

A study to assess the feasibility of using a novel digital animation to increase physical activity levels in asylum seeking communities

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*Authors' contributions*

JM was the principal investigator, leading all stages of the project including research activities, data analysis and writing of the manuscript. JM and MC completed the application for funding and the ethics application. MC advised on all stages of the research process and contributed to the data analysis and writing of the manuscript. All authors read and approved the final manuscript.

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## **Abstract**

The mental health benefits of physical activity and exercise are well documented and asylum seekers who may have poor mental health could benefit from undertaking recommended levels of physical activity or exercise. Digital mobile applications are increasingly seen as feasible to precipitate behaviour change and could be a means to encourage asylum seekers to increase their levels of physical activity and exercise. This paper reports on a study that aimed to assess the feasibility of asylum seekers using the digital animation as a tool to change behaviour and increase their physical activity and exercise levels.

A feasibility study underpinned by the principles of the COM-B behaviour change model was undertaken in West Yorkshire, UK, in 2019. Thirty participants were purposively recruited and interviewed. Peer interpreters were used as necessary. Deductive thematic analysis was undertaken to analyse the data.

Overall, participants were positive about the feasibility of asylum seekers using the application as a behaviour change intervention. All expressed the view that it was easy to follow and would motivate them to increase their physical activity levels. Participants identified facilitators to following the advice as the simplicity of the key messages, the cultural neutrality of the graphics and the availability of the mobile application in different languages. Identified barriers related to the dialect and accents in the translations and the over-simplicity of the application.

This study has identified that a targeted digital animation intervention could help asylum seekers change their behaviour and hence improve their health and wellbeing. In designing such interventions however, researchers must strongly consider co-design from an early stage as this is an important way to ensure the development of an intervention is fit for purpose for different groups.

**Keywords:** Asylum seekers, Mental Health, Physical activity, Exercise, Digital Smartphone Application, Behaviour Change; Co-design

#### **What is known about this topic?**

- Asylum seekers who may have poor mental health could benefit from undertaking recommended levels of physical activity.
- Digital mobile applications are increasingly seen as feasible to precipitate behaviour change.

#### **What this paper adds**

- This study identified that a mobile application could help asylum seekers increase their physical activity and exercise levels, and hence improve mental health and wellbeing. This is the first to be developed to support physical activity in asylum seekers.
- Co-design is an important way to ensure that the intervention is fit for purpose for different groups.
- The sample group were linguistically and culturally diverse. This may increase the likelihood that the principles underpinning the digital animation and the findings are transferable to other contexts where linguistic and cultural diversity is a feature.

## **Introduction**

The mental health benefits of physical activity and exercise are well documented (World Health Organisation, 2010) and asylum seekers who may have poor mental health (Turrini et al., 2017) could benefit from undertaking recommended levels of physical activity (England, 2014). However, people seeking asylum in the UK face barriers to doing so. Haith-Cooper, Waskett, Montague and Horne (2018) found that they lack understanding of the term physical activity, of the current recommended

levels, and of cost free facilities in their local area. This study recommended the development of an intervention to address these barriers.

The World Health Organisation (WHO) recommends that adults should undertake at least 150 min per week of moderate-intensity physical activity which slightly raises the heart rate but does not cause breathlessness (2010). Such activity can involve unplanned but small changes in behaviour such as walking faster or increasing the intensity of housework, both of which can improve health and wellbeing (PHE 2014). In contrast, exercise is planned and structured, undertaken with the very aim of improving health. Evidence suggests that exercise has mental health benefits beyond those of moderate physical activity including alleviating stress, pain, insomnia and depression (Cooney et al., 2013; Harvey, Hotopf, Øverland, & Mykletun, 2010; Pickett, Kendrick, & Yardley, 2017).

