Visualising active travel with Pakistani heritage families in Bradford, UK – Photovoice as a tool for change

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A B S T R A C T

In this paper we report insights on barriers to active travel among the Pakistani heritage community in Bradford UK, generated using the participatory Photovoice method. This is the largest minoritized ethnic group in Bradford, and though most segments of the UK population need to be more physically active, those of non-white ethnicities, and South Asian heritage in particular, are generally significantly less active than average. Insufficient physical activity (including active travel) contributes to a significant health burden for minoritized communities as well limiting progress with increasing active travel among these communities. Increasing active travel is known to contribute to both positive health outcomes and to key transport decarbonisation aims. To meet public health goals and Net Zero emissions targets by 2050, increasing walking and cycling for short journeys will be essential but it remains difficult to achieve. There is a lack of knowledge relating to how specific cultural groups perceive active travel as an option within their local areas. We sought to explore the use of Photovoice to understand whether this method has potential to enable minoritized communities to actively consider active travel, and to provide connections between these communities and their local authorities. We recruited eight Pakistani heritage families living in Bradford to do this. Their photos were used in semi-structured interviews, and the data collectively analysed. The analysis suggested key barriers to walking and cycling could be grouped into four main categories: personal factors, social factors and those related to the local and wider environment. We also found that people's travel choices in this study are influenced by cognitive biases and social norms that are quite connected to their cultural heritage and societal position as minoritized. There were also both generational and gendered effects that need to be accounted for in intervention design. Based on participants' reflection and feedback, this report concludes participatory techniques like Photovoice offer an opportunity to break the status quo for those who are struggling to make a change by raising their social consciousness and helping them to gather evidence of their concerns.

1. Introduction

This paper reports on a participatory pilot study carried out in Bradford, UK with Pakistani heritage families. The purpose of the study was to test the value of Photovoice as a participatory method that both helps policy stakeholders and participants to develop a richer understanding of attitudes towards active travel among this community against a public policy context of a need to increase physical activity and reduce transport carbon emissions.

Whilst current data on diversity within AT indicates persistent inequalities across gender, age, and socio-demographic status, there is much less understanding of individuals' and communities' lived experiences in this context. Hence, the current study is carried out to explore

how to encourage participants to share more about the challenges they perceive and identify solutions which they consider can best match their social and cultural needs. We were also interested in find a participatory method that could play a pedagogic role in habit change.

Deep participatory approaches have not been widely used in the UK within the domain of transport and behaviour change, although these techniques have been utilised widely within public health research to change perceptions and promote awareness (e.g., see Ramji et al., 2020; Gold, 2018). A significant debate in transport is how to engage with stakeholders to change stories and narratives in communities and at the policy table. For example, the Government's recent Active Travel Fund, the CCC and the Cycling and Walking Investment Strategy all recommend understanding behaviour and engaging with (marginalised)

communities.

The paper address two specific research questions: (1) what are the barriers to walking and cycling for Bradford's Pakistani heritage community? (2) Can the use of the Photovoice method encourage a critical consciousness[1] about Active Travel (AT)?

1.1. Policy context and case study selection

The UK's Commission on Climate Change (CCC) has declared the UK's progress on reducing greenhouse gas emissions to be too slow in relation to the urgency of the problem. The UK's sixth carbon budget requires a 63% reduction in emissions over the period 2019–2035, which represents a 78% reduction on 1990 levels (Climate Change Committee CCC, 2021). The UK is not on track. Whilst increasing active travel provides relatively small contributions to GHG emissions reductions overall, it has significant co-benefits in relation to improving public health, since inadequate levels of physical activity are estimated to be a significant cause of mortality worldwide (Lee et al., 2012). As a GHG reduction measure active travel is perhaps ten times more important than electric cars for example, over the next five years (Brand et al., 2021a, 2021b).

The government envisioned walking, wheeling and cycling(active travel[2]) to be the natural choices for shorter journeys by 2040. However, it is struggling to have a fast-enough impact despite some investments in infrastructure and the setting up of Active Travel England. A recurring challenge has been engagement with ethnic groups who are minoritized' in the uptake of active travel. Previously referred to as Black, Asian and Minority Ethnic groups (BAME) the UK government and other organisations in the UK dropped this term following criticism that important cultural differences are lost as a result of using a homogenising term (Race Disparity Unit, 2022). Nevertheless, there seems to be less utilisation of active travel infrastructure by people from these backgrounds in comparison to the white population.

However, a recent report by Burns et al. (2020) shows large unmet demand for cycling from all types of minoritized groups (whether along gender, ethnic, socio-economic or disabled lines) living in major UK cities and urban regions. Taking non-white ethnic groups together, 74% are currently not cycling, even though 55% across these groups state that they would like to start, compared to 37% of white people (Moore, 2020; Burns et al., 2020). Despite some widely known barriers to active travel e.g., lack of confidence in skills to cycle or a lack of facilities, it is still not clear what is needed to enable and sustain interest in it. Furthermore, it is unhelpful to group all non-white ethnicities into one category since there are significant cultural differences between ethnic groups that are likely to be important but remain less researched (Platt and Nandi, 2020).

The UK's CCC and Public Health England suggest that *widespread engagement* is required to support greater societal and behavioural change to be on course for the net-zero goal and to meet the government's vision to make England an active travel nation. To support this, the role of place-based decarbonisation is recognised as vital (Marsden et al., 2020). There is a long-standing debate that motivational strategies alone are insufficient. Hence, a focus on understanding and addressing contextual environmental issues related to specific inactive groups could prove beneficial (Lumsdon and Mitchell, 1999).

The city of Bradford in West Yorkshire (UK) is selected as a case

study. The city offers a unique opportunity to understand the perspective of different ethnic groups in relation to active travel and what is needed to be done to make change happen. This is because: car ownership in Bradford is higher than the national average ((1.9 vs 1.7) (Kilner, 2020); uptake of low emission vehicles is less than half the national average (Jagger, 2021); 38% of Bradford's citizens are living dangerously inactive lifestyles (PHE, 2016; Hurst, 2020); less than 5% of the population cycle at least once a week, the lowest in the country (DfT, 2018), and Bradford district has 32.6% of the population from ethnic minority backgrounds (Bradford Council, 2017).

To avoid over-generalised and homogenising results in a topic with a significant knowledge gap, the study focuses on Pakistani heritage families, selected as the biggest single migrant-heritage cultural group in Bradford (100,000 people). It is also the largest proportion of Pakistani heritage people (20%) in England (Bradford Council, 2017). Public health data also shows that low levels of physical activity are more pronounced among UK South Asians than in the general population. For example, only 14% of Pakistani women meet the recommended physical activity levels compared to 59% of all women (PHE, 2016b).

1.2. Review of literature

This section is in three parts. First, we briefly summarise the range of co-benefits from active travel. Second, we discuss levels of and attitudes towards active travel uptake among minoritised ethnic groups. Finally, we discuss the use of participatory methodologies in relation to the research constraints imposed by the Covid-19 pandemic.

1.2.1. The co-benefits from active travel

There has been a growing awareness of the multiple benefits of active travel in recent years, providing many reasons beyond addressing carbon emissions and local air pollution to encourage increased uptake. There is epidemiological evidence that being more physically active for transport reasons is highly beneficial for public health (Levine and Grabow, 2024), There is also evidence that pursuing active travel policies has local economic benefits derived from a mix of impacts: improvements to air quality, avoided GHG emissions and the reduced costs of ill health. Volker and Handy (2021) reviewed 15 studies of economic impacts of investing in infrastructure for active travel and found that it generally has positive economic impacts for local retailers and food service businesses. A Life Cycle Analysis of carbon emissions changes resulting from active travel in seven European cities found that there were significant lifecycle emissions benefits, and that the active travel was substituting for motorized travel rather than adding new trips (Brand et al., 2021a, 2021b).

1.2.2. Active travel and minority ethnic groups

Recent detailed studies are lacking, as there is an overwhelming research focus on white, economically and educationally privileged samples (Cavoli et al., 2015; Osei and Aldred, 2023). However, some literature highlights the importance of disaggregating populations more. For example, Bassett et al. (2020) researched how health benefits from active travel varied by age and ethnicity in New Zealand, using a health benefit valuation method. They found that in general older people and Māori can potentially benefit much more from the health benefits from active travel than other population groups. They also found that the use of population averages obscures great variation in health benefits between different groups, and thus limits equitability of interventions that do not take this into account. Biehl et al., 2019 studied active travel attitudes in two communities in Chicago (USA) and found that "*underserved populations within diverse communities view active mobility simultaneously as a necessity and as a symbol of privilege that is sometimes at odds with the local culture*" p269. Osei and Aldred (2023) explore the experience of Black male cyclists in London (UK) and Vietinghoff (2021) recounts experiences of racism among non-white cyclists in Grenoble (France).

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[1] Critical consciousness is defined as levels of consciousness and action that produce a potential for change at one or more socio-ecosystemic (e.g., individual, institutional) levels (Jemal, 2017). In the context of this research, the term is used to express whether taking part in PV-based participatory research encourages participants to adopt a critical mindset to reflect on their travel behaviours.

[2] For this research, the term *active travel* is used to describe walking/cycling only.

1.2.3. Exploring the role of participatory approaches to promote active travel

A range of participatory and qualitative research approaches exist. Focus groups and interviews are widely used, as they can generate community level insights that are useful in policymaking and have been used extensively in transport research to explore a range of topics, often applying a social equity lens. Contributions include modal perceptions (e.g. Guiver, 2007), walking behaviours (e.g. Segar et al., 2017), disadvantage (Combs et al., 2016), and vulnerable groups (Race et al., 2017; Adorno et al., 2018), and occasionally ethnicities (e.g. Biehl et al., 2019; Osei and Aldred, 2023). However, these methods are less equitable in terms of the relationship between researcher and participant than the set of tools for more collaborative approaches to participation in research.

