

RESEARCH

Disability, Cycling and Health: Impacts and (Missed) Opportunities in Public Health

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Public Health England recently launched an active travel strategy in which it advised local authorities, health professionals and community groups how to improve the physical and mental health of the population and to reduce health care costs by promoting walking and cycling. Despite highlighting the cost savings and health benefits across the population, disabled people are largely absent from the strategy. This is particularly notable given that people with disabilities have the poorest levels of mental and physical health. Moreover, cycling is easier than walking for most people with physical disabilities and is also crucial to mobility, exercise, and health. This paper draws on qualitative interviews with disabled cyclists to explore the physical and mental health impacts of cycling for disabled people. It also highlights the broader implications for wellbeing in terms of independence and autonomy and the deficit of knowledge about cycling for disabled people among health professionals and policy makers.

Keywords: disability; cycling; health; health policy; public health

Introduction

In 2016 Public Health England (PHE) launched an active travel strategy in which it advised local authorities, health professionals and community groups how to improve the physical and mental health of the population and to reduce health care costs by promoting walking and cycling as the primary forms of transport for journeys of five miles or less. Despite highlighting the cost savings and health benefits for the whole population, disabled people¹ are largely absent from the strategy. This is particularly notable given that people with disabilities have the poorest levels of mental and physical health in the population. Furthermore, where disabled people *are* mentioned, it is only in relation to walking and never cycling. Yet cycling is easier than walking for most people with physical disabilities and it is also crucial to mobility, exercise, and health. Moreover, excluding disabled people in this way contributes to the knowledge, infrastructural, and policy barriers which curtail the lives of people with disabilities and lead to their poor health outcomes.

The aim of this paper is to counter the exclusion of disabled people from policy, practice and knowledge regarding cycling and health. It draws on qualitative interviews with seven cyclists who have a physical disability and explores the health and wellbeing impacts of cycling. It highlights that for many people with physical disabilities cycling is a key form of exercise and health promotion. For some participants cycling is their only form of exercise, but all of the participants described how their experience of cycling opened up possibilities and aspirations for further exercise, either through additional forms of cycling, or exploring other kinds of exercise. Cycling is also crucial to good mental health, especially for those who had acquired disabilities in adulthood and were no longer able to access their usual forms of mobility and exercise. Cycling also had broader mental health and wellbeing impacts in terms of feelings of freedom, joy, and independence, which are not only crucial to good mental health but are also uncommon for disabled people because of the barriers they face in regards to mobility, exercise, and autonomy. However, notwithstanding

¹ There is ongoing debate about the 'correct' way to refer to disabled people/people with disabilities. In the UK 'disabled people' is the preferred term while in Ireland and internationally (e.g. UNCRPD) 'people/persons with disabilities' is preferred. I use both terms in order to be inclusive. As a disabled woman I am also rather jaded with the constant posturing about the 'best' terminology. For me, the intentions behind, and the actions which emerge from, the discussion of disabled people is much more important than arguments about semantics. This is especially so in the UK context where the British government uses the 'correct' terminology while perpetrating 'grave or systematic violations of the rights of persons with disabilities' (UN 2016: 20).

these health benefits, it transpired that cycling had never been recommended to any of the participants by a health professional – including those who advocated static cycling machines as part physiotherapy. There seems to be a gap in the knowledge of health professionals regarding cycling for people with physical disabilities and, indeed, a number of participants attempted to rectify this themselves by providing information about inclusive cycling to health services. This gap in knowledge is compounded by the PHE strategy, and until policy makers and health professionals are better equipped to understand the possibilities of cycling for people with disabilities, disabled people will remain excluded from key policies and services and will continue to encounter barriers to cycling and health.

Disability, cycling, and health

In 2016 PHE published an active travel strategy and disseminated guidance to local authorities about how to improve population health, and reduce the costs of healthcare, by promoting walking and cycling as a primary means of transport (PHE 2016). The document highlights that ‘walking and cycling are good for physical and mental health’ and that ‘building walking or cycling in to daily routines are the most effective ways to increase physical activity’ (PHE 2016: 4). It stresses the importance of involving community members and public health practitioners in achieving these objectives and goes on to emphasise that ‘sedentary’ lifestyles have multiple negative health impacts including cancer and diabetes. In contrast, regular exercise or physical activity is ‘associated with many improvements in health and wellbeing’ including ‘lower risk of heart problems and depression’ (PHE 2016: 7). Walking and cycling are also cited as important tools in ‘stress management’ as they are ‘relaxing’ and, when used as an everyday form of transport (e.g. active travel), they enable people to achieve recommended physical activity targets (PHE 2016: 10–11).

