



**PERSPECTIVES OF UK PAKISTANI WOMEN ON THEIR
BEHAVIOUR CHANGE TO PREVENT TYPE 2 DIABETES:
QUALITATIVE STUDY USING THE THEORY DOMAIN
FRAMEWORK**

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4 **PERSPECTIVES OF UK PAKISTANI WOMEN ON THEIR BEHAVIOUR CHANGE TO**
5 **PREVENT TYPE 2 DIABETES: QUALITATIVE STUDY USING THE THEORY DOMAIN**
6 **FRAMEWORK**
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10 Linda Penn,^{1,2} Stephan U Dombrowski,³ Falko F Sniehotta,^{1,2} Martin White^{1,2}

11
12 ¹ Institute of Health and Society, Newcastle University, Baddiley Clark Building, Richardson
13 Road, Newcastle upon Tyne, NE2 4AX, UK.

14
15 ² Fuse, UKCRC Centre for Translational Research in Public Health

16
17 ³ School of Natural Sciences, Division of Psychology, University of Stirling, FK9 4LA
18
19
20
21
22
23

24 Linda Penn, Research Associate (corresponding author): linda.penn@ncl.ac.uk

25
26
27 Stephan U Dombrowski, Lecturer in Health Psychology: s.u.dombrowski@stir.ac.uk

28
29
30 Falko F Sniehotta, Reader in Health Psychology: falko.sniehotta@ncl.ac.uk

31
32 Martin White, Professor of Public Health: martin.white@ncl.ac.uk
33

34 **Key Words**

35 Behaviour change

36 Community

37 Cultural adaptation

38 Ethnicity

39 Intervention

40 Type 2 diabetes

41 Intervention

42 Pakistani

43 Physical activity

44 Prevention

45 South Asian

46 Qualitative

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ABSTRACT

Background

Type 2 diabetes (T2D) is a debilitating disease, highly prevalent in UK South Asians, and preventable by lifestyle intervention. The 'New life, New you' (NLNY) preventive lifestyle intervention was culturally adapted for Pakistani women and tested for feasibility. We conducted a qualitative study of participants' perspectives on their behaviour change, to support intervention optimisation.

Methods

Participants were recruited to NLNY through community-based screening events. Following an eight-week intervention programme Pakistani women, sampled across screening locations, were invited to participate in semi-structured interviews in pairs or groups of three. The topic guide was developed from our previous work based on the Theory Domains Framework (TDF). The Framework approach, with comparison of emerging themes, was used to analyse transcribed data.

Results

We completed nine interviews involving 20 participants, aged 26-45 (mean 33.5) years. Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified the importance of social factors relating to participants' own physical activity and dietary behaviour change. We also identified cross-cutting themes relating to collateral benefits of the intervention including: participants' psychological health, 'safety and freedom', (cultural acceptance and feeling comfortable) and 'positive affect' (feeling happier, less isolated, not depressed); 'responsibility' (for others' health, especially family members included in the new PA and diet regimes); and 'inclusivity' (an ethos of accommodating differences).

Conclusions

Our findings suggest that providing culturally adapted interventions for Pakistani women at risk of T2D will encourage their PA and dietary behaviour change, and may have collateral health and social benefits. The NLNY intervention appeared acceptable, but could be improved by better facility provision. We plan to evaluate recruitment, retention and likely effect of the intervention on participant behaviour prior to definitive evaluation.

ARTICLE SUMMARY

Article focus

The 'New life, New you' lifestyle intervention for diabetes prevention was culturally adapted for local Pakistani women and tested for feasibility. In an interview study we sought intervention participants' perspectives:

- On their behaviour change
- On the intervention procedures and cultural adaptations

Key messages

- We identified the importance of several social factors, relating to participants' engagement in the intervention and their physical activity and dietary behaviour change
- Participants reported intervention benefits regarding their psychological health and positive affect
- Participants expressed responsibility for improving their family's lifestyle and the intention to apply learning from the intervention

Strengths and limitations

This qualitative study:

- Highlighted cultural adaptations needed to engage Pakistani women in a lifestyle intervention
- Identified unanticipated intervention benefits
- Was limited by data collection early in the intervention timescale and the small study size

BACKGROUND

Type 2 diabetes (T2D) is a debilitating disease that carries an increased risk of eye, kidney, nerve, and vascular disease with decreased life expectancy.[1] Prevalence of T2D is greater in UK residents of South Asian origin than in the general UK population and the disease often occurs at an earlier age in this population group.[2] Although there is good research evidence for the efficacy of lifestyle interventions for prevention of T2D,[3 4] translation of such evidence to service provision remains challenging [5] and recruitment of South Asian participants to preventive interventions has proved difficult.[6 7] The UK National Institute for Health and Care Excellence (NICE) guidance for risk identification and preventive interventions for high-risk individuals was published in July 2012.[1] This NICE guidance addresses the need to provide services, including risk assessment for those aged 25 to 39 who are not included in the National Health Service (NHS) Health Checks programme. The

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3 need to provide risk assessment and preventive opportunities for younger adults is particularly
4 relevant for ethnic minorities.[1]
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7 The 'New life, New you' (NLNY) intervention for primary prevention of T2D was developed in
8 Middlesbrough and has to date been evaluated through a feasibility study.[8-10] According to UK
9 government statistics, Middlesbrough ranks as one of the ten most deprived areas in England based
10 on the index of multiple deprivation (IMD) ranks of localities (lower super output areas (LSOA))
11 within the town.[11] The original NLNY intervention primarily targeted middle and older aged adults
12 in low income groups, priority groups identified using market segmentation of the Sport England
13 Active People survey.[12] The NLNY intervention was designed to be delivered in leisure and
14 community settings and to recruit participants directly from the community, rather than relying on a
15 health services referral route. Recruits to the NLNY intervention were assessed for individual risk of
16 future T2D, using the Finnish diabetes risk score (FINDRISC)[13] and the primary focus of the
17 intervention was on increased physical activity. The NLNY intervention design incorporated NICE
18 guidance requirements and was delivered through a programme of weekly supervised physical
19 activity sessions, each followed by reflection and advice,[14] with follow-up assessment at six and 12
20 months. Details of the original NLNY intervention feasibility and pilot studies have been published.[8
21 10] In Middlesbrough there is a South Asian community that comprises about 6.1% of the total
22 population (8461 of a total population of 138,700 in 2011).[15] Although participants from the local
23 ethnic minority communities were not excluded from the original NLNY intervention, few were
24 recruited. To better engage members of the local ethnic minority communities, we planned a
25 cultural adaptation of the NLNY intervention.[16 17] To develop the adapted intervention and its
26 evaluation the NHS commissioners convened an operational group that included community health
27 champions as well as health and fitness workers. The adapted NLNY intervention was informed by
28 mapping the distribution of ethnic minority communities within the Local Authority area, followed
29 by stakeholder consultations. The project delivery was managed by an NHS health improvement
30 specialist. One adaptation of the NLNY intervention specifically targeted Pakistani women. As
31 anticipated, and confirmed in stakeholder consultations, the main concern for local Pakistani women
32 was the availability of culturally appropriate services. Thus the need for single sex physical activity
33 group sessions was of paramount importance in adapting the NLNY intervention for this population.
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51 The intervention that was provided for the Pakistani women was delivered through a Community
52 Interest Company (CIC). The CIC was founded and registered by three local women (two of Pakistani
53 and one of Arabic heritage) who are directors of the company (NUR FITNESS CIC registration number
54 08143445 <http://www.bis.gov.uk/cicregulator>). The intervention was delivered by one CIC founder
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3 member, who recruited other local Pakistani women to assist with intervention delivery. These
4 women received training to qualify as fitness trainers or in some cases training to deliver the
5 nutritional aspects of the intervention. The NHS commissioners provided funding and facilitated
6 these training opportunities. The feasibility study for the adapted NLNY intervention is on-going and
7 we plan to collect outcome data comprising weight and waist measurements along with self-report
8 data on physical activity, diet, and quality of life at six and 12 months of follow-up in a before and
9 after pilot study design.
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15 In this paper, we report a qualitative interview study that was conducted as part of the feasibility
16 and acceptability evaluation of the adapted NLNY intervention for Pakistani women, in line with the
17 MRC guidance for the development and evaluation of complex interventions to improve health.[18]
18 In this interview study we aimed to investigate Pakistani women's perspectives of their behaviour
19 change and salient features of the culturally adapted NLNY programme, to inform the optimisation
20 of the intervention prior to formal piloting and definitive evaluation.
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25 **METHODS**