One type of intervention increasingly reported in the literature is the use of mobile digital applications to precipitate health behaviour change. (Villinger, Wahl, Boeing, Schupp, & Renner, 2019). Many studies report that phone users approve of downloadable health related mobile applications (Dennison, Morrison, Conway, & Yardley, 2013). Mobile phones are portable and often with their owners constantly; they can bring interventions directly and quickly to the recipients (Dennison et al., 2013). They are also a cheap, convenient, and non- stigmatising vehicle to do so (Dennison et al, 2013). For asylum seekers they are an essential item for their 'flight' and for maintaining contact with family (Borkert, Fisher, & Yafi, 2018). Recent research found that 95% of Syrian refugees have use of a smart

phone (Borkert et al., 2018). The use of a mobile digital application to encourage behaviour change for this group therefore seemed feasible.

There are many commercial mobile digital applications available that aim to increase physical activity levels. These usually involve the provision of information and advice, support and encouragement, and/or monitoring and recording tools. A review (Romeo et al., 2019) on the effectiveness of smartphone applications designed to increase physical activity through measuring time or steps, found that evidence exists to support their use in bringing about behaviour change, especially if the target intervention solely focuses on physical activity and not any other behaviour change. Other studies demonstrate that ease of use of the mobile application to the user group is the key factor to success (Dennison et al., 2013). Studies reporting on implementing interventions with hard-to-reach groups, for example, Meppelink et al, found that animated visual information combined with spoken text was a favourable method of communicating complex health messages (Meppelink, van Weert, Haven, & Smit, 2015). Furthermore, Chapman et al (2020) found mobile phones a successful way of delivering interventions to lower socio-economic and minority ethnic groups. However, no research could be found on their use as interventions with asylum seekers and more specifically on digital animation as the focus of the mobile application.

Following MRC guidance for developing a complex intervention (Craig et al., 2008), this paper reports on the second stage of development: assessing the feasibility of a mobile digital animation as

a behaviour change tool. The aim was to evaluate the feasibility of using the digital animation to increase physical activity and exercise levels in asylum seeking communities.

## **Methods**

To promote an increase in physical activity levels and exercise in asylum seekers in the UK, we developed a mobile digital animation as a fast, inexpensive, and easily available intervention. This short (one minute) animation comprises of gender-neutral avatars illustrating how everyday activities such as gardening and housework can be adapted to increase physical activity levels (PHE 2014) and recommends structured exercise activities such as swimming to improve health. To encourage participation in exercise, the animation links to a community map facility where the user inputs a postcode, and the map displays the location of free exercise activities in that area. Translation of this page is automatically available through a translation plug in tool. There are three key messages within this mobile application: physical activity is good for emotional wellbeing; increase physical activity to achieve recommended levels and locate facilities and opportunities for structured exercise in a specific geographical area. The animation is available in eight languages to enable a wider range of asylum seekers to access it. The languages were selected following consultation with stakeholders in a previous study upon which this work builds (Haith-Cooper, Waskett, Montague & Horne, 2018).

Additionally, being designed specifically for a mobile phone application was thought to facilitate accessibility given the high number of people seeking asylum who possess a smartphone.

The animation provides information about the importance of physical activity and exercise for good health, in order to increase knowledge and therefore capability to undertake a greater amount of physical activity. It presents simple examples of ways in which everyday activities can be altered to do this, with the purpose of increasing realisation of opportunity to change behaviour. The signposting to the community mapping facility is to facilitate opportunity. The aim is that together, these features motivate users to increase their physical activity levels and/or take up structured exercise.

The COM-B behaviour change model (Michie, van Stralen & West, 2011) assesses the capability, opportunity and motivation of an individual to change a particular behaviour. This is thought to occur when all three elements interact (see table 1). Capability can relate to knowledge; opportunity to social or environmental influences; and motivation to beliefs and intentions (McDonagh et al., 2018). For behaviour to change three factors need to be present. Firstly capability, where individuals must feel that they are both physically and psychologically able to do so; secondly, opportunity, where individuals feel they have the social and physical opportunity to do so and finally, motivation where they must want or need to behave in the way presented (West and Michie 2020). To achieve behaviour change, the intervention must target the elements of the model that the target group is missing.

**Insert Table 1 here**

In order to assess if the application had the potential to change the behaviour of the target group, we undertook a feasibility study, underpinned by the principles of the COM-B behaviour change model (Michie, van Stralen, & West, 2011).