Disabled people are rarely mentioned in the document (on only four pages out of thirty-three) and, when they are, they are only considered in terms of walking and never cycling – an omission which is a common feature of transport as well as health policy, and which increases barriers to cycling for disabled people (Andrews et al. 2018; Clayton et al. 2017; Hickman 2015; WfW 2017). The neglect of disabled people has been a feature of public health and transport responses to the coronavirus pandemic in the UK. Pop-up cycle infrastructure frequently excludes disabled cyclists (Tyrrell, 2020) and disabled people have encountered significant barriers to health, social care, and basic necessities (Inclusion London, 2020).

In the PHE guidance, disabled people are grouped together with older people for example, in regards to the needs for traffic control measures, even though only older (and not disabled) people had been consulted in regards to this issue (PHE 2016: 17). Disabled people are never considered in relation to wider population groups such as commuters, parents, or young people. Thus, PHE conceptualises disabled people in very limited and limiting ways, that is, as pedestrians and with the same needs and abilities as older people. The lack inclusion of disabled people as *cyclists* in the guidance and the failure to address the need for inclusive cycling infrastructure and policy is particularly notable in the context of PHE’s equality agenda. PHE emphasises that public health measures should ‘not increase health inequalities’ and suggest that equality impact assessments should be used to ‘ensure that interventions are equitable and reduce inequalities’ (PHE 2016: 21). Moreover, under the 2010 Equality Act, all public sector bodies, including health services and local authorities, have a duty to consider the needs of *all* individuals and to ‘advance equality of opportunity between people who have a protected characteristic [e.g. disability] and those who do not’ (WfW 2017: 16). As such, PHE should be advancing equal opportunities for cycling for disabled people. This is not merely a point of principle: cycling is crucial to the mobility, health and wellbeing of disabled people. Cycling is easier than walking and wheelchair propulsion for most people with physical disabilities (Andrews et al. 2018; Arnet et al. 2016; Author ref; van Drongelen et al. 2009; WfW 2017) and it has a vast range of benefits for health, wellbeing, social inclusion, and participation. These benefits include: improvements in mental and physical health (Arnet et al. 2016; Springer 2013), increased confidence, self-esteem, self-efficacy, and positive self-identity (Block et al. 2010; Springer 2013), increased social and leisure participation (Block et al. 2010; Pickering et al. 2103, 2015), and increased employment opportunities through increased mobility and experience (Clayton and Parkin 2016; Hickman 2015; Springer 2013). Cycling also enables disabled people to surpass their own and others’ expectations of their capabilities, to set significant new life goals and broaden their aspirations for independence (Pickering et al. 2013, 2015). Cycling also provides an accessible and sustainable alternative to both public and private transport and has significant impacts on mobility, which is key to independent living and labour market participation as well as health and wellbeing (Clayton et al. 2017; Hickman 2015; Springer 2013).

Overall then, cycling is a win-win for disabled people in terms of health, mobility, and social participation. However, disabled people face many barriers to cycling so that although up to 70% of people with disabilities *can* cycle, very few (6%) do so on a regular basis (TfL 2012). These barriers are almost never related to the specific nature of an individual’s disability but, rather, emerge from a range of factors,² including policy (Block et al. 2010) – such as PHE’s active travel strategy.

The impact of policy barriers are particularly concerning in relation to PHE’s focus on active travel as a route to health, given that disabled people are consistently found to have the worst physical and mental health outcomes and to face the greatest

² Other barriers include: cost, infrastructure, attitudes, knowledge about and access to cycling (see Block et al. 2010; Inckle 2019; WfW 2017).

barriers to exercise and physical activity (Mulligan et al. 2017; Reichard et al. 2011). 'Persons with disabilities experience far higher risk for adverse health outcomes than persons without disabilities' (Reichard et al. 2011: 64). People with disabilities have the lowest levels of physical activity and a shorter life expectancy than the non-disabled population (Clayton et al. 2017; WfW 2017). Within the disability population, people with physical disabilities fare the worst across all of these measures (Reichard et al. 2011) and they face a significant 'accumulation of interrelated health issues over time' (Clayton et al. 2017: 2).