Since the timing for the project was during the Covid-19 pandemic there were constraints on method from the outset. Therefore, we were searching for a participatory method that could be conducted with limited or no face-to-face contact between the researcher and the participants. The need for remote participation meant that we could not hold face-to-face focus groups or go-along interviews, both of which are widely used in AT, physical activity and health research (e.g. Jessiman et al., 2023). A key criterion was that the chosen method should encourage equitable openness between first the researcher and relevant public sector stakeholders and NGO actors (planning and implementing the study), and second between the researcher and the participants (observing and reflecting on the experience), to meet the requirements of participatory research defined by Slocum (2003). The findings and experiences of the project were intended to inform AT policymaking in Bradford, as well as generate transferable insight in relation to cultures and social practices around AT, and act as a template for future research with a wider range of minoritized groups.

Photovoice (PV) is a participatory research methodology that allows participants to document their perceptions and understandings of a particular issue using visual images and then to reflect with the researcher on what their images signified (Breny and McMorrow, 2021). Given the reflective engagement, it is also likely to be a suitable method for promoting change (Hunter et al., 2006). As a method in the domain of constructivist grounded theory it is compatible with the descriptive phenomenological approach described below.

Using a family-centred engagement approach, our study uses PV to capture a multigenerational perspective, closely collaborating with a mix of families by providing them an opportunity to explore and share their perspectives with us on issues related to active travel in their community with the help of their camera. The overall aim of the paper is to integrate and evaluate the effectiveness of placed-based and community-centred research intervention to supporting upscaling AT in communities with migrant heritage populations through participatory visual engagement activities.

2. Methodology

2.1. The research approach

The research has adopted a qualitative phenomenology research design approach. Also known as descriptive phenomenology, this design methodology considered suitable for present research as it seeks to understand and describe the universal essence of a phenomenon by investigating the everyday experiences of human beings. It sets aside biases and preconceived assumptions of researchers about human experiences, feelings, and responses to a particular situation (Deakin University, 2024; Delve Ho and Limpaecher, 2022). In social science research, this study design approach is considered just as reliable as quantitative and experimental method as "*it allows researchers to engage in flexible activities that can describe and help to understand complex phenomena*" (Alhazmi and Kaufmann, 2022, p.10). The approach facilitates investigation of the everyday experiences of people (Delve Ho and Limpaecher, 2022) through *inductive, qualitative methods …and representing it from the perspective of the research participant* (Lester, 1999). The approach is considered particularly useful when aim of research is to study what an experience means to a particular group of people (Grossoehme, 2014) in this case Pakistani-heritage people. Hence, using a placed-based, family centred engagement approach, the study used the PV technique (stage one) and semi-structured interviews (stage two) to present the perspective of Pakistani heritage families living in Bradford on walking and cycling. The techniques are complementary and generated broad ranging qualitative data to strengthen understanding of barriers related to walking and cycling. The study was being carried out during the COVID-19 pandemic with limited funding. Therefore, it is a pilot study exploring the utility of the method as action research for larger place-based studies with specific cultural groups.

2.1.1. Participants

In total, eight households (17 participants) from different areas of Bradford with varying demographics (ten women and seven men; three teenagers, eleven young and middle-aged adults and three older adults) were recruited with the help of using social media pages and establishing direct contact with local community centres. Eligibility criteria were

- Should be a Pakistani heritage family (especially encouraged multi-generational/young family)
- Use 'car' as the main mode of transport
- Interested in taking photos

Those who expressed interest were contacted via email or phone. Each participating household was given a number for identification purposes. For example, House One is referred to as H1 in this paper. Recruitment was completed in two phases. In phase one, four households took part in the study between November–January, and the second cohort participated from February to April. Fig. 1 represents the composition of participating families. Participant Information sheet and a brief about the project were given before data collection was started to allow participants to assimilate information and engaged in the study effectively.

2.1.2. Data collection

For each participating household, data is collected in two stages. In *stage one*, an introductory meeting was arranged with the families to help them learn about the aims of the project and introduce them to PV technique including project rules regarding taking photos (e.g., avoiding risky situations, taking photos in day light). The meeting was also used to discuss logistics and set up WhatsApp account to establish regular contact with participating family during the project and allowed them to share their thoughts, photos directly with the research team. After the meeting, participants were given two weeks to reflect on their everyday journeys by taking photos of what matters to them in the travel environment, good and bad. To take photos, participants were guided there can be many reasons for not walking and/or cycling or using a car (for example personal reasons, social reasons including friends and family related, or your local neighbourhood and community related reasons). They were asked to think about and capture their reasons of why they use car more or walk or cycle less through photos as much as possible and share their and photos with lead researcher whenever they liked during this time. They were informed there are no wrong photos and no judgments, and the team was only interested to know their story. To help participants think about what to photograph, they received some prompts. In week one we suggested capturing their reasons for using a car during that week. The intent was to increase the critical consciousness of participants by making them think about their everyday car use. In week two, participants were prompted to look around and gain a deeper understanding of the factors that influence their walking and/or cycling decisions. The intent was to allow participants to highlight
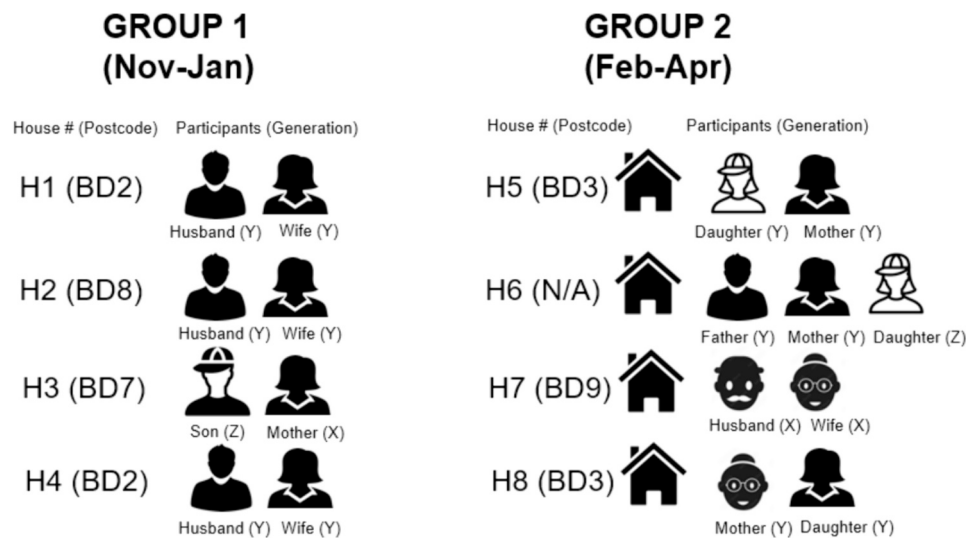
GROUP 1
(Nov–Jan)

House # (Postcode)   Participants (Generation)

H1 (BD2)   Husband (Y)   Wife (Y)

H2 (BD8)   Husband (Y)   Wife (Y)

H3 (BD7)   Son (Z)   Mother (X)

H4 (BD2)   Husband (Y)   Wife (Y)

GROUP 2
(Feb–Apr)

House # (Postcode)   Participants (Generation)

H5 (BD3)   Daughter (Y)   Mother (Y)

H6 (N/A)   Father (Y)   Mother (Y)   Daughter (Z)

H7 (BD9)   Husband (X)   Wife (X)

H8 (BD3)   Mother (Y)   Daughter (Y)

Fig. 1. Household composition of participating families.

barriers/enablers to active travel. Participants shared the photos and their thoughts with the research team through WhatsApp. The team also used WhatsApp to send reminder.

After taking photos for two weeks, semi-structured open-ended interviews were scheduled with participating families in *stage two* of data collection to contextualise and understand the meanings of the photos they took. The technique allows participants to share their personal experiences, thoughts, and experiences that researcher may not have initially anticipated or accounted for (Berg and Lune, 2014). Six of the interviews were conducted online via TEAMS and two were arranged in-person considering participants' preferences and availability. House 5 did not consent to record the interview and a women member of House 7 didn't participate in the interview. Hence, only the photo data generated by these participants in stage one is used to represent their perspective. Overall, online working arrangement worked well for both participants and research team. The collaboration allowed participants greater flexibility to arrange meetings and engage in the project based on their availability. From research perspective, using WhatsAPP allowed better contextualisation of photos since participants shared their real-time thoughts about the photos they took. The discussion was further facilitated by video discussion that allowed mapping of participants reflections and thoughts robustly compared to in-person meetings where mapping of photos and feedback posed some logistical challenges.

Aligned with instructions to take photos, the interview guide was broadly directed by the social psychological models of behaviours that explain why we do what we do. According to behavioural sciences, key factors that influence people's behaviour can be identified as personal ('micro') factors, social ('*meso*') factors, local ('exo') and wider ('macro') environmental factors (COI, 2007). This framework is used as a guide to develop a range of open-ended interview questions. In the beginning, general shorter questions were asked to build the momentum for discussion. For instance, driving profile of participants, amount of driving they do, or which car journey do they make as a family. This was then followed by more specific 'content' questions to investigate the factors that possibly influence participants' behaviours along with photos

shared by them. For instance, whether they find it difficult (or easy) to walk or cycle in everyday life particularly for local trips, whether they think their neighbours and people around are supportive and influence their behaviours, or what do they like or dislike about the environment around them and how much car use they see among Pakistani community around them. As discussed previously, PV technique allows participants to dialogue about the root causes of the phenomenon under study i.e., barrier to AT in the case of present research. The PHOTO[3] technique is given as a framework to participants to interpret their photos and to promote critical dialogue by using each letter in the acronym as a guide to address questions about their photographs. However, as suggested by Capous-Desyllas and Bromfield (2018), the framework was not enforced on participants so that they could lead the discussion and contextualise the meaning of their photos as they wish. In the end, concluding questions were asked to broadly cover participants' recommendations to increase AT in Bradford and their feedback about the project. For instance, what steps families, community groups, Bradford council or employers can take to make it easier for everyone in Pakistani community to walk or cycle more, and whether the experience of participating in the study affected how participants think about local journey As the nature of the interview was semi-structured, the general approach adopted during the interview was to let the interviewee talk in any direction first. However, prompts and native language (Urdu) were used when necessary to probe participants if they struggle to respond to any questions and to facilitate smooth and exhaustive discussion. Interviews lasted between 45 and 70 min.