We sought to explore whether these three elements could be influenced by the animation, and whether, consequently, the user group – asylum seekers – might intend to change their behaviour and increase physical activity and exercise levels. This would then enable us to assess whether the application is feasible for this purpose.

The study was approved by the Chair of the Humanities, Social and Health Sciences Research Ethics Panel at the University to which the authors are affiliated, on 22nd June 2018 ref EC25146.

**Insert Figure 1 here**

A volunteer worker within a community organisation which supports asylum seekers and refugees was employed to conduct semi-structured interviews with asylum seekers. She approached and purposively recruited 30 participants from within the organisation, a number restricted due to the level of funding for the project. The inclusion criteria were people who were seeking asylum, aged over 18 and spoke one of the languages available in the mobile application. Peer interpreters were

used as necessary. The researcher verbally outlined the aim and purpose of the study and audio recorded verbal consent was acquired as some participants may have been reluctant to provide a signature due to concerns about their immigration status. Demographic details were verbally requested. These comprised gender, age, home country and religion. Anonymity and confidentiality were stressed and that the research team had no links with the Home Office. No names were taken as part of the interview and all data were anonymised.

Following viewing the digital animation, single or duo semi-structured interviews were undertaken. The questions were underpinned by the COM-B model and focused on the participants' perceptions of the application and whether they thought it could be a useful tool to increase intention to change behaviour in order to increase physical activity and exercise levels. We sought to ascertain what key messages the participant recalled from the animation; if the animation was considered socially and culturally sensitive; if the advice was relevant and useful and if they would follow it (see Table 2 for interview questions). The more positive the response the more likely the application was to be feasible. At the time of the interviews, the community maps functionality was not available as the organisation responsible for the website was undergoing a review and update of the content, therefore participants were asked whether being signposted to information on local structured exercise opportunities would be useful to them. Participants were also asked to comment on the quality and detail of the animation and to suggest any changes that they thought would improve it. Interviews lasted less than 20 minutes and field notes were not used in this study. The participants' responses were audio recorded and transcribed verbatim by an external agency.

**Insert Table 2 here**

Deductive thematic analysis was then undertaken (Attride-Stirling, 2016), using the theoretical underpinnings of the COM-B model to drive the coding and theme development (see Table 3).

Two researchers (JM, MHC) read and re-read the transcripts independently and coded the data.

Discussions followed in order to reach consensus. A second coding exercise was then undertaken to review any key quotes or missed or mistaken coding. Finally, the researchers agreed on the dominant emergent themes from the coding. These related to the simplicity of the application to use but also the possible barriers created by language and dialect differences. This ensured that the themes focused on factors influencing motivation, capability and opportunity to change behaviour (Braun and Clarke, 2006) and hence contributed to our understanding of the application's feasibility.

Participants were randomly allocated a number in order to preserve anonymity. Demographic profiles are summarised below (see Table 4).

**Insert Table 3 here**

## **Results**

A total of 30 asylum seekers took part in the study. Participants originated from nine different countries, the majority from Iran and Iraq. Equal numbers of males and females participated and interpreters based in the community group were used to support seven of the 30 interviews.

### **Insert Table 4 here**

From the deductive thematic analysis two themes emerged: simple to use and overcoming language barriers. Together they identify asylum seekers' perceptions of potential barriers and facilitators to them having the capability, opportunity, or motivation to follow the advice in the animation and access information about structured exercise opportunities in their local area.

### **Simple to use**

Overall, participants were positive about the mobile application. All (n=30) thought that the advice was useful and that they would follow it. It was easy to locate and play, little user interaction was required, and it had limited written English on the screen. However, some participants believed the functionality was too simple and motivation to follow the advice could be increased by having more user interaction:

*'to improve the app...give us advice about rituals, someone that can practice, and diet, which foods, for example you can put your age and your weight and how tall.'* (032: Female, Iran)

All participants thought that the animation was sensitive to their social and cultural background as the avatars were both non-gender specific and not reflective of any particular ethnic background. Participants overwhelmingly responded positively although often with a simple affirmation rather than comment.

