maurice Merleau-Ponty countered Descartes' reductionist view of the body by presenting a more holistic view of human beings (Keller, 2020). His view of the lived body, where the mind and body are reintegrated as one, is in opposition to that presented by Descartes. Importantly, Merleau-Ponty's vision of the integrated lived body has implications for healthcare (Leder, 1984, Keller, 2020) as we move away from the metaphorical body as a broken machine to be 'fixed' to a focus on caring for a human being. Illness and disease here are viewed from a more existential perspective as involving suffering, fear, loss, hope, and change (Keller, 2020).

Modern healthcare practice

Sadly, this holistic view of the human being 'as a whole' has not always broken through into modern healthcare practice. Healthcare services promote activities focused on treating a physical illness through assessment, diagnosis, pathology, specialised outcomes, technology, audits, and treatment pathways to promote efficiency, with emotional and psychosocial needs often treated separately if at all (Keller, 2020).

This focus on the physical has been particularly evident in the earlier careers and formal training for the authors' own context of physiotherapy practice. Traditionally physiotherapy has been aligned with biomedical models of practice underpinned by positivist paradigms (Wiles and Barnard, 2001). The adoption of this biomedical or biomechanical view of the body was intentional and important in establishing the legitimacy of the profession in aligning them with medical practitioners to gain public trust (Nicholls and Gibson, 2010). The introduction of the biopsychosocial model in the 1970s (Engel, 1978) challenged the biomedical discourse of reductionism by offering a more holistic alternative (Borrell-Carrió et al., 2004). The physiotherapy profession adopted this paradigmatic shift toward a biopsychosocial model of care which considers the patient as a whole person including their social, cultural, and environmental context (Sanders et al., 2013).

In more recent times, there has been a further shift in international healthcare conversations, including physiotherapy, to focus more explicitly on person-centred practice and to prioritise this as the core model for care delivery (Groves, 2010, Foot et al., 2014, NICE, 2017, WHO, 2015, van Dulmen et al., 2015). Being person-centred refers to a philosophy in which the values, preferences, and individual perspective of the person play a central role in how their needs are met with a view to optimising the experience of care (Jesus et al., 2016). Key principles of person-centred practice include respect; choice and empowerment; patient involvement in health policy; access and support; and information (Groves, 2010). These principles are important because person-centred practice focuses on the whole life requirements, thereby determining what makes life meaningful for an individual (Håkansson Eklund et al., 2019). Person-centred practice is related to health as wholeness rather than reducing it to being predominantly biomedical and physical.

The shift in healthcare paradigms from biomedical, to biopsychosocial, to person-centred is theoretically sound. Yet the reality is that healthcare remains reductive and is not necessarily about the 'wholeness' we previously discussed. Physiotherapy practice and education remain typically entrenched in a biomedical discourse (Mudge et al., 2014, Roskell, 2013, Nicholls and Gibson, 2010, Foster and Delitto, 2011, Brun-Cottan et al., 2020, Killingback et al., 2021b, Killingback et al., 2021a). Narrow outcomes are often prioritised over more meaningful human processes and issues of wellbeing (Todres et al., 2009). The way that healthcare is organised and practiced means that patients are reporting that they do not feel fully met as human persons and that these human dimensions are important to them (Todres et al., 2009).

A recent position paper from the International Experience Exchange for Patient Organisations ((IEEPO), 2021), a patient-led initiative which aims to improve healthcare around the world, is calling for a transformational change with humanising healthcare. They consider humanising healthcare a means to re-build healthcare systems around the needs of patients and their communities, where people are at the heart of healthcare. Humanised care is defined as working with patients and all stakeholders to create a more personalised approach, as opposed to the impersonal, automated, mechanical procedures which can result from a reliance on technology ((IEEPO), 2021, Busch et al., 2019). The IEEPO call on healthcare professionals to "see" and treat the patient and not just the illness. And so, we return to the beginning where our understanding of what we mean by health determines how healthcare is delivered and perceived by those receiving healthcare services.

The reader may be wondering how these various philosophical perspectives relate to a chapter on emerging technology in healthcare. Understanding our philosophical beliefs about

what health is or how we view patients are central in the role that technology can play in our healthcare practice.

We do not wish to deny the achievements of modern healthcare, including advances around healthcare technology, and must acknowledge the role that this technology has played in improvements to our health and wellbeing. But we must consider voices such as Charon when they speak about the:

> "vexing failures of medicine – with its relentless positivism, its damaging reductionism, its appeal to the sciences and not to the humanities in the academy, and its wholesale refusal to take into account the human dimensions of illness and healing" (Charon, 2006), p. 193

Health and illness are often assessed in economic terms in relation to policy documents and statistical data from clinical outcomes. But where is the person in all of this? So, it could be fair to question whether something is missing from modern healthcare, despite the technological advances. In contrast to the high-technology world, what is missing might be as simple as seeing patients as people – as whole people and not simply a physical body which is diseased.