26 **Intervention**

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29 Participants were recruited to the adapted NLNY intervention for Pakistani women through women-
30 only assessment events that were organised by the project manager in consultation with the
31 intervention delivery staff and community health champions (members of the community who have
32 received training to promote health messages locally). These events took place in community venues
33 in the areas of the town partly populated by the Pakistani community. Initial individual risk
34 assessment was based on FINDRISC scores. [13] [19] Other data were collected at the assessment
35 events, including self-report physical activity and dietary data. Follow-up assessments, as part of the
36 service delivery and feasibility evaluation, were planned at six and 12 months.
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44 Women recruited to the intervention took part in an eight week programme of weekly sessions,
45 delivered to groups of between 10 and 20 women. The sessions comprised approximately 60
46 minutes of supervised group physical activity followed by 30 minutes of reflection and advice
47 centred on dietary information and action planning. Participant received a booklet that included
48 information, goal setting and action planning prompts with space for recording their progress. The
49 information provided about a healthy diet was specifically tailored to the participant group,
50 incorporating their preferred foods and cooking styles. The participants were also able to access
51 additional physical activity sessions at different times of the week, delivered by the same provider.
52 These additional sessions were made available to participants both alongside and following the eight
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3 week course. These sessions were provided at no cost to the participants for up to six months and
4 later at low cost. Most of the activity sessions were delivered in community halls, including school
5 halls. In the early stages of the programme the women had access to a community gym, where their
6 exclusive use was assured for some mornings, but this facility was later closed.
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10 The provider ensured that information about different sessions was easily available and regularly
11 updated. This was facilitated via a social networking page (i.e. Facebook) that the provider initiated;
12 others relied on text messages, also from the provider, or accessed information by keeping in touch
13 with other women participants.
14
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16 17 **Design and participants**

18 We obtained ethical approval for the study from Newcastle University Ethics Committee. All
19 participants received information and gave written informed consent prior to taking part in the
20 feasibility study and the interview study separately.
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24 For the qualitative interview study we purposively sampled participants from the feasibility study to
25 ensure representation from the three different areas of the town where early recruitment and
26 intervention delivery took place. The interviews were scheduled shortly after the first three groups
27 of women had completed their eight week intervention programmes. The NLNY evaluation team did
28 not have access to participant contact details so the interview invitations and arrangements were
29 made by the intervention delivery staff following guidance from the research team. The researcher
30 who conducted the interviews did not know any of the participants prior to the interviews. Our
31 previous work [9] and the Theoretical Domains Framework (TDF), [20] a framework that groups
32 component constructs from relevant behavioural theories into theoretical domains, were used to
33 inform the topic guide for this study. The topic guide was refined as the interviews progressed.
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41 42 **Data collection**

43 Group interviews involving two or at most three participants were planned to encourage
44 participation and these were conducted in English language by the female researcher (LP, MSc,
45 Research Associate). The interviews were conducted in the community venues where the
46 participants attended their physical activity sessions and were co-incident with on-going sessions
47 although always in a separate room. Interviews lasted between 60 and 75 minutes. As in previous
48 work, [9] we allowed flexibility within the areas outlined in the topic guide and the women were
49 encouraged to report what mattered to them. Active listening with prompts was employed to
50 provide clarification and improve insight. Notes were made of related topics introduced by the
51 participants and the topic guide was developed as the interviews progressed. All interviews were
52 audio-recorded and transcribed, as close to verbatim as possible.
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Analysis

We used the Framework approach[21] for data analysis. Transcripts were read, checked, and imported into NVivo V9 [22] to facilitate coding. The themes emerging from the data were first classified according to the *a priori* theoretical domains identified from the TDF and included in the topic guide as: intentions and goals; reinforcement; knowledge; nature of the activity; social role and identity; social influences; capabilities and skills; behavioural regulation and decision; emotion; and environment. LP performed the initial classification according to the TDF themes and these were then checked by SUD, differences being resolved through discussion. The use of NVivo software and the TDF defined *a priori* categories facilitated the analysis and promoted familiarisation with the data. Further analysis of the data within each of the theoretical domains, and reference to an empirical phenomenology approach, [23] which is primarily about retaining the appreciation of the respondents' subjective world, led to the identification and agreement of cross cutting constructs.

RESULTS

We conducted nine interviews (seven dyad interviews and two interviews with groups of three participants). All 20 interview participants were female and Pakistani, with ages ranging from 26 to 45 years with a mean of 33.5 years. For this group of interview participants, their baseline risk of future T2D based on FINDRISC score ranged from 11 to 22 with a mean score of 15 and their IMD scores, based on LSOA of residence from provided post-codes, ranged from 11 to 78 with a mean IMD score of 43. Details of participant characteristics are shown in Table 1.

Table 1: Participant baseline variables: group means

Group identifier	Number in the group	Age (years)	FINDRISC score	IMD score
A	2	33	20	46
B	2	30	12.5	52
C	2	31	13	78
D	3	35	15	69
E	2	36	13	20.5
F	2	40	14.5	37
G	3	32	14	18
H	2	29	14.5	29.6
I	2	45	17	34.5
All participants	20	34	15	43

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3 Some women were less confident in their use of English language than others and the women
4 tended to organise themselves so that the interview groups included at least one participant who
5 was confident in her own ability to express herself in English. Sometimes the women would converse
6 briefly between themselves in their first language to check their use of English. Those who were
7 more confident tended to speak more, although this was sometimes to clarify what the other person
8 had said for the benefit of the researcher, who only spoke English. Quotes are assigned to groups
9 (Table 1) and where group discussion is reported we have used numerals (i, ii) to identify different
10 speakers.

11
12 Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the
13 activity, social role and identity, social influences, capabilities and skills, regulation and decision,
14 emotion, and environment), we identified and analysed the anticipated theme relating to
15 participants' own physical activity and dietary behaviours. We also identified three further cross-
16 cutting themes which we have grouped as 'collateral health and social benefits'. These three
17 composite themes related to participants' perspectives of their psychological health, 'safety and
18 freedom', (cultural acceptance and feeling comfortable) and 'positive affect' (feeling happier, less
19 isolated, not depressed); their family role, 'responsibility' (for the health of others especially family
20 members, who were included in the new PA and diet regimes); and 'inclusion' (an empathetic ethos
21 of inclusion and accommodation of differences).

