

# Promoting Physical Activity through Mobile Technology in Rural Bangladesh

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## Background

Chronic diseases are a critical issue in Bangladesh, accounting for 61% of deaths (Alam et al 2017). Even relatively small increases in physical activity can reduce the risk of chronic diseases such as diabetes mellitus and CVDs. However, older urban adults typically engage in very little PA (physical activity). Over 90% of households however do own a phone presenting an opportunity to reach people through mHealth interventions.

The Bangladesh Diabetes Association (BADAS) and UCL Institute for Global Health have worked with communities in rural Faridpur to tackle interventions through community groups and mobile voice messages (Fottrell et al 2019). Building on this work we developed and piloted 12 one-minute voice messages to encourage PA among older adults in urban Faridpur informed by qualitative research and grounded in behavioural theory.

## Methods

*Formative phase:* In order to understand the nature and context of physical activity among older adults in urban Bangladesh and the specific barriers and enablers to behaviour change interviews and focus group discussions (FGD) were held with community representatives in urban Faridpur. Eight FGDs and 9 semi-structured interviews were conducted with older (50+) men and women from a range of backgrounds (a mixture of low, middle and income groups and Muslim, Hindu and Christian). The interviews and FGDs were conducted in Bangla by a qualitative researcher from BADAS, and the topic guide followed was based on the aims of the research and the COM-B (Capability, Opportunity, Motivation) theory of behaviour change. The data was analysed thematically and used to inform the development of the voice messages.

*Message development:* In order to develop contextually relevant theory driven voice messages we followed a six-step process developed as part of our earlier research addressing lifestyle in rural Bangladesh (Jennings et al 2019). This process involves identifying barriers and enablers to healthy

behaviour from contextual research, categorising the behaviours according to COM-B and TDF domains and identifying appropriate BCTs (Behaviour Change Techniques) that can be applied. This information is used to inform the content of the messages which are packaged in different formats such as short plays, case studies and doctors providing information. We developed scripts for twelve one minute messages which were recorded by a technology company and sent to 160 people in urban Faridpur.

*Piloting and evaluating the messages:* Over a four week period we sent 12 messages (3 a week) to 160 signed up men and women, all over 50. When collecting number some basic information was collected (age, sex, amount of PA done). At the end of each week we called 50 of the message recipients (selected randomly) to conduct a short survey. They were asked how if they liked the messages, had they learned from the messages and whether their behaviour had changed due to the messaged.

### Results: message development

*Formative phase:* Among the research participants there was some knowledge of the importance of physical activity, although age and illness as well as business were seen as barriers to being active. Walking was identified as the main type of PA, and participants reported doing varying amounts of PA. Many said it was more difficult to walk in urban environments, though spaces and times when it was possible were identified. A positive finding was that women felt more comfortable and free of harassment when walking than our research in rural areas revealed, although a few women said they did not feel entirely comfortable walking outside.

Below are some of the key barriers and enablers to PA identified by the research participants:

Table 1: Barriers and enablers to Physical Activity

Barriers			Enablers		
Capability	Opportunity	Motivation	Capability	Opportunity	Motivation
Illness/chronic disease can make it difficult to walk/exercise	Lack of space and equipment	Lack of motivation/willingness to exercise	Knowledge that PA is good for health and is important	Spaces and places to walk	Motivated and willing to exercise
Age can make it difficult to exercise	Too busy to walk/exercise (particularly women): busy with work, family, housework	Prefer 'comfort', find exercise difficult/uncomfortable	Participants feel able to exercise	Many women felt able to walk/ not criticised when walking	Since being diagnosed with a CD (such as diabetes) will exercise: may have been encouraged to by a doctor
Not knowing what kind of exercises to do/how to do them: especially if one has a chronic condition, and what is age appropriate	Some women are not comfortable walking outside			Walk early in the morning when there is less traffic Walk as part of a group Will take grandchildren to work with them	Exercises to be healthy Enjoyment of walking/exercise In the 'habit' of walking Encouraged by others to walk

*Message development:* Using the findings of the formative research and learning from our earlier project we developed 12 voice messages sent to 160 people over 4 weeks. The table below describes the messages.