Technology in healthcare

Next, we must consider what is meant by technology in healthcare. Technology in healthcare is composed of five major categories (Geisler and Heller, 2012), p. 3:

1. Medical devices: equipment, instruments, machines, and other devices used for clinical diagnostics, critical care, and other medical administrative functions (e.g., MRI, x-ray machines).
2. Drugs / pharmaceuticals: compounds used in clinical care, both in the prescription and over-the-counter categories.
3. Disposables: the one-time usage materials and devices which are discarded after use and do not constitute equipment in the medical devises category (e.g., catheters, disposable syringes).
4. Medical / surgical procedures and services: the medical and surgical knowledge involved in carrying out medical / surgical interventions.
5. Information technology: the informatics, automation and computer usage classes or equipment, software and techniques utilised in the clinical and administrative areas of the healthcare environment.

Questions about the role of drugs, pharmaceuticals, or big pharma are beyond the scope of this chapter. We also recognise there is a difference between genetic engineering as a medical intervention and the use of a Zimmer frame as a medical device to support independent mobility. But let us look more closely at two categories of healthcare technology in the form of medical devices and information technology which are closely linked: the internet of medical things and artificial intelligence.

The internet of medical things (IoMT) is a way of connecting medical technology such as smart devices monitoring heart rate, blood oxygen saturation, or skin temperature, for example, with information technology systems though networking technologies (Singh et al., 2020). The IoMT has the potential to monitor biomedical signals and diagnose disease

without human intervention (Vishnu et al., 2020). Thus, there is a network of medical devices and people which utilise wireless communication to facilitate the exchange of healthcare data (Al-Turjman et al., 2020). For example, the wireless sensors can remotely monitor a person's health and draw on communication technologies, such as the internet, to send this information to healthcare workers (Al-Turjman et al., 2020). Linked closely to this is the role that Artificial Intelligence plays in enabling the IoMT to support healthcare professionals with their clinical decision-making (Al-Turjman et al., 2020). For example, computers can use the data generated by feedback from healthcare staff and patients to learn normal and abnormal decision making (Al-Turjman et al., 2020).

The IoMT is not without its challenges: Issues of precision and accuracy of the data obtained by the sensors is vital as inaccurate data could be misleading; a secure system that ensures privacy is maintained is vital to avoid hackers stealing data which would results in identity theft or access to controlled substances; the electrical safety of devices must be properly maintained; the need for wireless devices to operate 24 hours a day raises issues of energy consumption and energy efficacy; usability of devices need to be considered; and data storage solutions need to be realised for the ever increasing amount of data generated (Al-Turjman et al., 2020).

Furthermore, there are undoubtably economic challenges to the continuous healthcare technological advances. In the 21st century, we are more dependent than ever on technology. Some new technologies can result in lower short-term spending; vaccines are one example of this, however, more generally speaking, technological advances in healthcare tend to result in increased spending (Goyen and Debatin, 2009). How do we continue to pay for the cures that get ever more expensive? And how do we ensure that the advances in specialisation,

technology, drugs, not just become a way of marketing industrial products? Where are people in these conversations?

The challenges listed above mostly include the economic and practical aspects of managing such a system but there are wider ethical aspects to consider. The IoMT indeed needs to be mindful of being technologically and scientifically robust but also ethically responsible and respective of services users rights (Mittelstadt, 2017). Social isolation would be a risk where healthcare visits from healthcare staff to patients are redundant since it has been replaced by technological monitoring (Mittelstadt, 2017). Healthcare via remote monitoring is at risk of removing the human element of care which can only be developed via face-to-face relationship. Being lonely is a significant risk factor or premature mortality and has been compared to the effects of smoking (Holt-Lunstad et al., 2010). This raises ethical questions. What is the use of healthcare technology if we are made socially poorer by the result of it? What if our health and wellbeing was reduced to a narrow range of measurable and quantifiable outcomes which are taken out of the context of being a whole person without consideration of social and mental aspects of our health and wellbeing? The IoMT may result in more efficiency, but it may come at the cost of the qualitative aspects of care which are what help add meaning to our lives. What are the unintended or unanticipated consequences of healthcare surveillance technology? Answering these questions is beyond the scope of this chapter but it is important that these questions are considered.

Questioning advancing technology

Technology is both ubiquitous and invisible (Haraway, 2000). It has become an inextricable part of today's healthcare practices (Jacobs et al., 2017). We cannot argue with the remarkable progress of health technology in recent decades and the impact this has had in increasing life expectancy. Indeed, the IoMT and Artificial Intelligence have a role to play in

this thus, the point here is not about being anti-technology, but we do need to consider unpacking some broader ethical aspects of technology in today's healthcare practice.