2.2. Data analyses

The data generated through PV and interviews are analysed together to answer the research questions. As discussed above, participants were first asked to interpret their photos using the PHOTO technique (for details see Hussey, 2006). This technique contextualises the photos and helps participants label their photos accordingly for the researcher. Thematic Analysis (Braun and Clarke, 2006) is then performed on the

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[3] PHOTO acronym stands for:

1. Describe your **P**icture?;
2. What is **H**appening in your picture?
3. Why did you take a picture **O**f this?
4. What does this picture **T**ell us about your life?
5. How can this picture provide **O**pportunities for us to improve life?

data. Thematic analysis is regarded as a qualitative analysis method highly suited for both PV and interview data (Capous-Desyllas and Bromfield, 2018). Using NVIVO software, a five-step model including compiling, disassembling, reassembling, interpreting, and concluding is followed. To sort and index the data at manageable levels, interviews were first transcribed (*compiling*). Transcripts were then organised into meaningful groups with the help of In Vivo coding (*disassembling*). As described by Castleberry and Nolen (2018), this technique "*uses verbatim words or phrases from the participants' narrative to describe the unit of data*". This has the advantage of highlighting participants' voices. Codes sharing similar concepts were then mapped and grouped to create superordinate themes and sub-themes (*reassembling*), representing patterns in the codes that related to the research questions. After reassembling the data, the identified themes were then interpreted with the help of extracted excerpts (*interpretation*).

The photos were also categorised into one of the identified themes and used for their empirical illustration and verification. The interpretation helped lead to an analytical conclusion to research questions (*conclusion*). The identified themes are described and interpreted in relation to the background context of the participants. For quality assurance purposes, the results were shared with the researcher's mentor and collaborators. The feedback provided was used to further refine and improve the illustration of established themes.

3. Results and discussion

The analysis suggested that the key barriers to AT identified by the participants could be grouped into four main categories: personal factors, social factors, local environment, and wider environment. In this section, the identified barriers are interpreted with the help of photos and interview excerpts. A pattern emerged that suggested barriers need to be understood generationally: the first generation of British Pakistanis (Baby Boomer: 1946–1964 and Generation X: 1965–1980), Generation Y/Millennials (1981–1996) and Generation Z (1997–2012) and Generation Alpha (2013+). We then discuss opportunities to increase AT in this community and review the utility of the PV method as a co-creative intervention tool.

3.1. Personal factors

The first level-one theme represents personal barriers to walking and cycling and car use habits. Personal factors are considered intrinsic to the individual (COI, 2007). The theme highlights seven key barriers that can hinder the community's ability to change their behaviour. These include *biases towards car use*, *attitudes and perceptions* and *past experiences* related to walking and cycling on roads. *Lack of knowledge and awareness* and a sense of *agency, self-efficacy* over walking in general and cycling along with *lack of motivation* are identified as some other key factors influencing everyday travel choices among the community as shown in Fig. 2. These identified barriers are discussed in the sections below.

3.1.1. Biases, perceptions, past experiences, and car use

Personal car use is reported to be the most preferred mode choice for everyday journeys by the participants. The main **biases** that explained high car use among the community are *habitual practices* that are interconnected with **attitudes *and* perceptions** and *lack of time* and *short-term rewards* car journeys can offer. The finding is in line with the current literature on 'car dependence' and 'active commuting'. A great amount of evidence suggests that habits play a vital role in influencing transport behaviours. Hence, a transition towards sustainable behaviours could not be achieved without adequately understanding the role of habits in forming car dependence (e.g., Marechal, 2018). According to participants, cars offer them convenience and living in an economically productive country where both husbands and wife need to work, they need to make good use of time. As '*it's quicker*' (H6/GEN Y/FM) and because '*you've got two days, Saturday and Sunday, to do these things in. You can't do things at a leisure and the car is outside on the drive so it's a convenience*' (H7/GEN X/M). There is evidence in the literature that suggests busyness can lead to bad decisions (Schulte, 2019). However, the feeling of being busy may not always be true (Burkeman, 2016). This is particularly important in the context of transport related decisions. Participants acknowledged that at times they know they could walk for shorter trips in their local areas if they wanted to. However, they preferred to take their cars simply '*out of ease and comfort*' (H4/GEN Y/ FM). They said '*we have become very pampered. We have become lazy*' (H3/GEN X/FM). Hence, there is a perception that the car offers the
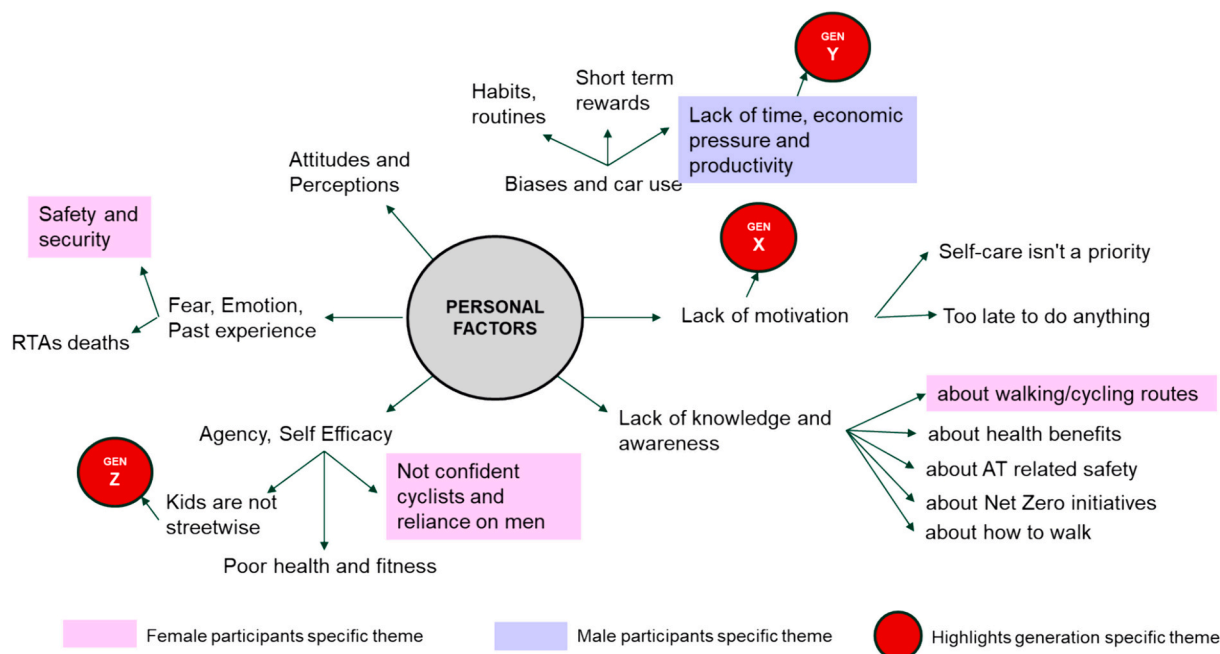

Fig. 2. Personal barriers to active travel.

most effective way of utilising time productively and habit combined with short-term rewards are the main reasons for this high dependence.

Millennials in particular are found to be the most impacted by **time constraints** as they must meet both work and family responsibilities. Participants said the main reasons they don't have time to walk as '*sometimes you are rushing late in the morning for work*' (H8/GENY/FM) and as soon as they finish work, they must be in another part of Bradford to pick up their kids. Talking about daily commuting, one of the participants said, '*I live in BD8, I work in BD5 and my son's school's in BD7, three different postcodes… I don't have time for this* (H2/GEN Y/FM). Literature on active commuting highlights that neighbourhoods in the era of industrial growth are designed and built on the principles of universal car access. Hence, cutting car use, especially for school runs requires feasible commuting distances and would take much more than educating children and parents (Noonan, 2020). If more feasible commuting distances were available, families would find this useful especially larger families as parents spend a lot of time on the school run and could possibly incorporate more active travel.

The study found that millennial men, compared to women are less active physically. Women participants brought this topic several times into discussion in the context of their husbands or sons. While talking about empty cycle lanes in Bradford, one of the participants said, '*I am thinking okay, if the females are not cycling why aren't the males cycling? Why are they not using these erm opportunities and cycle lanes*' (H8/ GEN Y/ FM)? One possible explanation for this inactivity is the severe economic pressure men found themselves in as identified in the excerpt below. The male participant reflected on his friends, his father and his own experiences related to work and family responsibilities and how this has impacted their lifestyle choices.

My dad was always fit and into sports and stuff like that…and then he just says, as I got older and I had to work more, work became a priority and family became a priority and everything else took a backseat…. I was always at work…I have friends who don't have you know, such a high paid job, they work in takeaways, they're doing Uber on the side, they're doing this, they're always working for their families and when they come home they say, I just want to go to bed and on the weekend, …I've got to do this, all the things during the week that I could not do and I want some time to rest. (H1/GEN Y/ M).

Compared to millennials, for the older generation, it is reported difficult to break **habits** this group has had for many years. Talking about his parents, one participant said it is more difficult for older people '*because 'it's convenient and they don't walk, and they just feel like get in the car and go*' (H1/GEN Y/M). The study found that the first generation women are the most impacted by these habitual practices. One of the participants said that his wife would never walk, although she has been advised by a doctor to take walk due to her backache and health reasons. He said, '*if we need to visit her sister 5 minutes' walk away, she'll say we'll go on car, I say shall we walk, she'll say no we'll go in the car*' (H7/GEN X/M). Poor health and fitness also lead to a **lack of motivation** to do anything for themselves among the older generation. The theme is identified as an additional barrier governing all their travel choices. It is important to note that illness and health issues like diabetes, and heart diseases are quite common among the Pakistani community. Participants suggested that the older generation has this mindset that '*…because we already got this [illness], there's no point in doing anything now*' (H1/GEN Y/FM). Self-care is not a priority, and the older generation could perceive taking time out for themselves as an act of selfishness. They would rather use their time taking care of kids, cooking or cleaning houses etc.