22 **Participants own physical activity and dietary behaviours**

23 ***Intentions and goals***

24 Health concerns were frequently stated as a reason for taking part in the intervention and there was
25 an appreciation of the increased diabetes risk associated with Asian ethnicity as described by one
26 woman,

27
28 *'I just about got myself motivated that it's for health reasons ... especially with the diabetes... we
29 as Asians, we get diabetes.'* (Group I).

30 Occasionally less explicitly health associated reasons would be mentioned such as,

31
32 *'Because we will gonna be like fit and we are gonna be smart and look nice.'* (Group C)

33 The intervention documentation was organised by the provider to promote action planning and this
34 was recalled as explained in this quotation,

35
36 *'Every week we give a self-challenge, we are not going to do this, we are not going to eat this, we
37 are going to eat something else.'* (Group C).

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3 More generally goal setting was closely related to being part of the group and the need to engage
4 with group activities,
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7 *'We have to go to the classes: we try our best to go to classes.'* (Group A).
8

9 **Reinforcement**

10 Most of the reinforcement centred on feedback from other people, especially others in the group,
11 for example,
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15 *'It was pointed out that I was getting more defined on my waist and that was like really brilliant.*

16
17 *It was a great motivator.'* (Group F)
18

19 **Knowledge**

20 Tailoring of dietary advice was much appreciated. There was frequent reporting of quantities of oil
21 and salt to include in making home cooked curries, often introduced with an air of disbelief
22 regarding how much oil and salt they had previously added to cooked food. They appreciated advice
23 to reduce these quantities gradually so that the change in taste was less obvious, but they explained
24 that as they became used to the different tastes they even preferred them.
25
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28
29 Perhaps surprisingly the risk effect of family history needed clarification, as explained here,
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31
32 *'I know my uncle in Pakistani, he's got diabetes and his leg is quite bad actually. I didn't know, I*
33 *didn't realise I would be at risk, because he's an uncle, he's not my dad and then it was quite a bit*
34 *of a shock when they said no actually he's part of your family.'* (Group E).
35
36

37 **Nature of the activity, capabilities and skills**

38 There was a range of experience within this group of women. Many were quite new to the physical
39 activities that were presented in the programme and were gradually attuned to them by the
40 trainers, as explained by one woman,
41
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44
45 *'They proper explain it, they do exercise and they keep telling us as well both ways.'* (Group A)
46

47 Generally the opportunity to participate in physical activity was valued and the women were pleased
48 with what they had achieved. One woman described her effort and the beneficial effects she felt,
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50
51 *'Trust me when I do work-out I'll be drenched, you know, and there's lots of ladies that really put*
52 *the effort in, but it's like built your confidence.'* (Group G).
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Social role and identity, and Social influences

These domains were particularly important for this group of Pakistani women and additionally contribute to the cross-cutting collateral benefits that we identified (detailed below). The women were mostly homemakers and mothers and often described themselves in relation to this role,

'You put yourself back and you give your children more.' (Group F).

The social responsibility to provide hospitality was sometimes seen as detrimental to their progress in achieving a healthy lifestyle,

'I have to buy some unhealthy foods in, just because it's the norm, people expect something like that on the table and what happens is, if I bought it in I'll end up eating it myself.' (Group F).

There was an expectation that the CIC providers would understand and accept the social and cultural issues that were pertinent to this participant group, because the delivery staff themselves were from the Muslim community as described by one woman,

'Because she's [trainer] Asian as well, she knows how to change basically, she knows the things that Asians ...whereas English people have different diet to what Asians do, our diet is totally different, whereas she helped us a lot by telling us small changes that we could make in our daily intake of food and the like type of cooking that we could do.'

The appreciation of the efforts that were being made by the CIC providers who were known to many of the women participants was evident. This was described by one interviewee,

'I think [they are] helping our Asian community ladies, especially the oldies to come out [of the house]. ... They give her [the trainer] blessing.' (Group D).

Recruitment by word of mouth was emphasised; people described how they had been encouraged to come by reassurance from those already engaged in the programme such as:

'Friends are like encouraging you. 'no you have to come, you have to come,' just it helps socialising and get out as well, because you don't realise you can get out,' (Group G), and *' it really helps to have someone saying actually it's ok to come,'* (Group B).

The women also described how later on they themselves had encouraged others and become 'champions' in promoting the intervention,

'And then after I tell them it's really nice, come you see, it's really, really nice' (Group B).

Regulation and decision

Regulation centred on attending the physical activity sessions, where prompts to attend were naturally provided as part of the women's usual routine. For example after taking the children to school the women could attend a session in an adjacent community venue.

'Every Monday we go, [to the activity session] like half nine till half ten,' (Group C).

With regard to diet there was some appreciation of the need for portion size control, for example by using a smaller plate. Sweet fizzy drinks were perceived as addictive, therefore difficult to regulate and better avoided. The dietary advice offered included information about reading food labels, which was reported as helpful for making decisions about food choices. The fact that some sweet foods, specifically intended for Asian festivals, did not have nutrition labels was mentioned by some of the women participants.

Emotion

Worry about the risk of diabetes, because of family members with the disease, and concern for relatives already suffering from diabetic complications was often mentioned. Retinopathy was specifically mentioned where it had affected younger aged relatives to the detriment of their quality of life.

There was also some mention of possible embarrassment about going to the gym, described as,

'Making a fool of myself,' (Group E)

In contrast the enjoyment experienced by participating in the activity sessions was often mentioned.

'We have a good laugh and we have good things.'(Group C)

But then the time flies by, you don't realised where the time has gone and you had a workout, but you had a laugh.' (Group E)

It's the motivation of seeing each other and as well as having a laugh, you enjoy your time here.'
(Group B)

Environment

The main environmental issue, as anticipated for this population group, was the provision of a female only facility. This is a broader criterion than just a single room, for example in a leisure centre, set aside for an hour. This requirement includes access to changing and toilet facilities with reassurance that the area would be securely restricted to women during the sessions and no man

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3 would accidentally just walk in. There were also environmental issues of concern around the cold
4 weather and the cost of attending sessions (once the free and subsidised period had expired).
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6

7 *'It's so cold. At the moment I've stopped walking because it's cold. (Group A)*

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9 *'In the park all friends go together but sometimes I said I don't want to go 'it's too cold' (Group D)*

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11 *'You have to look at it from the financial point of view, how much is the charge going to be? If I*
12 *want to come three times a week how much is that going to be? (Group F)*

13
14
15 *'Everything is expensive nowadays, just your basic household things cost an arm and a leg, so*
16 *money is a big issue, but I think just for fitness the prices that they've got now are reasonable'*
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19 *(Group H)*

20 21 **Collateral health and social benefits**

22 **Psychological health**

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25 The first part of this theme relates to participants' perspectives of their psychological health, 'safety
26 and freedom' (cultural acceptance and feeling comfortable) and 'positive affect' (feeling happier,
27 less isolated, and not depressed).
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30
31 Reference to Islamic culture used in engagement strategies was influential, as described by one
32 participant,
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34
35 *'The advert [Radio Ramadan] was talking Islamic, like people in Islam history, the women. In*
36 *those days women were like quite fit and strong and they had to be and that's what got me in [to*
37 *the programme] (Group D).*