The IoMT and Artificial Intelligence come from the scientific method of healthcare, but we must consider alternative viewpoints. To do this we need to look backwards to some of the voices of the 20th century who were warning about the moral questions of ever advancing technology. Let us look more closely at the phenomenological viewpoint as this can offer a different perspective.

Phenomenology seeks to answer philosophical questions which stem from what phenomenologists call the 'lived experience'. Phenomenology does not begin in the world of science, but in embodied meaning experiences known as the 'life world'. As humans we do not only have a body, but everybody is a body, a body which is lived in (Svenaeus, 2018).

Martin Heidegger, the 20th century phenomenologist wrote about the risk of technology dominating and being taken for granted and becoming part of our world view to the point of being barely visible (Svenaeus, 2018). The role of modern technology in society has come to a point where there is no other way to live and again, we must not underestimate the positive role that technology and science has played in healthcare practice. Thus Heidegger is not saying in his discourse on modern technoscience (Heidegger, 1977) that healthcare professionals need to be averse to science and subsequent technology, but rather they should be aware of the limitations of science and technology and be mindful of the "dangers of acting only as scientists in their profession when they are meeting patients" (Svenaeus, 2018) (p 82). Bioethicists are drawing on the work of phenomenologists to examine the ethical challenges that healthcare technology bring such that "our abilities to handle new

technologies – and not let technologies handle us – will be decisive for the society to come" (Svenaeus, 2018)(p. 90).

To say this another way and through another phenomenologist, Gadamer (1996) when discussing medical science, warns of the:

> "dissolution of personhood when the patient is objectified in terms of a mere multiplicity of data. In a clinical investigation all the information about a person is treated as if it could be adequately collated on a card index. If this is done in a correct way, then the data all belong to the person. But the question is nevertheless whether the unique value of the individual is properly recognized in this process." (Gadamer, 1996) (p. 94)

The concern of phenomenologists here is a warning for healthcare professionals to ensure that we do not frame human beings through medical science and technology alone, but that we also approach our patient encounters through an embodied approach and human dialogue. We must remember to see our patients as people first and foremost and keep technology and medical science in their right place. Otherwise, healthcare technology may pose the risk of 'dissolving' the person (Svenaeus, 2018).

This brings us back to Descartes and challenges us as healthcare professionals as to how we see our patients. Do we view them as a scientific biological body, or as a lived body? Our answer to this question will determine the type of healthcare professional we will become, and phenomenologists would argue that healthcare needs to acknowledge the priority of the lived body, as one which is embodied and not merely a diseased body. Again, this is not to be

hostile towards healthcare technology, but to hold the perspective of the lived body as a "way of being- in-the-world will also make us wary of the technologies that tend to block life-world concerns in order to prolong or even produce life as a goal in itself" (Svenaeus, 2018) (p. 86). Therefore we must return to the view that health is related to wholeness; we are more than a physical body, we are a lived body. In essence, it raises an important question: Is it possible to have person-centred healthcare technology with a focus on people and community as well as being mindful of efficiency?

Person-centred technology

The modern hospital environment is a place that we associate with high technology, alongside related themes of specialisation, standardisation, protocols, and efficiency. Efficiency, in particular here, relies heavily on the vital functions of unseen and heavily automated technological 'machinery'. Faced with such technological advancements, we need a reminder that these places serve real people with non-standardised lives; along with their embodied, contextualised, and narrated experiences (Svenaeus, 2018). Consequently, in healthcare settings, the world of the unique must interact with that of the 'standard', whatever that means.

Straddling these two worlds, however, are the healthcare professionals: highly trained individuals who aptly draw on their specialised, high technology knowledge to meet lay people, most often lacking in this knowledge. Thus, when performing at their person-centred best, clinicians might constitute the palatable human interface with this technology. When underachieving in this role, clinicians might unknowingly be conducting themselves, in the mind of the patient at least, as one with the machines; in the fashion of the unthinking,