Lastly, negative **past experience** on road is identified as an important factor keeping participants off from walking on local routes. One participant, who lost her sister in a car accident near her school when she was walking back home, said '*I'm born here but I'm never going to send, I'd be very cautious now to send my son on a walk on his own, you know, after what happened to my sister*' (H2/GEN Y/FM).

3.1.2. Lack of agency, knowledge, motivation, and active travel

The personal barrier theme further highlights *lack of agency, self-efficacy, knowledge and awareness.* Participants reflected convenience is not the only reason for having high car dependency, but it is '*also because not relying on your own foot and what if we get too tired*' (H7/GEN X/M). They think it is because of '*weight and illness*' (H1/GEN Y/FM) which is a result of poor diet and lack of physical activity. People have poor diet and access to cheap fast food which consequently leads to sedentary lifestyles. Participants raised concerns about obesity and said it is on the rise everywhere. Whereas 20–30 years back, there was no obesity problem within the community. Mothers were found concerned particular for the younger generation. While talking about Generation Z, participants said they are more into physical fitness compared to older generations. However, there is also a concern about whether encouraging children to opt for active travel is safe. Talking about the reasons, one father said, '*…nowadays kids are not as streetwise as they used to be, you know. Like we were always in the street, nowadays kids are in the house a lot more. just basically YouTube babies*' (H6/ GEN Y/M). Participants stated that this generation is inactive as they spend most of their time on social media and not outdoor. The situation has been reported to be further exacerbated due to COVID19.

Women's mobility needs and decisions are found to be significantly influenced by their lack of knowledge of local routes, awareness, and self-efficacy. The excerpt below reflects on the situation, and how women's journey and their circumstances over the years have led to these dependencies. Compared to the first generation, participants said the womens of the next generations are doing relatively better. They are changing themselves and receiving support from their spouses and families. Throughout the interviews, many examples of positive spouse influences have surfaced. For instance, one participant mentioned how his encouragement has opened up his wife to walking, '*she's more lazy than me to be fair, I'm very active. I like to think since she's obviously been here, my influence has rubbed off on her so she's enjoying her walks a lot more*' (H4/GEN Y/S). The same experience has been reported by House 1 where the wife pushed her husband into walking. However, in general, women reported to be less aware of the benefits of walking and how to start walking properly and sustain the habit.

the women have not used this country to their advantage when they first came here. They were too busy being under the thumb of the mother in law and extended family. They never had time for themselves, they never developed. They never learnt new skills and now, later in life, now they've got their health problems, they feel depressed because they don't know English, they don't know how to get around Bradford, they are always relying on a man or a son or somebody. (H2/GEN Y/S).

For cycling, in the case of men, physical fitness or time could be an issue but in the case of women, lack of confidence can be an additional barrier. The excerpt below is from a participant who knew how to cycle but still won't integrate it into her daily routine.

'…cycling I think in our Pakistani community, why the women don't do it, I think as a young child your parents never let you cycle so we are not confident cyclists. So, we are frightened with all of those cars going past ourselves so, we wouldn't cycle. Erm, but I know as a child my mum never got me a bike, to ride outside, girls don't ride bikes, that is what I would get. (H8/GEN Y/FM).

It is also found there is no integration of AT in everyday journeys. Although some of the participants have the potential and capacity to do that. They are taking other forms of physical activities such as gym, exercise and park walks. Apart from lack of agency, **lack of knowledge and awareness** have also contributed significantly to dissuading people to opt for sustainable behaviours. Some of the participants, including those who are young and part of an economically active population, have never experienced the benefits of walking and cycling. For instance, one of the participants said, '*To be honest with you, I've never really tried public transport or even tried walking or cycling.*' (H4/ GEN Y/ M). Many others have also mentioned the same thing. For instance,

talking about the community, one said '*they don't see the benefit because they've not tried it*' (H1/GEN Y/FM). In general, participants reported that '*a lot of the Asian community are walking outside in the park but I don't know why they are not taking the main routes*' (H8/GEN Y/FM). It is reported that the community, in general, is not aware of net-zero initiatives and what is happening at national or local levels. For instance, when discussing Cycle to Work scheme, one participant said, '*…there's, sometimes you hear like, there's like erm, schemes for more erm, help to cycle or things like that. Why aren't we being made aware more of these sorts of schemes*' (H8/ GEN Y/FM)? While talking about the Clean Air Zone initiative in Bradford, one participant who commute to work in the same area said.

> *I saw the sign but I couldn't make it out. So I know what clean air zone is, but I didn't know the implication. So if I am coming here, what does it mean for me…I don't believe we've had a letter from the council to say that look, this is a clear air zone and it might impact your staff or service users…there should have been some information (H6/GEN Y/FM).*

To conclude, the theme highlights multiple factors at a personal level that could dissuade people from walking and cycling including car use habits, poor health and fitness and lack of motivation. At the same time, a lack of awareness about the integration of active travel into everyday journeys and its associated benefits is also missing. The community may not be aware of facilities and schemes available locally. Appendix 1 below provides a quick overview of these identified issues with the help of the photos taken by participants. It is important to mention that throughout the study, participants frequently expressed positive attitudes and intentions to walk more. They said some of the barriers at a personal level could be overcome simply by **planning better**. As '*walking is just maybe planning a little bit better. So, going forward and then getting out earlier to walk to work so we have less usage of the car*' (H8/GEN Y/FM). GEN Z, they are usually found to be aware of issues related to climate change and sustainable behaviours. However, this generation needs a lot more facilitation and education about transferring their positive attitudes into action safely. To make them streetwise and increase their awareness, one parent suggested '*we need to get out a bit more, so if there were a bit more out and about then you're a bit more comfortable with them handling themselves on the street*' (H6/GEN Y/M).

3.2. Social barriers

The second level-one theme represents social barriers to walking and cycling. These factors, as described by COI (2007), are concerned with how individuals relate to each other and the influence of other people on their behaviour. The theme explains the reasons for *high car use in the community* concerning *social norms* and highlights how *cultural dimensions* and *lack of support from the community* promote this behaviour as shown in Fig. 3.

3.2.1. High car use in Pakistani community

In this study, car is reported to be the most preferred mode for everyday journeys at both personal and community levels. Apart from busy life and lack of time, affluence and affordability are highlighted as key reasons for high car use among the community members. As noted above, economic pressure and time constraints are one of the key reasons for **high car use in the community**. One participant explains this and said, '*everybody wants to or would like to have a conscience of the environmental impact, but the reality is that society demands people*' (H7/ GEN X/M). **Excess money** is identified as an additional factor worsening the situation and making car use an obvious choice for people. Participants were of the view that the community don't really have many financial issues as '*three or four incomes coming into the house and a lot of people are no longer sending money back home. So, the people can afford the bigger houses with three or four fancy cars*' (H3/GEN X/FM). Hence, switching to active modes of travel is not a consideration. However, it is also indicated that under the current financial situation with rising fuel prices and cost of living, the access to vehicles may reduce simply because '*If you can't afford two cars then you will not have two cars*' (H7/ GEN X/M). Participants identified over the years that getting a fancy car within the community has become a **status symbol**. Cars are used by the community as '*a sign of people doing well*' (H3/GEN X/FM). However, participants also indicated that the community's outlook is changing and compared to the older generation, '*the urge to have the car is not there*' among younger people. According to participants, '*the perception is changing*' (H7/GEN X/M) mainly because the younger generation is more health conscious.

Parental concerns are identified as an important dimension linked with high car use in the community. Participants said that being parents we can be overprotective. For instance, one participant said there is '*this*
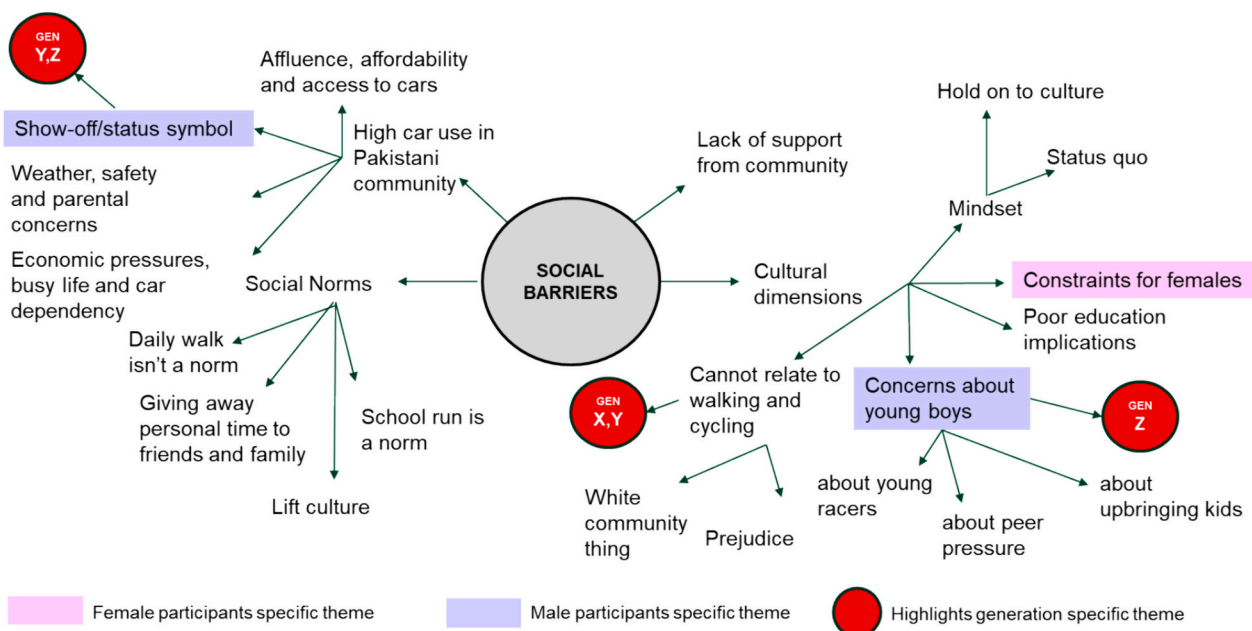

Fig. 3. Social barriers to active travel.

inbuilt thing inside us that ooh, you can't go out in the cold, you're going to get ill…if it will take me five minutes to get to school in a car, over 10 minutes walking, well I might as well just do the five minutes quick in the car, the kids won't get ill as well' (H4/GEN Y/FM). Apart from convenience, for families, it is also a matter of safety. One household highlighted possible concerns families would have related to women walking and cycling because '*some men are standing on the corner, and it is making it [walking and cycling] uncomfortable*' (H8/GEN X/FM). The issue of drug use and drug selling along with men's presence especially in certain areas of Bradford dissuades women especially from active travel.