*'it cannot offend anyone'* (034: unknown) and

*'[it is] acceptable'* (001: unknown)

All participants were enthusiastic about the possibility of a link to a webpage that identifies structured exercise opportunities. They believed they could easily complete the postcode box to get access to the page. Participants believed that this functionality increased their capability and opportunity to change their behaviour and participate in structured exercise programmes such as attending the local gym or getting involved in local sport teams:

*'that would be really helpful for people who want to go and do exercise and they don't know how to do that and don't want to get individual coaches or cannot pay for them.'* (031: Female. Iran)

In addition, all participants felt that the simplicity of the messaging within the mobile application facilitated their capability to follow the advice provided in the animation to increase their levels of physical activity.

*'It was very brief and short, but was, yeah straight to the point. I understood the message, yeah... it was very simple, but it was, yeah, it explained what, yeah'(026: Female, Morocco)*

The simplicity of the mobile application also increased participants' motivation to follow the advice:

*'yes.... I will follow because for health' (033: unknown)*

However, some participants believed that the mobile application content and style were too simple. They thought that the animation should be longer and could provide examples of a wider set of physical activities. They also felt that more professional graphics would increase user motivation to follow the advice:

*it needs something more exciting, like you know, bicycle, maybe ice skating, like competition'(013: unknown)*

*'yeah it would be nice if you can add more sort of images of people doing housework because it showed a bucket and a mop or a brush but it wasn't really that long enough, so if they don't notice what the guy is talking about they might get a bit confused. But if you've got some images of somebody walking round their house, making different type of movement on their body, if they're going for a walk and they're actually showing you they take their children for a walk so there's going to be a lot more interest' (026: Female, Morocco)*

It was suggested that providing wider public health advice would also increase the motivation of users:

*'it needs more information: how it can help them to prevent some diseases like diabetes, high blood pressure like it can, you can even reduce stress, how some can stretch their body' (014: Female, Syria)*

This advice could include the consequences of increasing physical activity levels:

*'...what I see is missing from the app is to tell people the benefits of doing exercise'(014: Female, Syria)*

### **Overcoming language barriers**

The majority of participants felt that the availability of the animation in different languages increased the mobile application's accessibility for people. However, many participants raised issues with how the languages were translated. This included the accents of people doing the translating:

*'it was Farsi, but with different accent..... Farsi's different, [there are] Afghani, Tajik and Iran, both Tajik and Afghani are different. Iran is different' (005: Male, Iran)*

And different dialects of languages was raised as an issue reducing accessibility:

*'...not in standard Arabic, ... if [needs to be] in standard Arabic' (023: Male, Sudan)*

Additionally, some of the participants commented on the speed of the animation making it harder to follow the spoken language. Slowing it down would help people understand the key messages more:

*'it was going far too fast ... because most of the refugees are foreigners so they're not going to pick it up fast enough' (012: Female, Iraq)*

## **Discussion**

The aim of this study was to assess the feasibility of asylum seekers and refugees using the digital animation as a tool to change behaviour and increase their physical activity and exercise levels. Overall, participants were positive about the feasibility of asylum seekers using the digital animation as a behaviour change intervention. All expressed the view that it was easy to follow and would motivate them to increase their physical activity levels. Participants confirmed that they would make use of the mobile application if it were available. They were especially positive about the addition of the link to the webpage that would provide information on structured exercise opportunities in their local area, although it is noted how difficult this is to keep updated. It may be that this becomes a simpler generic signposting to leisure facilities rather than specific activities.

Identifying the facilitators and barriers to using the digital mobile application can contribute to our understanding of how feasible it is for changing behaviour. Participants identified facilitators to following the advice as the simplicity of the key messages, the cultural neutrality of the graphics and the availability of the mobile application in different languages. The latter was perceived as increasing its accessibility for a wider population of asylum seekers and also increasing their capability to follow the advice. All participants regarded the cultural neutrality of the avatars as a positive aspect. Identified barriers related to the dialect and accents in the translations and, for some participants, the over-simplicity of the animation. In developing the mobile application, it had not been foreseen that multiple dialects are present within single language families. Farsi, for example has at least three dialects, not all of them easily transferable.