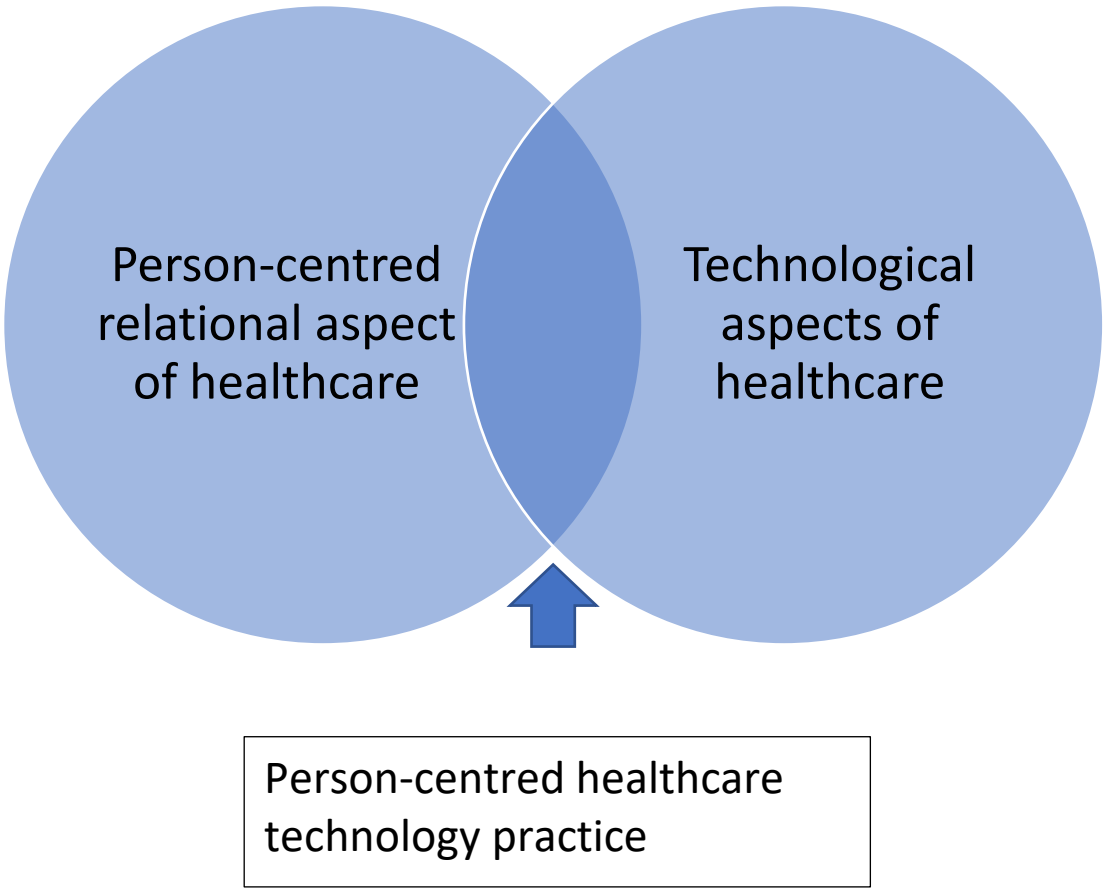
unfeeling automatons of science fiction. Healthcare professionals as humans must therefore bridge this chasm.

The paradigms of person-centred practice and healthcare technology could be said to be antithetical. However, instead of focusing on such polarisation, clinicians would be better advised to find ways in which to apply the principles of person-centred practice *to* healthcare technology. In this way, person-centred healthcare's focus on the values, preferences, respect, choice, empowerment, involvement, and individual perspective of the person in considering how their healthcare needs are met could be married with technology. We would suggest an urgent need to consider person-centredness *and* technology together with the understanding that, although the modern healthcare system is technologically shaped, it must be considered through a human lens - with people at the heart of it. This liminal space is where technology *and* person-centred practice can co-exist, preferably in a way that facilitates and thrives rather than hinders (Lapum et al., 2012). Rather than be governed by technology in our healthcare practice, we perhaps need to move towards consciously integrating person-centred practice and recognising our humanness in a highly technological healthcare environment.

Technology and 'humanness' are relational and thus responsible for shaping our way of being as healthcare practitioners (Lapum et al., 2012). At present, technology appears to be the dominant form of knowing in many healthcare services. The authors are therefore keen to champion those healthcare professionals who can harness the benefits of technology but in a manner where people remain at the heart of their practice. There will be times when the emphasis is rightly placed on technology, such as a critical or intensive care scenarios - or simply when this is highly valued by patients, which means flexibility is more important than dogmatic application of our vision. Furthermore, some have cautioned the substitution of

Cartesian mind body dualism with that of technology/ people or objective/subjective dichotomies (Lapum et al., 2012). At risk of being over simplistic, the authors would argue that there is a space where both person-centred practice and technology can intersect that offers the best in person-centred healthcare technology practice (figure 1).