The lack of activity, or 'sedentary' lifestyle, of people with disabilities emerges from barriers to exercise and physical activity not the disability itself. Many health and leisure facilities have limited access for people with disabilities and/or present attitudinal barriers from staff and customers (Mulligan et al. 2017). Barriers to public transport can also reduce access to leisure and physical activity (Clayton et al. 2017). As such, people with physical disabilities often face significant secondary health problems as a result of their immobility (Clayton et al. 2017; Mulligan et al. 2017; Reichard et al. 2011). Key among these health issues are weight problems, with 70% of physically disabled people being classed as overweight or 'obese' (Clayton et al. 2017; Reichard et al. 2011; Roulte et al. 2015) and, compared to the overall population who are classed as 'obese', people with physical disabilities have the highest BMI scores (Reichard et al. 2011).³ In addition to weight problems, people with physical disabilities have the worst health outcomes in relation to a range of other secondary, 'lifestyle' or chronic conditions such as cardiovascular health, cardiac disease, diabetes, asthma, blood pressure, cholesterol, and hypertension (Clayton et al. 2017; Mulligan et al. 2017; Reichard et al. 2011). Poor health, employment, and poverty are interconnected in multiple directions: poor health can lead to labour market exclusion and unemployment often creates physical and mental health problems. People with disabilities are less likely to be in employment and are more likely to live in poverty and to have lower levels of educational attainment and social participation than able-bodied people – all of which impact on both physical and mental health (Clayton et al. 2017; WHO 2008). Austerity in the UK has heightened these inequalities as well as imposing a culture of surveillance and blame upon disabled welfare claimants. Sanctions, punitive assessments and benefit changes have resulted in increasing deprivation for disabled people and a high number of deaths by suicide and starvation (Ryan 2019; Stewart 2016). The UN found that austerity measures had resulted in 'grave or systematic violations of the rights of persons with disabilities' (2016: 20), a process which Glover (2018) refers to as 'social murder'.⁴

Cycling both constitutes, and provides access to, health-promoting physical activity for disabled people, improving health and fitness and reducing secondary conditions (Arnet et al. 2016; Clayton et al. 2017; Springer 2013; van der Woude et al. 2013). Cycling also enables participation in a range of family, social, recreational, and leisure activities which are integral to wellbeing and social participation (Block et al. 2010; Mulligan et al. 2017; Pickering et al. 2013; van der Woude et al. 2013). Thus, cycling results in improved quality of life, physical and mental health for disabled people (Clayton et al. 2017; WfW 2017) and it produces long-term cost savings and reduces demands on health services (Mulligan et al. 2017) – all of which are central aims of the PHE strategy.

This paper draws on qualitative research with disabled cyclists to highlight how the key elements of PHE's aims – increased physical activity/exercise and improved physical and mental health and wellbeing – are integral to disabled people's experiences of cycling and the significance of their omission from PHE's policy. It also highlights the ways in which health professionals, who should be supporting and advocating cycling for disabled people, are constrained by a similar lack of knowledge and awareness. If the health of the population is to be improved through active travel, it is essential that disabled people are not excluded from this, especially given that they already disproportionately experience poor health and face significant barriers to health promoting activities. The aim of this paper is, then, to counter the exclusion of disabled people and their experiences from public health policy and practice by focusing in-depth on the experiences of disabled cyclists and their accounts of the health and wellbeing impacts of cycling.

Methods

This paper draws on qualitative interviews with seven cyclists who identified as having a physical disability, impairment or mobility impairment.⁵ The focus on people with physical disabilities is important for three reasons. Firstly, because physical disability is usually accompanied by challenges to mobility and barriers to transport, and cycling addresses both of these issues. Secondly, the barriers to cycling encountered by people with sensory, intellectual, and mental health disabilities are very different to those faced by people with physical disabilities as they can often still use a standard two-wheeled bicycle, walk, and use public transport (albeit with different barriers). Thirdly, the legal definition of disability in the UK is so broad as to be effectively meaningless in terms of attempting to understand a collective experience of barriers and opportunities.

Participants were recruited via an inclusive cycling organisation (in London, UK), Wheels for Wellbeing (WfW), who run inclusive cycling sessions and campaign for improved policy and infrastructure for disabled cyclists. WfW released a call for participants via their online newsletter, their twitter feed, and their inclusive cycling forum (of which I am a member). Four women and four men responded to the initial call, but one male and one female later dropped out, and

³ BMI is a contested measure of health especially within Fat Studies and Fat Activism (see Cooper 2016). However, I use it here because it is widely deployed in the public health context.

⁴ My own term for this is 'social eugenics'.