38
39
40 Similar references were used by the community provider during the sessions and contributed to the
41 perspectives of cultural acceptance that made the women comfortable,
42
43

44
45 *'You know the instructor... and sometimes they talk in our own language and we just do jokes.'*
46
47 *(Group A)*

48
49 Feeling safe and comfortable was a regular and much emphasised theme, as described clearly by
50 members of one group,
51

52
53 *'i) It's easy for me to say, 'I'm going to a ladies only gym, there's no men there,' and I know there*
54 *will be no disapproval from the male side of our family.*

55
56 *ii) I felt like the whole mental pressure was lifted because I could justify to anyone that I am in an*
57 *entirely female environment.*
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3 *i) He [husband] is in the mind that my wife is in a safe environment. ii) It is completely peaceful in*
4 *mind. (Group F)*
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7 The relief from anxiety was expressed by one participant as,

8
9 *'You can just do exercise, you are not like wary - is anyone [male] suddenly going to walk through*
10 *the door.'* (Group D)
11
12

13 Other aspects of feeling safe were about confidence to exercise. For example,

14
15 *'That's what they teach you, 'listen to your own body', whatever your body allows you go to that*
16 *speed and level. With me being a blood pressure patient..... Absolutely I found no fear, no worry*
17 *and I was in a good safe environment.'* (Group F).
18
19
20

21 The purposeful social grouping appeared to promote greater confidence within participants'
22 perceived role: as described by one woman when talking about cooking for the family,
23

24
25 *'if you are the main cook then it's part of your role, if you got the knowledge [re: healthy food*
26 *choices] (Group G)*
27
28

29 Another woman talked about cooking for her husband,

30
31 *'When I go home I say, 'I'm going to cook and you are going to eat, this is how I am going to*
32 *cook.' Husband was a bit like, you know, like it is -isn't it? 'Ah, you are not going to cook like that?'*
33 *'Oh yes I am, but it will taste nice.'* (Group F).
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38 There were also explicit references to depression such as,

39
40 *'She [relative] spent time at home a lot and I think a lot of depression got to her'* (Group E)
41
42

43 Two women in another group discussed depression in relation to the intervention,

44
45 *'i) If you stay home all day obviously it's different isn't it? I was very, very lazy. I didn't used to go*
46 *out. I just used to stay at home all the time.*
47

48 *ii) Watch TV.*

49 *i) Watch TV and just do the housework and just eat. Sit down in one place. So now I am very*
50 *active. This year we got the choice to get depressed or to go out and get fresh'. (Group A).*
51
52
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54 **Health of others**

55 The women's pivotal role within the family as the main cook was perceived as conveying a
56 responsibility for their family's health that was often explained such as,
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3 *'We have responsibility, we doing the shopping, we bring all the best things back for them' (Group*
4 *D).*

5
6
7 In relation to this there were clear statements that the knowledge and support the women had
8 received through the programme would empower them to make healthy changes for their own
9 benefit with the added consequence of influencing other family and community members. One
10 person clearly spoke about this as:

11
12
13
14 *'By educating the women I think what you are doing is you are empowering the women to sort of*
15 *make decisions, informed decisions 'cos they know that, 'this is right', this is wrong'. Then they are*
16 *in turn helping their younger, and extended elders.'* (Group F)

17
18
19 Similarly another woman described how her perception of responsibility had changed,

20
21
22 *'Now I go outside [of the house, to the sessions] I know what to do to my child you see. I want*
23 *to give good things you know.'* (Group D)

24
25
26 A description of specific changes was supplied by another group,

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28
29 *'We have stopped biscuits, we stopped cakes, we stopped crisps, we stopped everything, even*
30 *we stopped white bread as well, we start brown bread and everything like brown rice.'*

31
32
33 This confidence to change extended to encouraging their children to exercise and even jokingly to
34 the possibility that they might influence their husbands as explained in discussion with laughter
35 by one group,

36
37
38 *'i) I wanna send mine [husband].*
39 *ii) Yeah, I said to mine, 'Get out there'.*
40
41 *i) They are jealous wasn't it, looking at us, and now, 'Look we [imagining husbands' speaking]*
42 *need to work out.'* (Group G).

43
44
45
46 There was also an appreciation by the women of the way their own health would impact on others
47 as explained in the following,

48
49
50 *'I'm the one that makes – does everything, if for some reason my health suffers then everyone*
51 *else in our family suffers.'* (Group E)

52 53 54 **Tolerance**

55
56 The Pakistani women within this group had a range of faith related preferences. A particular
57 example was that some women did not want to participate in activities that involved music and the
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3 other women in the activity group were encouraged, by the trainer, to respect and accommodate
4 these wishes so the issue was resolved with tolerance. This issue and its resolution were reported by
5 one or two groups,
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8
9 *'Then [the trainer] said, 'No, they don't like music on' then [everyone] agree as well. They said,*
10 *'Oh you are so kind, because we don't like music.'* (Group C).
11

12 Although this intervention targeted ethnic minority participants, the additional physical activity
13 sessions run by the community provider were open to other paying customers and attracted a few
14 of the local women from the white population, who were welcomed as described by one woman,
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17
18 *'Four white women were there and we had such a laugh with them as well, you know trying to*
19 *speak our lingo and we were like, we tried like, the one that do speak English they are trying to*
20 *say their words... we are having a laugh and everything'* (Group E).
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23
24 This inclusivity was similarly described by another group,
25

26
27 *'i) The more the merrier and I think as long as it is women only it doesn't matter what ethnicity or*
28 *what race or what age, we don't care .*

29
30 *ii) I'm sure women from non-Muslim background they will probably feel intimidated by gyms*
31 *anyway and they might find coming to a women only gym- Wow this is great!'* (Group F).
32
33

34 The women themselves even encouraged wider participation,
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36
37 *'I've been recommending it to lots of Asians [and] English ladies, because they [all] like Bollywood*
38 *music don't they?'* (Group G).
39

40 The appreciation of issues that would be common to all women was described by one group
41 member as,
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45 *'When women work together from different cultures we all find that we have the same fears, the*
46 *same sort of issues about our bodies and how we want to look better'*(Group F) .
47

48 **DISCUSSION**

49 **Main findings**

50 This qualitative study suggests that provision of culturally adapted lifestyle interventions will
51 facilitate the engagement of Pakistani women and encourage their physical activity and dietary
52 behaviour change. The study results emphasise the importance of social influences and the women's
53 own perceived social role and identity for the development of acceptable interventions. The
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3 women's appreciation of the tailored intervention provision and their enthusiastic participation in
4 moderate to vigorous physical activity were important findings. The fact that the delivery staff were
5 from the local Pakistani women's own community contributed to recruitment and engagement of
6 the participants. The opportunity for Pakistani women to participate in culturally acceptable social
7 engagement in a proactively healthful context may have important health and social benefits in
8 addition to those specifically intended by the intervention. We have described these unanticipated
9 additional effects as 'collateral health and social benefits.' These collateral benefits are: a potential
10 positive impact on the women's own psychological health including reduction in feelings of isolation
11 and depression; improved knowledge and confidence with which to fulfil their perceived role as
12 having responsibility for providing healthy food for their families and thus encouraging healthy
13 lifestyles in their children; and an ethos of tolerance for the range of different cultural variation
14 within local groups of women.
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23 **Strengths and limitations**