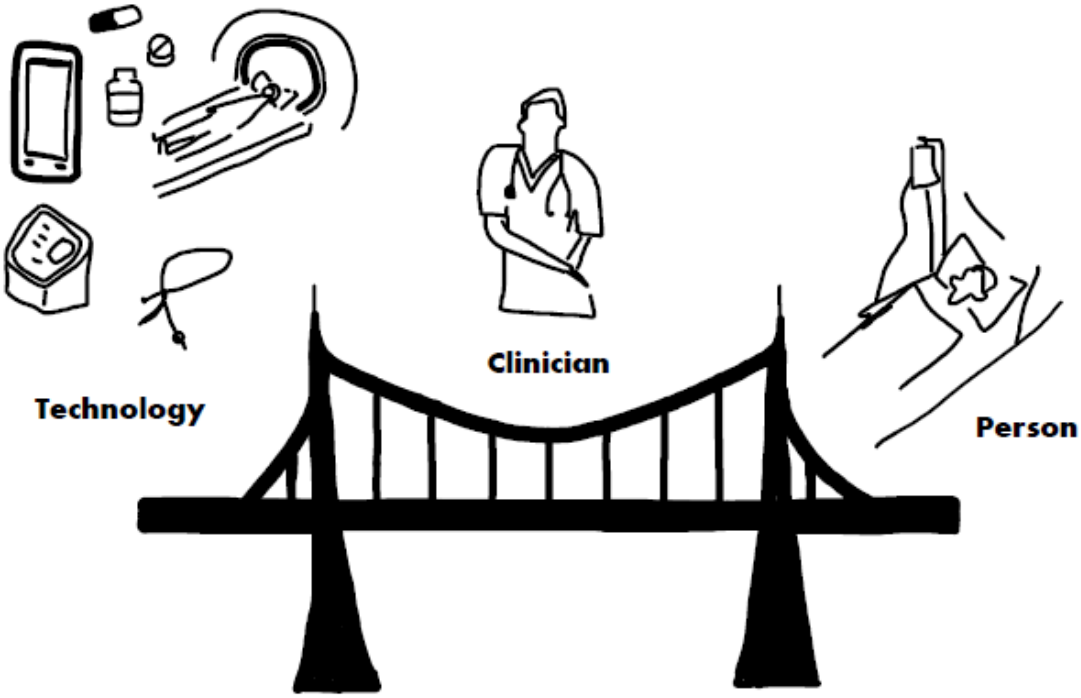
Figure 1. Person-centred healthcare technology practice



The metaphor of *travel* between person-centred and healthcare technology paradigmatic worlds, with particular importance placed on the direction of travel, refutes the idea that people cannot cross between them. A lay person's attempt to cross into the professional

world would likely be too steep a climb for most, thus necessitates movement by the healthcare professionals into the lay world (Berry, 1994). The meeting needs to be between two *people,* where healthcare professionals can act as a metaphorical bridge between the professional world and the lay persons world (figure 2).

Figure 2. Clinicians bridging the world of the person and healthcare technology



Sometimes we think as healthcare professionals that we are crossing that boundary when we provide people with information in lay terms to help them make an informed decision. Atul Gwande (2015) says when discussing the role of the healthcare professional in end-of-life care that the mistakes clinicians make is that they see their role as a task in supplying cognitive information, the cold facts, and descriptions in lay terms. However, he says more

often people are looking for the meaning behind the information rather than the facts; what might be a person's biggest fears or concerns? What goals are most important?

> "Our most cruel failure in how we treat the sick and the aged is the failure to recognise that they have priorities beyond merely being safe and living longer; that the change to shape ones' story is essential to sustaining meaning in life…" (Gwande, 2015) (p. 243)

These are the wider existential, phenomenological aspects that matter to people's lives beyond the physical body, although we must also be mindful of the physical aspects.

As clinicians we need to be ready to cross the boundary to the world of the person. We know as healthcare professionals ourselves that when our professional relationship with our patients has been a meeting between two human beings, these moments have been some of the most rewarding and moving aspects to our work; the things that have made our work meaningful and why we signed up for a caring profession.

Role of healthcare professionals in a high technology healthcare service

Earlier in this chapter we included a conceptualisation of five aspects of healthcare technology (medical devices, drugs/pharmaceuticals, disposables, medical/ surgical procedures and service, information technology). This conceptualisation of healthcare technology focuses on material objects. Whilst this is true, we also need to consider the socially embedded aspects of technology which shape practice (Lapum et al., 2012). For example, healthcare practitioners respond behaviourally and cognitively to interpreting

technological readings resulting in protocols and pathways which shape healthcare practice (Lapum et al., 2010, Lapum et al., 2012, O'Keefe-McCarthy, 2009). The thoughtless paraphrasing of a spinal imaging report to a patient in a way that paints the picture of a crumbing spine can create a powerful nocebic effect for the recipient. This emphasises the important point that clinicians realise the technical words they use without due consideration can cause considerable harm. This implies that it is not just the technology (the object) but our response to the object that matters, and this can potentially be a reductivist, positivist response or a person-centred response.

In many ways, to be human is to be limited – to live within the constraints of our biological bodies and the limits set by the cells which make up our physical body (Gwande, 2015). Technology in healthcare has enabled us to extend some of these physical limitations in a powerful way. Gwande (2015) is calling for a challenge in how we view the role of healthcare professions when he says:

> "We've been wrong about what our job is in medicine. We think our job is to ensure health and survival. But really it is larger than that. It is to enable wellbeing. And wellbeing is about the reason one wishes to be alive. Those reasons matter not just at the end of life, or when debility comes, but all along the way." (Gwande, 2015) (p. 259).