⁵ Participants had the capacity to consent.

one woman recruited an additional (male) participant from her workplace – resulting in a total of three female and four male interviewees. All participants were provided with an information form and a combined participant consent and researcher commitment form (see Inckle 2015) and had the opportunity to ask questions, view their interview transcript and to receive outputs from the project – all seven have received a copy of this paper. This ethos of openness, inclusion and ongoing consent is essential in disability research. Disability research is founded on politics and practices which promote equality, inclusion, and accountability and which counter hierarchical approaches that silence and objectify people with disabilities (Barnes 2003; Kitchin 2000). Disability research should also benefit the lives of people with disabilities through the production of knowledge and evidence which challenges barriers, promotes change, and is easily accessible (Charlton 2000; Payne et al. 2016). The research project underwent ethical review at the London School of Economics in the summer of 2017 when I commenced the interviews. At the time I was a member of the British Sociological Association (BSA) and bound by the BSA statement of ethical practice (BSA 2017).

Five of the interviews were conducted face-to-face either in my office or in a location of the participant's choosing and two took place over skype. The interviews lasted between 38–78 minutes with the Skype interviews being of shortest duration (38 and 41 minutes). All interviews were recorded on a digital device and then transcribed verbatim into word documents with anonymization taking place during the process of transcription.⁶ After some experimentation with different forms of analysis (see Inckle 2020) I found an in-vivo approach to thematic analysis to be the most effective in drawing out and reflecting the key content of the dataset. I conducted a two-stage analysis, firstly devising codes from close readings of the transcripts and then grouping and sorting the codes into themes (Rubin & Rubin 2005; Sanders & Wilkins 2010; Spencer et al. 2014). These themes emerged with clear interrelations apparent so that, for example, access to cycling, cycling as mobility and barriers to cycling formed the basis of one paper (Inckle 2019), and in this paper I explore the physical and mental health and wellbeing impacts of cycling along with encounters with health professionals. In doing so the aim of this paper is to provide an in-depth, rich account of the experiences that are omitted not only from PHE's active travel strategy but which are also excluded from wider policy and practice regarding the health, wellbeing, and mobility of people with disabilities.

As noted above, three participants were female and four were male, their ages ranged from 31 to 64 years and they had been cycling from ten to more than fifty years (including the years of cycling pre-disability). Participants rode a range of cycles, three used standard two-wheeled bicycles, three used non-standard cycles (handcycle, trike, recumbent) and one rode a mixture of standard and non-standard cycles. All of the participants described cycling as easier than walking or wheelchair propulsion and none of them had any formal support to enable them to access cycling. Three participants (all males) had acquired their disability in their adulthood. Five out of seven of the participants lived in the south east of England and six were white. Six of the participants currently or previously worked in white collar jobs. As such, the sample consisted of middle class disabled people in contrast to the majority of disabled people in the UK who live below the average income (EHRC 2017). This means that the participants would be able to access a wider range of resources than many disabled people, including cycling.

Physical activity/exercise and physical health

All of the participants described cycling as easier than walking or wheelchair propulsion and for most it was their main form of mobility (see Inckle 2019). Cycling was also their main form of physical activity and exercise and for Paul, Eric, and Michael⁶ it was their only form of exercise. Prior to becoming disabled Michael⁷ had participated in a range of high-intensity physical sports, including fell-running and mountain biking, which were no longer accessible to him as a disabled person. Therefore, following his accident, his discovery that he could cycle a recumbent and that he could use this to boost his activity levels and improve his cardiovascular health and fitness which was essential to both his physical and mental health.

The other most normal thing that I do, the highest frequency, would be leisure riding on the recumbent. And that's really my kind of gym session, my opportunity to get a proper work out, just spend a good hour or two getting the heart rate up, getting the breathing rate up, and, yeah, cos taking the kids to school [on family trike], as much fun as it is I don't really get that much of a sweat on! [both chuckle] (Michael).

Hélen also recounted the importance of physical activity which impacted on her cardio-vascular system. Prior to discovering cycling, her only experience of exercise had been physiotherapy, which was not only 'boring' but also failed to provide her with any of the health benefits of intensive physical activity:

What physio never did was actually exercise my heart because I didn't do it for that I did it for a knee or I did it for a hip or I did it for- and then you work on that particular thing but then it's not effort. Well, it is effort, but

⁶ All names are pseudonyms, and italicisation in quotes reflects participants' original emphasis.

⁷ In Michael's interview only the first fifteen minutes (out of a total of approximately fifty) were recorded as the device and the back-up recording failed. I made extensive notes at the end of the interview and I have drawn on these notes to describe Michael's experiences; long quotes are verbatim excerpts from the recorded portion of the interview.

it's not sustained effort. So, actually, I think *that's* the main difference, is that it gets my lungs and my heart really pumping and exercising (Hélen).