Although we could find no previous research using digital animation to provide messages about physical activity to asylum seekers, our findings do support the use of mobile applications to promote physical activity in different contexts. Sun et al found similar enthusiasm and positivity in their study among Chinese patients with chronic diseases (Sun et al., 2017). Other studies of applications that sought to achieve behaviour change found increases in physical activity for groups including primary care patients (Glynn et al., 2014) healthy and/or inactive adults, patients with chronic conditions and stroke survivors (Gal, May, van Overmeeren, Simons, & Monninkhof, 2018).

We found that ease of use of the mobile application increased capability to use the animation. This supports previous research around the effectiveness of mobile applications in the management of diabetes (Jeffrey et al., 2019; Torbjørnsen, Ribu, Rønnevig, Grøttland, & Helseth, 2019), in cancer prevention behaviours (Ribeiro, Moreira, Almeida, & Santos-Silva, 2017) and in increasing physical activity of young adults (18-35) (Hebden, Cook, van der Ploeg, & Allman-Farinelli, 2012). Zhao et al's evidence review (Zhao, Freeman, & Li, 2016) found that 17 studies reported statistically significant effects of user-friendly mobile applications in bringing about behaviour change. However, some of our participants felt they would be more motivated to use the mobile application if it was more complex, reflecting Murray et al's study on the development of a visually mediated intervention to increase physical activity amongst asthma sufferers (Murray et al., 2016). They found that participants wanted a greater number of activity options and a wider and more diverse range of characters in the animation. Finding the balance between ease of use whilst ensuring the mobile application is complex enough to stimulate motivation could be difficult to achieve.

Mobile applications may be an innovative way to deliver behaviour change interventions, however developers need to give specific and close consideration to the target population from an early stage (Hebden et al., 2012). Studies frequently demonstrate the importance of 'getting it right' for the target audience (Bevan Jones et al., 2020). Co-design may be an important means of achieving this (Haith-Cooper, Stacey, Bailey, & Broadhead-Croft, 2020; Thabrew, Fleming, Hetrick, & Merry, 2018).

For our target population, some of the challenges included accuracy of dialect/accents and producing something that is easy to use but complex enough to stimulate behaviour change. Undertaking co-design with potential users can assist in ensuring that any intervention is 'engaging, feasible, acceptable and potentially effective' (Thabrew et al., 2018). In working with hard to reach or diverse groups, early consultation could ensure that simple pitfalls, for example, around language and culture, can be avoided. The intervention can be adapted to meet the needs of specific groups or cultures (Saulsberry et al., 2012).

Eyles et al., (2016) suggest that the iterative nature of co-design can be especially effective when working with marginalised or minority groups. In this context, the process would have involved partnering asylum seekers with other stakeholders, and researchers and/or designers to develop the intervention. This would have ensured that from the beginning the intervention was developed, refined and redeveloped in collaboration with asylum seekers (Kitzman et al., 2017) and therefore more immediately usable in practice. The language and dialect errors could have been avoided, and the animation and messages might have been refined more appropriately from the start.

This would then increase the chances of 'getting it right' from an early stage, and consequently its feasibility. Co-design therefore can result in an intervention that is likely to be more feasible to use in practice. Clearly the more acceptable it is to the user group the more feasible it is.

Given the nature of the study there are some limitations. This is a small study based on a sample (n=30) of self-selecting participants who may have been enthusiastic about mobile applications, positively influencing the results. The data generated was superficial in places with missing demographic data and participants answering yes or no to some questions, possibly due to language barriers. In addition, the community maps function was not working at the time of our research and so could not be properly evaluated. However, to our knowledge, this is the first mobile application to be developed to support physical activity in asylum seekers and the sample group were ethnically diverse, men and women, of different ages and with different languages. This diversity may increase the likelihood that the principles of the content of the digital animation and the findings are transferable to other contexts where the target group for the intervention comprise a range of cultural and linguistically diverse communities. However, there is no guarantee that intention to change behaviour will actually lead to asylum seekers increasing their levels of physical activity and exercise due to the 'intention-behaviour' gap (Faries, 2016). Further research is needed to test whether the application does actually bring about behaviour change to increase physical activity and exercise levels and the impact of this on mental health in asylum seekers and refugees.