This view is important because it calls on healthcare professionals to be cognisant of the power of healthcare science, but also to acknowledge the finite nature of that power and hold it in tension with our role in considering a person's wider wellbeing – i.e., health in its wider sense of wholeness and living a meaningful life.

Healthcare managers faced with the pressures of managing growing waiting lists with their limited resources might understandably favour technological solutions without understanding the deeper ramifications for staff and service users. Since the peak of the Covid-19 pandemic, the authors' themselves have witnessed a pragmatic and swift normalisation of remote telehealth musculoskeletal outpatient consultations, previously uncommon within the physiotherapy profession. The continuity and expansion of this approach offers clear benefits ranging from fulfilment of service demands with more appointment slots to supporting employee's preference of working from home. However, it is too soon to tell what impact this change will have for patients and the wider physiotherapy profession, particularly in terms of the development of the next generation of physiotherapists as we take away the face-to-face, tactile human interaction. Working alone on a laptop is a sea change from working in a bustling outpatient department. This might lead to feelings of isolation and loss of collegial spirit among fellow professionals so used to bouncing off and challenging each other's practice. Without this in-person human interaction that many cite as the reason for doing the job, the authors' question if this is still a role that they would be happy to fill? No matter what the data tells us, the unescapable fact is that most patients prefer to deal with another human being and anything that unnecessarily restricts that could fairly be considered a direction of travel away from person-centred practice. Furthermore, it stands to be the seen what the longer-term data on what has been missed in general practice in terms of important diagnoses since the shift to remote consultations.

An example of where people and technology meet

Let us look at one example of the meeting of technology whilst supporting person-centred practice.

The Covid-19 pandemic led to a rapid transition to the use of digital technologies for remote healthcare, including physiotherapy. Restricted access to face-to-face therapy was important in reducing exposure and transmission of Covid-19. Existing community services were lacking in capacity to support those with Long Covid. Telerehabilitation was piloted by a team of practitioners and researchers from a hospital in the North of England to support those who had been hospitalised with Covid-19 and had on-going symptoms to help them on their path to recovery.

The telerehabilitation programme was structured using conventional pulmonary rehabilitation principles with 12 sessions of group exercise, with educational sessions and peer support. It was delivered using a video conferencing application (Cisco WebEx Meetings, Cisco Systems Inc, USA). Prior to the telerehabilitation programme commencing, a physiotherapist conducted a virtual initial assessment to check for eligibility, accessibility, and safety to exercise with remote supervision. Twice a week for six weeks, participants were invited to join a virtual group-based exercise programme with three-six people.

A qualitative evaluation was carried out to understand the views of patients hospitalised with Covid-19 on a telerehabilitation programme. Participants reported that the telerehabilitation programme helped them overcome some of the challenges they faced due to Long Covid. For

example, they perceived improvements in walking stamina, strength, managing breathlessness, improved sleep quality, and fatigue management.

Despite never meeting physically face-to-face, the telerehabilitation programme provided important social peer support. Those involved in the programme found that being with others who had been through a similar experience was helpful and reduced some of the sense of isolation after returning home from hospital. These online social aspects helped them deal with some of the wider psychosocial challenges of their health and long-term recovering from Covid-19. Participants similarly never met the physiotherapy instructors face-to-face. Yet, they reported that the physiotherapy instructors were central to the positive experience of the telerehabilitation programme. Instructors were described as cheerful, positive, informative, full of joy, full of life, encouraging, cheery personality, and caring – they were perceived as being supportive and person-centred in their approach by treating participants as unique individuals.

We share this example to highlight the positive impact that can be realised when healthcare professionals bring person-centred practice and healthcare technology together. It shows that it is possible to cross that lay person / professional divide – we just need to be mindful and intentional of that crossing. The telehealth programme used technology to enhance human connection at a point in someone's life where they are at risk of social isolation. Good communication is at the heart of good healthcare so we need to be considerate of how online support may help people connect with healthcare teams between visits. Thus, we need to think beyond efficiency, standardisation, and protocol driven outcomes and ensure healthcare technology is applied in a people-centred way. We need to apply technology in a thoughtful

way to ensure it supports patients as whole people with a lived body and not just a physical body.

Conclusion and Future Recommendations

What we have sought to do with this chapter is to open a discourse on the interplay between emergent health technology and its human operators and recipients. From our perspective, one of the key questions is how we might go about harnessing health technology, with all its benefits, without losing the person-to-person contact we hold sacrosanct? It is vital to note that just because we have a relational, person-to-person contact this does not automatically constitute person-centredness. Therefore, how can we ensure that this person-centred practice is taking place? Personally, we believe this is only possible if we have healthcare professionals who are willing and able to bridge the high-efficiency technological world that is modern healthcare, to the world of the people with whom they interact. To be able to do this, practitioners must first acknowledge the high technology environment in which they operate along with the invisible influences this can have on our clinical practice. Finally, they must show clinical bravery to be able to cross the boundary and enter the life world of the person, however uncomfortable this may be (Naylor et al., 2022). Only then is it possible to deliver our truly person-centred vision of healthcare as it should be.