3.2.2. Norms, culture specificity, and a lack of encouragement from the community

Participants consider using a car for local journeys as a **norm** within the community, compared to white people, where walking locally including dog walks is more likely to be the norm. Participants acknowledged seeing '*far more Pakistani people using the car…the majority of the people that are walking are non-Asian*' (H4/GEN Y/M). They expressed that dropping children to **school** by car is also a norm. One participant mentioned her kids push her to take a car because for them, '*it is like I want to take a car to school like my friends do sort of thing*' (H1/ GEN Y/FM). **Offering a lift** is identified as another social norm that dissuade people from walking. One participant mentioned that her parents usually walk when they visit her. However, she is always geared up to offer them a lift. She said, '*It's a cultural thing, you know, your mother walking and you feel rude not to offer that lift*' (H6/GEN Y/FM). Talking about norms, **giving away personal time** to friends and family is also identified as an additional barrier that may limit people to take out time for a walk. Comparing himself to his English friends, one participant said, they invest their time in their mental and physical fitness. Contrary, '*we give time away. If I decided to go for a walk, and my son is here, my walk would take a back seat*' H7/GEN X/M). However, those who would like to make a change, may also experience a **lack of encouragement and support** from the community. This is particularly true for women who reported feeling resistance and unwelcoming attitudes if they would like to go alone or walk. One participant, who started her walking journey a couple of years back due to health reasons, shared her experiences of discouragement from her mother and women in the neighbourhood. On contrary, her father and husband encouraged her and supported her. She said, '*My mum would see that as a selfish act to take time out for herself, I think that's exactly in my family where it stems from. Even now like if I'm tired, I'll say like I'm going for a walk and my mum would be like, why are you going for a walk, why don't you sit and rest*' (H1/ GEN Y/FM). Women participants felt that they are being judged and reported they wouldn't walk across certain streets where Asian women live as they made them feel as if they are doing something disrespectful. It is worth noting that young or middle-aged women are likely to experience this discouragement more compared to older age women as reflected in the excerpt below. Contrary to women, men didn't report being influenced by or experiencing any such judgments.

> *Well, if I was to live in a city in a much more built up Pakistani area, with the same ethnicity basically, I think that people there might feel, at times, maybe feel a bit judged and stuff, maybe that's why they don't walk. Maybe my age range, whilst the older age, so like my husband's parents both go out on daily walks, but because they're in their 50s and 60s it's seen as slightly different isn't it. Because women your age are like oh, what are they going out walking again for, and I think that's, you know, based on that area having mostly Pakistani people in there. (H4/FM/GEN Y).*

It is worth noting that all the households in the study appreciated the engagement of the White community in physical activities. Three households (H1, H3, H4), reported walking (in parks) or engaging in some form of physical activity on regular basis. They have all stated they were positively influenced by their friends, colleagues, neighbours or walking groups led by White people. The photos in Appendix 2 highlight

how women participants are finding walking opportunities outside Bradford and with (White) peer support. However, some participants pointed out at a cultural dimension associated with AT and mentioned that there could be a perception that walking, and cycling is a thing White people do as reflect in the excerpt below. They considered it a result of a way of thinking that influences lifestyle choices. Participants said that the older generation of Pakistani living in Bradford didn't change compared to Pakistanis living in Pakistan or other parts of the UK. For instance, one said, '*they're not typical…I think Londoners totally think differently*' (H2/GEN Y/FM). They also said the older generation was conscious as they felt '*they have got to hold on to their culture, to pass it on to their children*' (H8/GEN Y/FM).

However, participants also acknowledged that the community is changing. One participant said, '*I'm not as young but certainly with myself and my children I feel like they are changing. Their way of thinking is changing*' (H8/GEN Y/FM). However, at the same time, participants also raised their concern for young boys and the need to change their mindset. A male participant reflected on the car culture among men and said '*loss of activities*' (H1/GEN Y/M) for boys over the years is one of the reasons they got more into driving. Another linked it with deprivation and stated, '*…when they were younger they were probably deprived of it so when they get to a certain age and they're given that chance they will take it with both hands… so as soon as they are 17 or 18 they're allowed to drive, they will drop the bikes and go onto the cars, so I think that's kind of the mentality at the moment*' (H6/FM/GEN Y). In addition, parents repeatedly raised their concern over peer pressure issues and said, '*there is a lot of pressure for you guys [her son] at a certain age to start driving*' (H3/GEN X/FM). Whereas a teenager admitted that '*Wearing a helmet is definitely not cool*' (H3/GEN Z/M).

As learnt above, despite being dependent on others for walking or going anywhere at times, women are still making changes and finding walking opportunities for themselves in Bradford according to their convenience and availability. In the case of cycling, it is not clear how progressed they are. Apparently, there is still a long way to go. The excerpt below comes from a woman participant who knows how to cycle and would occasionally cycle with the support of her husband. Reflecting on social taboos attached to cycling, she said.

> *I feel like they think it's a taboo to actually ride a bike, especially to see a women on one. You know the walking you know they say it doesn't seems good to go alone (H8/GEN Y/FM).*

To conclude, the theme highlights there is a social dimension attached to AT. Social and cultural norms, as well as lack of encouragement and support from community, are all the factors that are likely to affect the community's active travel related decisions. People are more likely to walk (and/or cycle) if they receive peer support in form of friends, families, colleagues and live in mixed communities. There is clear evidence in the literature that suggests *diversity* within neighbourhoods helps ethnic minorities better identify with the UK (Dugan, 2014). This report recommends promoting active travel as a family-centred activity and making people see it as an opportunity to spend time with each other can prove useful. Likewise, interventions delivering peer support locally could be useful to build confidence, especially for cycling.

3.3. Local barriers

The third level-one theme represents local environment related barriers to walking and cycling. The theme highlights issues related to *the area* in which participants live including the lack of local facilities to encourage active travel. The theme explains the main barriers are living in a *deprived neighbourhood*, *poor weather*, and a *lack of active travel infrastructure* and further identifies some latent *cycling related barriers* in Bradford as shown in Fig. 4 and photos taken by participants in Appendices 3 and 4.
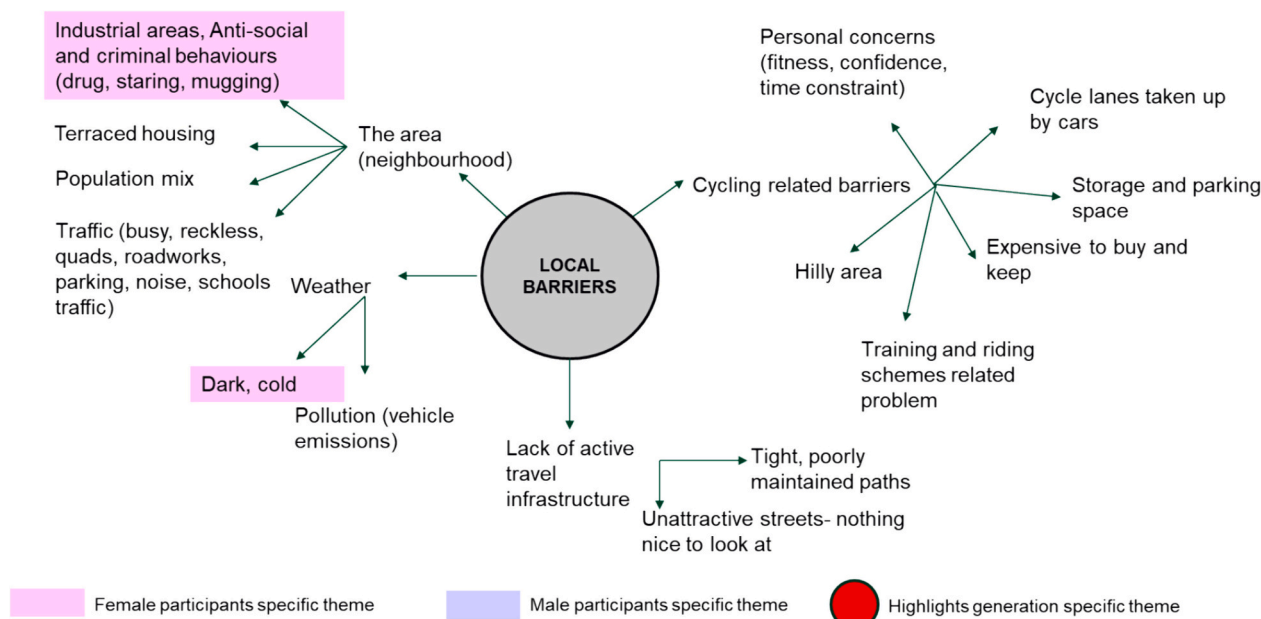
Fig. 4. Local barriers to active travel.