These benefits have been noted by other disabled cyclists, for example, a participant in Calyton et al.'s research highlighted that 'I went for a check-up and they found my blood pressure had really dropped' (2017: 8). In addition to cardiovascular health, cycling also burns fat and calories and can be crucial to weight management. Michael and Nasia described the importance of cycling in terms of maintaining control of their weight, which is often a key challenge for people with physical disabilities (Clayton et al. 2017; Reichard et al. 2011; Roulte et al. 2015). Following his accident Michael had gained weight due to his sudden inactivity, and Nasia became concerned that she 'was putting a bit of weight'. For both, cycling allowed them to address their weight gain:

It's really good for my health, it keeps my weight down, I do it because it *does* keep my weight down, and it is constant exercise. ... It's my commute but it's good for my exercise (Nasia).

Cycling was not only an important form of physical activity in itself but it also functioned as a gateway to further exercise – be that more cycling or different forms of sport or exercise. For example, in addition to using their cycles to meet their basic mobility needs such as shopping and/or commuting Paul and Rob both cycled long distances as forms of social physical activity. Rob had completed a 111 km one-day group cycle just prior to our interview, and Paul had recently returned from a tandem cycling holiday with his wife. For both, these experiences opened up further goals and aspirations (see Pickering et al. 2013, 2015).

I still have dreams about going on *very long* distance bike rides, when I retire. I want to cycle the width of Europe or the length of Spain or something like that, I have these ideas and these plans in my head to do stuff like that (Rob).

[Without cycling] there is no way we could have had that nice holiday in Holland cycling, cycling miles on the tandem, I think the furthest we went was thirty kilometres in one day. Not all at once, you stop for a nice picnic or stop at a bar and have a sandwich or whatever, and that was just *great*. ... So certainly we intend to do some more cycling holidays with the tandem (Paul).

For other participants the discovery of cycling changed their perception of exercise and physical activity from something that was either 'boring' or inaccessible to something that was positive and easily available. This not only resulted in them doing more cycling, but also exploring other forms of exercise and enjoying the attendant physical and mental health benefits of them.

It hasn't turned me into a sports-mad person at all but it's turned towards the positive element of thinking about exercise. ... I guess it has changed my vision of me and my health, I guess. So I do some yoga as well now, whether I would have done yoga before cycling I'm not sure, so it's opened up in a more positive way, different ways of using my body (Hélen).

It made me more confident of there is much more out there that I can do, because I didn't know about *that* [e.g. cycling] before, [so] then I was like gosh what *else* is out there that is inclusive that I didn't know about. ... My sister found this skiing, dry slopes, and you can go down, they have got a seat thing that you can go down on, so I want to try that now (Rosie).

Participants also described positive outcomes in relation to their disability, enabling them to improve muscle tone and strength in their affected limbs and, in Michael's case, to improve his overall mobility and 'keep things moving'. Rosie and Nasia experienced benefits from cycling which they had not achieved through physiotherapy: 'I think it's good, it's also building up the muscles in the bad leg, so yeah, I think it's good' (Nasia).

Yeah I do feel my leg muscles getting stronger [pats thigh] because my muscle is really bad up here, it's like really weak and I've done so much physio on it and it just never gets anywhere – well it does get [laughs], but do you know what I mean? But doing it [cycling], it does make it a bit stronger. I mean sometimes I come back and I'm like, "Oh my gosh! It's so sore!" But that's part of it isn't it? (Rosie).

Paul reflected on how his physiotherapy had focused on him learning to *walk* with his prosthetic after he became disabled, but had not explored him undertaking any other activities such as cycling. This was despite him being a keen cyclist before his accident, and cycling being his only form of exercise afterwards, which mitigated some of the impacts of his disability.

That's the only thing I do to keep fit so I'm quite keen on that. ... I don't know if it actually helps build the muscle in that leg a bit, it might do, because obviously I'm worried slightly about it, because most of my work is now

done with my left leg and if you compare the two that one is much bigger than the other because it's doing the duty of what the other one used to do, partly. So I think probably cycling helps *that* because you are pushing equally on both legs (Paul).

After becoming disabled Eric not only needed to recover his mobility but he also needed to be physically active in order to avoid secondary impacts. He confessed that while 'I don't do my physiotherapy properly' he used a cargo trike as his primary means of mobility and exercise, which also had positive impacts on another long-term health condition.

The other thing, with this stroke I'm not able to walk far *at all*, and I'm very slow walking, so there is no exercise there and the thing is they say to people if you are not getting enough exercise it makes you worse and worse and worse. ... It [cargo trike] means that I *am* able to do a full shop, and I am able to get exercise. I am getting a lot of exercise. I've got asthma as well and they said – the asthma nurse – said my lung capacity was improving, it's better than it had been in previous years, which is what you want (Eric).