*Table 2: List of Messages*

	Message content	TDF and BCT
<b>Message 1</b>	Introduction to the messages	
<b>Message 2</b>	Straight information about PA from a doctor about the importance of PA	Knowledge: Shaping knowledge
<b>Message 3</b>	Drama: conversation about chronic disease, age and PA	Knowledge: Shaping knowledge
<b>Message 4</b>	Exercise demonstration: explaining how to do a chair-based exercise	Skills: Behavioural practice
<b>Message 5</b>	Drama: discussion about walking, motivation and how to be active	Skills: Shaping knowledge
<b>Message 6</b>	Drama: between a man and women about women walking and supporting them	Social influences: Social support, Modelling behaviour
<b>Message 7</b>	Drama: man and his daughter in-law and supporting each other	Social support: Social support, Modelling behaviour
<b>Message 8</b>	A doctor discussing the problems people face and ways of overcoming and	Environment, context and resources: Pros&cons, Shaping knowledge
<b>Message 9</b>	A doctor recapping key information about PA, skills and support	Knowledge, skills, social support: Shaping knowledge
<b>Message 10</b>	Drama: discussion about the reasons and motivations to exercise	Beliefs about consequences, emotions, social support: Shaping knowledge, Modelling behaviour
<b>Message 11</b>	Case study: about a person who started to exercise after medical advise and the positive effects it had	Beliefs about consequences: Modelling behaviour
<b>Message 12</b>	Final message: recap and thank you	

### Results: survey and reception of the messages

*Survey response and receiving messages:* The response rate to the survey was overall high (78-92%), see figure 1. The number of messages participants listened to varied per week (figure 2), with over 80% in weeks 1, 3 and 4 and 67% in week 2 listening to 2-3 of the 3 messages (figure 3). Reasons for missing messages included being busy, talking on the phone or not being with their phone.

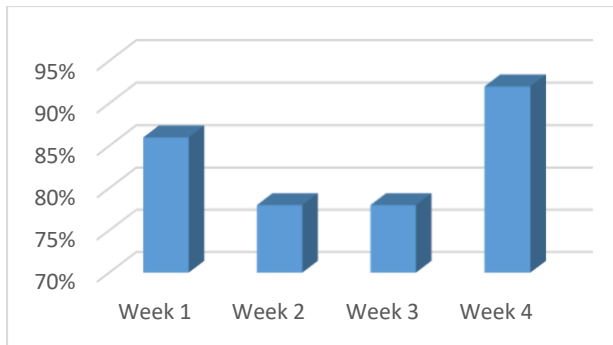


Figure 1: Survey response rate

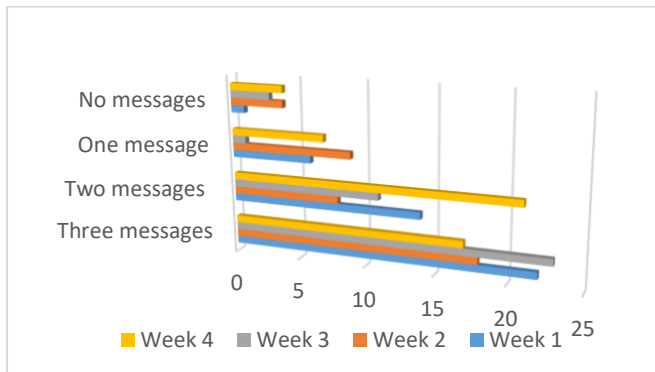


Figure 2: Number of messages listened to per week

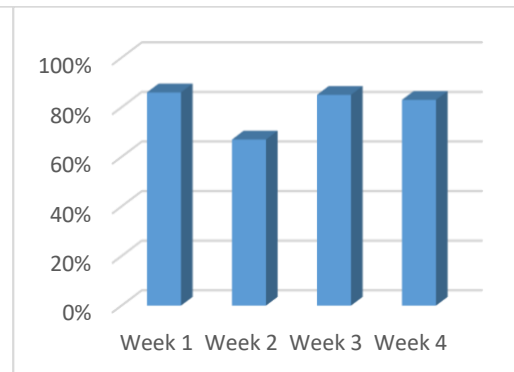


Figure 3: People who listened to most messages

**Enjoyment of the messages:** Overall people reported enjoying the messages. Figure 4 shows that all the messages were well liked, with message 7 (drama about social support being the most popular). When asked about the types of messages that were most enjoyable a doctor giving straight information was the most popular (figure 5). 82% of participants surveyed in week 4 reported liking the messages a lot overall (see figure 6).