## **Conclusion**

Evidence suggests that undertaking the recommended levels of physical activity and exercise can have a positive impact on mental health. People with poor mental health, including asylum seekers, need cost free opportunities to increase physical activity levels.

This study has identified that a digital animation housed within a mobile application could help asylum seekers change their behaviour, increasing physical activity and exercise levels leading to an improvement in mental health and wellbeing. Participants were enthusiastic and accepting of the animation and all thought that they could and would follow the advice. All were receptive of the idea of further information to facilitate behaviour change.

We found that the animation's appeal could be increased by attention to language/dialect specificity and achieving a balance between ease of use and complexity to motivate the user. Co-design at an early stage would have been a means to ensure this. In designing such interventions, researchers must strongly consider the target population. This is especially the case where the focus is on people with low levels of health literacy and/or of diverse language families. Co-design is an important way to ensure that interventions are fit for purpose for different groups and hence are feasible as a means of behaviour change.

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Table 1: COM\_B principles and domains

<b>COM-B principle</b>	<b>Domain</b>
Capability	Knowledge
Opportunity	Social or Environmental Influences
Motivation	Beliefs and Intentions.

Figure 1: Screenshot of the digital animation application once user has chosen their appropriate language.



Table 2: Interview Questions

Questions	Link to COM-B model
Do you think that the animation was sensitive to your social and cultural background? Why/why not?	Opportunity: ensuring the content does not create a social or cultural barrier
Do you feel that you would want to follow the advice in the animation? Why/why not?	Motivation
Do you think that you would be able to follow the advice on the animation?	Capability in relation to key messages and level of information provided

If not, why not?	
<p>Can you suggest any changes to the animation that would improve it? For example</p> <ul style="list-style-type: none"> <li>• Length of animation</li> <li>• Style of animation (colours, figures, voice over)</li> <li>• Words used</li> <li>• Anything else that might make you want to increase your activity? (for example, types of activities or exercise)</li> </ul>	
Would a link to suggested activities or exercise – and where they are - be useful?	Opportunity, capability and motivation

Table 3: Coding of interview data in relation to COM-B domains of capability, opportunity and motivation

<b>COM-B domain</b>	<b>Codes</b>	<b>Themes</b>
<u>Capability</u>	Ease of use of application Advice easy to follow Recognition of impact on health	Simple to use
<u>Opportunity</u>	Sensitivity to cultural background Different Languages Content and duration	Overcoming language barriers

<u>Motivation</u>	Quality of graphics/content Advice viewed as useful/positive	Simple to use
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Table 4: Demographic profiles of respondents

Gender	Home Country	Age	Religion
F	Morocco	34	*
F	Norway**	54	None
F	Morocco	37	Muslim
*			
*			
F	Iran	35	Christian

F	Ghana	48	Christian
M	Iran	21	Christian
F	South Sudan	34	Christian
M	*	*	*
M	*	*	*
M	Eritrea	20	Christian
F	Eritrea	*	Christian
M	Iran	*	*
M	Sudan	26	Muslim
M	Eritrea	20	Christian
M	Iran	54	Muslim
*	Iran	*	*
F	Syria	34	Muslim
M	Iraq	28	*
F	Iraq	45	Muslim
*	Eritrea	*	*
F	Iraq	42	Muslim
M	Iraq	48	Muslim
F	Iraq	18	Muslim
M	*	*	*
F	Nigeria	50	Christian
M	Sudan	30	Muslim
M	Iran	*	*

\*data not known or shared with researcher (accidentally not asked, not understood by transcriber and/or not recorded)

\*\* we assume in transit to the UK as Norway nationals would have no reason to seek asylum