Overall, cycling fulfilled a range of functions for the participants in terms of their everyday mobility and as a form of health-promoting physical activity with a range of noticeable benefits. Cycling had significant impacts on all of the target health areas identified by PHE – cardiovascular health, physical activity and weight – as well as reducing secondary conditions and improving muscle strength and mobility. This makes PHE's neglect of disabled people all the more concerning, especially in light of the poor health outcomes that people with disabilities experience. Cycling not only impacts on the physical health of people with disabilities, it also has significant impacts on mental health and wellbeing.

Mental health and wellbeing

PHE (2016) cite a number of mental health benefits of cycling, and research with disabled cyclists bears this out (e.g. Arnet et al. 2016; Block et al. 2010; Pickering et al. 2013; Springer 2013). Here, participants highlighted a range of positive impacts including: the direct physiological impacts of physical activity, stress-relieving functions, and promoting feelings of autonomy, freedom, and independence, which are integral to wellbeing and social participation. Participants often described the direct physiological impacts of exercise on their mental health in terms of an 'endorphin rush', which followed intense physical activity. This is particularly important for people with physical disabilities who may face significant barriers to cardio-vascular activity.

So, because I have never been sporty, I hadn't realised the impact of endorphins on your mood because I don't *move*, [laughs] and I didn't miss it because I hadn't experienced it. So that's the thing about that *thrill* of the first ride back in whenever it was. I'm sure part of it, what *stuck* it in my memory was that gush of endorphins, suddenly, and how *good* that felt. And now I know that, so obviously I'm not going to forget and I'm going to carry on wanting to do more. So it's really given me an insight, opened a door, into realising what the real fun effects of exercising are (Hélen).

Rob also highlighted the pleasurable impact of a long cycle ride:

It's the feeling afterwards that I feel. I think I'm addicted to the endorphin rush you get after a long bike ride! And the best thing is coming to the end of a long ride like that, and having a shower, and then having a beer [both laugh] and just feeling the alcohol seep into your muscles, and then of course I always do it with other people (Rob).

The physiological and wider impacts of physical activity are particularly important for those who become disabled in adult life and experience potentially life-altering changes to their mobility. After his accident Michael was prescribed psychiatric and pain relief medication to help him cope with the mental and physical trauma. However, after he began cycling his recumbent he found that he no longer needed either of his medications and he described cycling as 'better than counselling'. Paul also found that cycling helped him to cope with acquiring his disability and to remain positive and active.

To my mind you can go one of two ways if you have an accident – obviously for people who are already disabled they have grown up with that – but when something *happens* to you like this you can go one of two ways: you can sit in a chair and go, 'Oh my goodness this is terrible, what am I going to do?!' Or you can try and get on with life, and I think that if you can stay positive and do what you could do *before* then that certainly [helps]. I think if I hadn't had *that*, that would have been a very different story *for me* (Paul).

In addition to the direct mental health effects of cycling, it also has wider impacts on overall wellbeing. Cycling provides a means of independent mobility and autonomy – an experience of freedom which is often rare for people with physical disabilities and which participants cited as a key benefit.

What the trike has done is it as actually given me freedom (Eric).

Just that feeling of *being* out on the road, it was like freedom (Rosie).

In addition to independence and freedom cycling is also experienced as joyful and fun, feelings which are essential to good mental health and wellbeing. All of the participants described cycling as intensely pleasurable, using words like 'love' and 'joy' to express their feelings.

I *just love* cycling, it's a *fantastic* way for me to get around, otherwise I wouldn't be able to (Rob).

I enjoy cycling a lot and I do a lot *of it* (Paul).

It was such a thrill, as I said, from the moment that I picked it up ... I *really enjoy* it and I can get here [work] fresh and much more awake than I do when I drive here (Hélen).

Participants also emphasised the autonomy and self-reliance/self-efficacy that cycling gave to them: 'I find it gives me the independence' (Michael); 'I'm much more self-determined when I take my bike' (Hélen). Self-determination and self-efficacy are essential for good mental health and wellbeing; confinement and restriction are diminishing experiences. People with disabilities encounter multiple barriers to autonomy and independence which are hugely detrimental to health, wellbeing, and social participation (EHRC 2017). As such, the autonomy provided by cycling is even more significant for the mental health and wellbeing of people with disabilities than the wider, able-bodied population.