We offer the following reflective questions for healthcare professionals to consider:

- Which lens(es) do I use to view interactions with patients (scientific, biomedical, phenomenological, person-centred)?
- How do I view healthcare technology as part of my interactions with patients?

- What assumptions do I make about what is important to the person I am working with?
- Do I provide patients with an opportunity to share what is important or meaningful to them as part of healthcare interactions? In other words, how willing am I to cross into the world of the patient? What are the barriers that stop me doing this more?
- Do I then seek to incorporate what is important to them into their treatment plan?

If we as healthcare professionals reflect on these questions, we believe that it will help us be more cognisant of a space where both person-centred practice and technology can intersect and offer the best in person-centred healthcare technology practice.

References

(IEEPO), I. E. E. F. P. O. 2021. IEEPO 2021 Position Paper Humanising Healthcare: a call for transformational change.

AL-TURJMAN, F., HASSAN NAWAZ, M. & DENIZ ULUSAR, U. 2020. Intelligence in the Internet of Medical Things era: A systematic review of current and future trends. *Computer communications,* 150**,** 644-660.

BERRY, W. Health is membership. Spirituality and healing, 1994 Kentucky, USA.

BORRELL-CARRIÓ, F., SUCHMAN, A. & EPSTEIN, R. 2004. The biopsychosocial model 25 years later: principles, practice, and scientific inquiry. *Annals of family medicine,* 2**,** 576-582.

BRUN-COTTAN, N., MCMILLIAN, D. & HASTINGS, J. 2020. Defending the art of physical therapy: Expandinginquiry and crafting culture in support oftherapeutic alliance. *Physiotherapy Theory & Practice,* 36**,** 669-678.

BRÜSSOW, H. 2013. What is health? *Microbial Biotechnology,* 6**,** 341-348.

BUSCH, I., MORETTI, F., TRAVAINI, G., WU, A. & RIMONDINI, M. 2019. Humanisation of care: Key elements identified by patients, caregivers, and health care providers. A systematic review. *Patient* 12**,** 461-474.

CHARON, R. 2006. The self-telling body. *Narrative inquiry,* 16**,** 191-200.

ENGEL, G. 1978. The biopsychosocial model and the education of health professionals. *Annals of the New York Academy of Sciences,* 310**,** 169-171.

FOOT, C., GILBURT, H., DUNN, P., JABBAL, J., SEALE, B., GOODRICH, J., BUCK, D. & TAYLOR, J. 2014. People in control of their own health and care: The state of involvement. London: The King's Fund.

FOSTER, N. & DELITTO, A. 2011. Embedding Psychosocial Perspectives Within Clinical Management of Low Back Pain: Integration of Psychosocially Informed Management Principles Into Physical Therapist Practice—Challenges and Opportunities. *Physical therapy and rehabilitation journal,* 91**,** 790-803.

GADAMER, H. 1996. *The enigma of health: The art of healing in the scientific age,* Stanford, CA, Stanford University Press.

GEISLER, E. & HELLER, O. 2012. *Managing Technology in Healthcare,* Boston, Kluwer Academic Publishers.

GOYEN, M. & DEBATIN, J. 2009. Healthcare costs for new technologies. *European journal of nuclear medicine and molecular imaging,* 36**,** 139-143.

GROVES, J. 2010. International alliance of patients' organisations perspectives on person-centred medicine. *International Journal of Integrated Care,* 10.

GWANDE, A. 2015. *Being mortal: Illness, medicine and what matters in the end,* London, Profile books ltd.

HÅKANSSON EKLUND, J., HOLMSTRÖM, I., KUMLIN, T., KAMINSKY, E., SKOGLUND, K., HÖGLANDER, J., SUNDLER, A., CONDÉN, E. & SUMMER MERANIUS, M. 2019. "Same same or different?" A review of reviews of person-centered and patient-centered care. *Patient Education and Counseling,* 102**,** 3-11.

HARAWAY, D. 2000. A manifesto for cyborgs: science, tech- nology, and socialist feminism in the late 1980s. *In:* JANES, L., WOODARD, K. & HOVENDEN, F. (eds.) *The gendered cyboarg: A reader.* London: Open University.

HEIDEGGER, M. 1977. *The question concerning technology and other essays,* New York, Harper and Row.

HOLT-LUNSTAD, J., SMITH, T. B. & LAYTON, J. B. 2010. Social relationships and mortality risk: a meta-analytic review. *Plos Medicine,* 7**,** e1000316-e1000316.