3.3.1. Neighbourhood, weather, and active travel infrastructure

SUSTRAN (2020) suggests neighbourhoods are defined by the communities who live there. Almost all participants in the study have reported being influenced by their neighbourhood and identified the factors that make certain **areas** unattractive for active travel including issues of fly tipping, dirty, congested streets and roads, poor driving culture, densely populated areas, and noise. For instance, as can be seen in one of the photos in Appendix 3, talking about commuting to work through Thornton Road, one participant said she will never walk on this road because, *it's full of these horrible looking mills, broken mills…there's a lot of cars coming up and down and then you've got all these buildings that look really scary because no one's in them…no offence to the people, you see weird people walking around there too'* (H2/GEN Y/FM). It is important to remember that *Bradford is known for its industrial legacy (*Bradford Gov, 2022*). However, many of the mills in the city are now deserted.*

Linked to that, women complained about not feeling safe in certain areas of Bradford due to drug selling and men standing at the corners of the streets, drinking and smoking. The issue has earlier surfaced under parental concerns – social barriers theme. One women participant suggested that she doesn't mind walking in the parks but not on the main road. She explained, '*everybody is walking in the park and it's a secluded, it's for families, it's not for riff raff. You do get some riffraff but not a lot'* (H8/GEN Y/FM). It is worth noting that many participants in the study have mentioned a growing trend of park walks within the Pakistani community in Bradford. One participant said, '*I think a lot more people are walking…I drive past the park and I'm shocked at the people going round. It's like the Olympics'* (H6/GEN Y/M). Participants agreed that there is a big change and realisation among people to become healthier and fitter. However, there is a concern that '*parks are really full'* (H2/GEN Y/FM) and can be off-putting for many people. Participants emphasised having more greenery or green areas in the city '*where families could go'* (H2/GEN Y/M) would probably encourage people to walk.

For participants, it was important for areas to look visually nice and safe for walking. They mentioned that in certain areas of the city, it is very common to see poor lighting, takeaways litter, dog poo, rat infestation and **fly tipping**. There is no space to walk on the streets because '*people dump all their rubbish on the road'* (H2/GEN Y/FM). Participants think one of the reasons why fly tipping has increased so visibly is because Bradford council now charge for cleaning up waste and not everyone could afford it or are not willing to pay. National statistics

suggest that cleaning up litter costs taxpayers almost £1bn every year (Keep Britian Tidy, 2013).

The neighbourhoods closer to the city centre are considered unsuitable for active travel not only because of poor cleanliness but due to poor road infrastructure and **traffic** culture. Participants were of the view that the city infrastructure has not expanded at the level to match growing population demand. Roads are congested and noisy because of heavy traffic, constant roadwork and illegal car parking on yellow lines, outside schools. The excerpt below reflects on the overall situation.

> *We have literally five, six major roads the whole of Bradford has to use come on. We're all using the same roads, getting stuck in the same traffic, you know, there's no extension and then they made the streets really tight. The pavements are tiny. (H4/FM/GEN Y).*

Participants complained about speeding, reckless driving and youth out driving (quad) bikes without helmets and safety measures. A demonstrative culture through the ownership and display of extravagant cars has already been raised earlier under the social barrier theme. The concern is extremely relevant in the context of poor driving practice and busy traffic in Bradford. One child said, '*I walk to the park with my sister… when we were walking back, there was a car went really fast and I was sort of scared'* (H6/GEN Z/FM). Her mother added, '*you get bad drivers everywhere, but we've driven in other cities…people will give you way…[however] in Bradford, everybody's in a rush'* (H6/GEN Y/FM). Talking about riding a bike to the park, the father said, it cannot be done as '*the driving in Bradford is very hostile, or very volatile…it would leave you uncomfortable because the way that people drive'* (H6/GEN Y/M).

The study concludes that despite overcoming personal or social barriers, people will not be convinced to cycle on roads in the city unless traffic and driving related issues are dealt with. After raising these concerns, one participant said, '*Do you really think I'm going to cycle down a road'* (H2/GEN Y/FM). In general, there is a perception that Bradford as a city isn't safe. Throughout the interviews, participants made its comparison with other cities of the UK and abroad (such as Paris). Altogether, this perception coupled with negative experience (at a personal level) and parental concerns about not sending women alone within the community (at social a level) dissuade people from walking even if they can. Participants recommended that better law enforcement, clearly labelled black and white lines, more planting, and the introduction of safe pedestrian crossing and structured cycle lanes are

some of the measures that could encourage people to opt for active travel.

Lastly, the bad **weather and the hilly topography** of Bradford is identified as additional barriers to walking and cycling. While discussing personal factors, convenience has emerged as one of the main reasons explaining car use. This factor is interlinked with weather where car use offers convenience to avoid rainy, cold weather. According to participants, cold, dark, rainy weather can be off putting and *'you think I'll just get in the car, it's quicker, and you stay warmer'*. (H6/M/GEN Y). Some also consider it is not practical to bike in Bradford, as 'it is very hilly' (H3/GEN X/FM).

3.3.2. Cycling related barriers in local environment

In addition to above mentioned local environment related barriers, the study has identified several other latent factors that could contribute to low cycling uptake in the Pakistani community. With the help of photos, participants have identified several reasons why cycle lanes are rarely used including proximity to traffic, poor segregation and cars taking up bike lanes (see Appendix 4). Participants suggested it would not be useful to add more cycle lanes to the city's infrastructure. As '*all these cycle lanes done is increase traffic because nobody cycles in the cycle lane and then they reduce the [traffic] lanes where there's two to one and it's just promoting more pollution and traffic in those places'* (H6/GENY/FM). Another participant shared a similar view and said, '*you cycle to get fresh air. Do you really want to be cycling down a path where you've got queues of cars with their tail to tail with smoke coming out of the exhaust'* (H1/GENY/M)? Instead, participants suggested introducing '*a structured area just for cycling*' (H2/GEN Y/FM) could help promote cycling. Furthermore, there are not many interconnected cycle lanes in the city. Those which are operational are '*quite tight*' (H2/GEN Y/FM) and have '*uneven paths and puddles*' (H3/GEN X/FM) which make these lanes unattractive. Participants also raised concerns that there is no parking and storage space for bikes as many people live in **terraced housing**. For some people, '*bike is very expensive…bike repairs, maintenance cost money*' (H1/GEN Y/M) and '*a lot of people in Bradford can't afford to buy bikes*' (H6/GEN Y/FM) or to '*put shed in our garden*' (H1/GEN Y/M). Keeping in view that Pakistani families are generally bigger, compared to an average White family, a participant said '*it is more of a cost and more of a logistical issue*' (H6/GEN Y/M). Participants said that bike riding schemes could help them to learn to ride a bike, build confidence and can also teach them about its maintenance. The grass root support is needed because many parents don't know how to cycle. One said '*I just never learnt to cycle, and the kids subsequently haven't learnt to cycle as well*' (H4/GEN Y/FM).

To conclude, the local barrier theme highlights people living in low-income neighbourhoods near the city centre are less likely to actively travel compared to those living in less deprived neighbourhoods. The finding is aligned with the TFL (2020) work which found people from the most disadvantaged communities are more likely to *live* in an 'obesogenic' environment which discourages *walking* and *cycling*. The study suggests providing cycling training along with dedicated, segregated cycle lanes, storage space and the option to rent bikes could build confidence among community members and encourage them to cycle in Bradford.

3.4. Wider factors

The fourth and final level-one theme 'wider factors' represents macro environmental factors that can act as barriers to active travel. The theme highlighted the Pakistani community's sense of *disconnect from land, disintegration with the White community, lack of inclusive promotional activities*, a shift in the *use of public transport* over time and a *lack of community preparedness* for net zero initiatives (see Fig. 5). Whilst many of these barriers are not unique to the Pakistani-heritage community, or even other minoritized groups, they are barriers could potentially hamper the path to sustainable transport behaviours that need solutions tailored to

Fig. 5. Macro barriers to active travel.

particular communities.

Talking about the lack of promotional campaigns and guidance from the government, participants suggested people are unaware of walking and cycling groups in the city, if any. One participant mentioned about cycling club in Manningham, Lister Park. She said, '*I don't think there is anything like that at Marryshay or the BD3 area…But even if there was one set up I don't think that like, everybody gets to hear about things and activities that have been put on for them*' (H8/GEN Y/FM). Participants linked this lack of awareness to community preparedness for net zero policies. One raised concern about the older generation and said, '*it's not like my mum's illiterate, she's just complete unaware of this [net-zero initiatives] happening*' (H1/GEN Y/FM). Another said, with education, confidence can be built among community members and '*if you show them how to do it [how to walk or cycle and reduce car use] they will do it*' (H3/GEN X/FM). Along with making people aware of schemes and facilities available to them locally, participants highlighted the need for specific positive messaging for the specific communities, as suggested in the excerpt below.

> *The adverts you see, there's not a Pakistani person or a Punjabi sat there with a bicycle hat or anything. It's generally a middle class White man in his 30s or 40s who's very skinny and tall as a cyclist. That's it isn't it, that's the advertising, and that's what a cyclist is assumed.* (H4/GEN Y/M).

Inclusion in promotional campaigns is considered highly important as explained by a participant, otherwise '*they [people] don't feel like they want to be part of it [the scheme] because you can't envisage yourself like that*' (H4/GEN Y/FM). Participants suggested that is was the '*perfect time to introduce walking and cycling schemes*' (H1/GENY/M) as the community is ready to change. Since this was during Covid-19 pandemic however, that contingent moment may have passed.

Along with inclusion, some of the participants emphasised the need for social cohesion and **integration** with White communities. The significance of White peer influences has already been established in the context of active travel. One participant shared her feelings about how community spirit in Bradford has changed over time and impacted people like her. She said, '*When I was younger, it was such a nice clean society, you know White English people used to live with us and we were very integrated and now we're just not integrated, and we've become really messy and I don't know what to say*' (H2/GEN Y/FM). Talking about generational differences, and how things have changed over the time within Pakistani community living in Bradford, one participant recalled how the community got disconnected from its culture of walking. She emphasised the strong need to adopt back walking and cycling habits of our forefathers.