It's the *independence*, which I haven't said. I think that's the other thing, you're not *relying* on transport you are relying on your own transport: you are relying on *yourself* and I think that is a big boost to anybody with a disability. You rely on yourself, and wherever you are when you are on your bicycle, you rely on yourself. And wherever you are you can dictate what you do, no one's dictating to you what you can do (Nasia).

Moving, actually moving, the surroundings, moving through actual surroundings [e.g. outdoors] but I don't know if it's also cos it's like *not* relying on the crutches and stuff so it's just having that freedom of being able to just cycle (Rosie).

Cycling is key to mental health and wellbeing and this one of the reasons why it is integral to PHE's active travel strategy. However, it is even more important for people with physical disabilities who often face significant barriers to mobility, transport and independence which limits autonomy and self-efficacy. As such, it is particularly disappointing that disabled cyclists have been excluded from the PHE policy given its potential to challenge knowledge barriers and improve the wellbeing of disabled people.

Health professionals, policy, and practice

PHE emphasises the 'importance of community involvement' and 'public health practitioners' in promoting health through active travel (2016: 4). However, it makes no reference to disability organisations which support cycling or other forms of physical activity for disabled people. Nor does it reference the knowledge gaps of health professionals in understanding and the needs and abilities of disabled people in order to support their activity. Thus, notwithstanding the health benefits of cycling, none of the participants had ever been recommended cycling by a health professional even though in some cases (Hélen, Rosie, Nasia) they were offered a static cycling machine as part of their physiotherapy.

No, no, never, no, no, no. It's definitely something that I discovered for myself and it kind of evolved in a way, it just [pause], yeah, nobody ever said that cycling might be an option for you, it's just something which I *found, myself* (Rob).

No, no, only on the exercise bike, but not ever – I didn't know, I had *no* clue whatsoever that there was inclusive cycling (Rosie).

There was a period of time where I got quite a bit of support through the neuro-physiotherapy gym at [name] and they have got a static bike that they put you in front of to get your legs, it's legs *and* it does have arm things like that [gesturing handcycling]. And that was brilliant, that was really good, I could get my legs moving using muscles that I don't normally use, but I saw it as physio, nobody then said 'Oh how about looking into doing it as a mode of transport', or as fun, or as exercise (Hélen).

This omission is not only significant in terms of reducing access to cycling, mobility and health for disabled people but also because it neglects the importance of bodily autonomy for wellbeing. For example, instead of autonomy and independence, Hélen's physiotherapy reinforced experiences of dependency and passivity – experiences which are detrimental to self-efficacy and wellbeing as well as Hélen's long-term enjoyment of physical activity.

Physio is something – cos I've done physio since I was a *baby* and it's always *done to me* really, I was *made to do* it and all that stuff, it's not something that I associate with anything positive, it's just *got to be done* ... there is no fun in it (Hélen).

Rosie also highlighted how static cycling in physiotherapy had none of the positive mental health or well-being impacts of riding a cycle. 'I hate it [physio]. I just find it really *boring*, cos you're not going anywhere, so that's why the first session at WfW I was like, "Oh my gosh! This is really fun!"'

Following his stroke, and of his own volition, Eric explored cycling options himself and found that Danish neuro-physiotherapists commonly recommended cycling a trike for stroke patients – later forwarding me the email exchange which included advice about how to ride optimally and safely given the specific impacts of his stroke.

Not in Britain. When I first had my stroke I did a lot of research on email and had email conversations with Danish neuro-physiotherapists and they said, 'Oh yes definitely go for a cargo trike, it's what you do' (Eric).

In the UK it is common for cycling activists to compare our national situation unfavourably with mainland European countries, especially Denmark and Holland, where infrastructure and cycling culture is far superior. For example, areas of towns or cities which are refigured to be cycling (pedestrian and access)-friendly are referred to as 'mini Hollands' (e.g., Walker 2018).

Cycling was also a process of self-discovery for Nasia, Paul, Hélen, and Rosie all of whom brought it to the attention of their health professionals. Paul recounted how he raised his experiences of cycling during his medical consultations: 'I have told people like my prosthetist at [name of hospital] about it and they are fully supportive and pleased that I am doing it, obviously, to keep fit'. Rosie and Hélen provided health professionals with information about inclusive cycling to share with their colleagues and service-users: 'They were really pleased about it. So every time I have been, I've been like you need to tell everyone about this [e.g., cycling] to try and spread the word!' (Rosie). In recent years Hélen has become an inclusive cycling activist and continues to raise awareness with a range of service providers. All participants agreed that there needed to be more knowledge and information about cycling for disabled people and that health professionals should be actively promoting it in a range of contexts.