JACOBS, G., VAN DER ZIJPP, T., VAN LIESHOUT, F. & VAN DULMEN, S. 2017. Research into Person-Centred Healthcare Technology. A Plea for Considering Humanisation Dimensions. *In:* MCCORMACK, B., VAN DULMEN, S., EIDE, H., SKOVDAHL, K. & EIDE, T. (eds.) *Person-Centred Healthcare Research.* West Sussex: Wiley and Sons Ltd.

JESUS, T., BRIGHT, F., KAYES, N. & COTT, C. 2016. Person-centred rehabilitation: what exactly does it mean? Protocol for a scoping review with thematic analysis towards framing the concept and practice of person-centred rehabilitation. *BMJ Open,* 6.

KELLER, K. 2020. The body as machine and the lived body in nursing. *Collegian,* 27**,** 238-244.

KILLINGBACK, C., THOMPSON, M., CHIPPERFIELD, S., CLARK, C. & WILLIAMS, J. 2021a. Physiotherapists' views on their role in self-management approaches: A qualitative systematic review. *Physiotherapy Theory & Practice*.

KILLINGBACK, C., TOMLINSON, A., STERN, J. & WHITFIELD, C. 2021b. Teaching person-centred practice in physiotherapy curricula: a literature review. *Physical Therapy Reviews*.

LAPUM, J., ANGUS, J. E., PETERS, E. & WATT-WATSON, J. 2010. Patients' narrative accounts of open-heart surgery and recovery: authorial voice of technology. *Social Science & Medicine,* 70**,** 754-762.

LAPUM, J., FREDERICKS, S., BEANLANDS, H., MCCAY, E., SCHWIND, J. & ROMANIUK, D. 2012. A cyborg ontology in health care: traversing into the liminal space between technology and person-centred practice. *Nursing philosophy,* 13**,** 276-288.

LEDER, D. 1984. Medicine and paradigms of embodiment. *The journal of medicine and philosophy,* 9**,** 29-43.

MAGEE, B. 1987. *Descartes: A dialogue with Bernard Williams. The great philosophers: An introduction to Western Philosophy,* Oxford, England, Oxford University Press.
MITTELSTADT, B. 2017. Ethics of the health-related internet of things: a narrative review. *Ethics and information technology,* 19**,** 157-175.
MUDGE, S., STRETTON, C. & KAYES, N. 2014. Are physiotherapists comfortable with person-centred practice? An autoethnographic insight. *Disability and rehabilitation,* 36**,** 457-463.
NAYLOR, J., KILLINGBACK, C. & GREEN, A. 2022. What are the views of musculoskeletalphysiotherapists and patients on person-centredpractice? A systematic review of qualitative studies. *Disability & Rehabilitation*.
NICE 2017. Tailored resources: Working with adults to ensure person-centred care and support for admissions. London: National Institute for Health and Care Excellence.
NICHOLLS, D. A. & GIBSON, B. E. 2010. The body and physiotherapy. *Physiotherapy Theory and Practice,* 26**,** 497-509.
O'KEEFE-MCCARTHY, S. 2009. Technologically-mediated nursing care: the impact on moral agency. *Nursing Ethics,* 16**,** 786-796.
ROSKELL, C. 2013. An exploration of the professional identity embedded within UK cardiorespiratory physiotherapy curricula. *Physiotherapy,* 99**,** 132-8.
SANDERS, T., FOSTER, N., BISHOP, A. & ONG, B. 2013. Biopsychosocial care and the physiotherapy encounter: physiotherapists' accounts of back pain consultations. *BMC Musculoskeletal Disorders,* 14.
SINGH, R., JAVAID, M., HALEEM, A., VAISHYA, R. & ALI, D. 2020. Internet of Medical Things (IoMT) for orthopaedic in COVID-19 pandemic: Roles, challenges, and applications. *Journal of clinical orthopaedics and trauma,* 11**,** 713-717.
SVENAEUS, F. 2018. *Phenomenological bioethics. Medical technologies, human suffering, and the meaning of being alive,* London, Routledge.
TODRES, L., GALVIN, K. T. & HOLLOWAY, I. 2009. The humanization of healthcare: A value framework for qualitative research. *International Journal of Qualitative Studies on Health and Well-being,* 4**,** 68-77.
VAN DULMEN, S., VAN DER WEES, P. & NIJHUIS-VAN DER SANDEN, M. 2015. Patient-centered approach in clinical guidelines; a position paper of the guideline international network (G-I-N) allied health community. *Physiotherapy,* 101**,** E1575-E1576.
VISHNU, S., JINO RAMSON, S. & JEGAN, R. Internet of Medical Things (IoMT) - An overview. International Conference on Devices, Circuits and Systems, 2020 Tamilnadu, India.
WHO 2015. WHO global strategy on people-centred and integrated health services. Geneva: World Health Organization.
WILES, R. & BARNARD, S. 2001. Physiotherapists and evidence-based practice: an opportunity or threat to the profession? *Sociological Research Online,* 6**,** 62-74.