Considering Asian people come from agricultural backgrounds. You know, I don't know why we have become a little bit disconnected from the land. You know, that is why I am surprised about the walking, you know they have Muslim hikers and this and that. Well do you know what, search your memory, we come from agricultural backgrounds. We used to walk. We now reclaiming it, or we need to. (H3/GEN X/FM).

3.5. The utility of PV as an intervention tool

We sought to understand whether the PV technique can encourage a critical consciousness about Active Travel (AT) as both research and intervention. Whilst regularly used in social research (Capous-Desyllas and Bromfield, 2018; Liebenberg, 2018; Brown et al., 2020; Macdonald et al., 2020), its use in transport research is limited and not much attention is given to understanding the effectiveness of the method to influence and enhance widespread engagement of the public. At the time of authoring this paper, studies couldn't be found that have mapped the impact of the technique on influencing transport related attitudes and behaviours. To assess PV effectiveness in influencing attitudes, throughout the data collection, participants' reflection on taking part in the study has been captured. For instance, Appendix 5 shows photos sent by participants who acted because of participation in the study. The first photo from the bottom left is shared by a participant who always takes a car to his relative's house who lives nearby. However, on that day, the participant mentioned that he decided to walk because of the study. Likewise, the top picture is from another male participant, who doesn't walk due to limited time and work pressure. However, he also decided to take a walk at the time of participation and said the experience was refreshing for him. While talking about the photo during the interview, he said '*the picture…it was exactly that, it made me think that actually, even though I worked you know, two weekends and [wife] was out at the time, she came back and I thought you know what, I'm going to get out, I'm going to get a bit of time for me. I'm going to get some fresh air, I'm going to stretch my legs, I'm going to do this and I did. I did. I felt a lot better afterwards* (H1/GEN Y/M). Appendix 6 shows some more pictures shared by participants highlighting positive attitudes and the reasons to walk and cycle more in Bradford.

A women participant from the same household shared a cycle training flyer with the researcher and said she was thinking to learn cycling. Likewise, Household 6, which is highly car dependent, also took an action and one day send the message that '*last weekend we [mother and daughter] walked as this research made us think to walk*'. When asked about this message in the interview, the mother explained '*The two of us walked yesterday, everybody else went in the car. They stopped on the way and offered us a lift and we were like, no, we're walking. It's literally, we Google mapped it, and it was a 14-minute walk, and the car it takes about four minutes*' (H6/GEN Y/FM). Overall, participants gave positive feedback about the study and said they '*enjoyed it*' (H3/GEN X/FM). They found the study *useful, insightful,* and *refreshing* for the community. The study has also raised participants' understanding of issues in their local area. For instance, one participant said, '*it has opened my mind up to a lot more things in my area that I wasn't aware of before and what can we change and can improve*' (H8/GEN Y/FM).

To conclude, this paper suggests that the PV method has impacted, and triggered participants thought processes. It gave them an opportunity to reflect on their habits and think about their transport behaviours. It has offered participating families unique learning benefits by looking around their environment. Hence, the technique has the potential to raise critical consciousness and enable transport-related behaviour changes. However, it is not clear, given the limitations of the study, whether in the longer run, participants would maintain their changed attitudes and behaviours alone. It would be worth investigating at a wider scale whether the technique can be used to break car use habits or at least make people consider introducing active travel in their daily routines. This potential of the technique can be enhanced by making

families work towards a shared goal of 'breaking car use habit' as a unit.

PV certainly has potential to be carried out at a larger scale than in this study, since the taking and sharing of photographs via smartphones and encrypted messaging apps is cost effective and simple for most people. It is also similarly simple to use the same technology to send out prompts to participants and to initiate the reflective process. The final step of mainstream PV studies is one of the participants and researchers taking the findings to policy stakeholders directly, often through a public exhibition. We were not able to do this due to the Covid-19 pandemic, and so we cannot evaluate any policy-related benefits of this participatory action research method.

A barrier to the scaling up of this method is that of the cost of researcher time. However, there are precedents in inclusive research practice that demonstrate that community members can be trained in such techniques, enhancing community capacity and empowering participants to use the technique to advocate for themselves.

4. Conclusions

Using a participatory visual approach (PV) the study sought to provide an insight into barriers to walking and cycling among Pakistani heritage people living in Bradford.

We conclude that Pakistani community members experience a range of barriers, some of which are culturally specific. Nevertheless, they express a desire to change towards more active travel behaviours, mainly for health-related reasons. However, the intensity with which this change can happen may vary across different generations with the first generation of Pakistani being identified as the one that needs the most support (as reflected in the excerpt below), followed by the Millennial (Generation Y) who are *ready to change* and Generation Z as *the game changer*.

The barriers exist at personal, social, local, and wider levels. For example, our participants, like most people, find it difficult to break the car use habit and weigh off its benefits with short term rewards including protection against cold weather, convenience, and time saving. For the older generation, lack of motivation could be an additional barrier due to their health condition, something which is particularly prevalent in the South Asian community, and thus may need tailored support to address. Considering economic pressures and a culture that emphasises family and work responsibilities, opting for walking and cycling may not be considered practical unless people are incentivised for making these changes. Something our participants mentioned themselves is countering the challenges associated with stereotyping and lack of representation in terms of role models. Therefore, integrated inclusive awareness campaigns could prove beneficial as many of the community members may perceive cycling as an activity for healthy, fit, high-income white people (N.B. the wider debates about cultural assimilation are beyond the scope of this paper, and we reflect only what our participants have told us on this topic).

Among our participants, we found that there are gendered vulnerabilities for both men and women. For women, lack of community support could be the biggest challenge where the fear of being judged could dissuade them from walking and cycling independently. On contrary, whilst men were found not to be subjected to these judgments they are subject to peer pressure around car adoption and use.

We recommend developing behavioural strategies and promotional campaigns that can attempt to overcome these challenges by engaging the communities of the place using the PV method to collaboratively design the interventions in place. For example, by training Pakistani-heritage women activists in the PV method to help communities express their AT goals and needs to decision-makers. The findings show that Pakistani families have expressed limited knowledge on what's out there. To help bridge the gap, the research recommends that current and upcoming active travel related schemes need to ensure they are reaching Pakistani families through a range of communication channels and platforms. Although there is the perception that the younger generation

is more into fitness and less concerned or influenced by social judgments, there is also a concern that teenage boys may be pressured into the culture of owning fancy cars and reckless driving due to a lack of awareness and loss of other leisure activities for them in Bradford.

Local barriers in the environment including fly-tipping, poor lighting, heavy traffic and poor driving culture, as well as lack of active travel infrastructure are some of the challenges which need addressing especially in low-income areas. In general, there is a perception that Bradford as a city isn't safe. Women particularly perceive it as an unsafe city for walking. Altogether, this perception coupled with negative experience (at a personal level) and parental concerns about not sending women alone within the community (at a social level) dissuade people from walking even if they can. Based on the feedback received, this report recommends street quality initiatives to transform lower income neighbourhoods near the city centre has the potential to encourage people along with introducing peer support in form of local walking clubs and cycle training programmes. Based on the views expressed in the study, the strategy of having cycle lanes are considered a safety risk, adding pressure to the city's traffic, and exposing people to air pollution. Greater separation may also attract less confident cyclists or women who are concerned about men staring.

Asian activists, especially women, can play a vital role as the study found that compared to many of the men in this community, women are more active and looking for opportunities to improve their and their family lifestyles. For this, participatory techniques like Photovoice offer an opportunity to break the status quo for those who are struggling to make a change by raising their social consciousness. Furthermore, designing family-centred activities could offer families learning benefits of active travel together.

We conclude that Pakistani heritage families living in Bradford are motivated to change mainly for health reasons. There is awareness about the benefits of physical activity. However, the realisation of integrating active travel as a form of physical activity is either missing or needs encouragement through a guided framework. The motivation to change could also vary depending on which neighbourhood families are living in and what kind of community support is available to them. By introducing some of the placed-based, community centred targeted interventions mentioned above, we can capitalise on this change. The excerpt below highlights the overall community spirit to change for the better.

> *We need to talk more, you know, improve communities. Now we as a community, we're in our third generation, fourth generation, you know, we're pretty established now. We're more affluent, but we're not as adventurous so we're not as, how can I put it, you know, we still like the status quo, this is how we've always done it and this is how we'll continue to do it but we need to change our ways for the better. That's the hard part you know. (H6/GEN Y/M).*

CRediT authorship contribution statement

Zahara Batool: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. **Kate Pangbourne:** Conceptualization, Funding acquisition, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing.

Data availability

The authors do not have permission to share data.