24 This qualitative study was conducted quite early in the life of the intervention programme, when the
25 women had been involved in the intervention for less than six months. It was not clear whether early
26 enthusiasm for the intervention would be sustained. The interviews were conducted in English,
27 which was not the participants' first language. Although participants could all speak some English
28 and were able to translate for each other to an extent, the accuracy of these translations remains
29 unclear. The small group, mostly dyadic, format for conducting the interviews, and the fact that they
30 took place alongside intervention sessions that the women would usually be attending, facilitated
31 study engagement. The disadvantage of this was that the interview rooms were not very quiet and
32 so some of the recordings were difficult for the staff undertaking the transcriptions. We were able to
33 call on an experienced staff team to ensure the transcriptions were as accurate as possible. The
34 interview arrangements were made by the intervention delivery staff, which could mean some bias
35 in the choice of respondents, although we accessed women from different areas of the town and we
36 were aware of a diverse range of cultural differences among Pakistani women who participated. The
37 researcher who conducted the interviews was not Pakistani and only spoke English; however, the
38 interviewees were open and friendly, keen to communicate their views and to do so in a way that
39 could be understood beyond their cultural group. The group of women who took part in the
40 interview study were aged from 27 years to 45 years and most were under 40 years of age. This is
41 the younger age range of the typical target population for T2D prevention. We do not know how
42 effective the intervention will be in attracting older women. There was some suggestion that these
43 younger women might recruit older relations to take part in the intervention and it will be valuable
44 to assess the recruitment age profile over time.
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Comparison with other studies and implications

The NICE guidance for risk identification and provision of preventive interventions for high-risk individuals included recommendations for adults aged 25 to 39 of South Asian ethnicity, who are not included in the NHS Health Checks programme.[1] The findings from a recent National Institute for Health Research (NIHR) Health Technology Assessment evidence synthesis confirmed the importance of adapting health promotion interventions for ethnic minority communities and suggested that adaptation decisions should be based on detailed understanding of the target community.[16] Our plans for the adaptation of the NLNY intervention [10 24] to engage people from the local ethnic minority communities were therefore appropriate. The service commissioners took the lead in convening an operational group that included representation from the evaluation team. The commissioners were able to expand existing community links. Members of the local ethnic minority communities were invited to a dissemination seminar that was arranged to promote the NLNY intervention in its original format and invite interest in the adaptation.

In the interview study reported here we sought to explore Pakistani female participants' views and we were able to draw on information from our qualitative process evaluation within the original NLNY intervention.[9] As we experienced with the original NLNY intervention, community based recruitment was successful. The benefit of community based recruitment procedures was also experienced in the PODOSA trial.[7] The adapted NLNY intervention was unusual in being provided through a CIC.[25] It was evident that some of the women interviewed knew the intervention providers and that this positively affected their confidence and decision to participate.

The social support engendered by the nature of the intervention was evident, as it was in the original NLNY intervention, and this reflects the more general literature around social support and behaviour change.[26] The social needs of this specific participant group were of paramount importance for their engagement and confidence to become involved in the intervention. The provision of occasional female only sessions in local authority leisure centres does not constitute ideal provision of appropriate facilities. However, in this feasibility phase the provision of staff training so that women from the Pakistani community could conduct physical activity sessions in appropriate and convenient community venues, including school premises, was of immediate importance for the continued intervention delivery.

The identification of beneficial effects on other aspects of participants' own health that may result from their participation in physical activity intervention delivered in social groups and the 'spill over' effects of health promotion on other family members is supported by other evidence. [27-30] This additional benefit may have importance for health economic evaluation of interventions designed to

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3 promote increased physical activity, especially where these are delivered to groups that are
4 organised to promote social support networks.
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7 **Unanswered questions and future research**

8 The feasibility study of the adapted version of the NLNY intervention, which was planned to better
9 engage members of the local ethnic minority communities, is on-going and we plan to analyse the
10 outcomes at 12 months follow-up. This feasibility study, together with our previous work relating to
11 the original NLNY intervention[8] and the related qualitative studies[9] will inform plans for
12 optimisation of the intervention and for definitive evaluation of the NLNY intervention for
13 effectiveness and cost effectiveness.
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21 **Acknowledgements**

22 We thank the participants in the adapted version of the New life, New you intervention, particularly
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24 including NHS health promotion staff and intervention delivery staff, especially Claire Robinson and
25 Shazia Noor.
26
27

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29 Integral to the London 2012 Olympic and Paralympic Games was the aspiration that the Games
30 would encourage more people across the UK to participate in physical activity. In the North East of
31 England this Olympics vision and the regional health strategy provided the foundation for the 'New
32 life, New you' intervention that was originally funded as a 2012 Olympic Legacy Project by a
33 consortium including: Sport England, Middlesbrough Council, Middlesbrough Primary Care Trust, the
34 North East Strategic Health Authority. The adapted version of the New life, New you intervention
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36 Primary Care Trust.
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46 above named funders or UKCRC.
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50 **Abbreviations**

51 CIC Community Interest Company

52
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54 FINDRISC Finnish Diabetes Risk Score

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57 IMD UK Government Statistics index of multiple deprivation
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1
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3 NICE UK National Institute for Health and Care Excellence

4
5 NLNY 'New life, New you' intervention

6
7 T2D Type 2 diabetes

8
9 TDF Theoretical Domains Framework of behaviour change

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11 REPS UK Register of exercise professionals

12 13 **Authors' contributions**

14 MW was a member of the Steering Group responsible securing funding and for the outline plan for
15 the original NLNY intervention and evaluation. LP contributed to the development of the NLNY pilot
16 intervention and designed the feasibility evaluation. Adaptation of the NLNY intervention was later
17 planned to better engage local ethnic minority communities. This interview study was planned by LP
18 as part of the evaluation of the adapted NLNY intervention. LP conducted the interviews. FFS, SUD
19 and MW provided advice on the analysis. LP conducted the preliminary analysis which was then
20 discussed and agreed with SUD. MW, FFS and SUD, reviewed, and contributed to the manuscript
21 drafted by LP. All authors read and agreed the final version.
22
23

24 25 **Competing interests**

26 The business case and outline plan for the original 'New life, New you' study was determined by a
27 steering committee. This included representatives from members of the organisations that
28 comprised the funding consortium as well as the Principal Investigator for the evaluation, co-author
29 MW. The detailed development of the intervention was then progressed by a small operational team
30 including the evaluation researcher, co-author LP. The adapted version of the New life, New you
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34 Society that provide open access funding for the publication. The authors declare that they have no
35 other competing interests.
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39 40 **Data sharing**

41 There is no additional data available

42 43 **References**

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45 high risk. 2012. <http://guidance.nice.org.uk/PH38> (accessed 17/09/2013).
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Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:

Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
<i>Personal Characteristics</i>		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	6
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	6
3. Occupation	What was their occupation at the time of the study?	6
4. Gender	Was the researcher male or female?	6
5. Experience and training	What experience or training did the researcher have?	6
<i>Relationship with participants</i>		
6. Relationship established	Was a relationship established prior to study commencement?	6
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	6
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	6
Domain 2: study design		
<i>Theoretical framework</i>		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	6
<i>Participant selection</i>		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	6
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	6
12. Sample size	How many participants were in the study?	7
13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A
<i>Setting</i>		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	6
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	6
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	7

1	<i>Data collection</i>		
2	17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	6
3	18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	No
4	19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	6
5	20. Field notes	Were field notes made during and/or after the inter view or focus group?	6
6	21. Duration	What was the duration of the inter views or focus group?	6
7	22. Data saturation	Was data saturation discussed?	No
8	23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No
9			
10	Domain 3: analysis and findings		
11	<i>Data analysis</i>		
12	24. Number of data coders	How many data coders coded the data?	7
13	25. Description of the coding tree	Did authors provide a description of the coding tree?	7
14	26. Derivation of themes	Were themes identified in advance or derived from the data?	7
15	27. Software	What software, if applicable, was used to manage the data?	7
16	28. Participant checking	Did participants provide feedback on the findings?	No
17			
18	<i>Reporting</i>		
19	29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	8 - 15
20	30. Data and findings consistent	Was there consistency between the data presented and the findings?	N/A
21	31. Clarity of major themes	Were major themes clearly presented in the findings?	8 - 15
22	32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	N/A

Once you have completed this checklist, please save a copy and upload it as part of your submission. When requested to do so as part of the upload process, please select the file type: *Checklist*. You will NOT be able to proceed with submission unless the checklist has been uploaded. Please DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

BMJ Open

PERSPECTIVES OF UK PAKISTANI WOMEN ON THEIR BEHAVIOUR CHANGE TO PREVENT TYPE 2 DIABETES: QUALITATIVE STUDY USING THE THEORY DOMAIN FRAMEWORK

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Keywords:	General diabetes < DIABETES & ENDOCRINOLOGY, PREVENTIVE MEDICINE, PUBLIC HEALTH, QUALITATIVE RESEARCH, HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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4 **PERSPECTIVES OF UK PAKISTANI WOMEN ON THEIR BEHAVIOUR CHANGE TO**
5 **PREVENT TYPE 2 DIABETES: QUALITATIVE STUDY USING THE THEORY DOMAIN**
6 **FRAMEWORK**
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9
10 Linda Penn,^{1,2} Stephan U Dombrowski,³ Falko F Sniehotta,^{1,2} Martin White^{1,2}

11
12 ¹ Institute of Health and Society, Newcastle University, Baddiley Clark Building, Richardson
13 Road, Newcastle upon Tyne, NE2 4AX, UK.

14
15 ² Fuse, UKCRC Centre for Translational Research in Public Health

16
17 ³ School of Natural Sciences, Division of Psychology, University of Stirling, FK9 4LA
18
19
20
21
22
23

24 Linda Penn, Research Associate (corresponding author): linda.penn@ncl.ac.uk

25
26
27 Stephan U Dombrowski, Lecturer in Health Psychology: s.u.dombrowski@stir.ac.uk

28
29
30 Falko F Sniehotta, Reader in Health Psychology: falko.sniehotta@ncl.ac.uk

31
32 Martin White, Professor of Public Health: martin.white@ncl.ac.uk
33

34 **Key Words**

35 Behaviour change

36 Community

37 Cultural adaptation

38 Ethnicity

39 Intervention

40 Type 2 diabetes

41 Intervention

42 Pakistani

43 Physical activity

44 Prevention

45 South Asian

46 Qualitative

47 **Word count = words**
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ABSTRACT

Background

Type 2 diabetes (T2D) is a debilitating disease, highly prevalent in UK South Asians, and preventable by lifestyle intervention. The 'New life, New you' (NLNY) physical activity (PA) and dietary intervention for T2D prevention was culturally adapted to better engage minority ethnic populations and tested for feasibility.

Objectives

To investigate Pakistani women participants' perspectives of their behaviour change and of salient intervention features.

Setting

A community based eight-week programme of group delivered PA sessions with behavioural counselling and dietary advice, culturally adapted for ethnic minority populations, in an area of socioeconomic deprivation. Participants to NLNY were recruited through screening events in community venues across the town.

Participants

Interviews were conducted with twenty Pakistani women NLNY participants, aged 26-45 (mean 33.5) years, from different parts of town.

Results

Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified the importance of social factors relating to participants' own PA and dietary behaviour change. We also identified cross-cutting themes as collateral benefits of the intervention including: participants' 'psychological health'; 'responsibility' (for others' health, especially family members included in the new PA and diet regimes); and 'inclusion' (an ethos of accommodating differences).

Conclusions

Our findings suggest that culturally adapted interventions for Pakistani women at risk of T2D, delivered via group PA sessions with counselling and dietary advice, may encourage their PA and dietary behaviour change, and have collateral health and social benefits. The NLNY intervention appeared to be acceptable. We plan to evaluate recruitment, retention and likely effect of the intervention on participant behaviour prior to definitive evaluation.

ARTICLE SUMMARY

Article focus

The 'New life, New you' lifestyle intervention for diabetes prevention was culturally adapted for local Pakistani women and tested for feasibility. In an interview study we sought intervention participants' perspectives:

- On their behaviour change
- On the intervention procedures and cultural adaptations

Key messages

- We identified the importance of several social factors, relating to participants' engagement in the intervention and their physical activity and dietary behaviour change
- Participants reported intervention benefits regarding their psychological health and positive affect
- Participants expressed responsibility for improving their family's lifestyle and the intention to apply learning from the intervention

Strengths and limitations

This qualitative study:

- Highlighted cultural adaptations needed to engage Pakistani women in a lifestyle intervention
- Identified unanticipated intervention benefits
- Was limited by data collection early in the intervention timescale and the small study size

BACKGROUND

Type 2 diabetes (T2D) is a debilitating disease that carries an increased risk of eye, kidney, nerve, and vascular disease with decreased life expectancy.[1] Prevalence of T2D is greater in UK residents of ethnic minority heritage than in the general UK population and the disease often occurs at an earlier age in these population groups.[2 3] Although there is good research evidence for the efficacy of lifestyle interventions for prevention of T2D,[4 5] translation of such evidence to service provision remains challenging. [6 7] The UK National Institute for Health and Care Excellence (NICE) guidance for risk identification and preventive interventions for high-risk individuals was published in July 2012.[1] This NICE guidance addresses the need to provide services, including risk assessment for those aged 25 to 39 who are not included in the National Health Service (NHS) Health Checks programme. The need to provide risk assessment and preventive opportunities for younger adults is particularly relevant for ethnic minorities.[1]

The 'New life, New you' (NLNY) intervention for primary prevention of T2D was developed in Middlesbrough and has to date been evaluated through a feasibility study.[10-12] According to UK government statistics, Middlesbrough ranks as one of the ten most deprived areas in England based on the index of multiple deprivation (IMD) ranks of localities defined as lower super output areas (LSOA) within the town.[13] The original NLNY intervention primarily targeted middle and older aged adults in low income groups, priority groups identified using market segmentation of the Sport England Active People survey.[14] The NLNY intervention was designed to be delivered in leisure and community settings and to recruit participants directly from the community, rather than relying on a health services referral route. Recruits to the NLNY intervention were assessed for individual risk of future T2D, using the Finnish diabetes risk score (FINDRISC).[15] The NLNY intervention promoted increased physical activity, healthy eating and weight loss, in line with the UK National Institute for Health and Care Excellence (NICE) guidance. The intervention was delivered through an eight week programme of weekly supervised physical activity sessions, each followed by reflection, behavioural counselling and advice,[16] with ongoing support and follow-up assessment at six and 12 months. Details of the original NLNY intervention feasibility study has been published.[10 12]

In Middlesbrough minority ethnic communities comprise about 9% of the total population. The South Asian community is well established in the town and in 2011 comprised about 6.1 % of the total population (8461 of a total population of 138,700).[17] Most of the South Asians in Middlesbrough are of Pakistani heritage, although there are also people of Indian and Bangladeshi heritage. Other ethnic groups in Middlesbrough include Black African and Chinese communities.