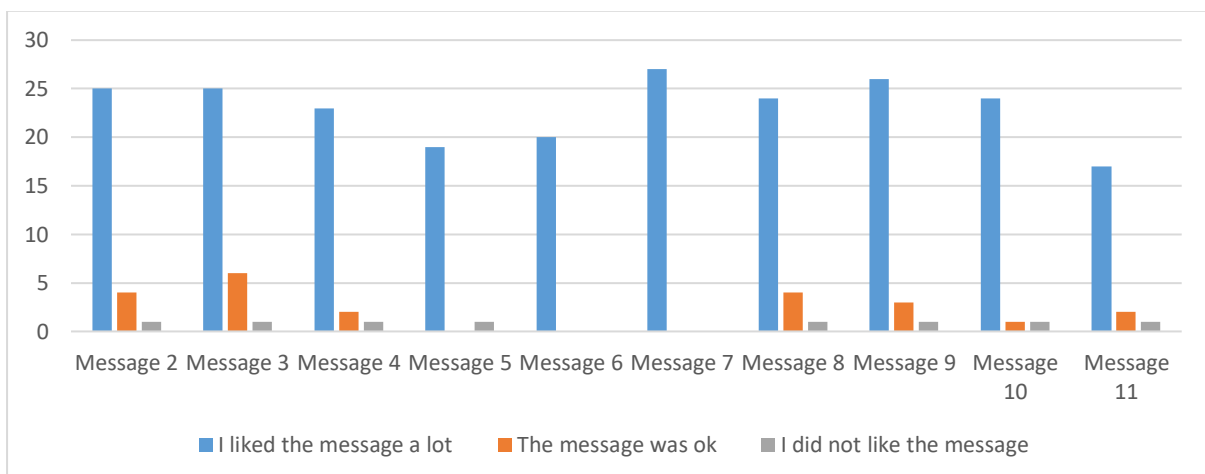


Figure 4: Enjoyment of individual messages

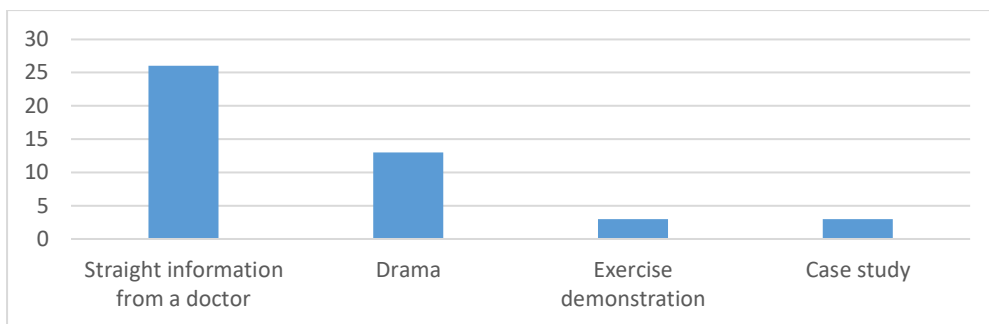


Figure 5: Types of messages most enjoyed

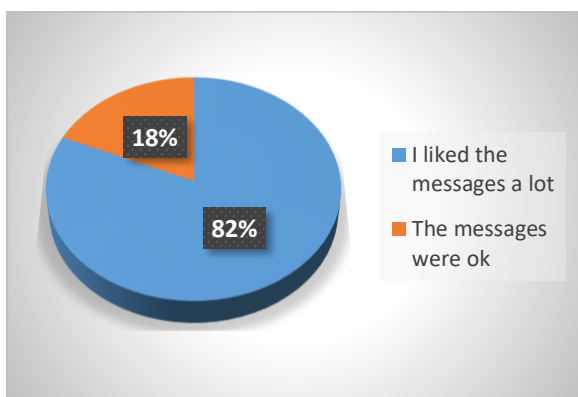


Figure 6: Overall enjoyment of messages

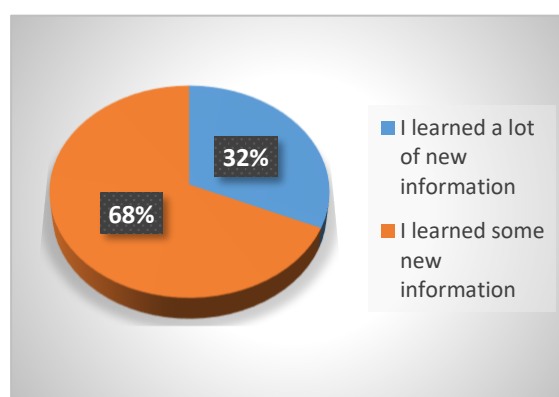


Figure 7: Overall learning from messages

**Learning from the messages:** Overall participants reported learning at least some new information (68%) and 32% reported learning a lot of new information (figure 7). Every week