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Appendix 1. Photos highlighting personal barriers to active travel

PERSONAL BARRIERS TO WALKING AND CYCLING

I can easily put them on but I've been working double weekends and I'm just feeling tired and lazy - I know that a walk and some fresh air will relieve the stress, maybe I'll go for a walk when my wife comes back (H1/GEN Y/M)

I was at work and drove to get my lunch instead of walking because of time and sheer laziness (H6/GEN Y/FM)

Drove into work as too early n time consuming (H4/FM/GEN Y)
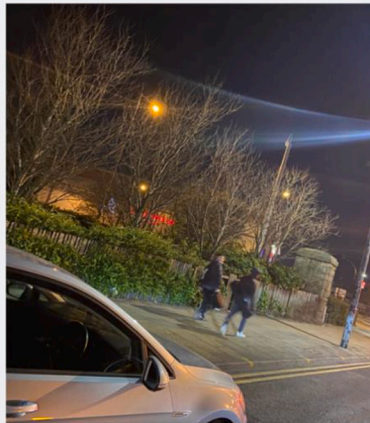
Went by car as it was dark and cold and also we rarely think to go by walking (H6/FM/GEN Z)

Morning Asda carpark shopping less than 10 minutes from home should have walked but drove. Why? Convenient bags to carry (H3/GEN X/FM)

I've had to leave my house without even picking up breakfast dishes it's a mad rush in the morning to get to school and work and I have to drive (H2/FM/GEN Y)

Went to nanos for tea it is a 15min walk but we always go in the car (H4/FM/GEN Y)
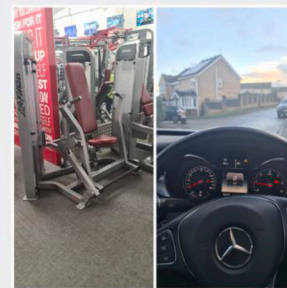
Going to the gym to do some light weights - gym is 30 mins walk away. Working from home so don't have time to gym+walk to and from gym as need to get back and carry on working (H1/GEN Y/M))

Appendix 2. Photos highlighting peer support can overcome social barriers to active travel

PEER INFLUENCES AND WALKING

This is my group walking photo.
Walking with my group in Farsley (Leeds) . This is a Walking group i am a part of and attend most Thursday evenings
(H1/GEN Y/FM)

Took the kids on a walk to the park. Had time in holidays and weather was ok and park not too far [Nottingham - with mother]
(H4/GEN Y/FM)
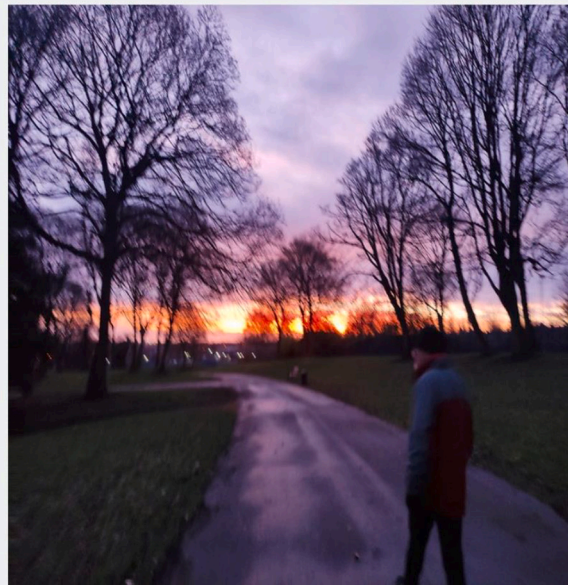
My walking partner...I Feel safe walking with a partner
(H3/GEN X/FM)

Appendix 3. Photos highlighting environmental barriers to active travel

ENVIRNOMENTAL BARRIERS TO WALKING AND CYCLING
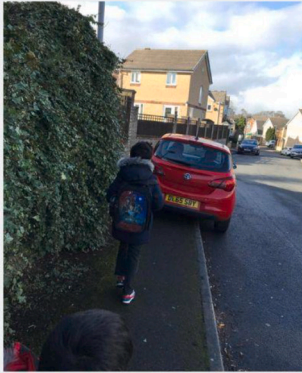
Parking on streets like this is very off putting, especially if you are out with children, and particularly if they are in a pushchair. It means you have to focus on their safety even more so and can take the pleasure out of walking with you family if you are constantly having to overcome vehicles being parked incorrectly. (H1/GEN Y/FM)

Storm need I say more (H6/GEN Z/FM)

I used my my car going to work because I don't like walking on this road as it's an industrial area called city road just of Thornton road in Bradford (H2/GEN Y/FM)

It's raining and cold so we are driving to town (H5/FM/GEN Z)

Mum doesn't like walking when there's some much traffic to cross the road., her anxiety comes on! (H8/GEN X/FM)
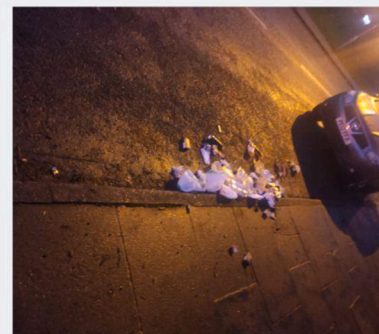
Litter outside the park falls risk (H3/GEN X/FM)

Pathways uneven and wrecked (H5/FM/GEN Z)

Took the kids swimming in the car. Its foggy and cold so is so much quicker in the car. (H4/GEN Y/FM)

Faeces on the walkway: A no no no! (H3/GEN X/FM)

Appendix 4. Photos highlighting local barriers to cycling

WHY CYCLE LANES ARE NOT IN USE IN BRADFORD?

Can't cycle here as the road works make you closer to the cars. Very off putting (H8/GEN Y/FM)

The cycle lane is on pavement I have never seen anyone use it. On Manchester road looks dangerous too (H2/GEN Y/FM)

Bike barriers making it dangerous for drivers and bikers themselves (H5/FM/GEN Z)

Cycle lane looks dangerous in Bradford (H2/GEN Y/FM)
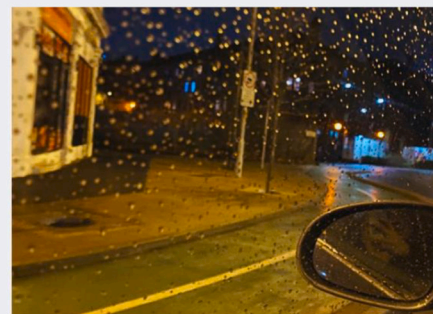
Made for cyclists but hardly used takes up a lot of space (H5/GEN Z/FM)

Unfortunately we have nowhere to store any bikes(see back garden), I've often thought of getting my 2 boys signed up with cycling learning programs but most require you to have your own bike. In the past we have kept bikes outside and even tried using covers but the wind rips them off and the bike end up rusting or seize the breaks. (H1/GEN Y/M)

Negative safety as a woman, poor lighting in park, have been recently reported attacks in media, so having to adapt my behaviour but not stop it. Cycling cannot cycle, would like to try, not enough safe lit routes. (H3/GEN X/FM)
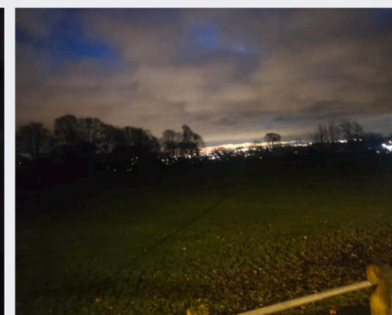
Fields And the park that could become a cycle pass through (H3/GEN X/FM)

Appendix 5. **Photos highlighting the utility of Photovoice methods as an interventional tool to behaviour change**
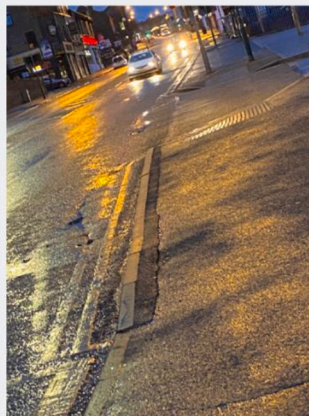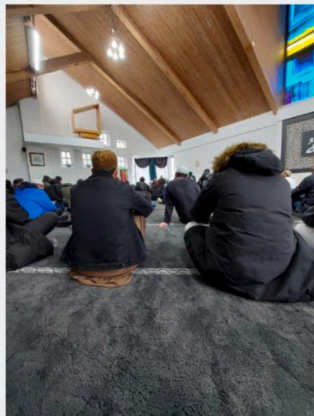
Appendix 6. Photos highlighting reasons to walk and cycle more in Bradford

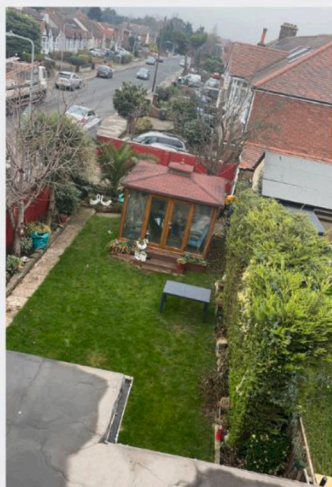# Reasons why you should walk and cycle more (in Bradford)
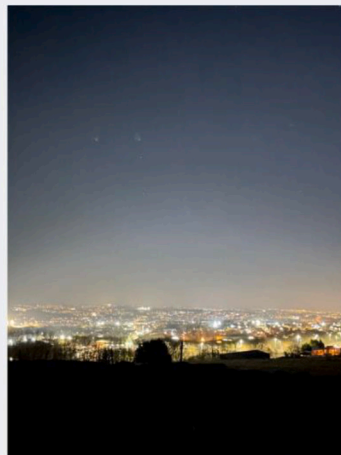
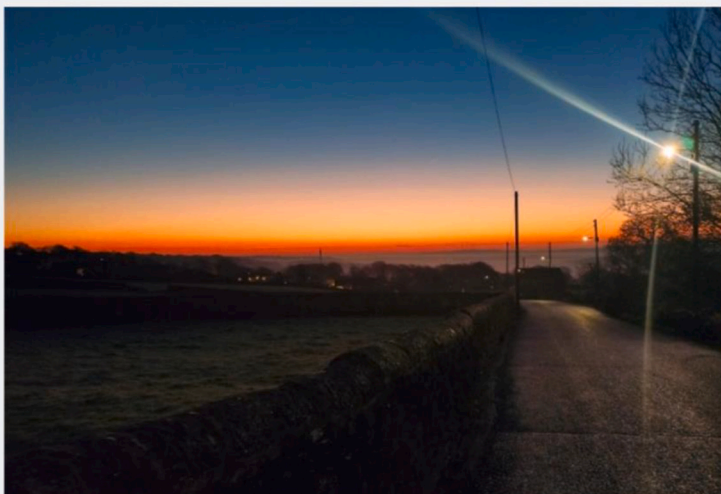I enjoy the company and the routes …each week its something different (H1/GEN Y/FM)

I look forward to summer when the sun is shining, and can walk to the masjid.(and meet other mosque-goer along the way) (H7/GEN X/M)

U could walk and cycle avoiding traffic at busy times (H5/GEN Z/FM)

Morning views of nature makes you feel like going out all the greenery (H2/GEN Y/FM)

Worth getting out of bed for (H3/GEN X/FM)

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