I think it's the chance for kids who are disabled and don't realise that they *can* cycle: I mean who would know that someone with polio could cycle, you just don't know. So I think the chance of actually having those special needs and actually having a bicycle or an adapted cycle: and you can cycle, to give kids with disabilities that chance. They should start with the hospitals or the physios ... I think physios should be a bit more involved and not see it as like an ablebodied [activity] (Nasia).

One thing springs to mind is that after my accident I had physiotherapy and that was about getting me walking again. Basically, it was to teach me to walk again. But why not have a little bike and people can try out riding in the rehabilitation area? ... so that people could get their confidence back in the same way that I got my confidence back walking with the physiotherapist (Paul).

Health professionals are quick to recognise the benefits of cycling for people with disabilities when it is brought to their attention by disabled people. However, they do not seem to have the knowledge and awareness about cycling and disability to suggest it themselves – even when instructing the use of static cycle machines. As such, cycling is perceived as an activity for ablebodied people and little or no information is available to people with disabilities or the health professionals who work with them (Andrews et al. 2018; Clayton et al. 2017; WfW 2017). Health professionals need more knowledge and training in this area and/or to be able to refer disabled people to specialist cycling organisations.

All of the participants in this study discovered or continued cycling on their own initiative as, or after becoming, disabled adults. For many, it was only because they had previous experience of cycling (often as children) and/or the confidence to cycle that they continued to do so (see Inckle 2019). At the same time, many of the participants had undertaken physiotherapy which involved the use of static cycle machines. There is, then, a significant knowledge gap between the abilities and needs of disabled people and the health professionals who work with them. Much like Mulligan et al. (2017) found in sports and exercise facilities, health professionals are rarely trained to work with disabled people in ways which enable them to realise their full potential. Cycling is key to health, mobility and independence for disabled people and yet it is entirely absent from public health policies and individual physiotherapy or rehabilitation programmes. Cycling for disabled people should be at the forefront of public health (and transport) policy and practice, especially given the health and climate crises that we face. Much needs to be done to improve knowledge, awareness,

and access to cycling for disabled people so that they too can enjoy the physical and mental health benefits outlined by PHE and counter the secondary impacts and barriers to exercise and health that they encounter.

Conclusion

Overall, PHE's active travel strategy marginalises people with disabilities, and entirely excludes disabled people from cycling, despite seeking to avoid the reproduction of health inequalities. This exclusion is problematic both in terms of the public sector equality duty as well as reinforcing the mental and physical health disparities that disabled people already endure. Rectifying this exclusion and its health impacts requires a twofold approach, firstly in terms of how disabled people are conceptualised in health policy and practice, and secondly through increased knowledge and awareness about cycling and disability.

Firstly, in conceptual terms, the PHE strategy only equates disabled people with pedestrians and older people, a very limited and limiting view of people with disabilities which ignores the diversity and capacities of the disabled population. Reichard et al. argue that if the health inequalities experienced by disabled people are to be addressed, then people with disabilities need to be conceptualised in the same way as other social minorities (such as women or people from minority ethnic groups), rather than simply as a group with additional health burdens. We 'need to shift [the] public health focus ... to viewing people with disabilities as a substantial minority population that experiences health disparities' (2011: 59). Once people with disabilities are recognised as a minority group within health policy and practice, it will be much more difficult to exclude and marginalise them, or to simply equate them with another minority group (e.g. older people), than is currently the case in the PHE strategy. There also need to be improvements in knowledge about disability and cycling.

Cycling offers people with disabilities a form of physical exercise, which is also an opportunity to experience mobility, independence, and freedom. As such it has huge benefits for mental and physical health and wellbeing, as is evident in the experiences of the participants in this research. The health and wellbeing impacts of cycling are particularly important for people with disabilities who have the poorest levels of mental and physical health in the population and who face multiple barriers to exercise and physical activity. Nonetheless, there is a significant knowledge deficit about the possibilities of cycling for disabled people within health policy and among health practitioners. This deficit creates further barriers to cycling and health, shoring up rather than redressing health inequalities. This paper has attempted to go some way to redressing this deficit by enabling the voices and experiences of disabled cyclists to be heard and to increase knowledge and awareness among health practitioners and policy makers and disabled people themselves. If more health professionals understood the possibilities of cycling for disabled people they could become powerful agents in interconnecting health policy and practice, raising awareness, promoting opportunities, and challenging the barriers that disabled people face in regards to cycling and enabling them to access the attendant health and wellbeing benefits.

Competing Interests

The author has no competing interests to declare.

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