most participants reported at least a little learning from each message. Participants reported the most learning from message 3 (drama about chronic disease, age and PA) and message 9 (doctor recapping information about PA), see figure 8. Overall it was reported participants learned most from the messages that a doctor gave information (figure 9).

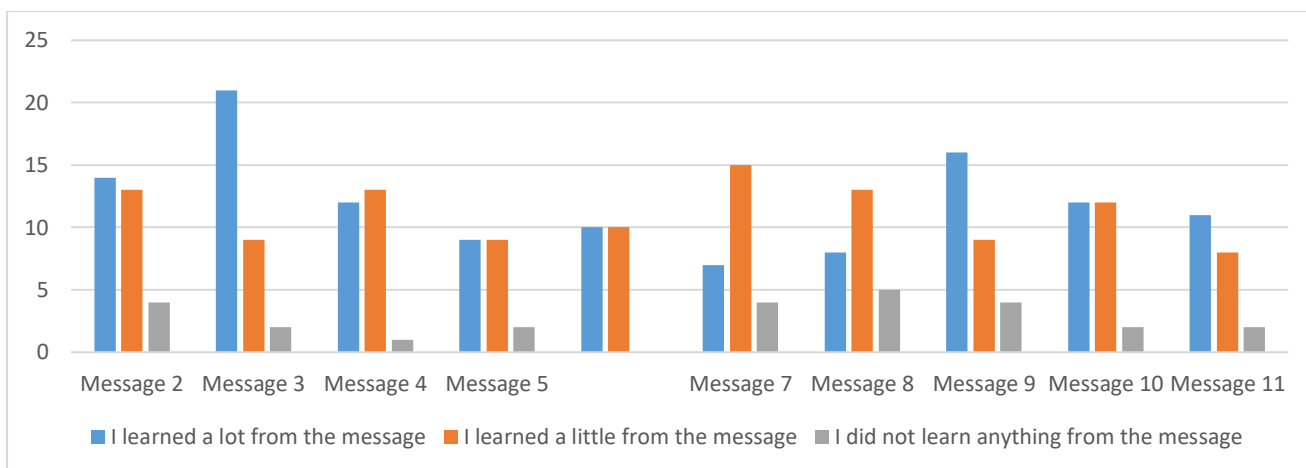


Figure 8: Learning from individuals messages

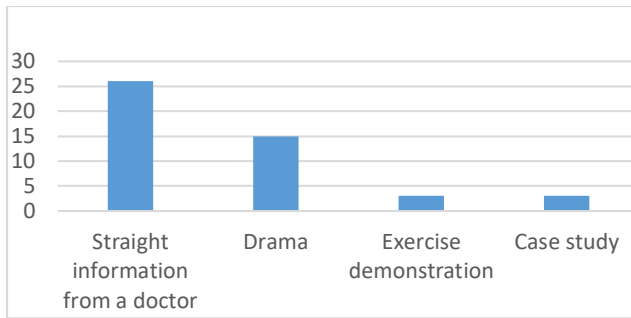
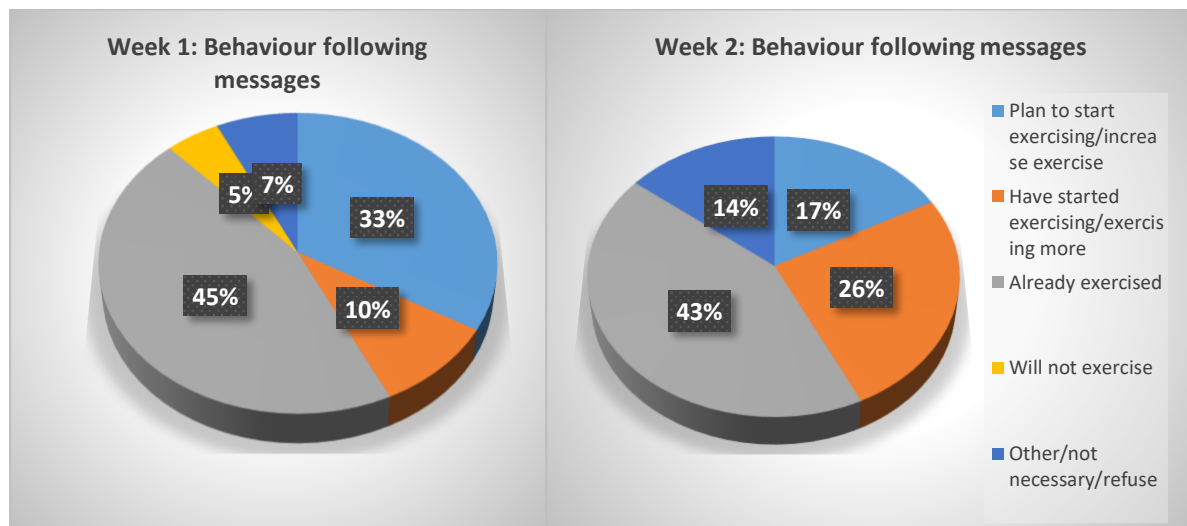