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3 Although participants from ethnic minorities were not excluded from the original NLNY intervention,
4 few were recruited. To better engage members of the local ethnic minority communities, we
5 planned a cultural adaptation of the NLNY intervention.[18 19] The feasibility study for the adapted
6 NLNY intervention is on-going. We are collecting recruitment data, including ethnicity and outcome
7 data comprising weight and waist measurements along with self-report data on PA, diet, and quality
8 of life at six and 12 months of follow-up in a before and after study.
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13 Recruitment of South Asian participants to preventive interventions has proved difficult.[8] We
14 anticipated that the cultural needs of Muslim women might deter their engagement in PA unless
15 these needs were recognised and addressed. In this paper, we report a qualitative interview study
16 that was conducted as part of the feasibility and acceptability evaluation of the adapted NLNY
17 intervention, in line with the MRC guidance for the development and evaluation of complex
18 interventions to improve health.[20] Women from the Pakistani community were early recruits to
19 the adapted NLNY programme and this interview study was conducted at an early stage of the
20 programme. We aimed to investigate Pakistani Women's perspectives of their behaviour change and
21 salient features of the culturally adapted NLNY programme. We planned this investigation, along
22 with other outcomes of the feasibility study, to subsequently inform the optimisation of the
23 intervention via discussion with the commissioners. This feasibility assessment will also inform
24 future options for a definitive evaluation of the adapted NLNY programme.
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33 **METHODS**

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35 To develop the adapted intervention and its evaluation the NHS commissioners convened an
36 operational group that included community health champions as well as health and fitness workers.
37 The adapted NLNY intervention was informed by mapping the distribution of ethnic minority
38 communities within the Local Authority area, followed by stakeholder consultations. The project
39 delivery was managed by an NHS health improvement specialist. One adaptation of the NLNY
40 intervention specifically targeted Pakistani women. As anticipated, and confirmed in stakeholder
41 consultations, the main concern for local Pakistani women was the availability of culturally
42 appropriate services.[21] Thus the need for single sex PA group sessions was of paramount
43 importance in adapting the NLNY intervention for this population.
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51 **Intervention**

52 The intervention that was provided for the Pakistani women was delivered through a Community
53 Interest Company (CIC). The CIC was founded and registered by three local women (two of Pakistani
54 and one of Arabic heritage) who are directors of the company (NUR FITNESS CIC registration number
55 08143445 <http://www.bis.gov.uk/cicregulator>). The intervention was delivered by one CIC founder
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3 member, who recruited other local Pakistani women to assist with intervention delivery. These
4 women received training to qualify as fitness trainers or in some cases training to deliver the
5 nutritional aspects of the intervention. The researcher and the project manager also provided
6 training for the delivery staff that was specific to the NLNY intervention, including data collection
7 procedures, use of behavioural change techniques and information regarding the relevant NICE
8 guidance [1]. The NHS commissioners provided funding and facilitated these training opportunities.
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13 Participants were recruited to the adapted NLNY intervention for Pakistani women through women-
14 only assessment events that were organised by the project manager in consultation with the
15 intervention delivery staff and community health champions (members of the community who have
16 received training to promote health messages locally). These events took place in community venues
17 in the areas of the town partly populated by the Pakistani community. Initial individual risk
18 assessment was based on FINDRISC scores. [15] [22] Other data were collected at the assessment
19 events, including self-report PA and dietary data. Follow-up assessments, as part of the service
20 delivery and feasibility evaluation, were planned at six and 12 months.
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27 Women recruited to the intervention took part in an eight week programme of weekly sessions,
28 delivered to groups of between 10 and 20 women. The sessions and comprised approximately 60
29 minutes of supervised group PA followed by 30 minutes of reflection and advice centred on dietary
30 information and action planning. Participant received a booklet, written in English that included
31 information, goal setting and action planning prompts with space for recording their progress. The
32 information provided about a healthy diet was specifically tailored to the participant group,
33 incorporating their preferred foods and cooking styles. The participants were also able to access
34 additional PA sessions at different times of the week, delivered by the same provider (NUR FITNESS
35 CIC). These additional sessions were made available to participants both alongside and following the
36 eight week course. These sessions were provided at no cost to the participants for up to six months
37 and later at low cost. Most of the activity sessions were delivered in community halls, including
38 school halls. In the early stages of the programme the women had access to a community gym,
39 where their exclusive use was assured for some mornings, but this facility was later closed.
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49 The provider ensured that information about different sessions was easily available and regularly
50 updated. This was facilitated via a social networking page (i.e. Facebook) that the provider initiated;
51 others relied on text messages, also from the provider, or accessed information by keeping in touch
52 with other women participants.
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Design and participants

We obtained ethical approval for the study from Newcastle University Ethics Committee (Number 0447). All participants received information and gave written informed consent prior to taking part in the feasibility study and the interview study separately.

For the qualitative interview study we purposively sampled participants to ensure representation from the three different areas of the town where early recruitment and intervention delivery took place. The interviews were scheduled early in the feasibility study, shortly after the first groups of women, all of whom were Pakistani, had completed their eight week intervention programmes. The NLNY evaluation team did not have access to participant contact details so the interview invitations and arrangements were made by the intervention delivery staff following guidance from the research team. The researcher who conducted the interviews did not know any of the participants prior to the interviews. Our previous work [11] and the Theoretical Domains Framework (TDF), [23] a framework that groups component constructs from relevant behavioural theories into theoretical domains, were used to inform the topic guide for this study. The topic guide was refined as the interviews progressed.

Data collection

Group interviews involving two or at most three participants were planned to encourage participation and these were conducted in English language by the female researcher (LP, MSc, Research Associate). Resources for an interpreter were not available. The interviews were conducted in the community venues where the participants attended their PA sessions and were conducted in parallel with on-going sessions although always in a separate room. Interviews lasted between 60 and 75 minutes. As in previous work, [11] we allowed flexibility within the areas outlined in the topic guide and the women were encouraged to report what mattered to them. Active listening with prompts was employed to provide clarification and improve insight. Notes were made of related topics introduced by the participants and the topic guide was developed as the interviews progressed. All interviews were audio-recorded and transcribed, as close to verbatim as possible by staff in the Institute of Health and Society at Newcastle University who have transcription expertise.