Figure 9: Types of messages people learned from most

**Behaviour change:** In addition to participants liking the messages and having learned from the messages, it was reported that behaviour has started to change. The proportion of participants that report to have started to exercise or increase the amount of exercise they do as a result of the messages increased every week, from 10% in week 1 to 45% in week 4 (see figures 10-13). A higher proportion of participants reported planning to change behaviour (33%) in week one (14-18% weeks 2-4), by weeks 3-4 it appears this has started to translate to action. At baseline the reported average amount of physical activity was 96 minutes a week, among the participants in the final survey their average was 130 minutes a week and in the final survey it was 200 minutes a week which is a 70 minute increase.

It should be noted that the results need to be viewed with some caution, as they are self-reported and the numbers are relatively small without any in-depth statistical analysis. However, these are very encouraging results and similar messages should be tested at scale.



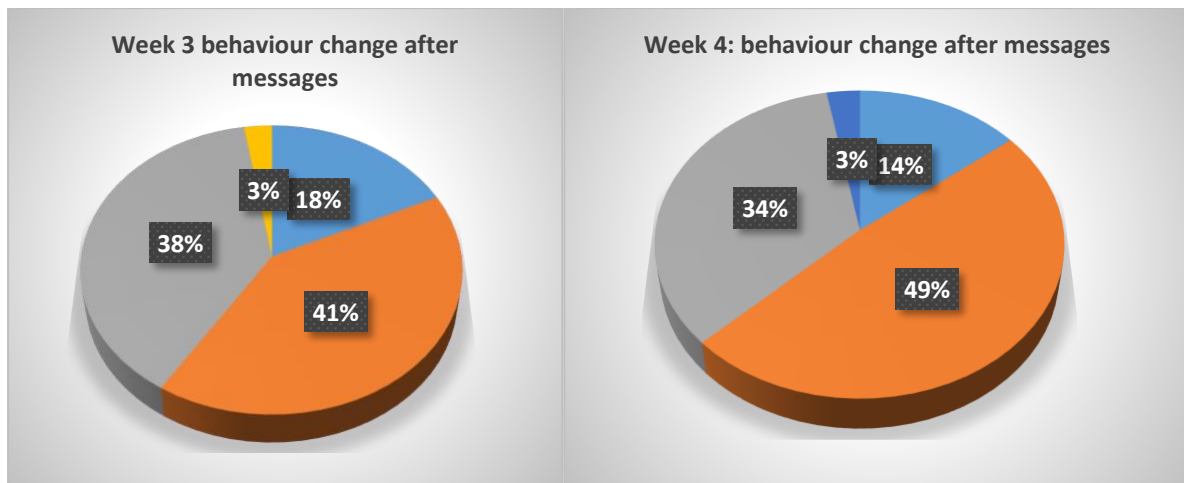


Figure 10, 11, 12 and 13: Behaviour change due to messages by week

### Moving forward

The findings from this pilot study are very encouraging. They reveal that messages are relevant and listened to. The messages, informed by context and theory, were well liked and enjoyable. It was reported that people learned new information from the messages and that people were doing more physical activity as a result of the messages.

This was a small study but the results were positive. It is important that the process is replicated and similar messages are tested at scale in order to assess the impact of such messages more rigorously, and explore how they can be applied more generally.