Analysis

We used the Framework approach [24] for data analysis. Transcripts were read, checked, and imported into NVivo V9 [25] to facilitate coding. The themes emerging from the data were first classified according to the *a priori* theoretical domains identified from the TDF and included in the topic guide as: intentions and goals; reinforcement; knowledge; nature of the activity; social role and identity; social influences; capabilities and skills; behavioural regulation and decision; emotion; and

environment. LP performed the initial classification according to the TDF themes and these were then checked by SUD, differences being resolved through discussion. The use of NVivo software and the TDF defined *a priori* categories facilitated the analysis and promoted familiarisation with the data. Further analysis of the data within each of the theoretical domains, and reference to an empirical phenomenology approach, [26] which is primarily about retaining the appreciation of the respondents' subjective world, led to the identification and agreement of cross cutting constructs.

RESULTS

We conducted nine interviews (seven dyad interviews and two interviews with groups of three participants). All 20 interview participants were recruited from among the first 78 female Pakistani intervention recruits in three areas of the town (Breckon Hill, Abingdon and Green Lane), with ages ranging from 26 to 45 years and a mean of 33.5 years. For this group of interview participants, their baseline risk of future T2D based on FINDRISC score ranged from 11 to 22 with a mean score of 15. Their English Index of Multiple Deprivation (IMD) scores, an ecological, composite measure based on routinely available data in seven categories of deprivation at the Lower Super Output Area (LSOA): a small administrative area with a population of about 1500) of residence from provided post-codes, ranged from 11 to 78 with a mean IMD score of 43 (which ranks among the most deprived English quintile). Details of participant characteristics are shown in Table 1.

Some women were less confident in their use of English language than others and the women tended to organise themselves so that the interview groups included at least one participant who was confident in her own ability to express herself in English. Sometimes the women would converse briefly between themselves in their first language to check their use of English. Those who were more confident tended to speak more, although this was sometimes to clarify what the other person had said for the benefit of the researcher, who only spoke English. Quotes are assigned to groups (Table 1) and where group discussion is reported we have used numerals (i, ii) to identify different speakers.

Table 1: Participant baseline variables: group means

Group identifier	Number in the group	Age (years)	FINDRISC score	IMD score *
A	2	33	20	46
B	2	30	12.5	52
C	2	31	13	78
D	3	35	15	69
E	2	36	13	20.5

F	2	40	14.5	37
G	3	32	14	18
H	2	29	14.5	29.6
I	2	45	17	34.5
All participants	20	34	15	43

* a higher score indicates a higher level of deprivation

Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified and analysed the anticipated theme relating to participants' own PA and dietary behaviours. We also identified three further cross-cutting themes which we have grouped as 'collateral health and social benefits'. These three composite themes related to participants' perspectives of (1) their psychological health, (2) their family role and responsibility for the health of others, and (3) an ethos of inclusion and accommodation of differences.

Participants own physical activity and dietary behaviours

Intentions and goals

Health concerns were frequently stated as a reason for taking part in the intervention and associated with an appreciation of the opportunity afforded by the availability of this intervention programme. There was an understanding of the increased diabetes risk associated with Asian ethnicity as described by one woman,

'I just about got myself motivated that it's for health reasons ... especially with the diabetes... we as Asians, we get diabetes.' (Group I).

Occasionally less explicitly health associated reasons would be mentioned such as,

'Because we will gonna be like fit and we are gonna be smart and look nice.' (Group C)

The intervention documentation was organised by the provider to promote action planning. Participants were encouraged to write an action plan for themselves for the next week (such as drink a glass of water instead of a fizzy drink at lunchtime). This planning was recalled as explained in this quotation,

'Every week we give a self-challenge, we are not going to do this, we are not going to eat this, we are going to eat something else.' (Group C).

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3 More generally goal setting was closely related to being part of the group and the need to engage
4 with group activities,
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6
7 *'We have to go to the classes: we try our best to go to classes.'* (Group A).
8

9 **Reinforcement**

10 Most of the reinforcement centred on feedback from other people, especially others in the group,
11 for example,
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14
15 *'It was pointed out that I was getting more defined on my waist and that was like really brilliant.*

16
17 *It was a great motivator.'* (Group F)
18

19 **Knowledge**

20 Tailoring of dietary advice was much appreciated. There was frequent reporting of quantities of oil
21 and salt to include in making home cooked curries, often introduced with an air of disbelief
22 regarding how much oil and salt they had previously added to cooked food. They appreciated advice
23 to reduce these quantities gradually so that the change in taste was less obvious, but they explained
24 that as they became used to the different tastes they even preferred them.
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29 Perhaps surprisingly the risk effect of family history needed clarification, as explained here,
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32 *'I know my uncle in Pakistani, he's got diabetes and his leg is quite bad actually. I didn't know, I*
33 *didn't realise I would be at risk, because he's an uncle, he's not my dad and then it was quite a bit*
34 *of a shock when they said no actually he's part of your family.'* (Group E).
35
36

37 **Nature of the activity, capabilities and skills**

38 There was a range of experience within this group of women. Many were quite new to the physical
39 activities that were presented in the programme and were gradually attuned to them by the
40 trainers, as explained by one woman,
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45 *'They proper explain it, they do exercise and they keep telling us as well both ways.'* (Group A)
46

47 Generally the opportunity to participate in PA was valued and the women were pleased with what
48 they had achieved. One woman described her effort and the beneficial effects she felt,
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51 *'Trust me when I do work-out I'll be drenched, you know, and there's lots of ladies that really put*
52 *the effort in, but it's like built your confidence.'* (Group G).
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Social role and identity, and Social influences

These domains were particularly important for this group of Pakistani women and additionally contribute to the cross-cutting collateral benefits that we identified (detailed below). The women were mostly homemakers and mothers and often described themselves in relation to this role,

'You put yourself back and you give your children more.' (Group F).

The social responsibility to provide hospitality was sometimes seen as detrimental to their progress in achieving a healthy lifestyle,

'I have to buy some unhealthy foods in, just because it's the norm, people expect something like that on the table and what happens is, if I bought it in I'll end up eating it myself.' (Group F).

There was an expectation that the CIC providers would understand and accept the social and cultural issues that were pertinent to this participant group, because the delivery staff themselves were from the Muslim community as described by one woman,

'Because she's [trainer] Asian as well, she knows how to change basically, she knows the things that Asians ...whereas English people have different diet to what Asians do, our diet is totally different, whereas she helped us a lot by telling us small changes that we could make in our daily intake of food and the like type of cooking that we could do.'

The appreciation of the efforts that were being made by the CIC providers who were known to many of the women participants was evident. This was described by one interviewee,

'I think [they are] helping our Asian community ladies, especially the oldies to come out [of the house]. ... They give her [the trainer] blessing.' (Group D).

Recruitment by word of mouth was emphasised; people described how they had been encouraged to come by reassurance from those already engaged in the programme such as:

'Friends are like encouraging you. 'no you have to come, you have to come,' just it helps socialising and get out as well, because you don't realise you can get out,' (Group G), and *' it really helps to have someone saying actually it's ok to come,'* (Group B).

The women also described how later on they themselves had encouraged others and become 'champions' in promoting the intervention,

'And then after I tell them it's really nice, come you see, it's really, really nice' (Group B).

Regulation and decision

Regulation centred on attending the PA sessions, where prompts to attend were naturally provided as part of the women's usual routine. For example after taking the children to school the women could attend a session in an adjacent community venue.

'Every Monday we go, [to the activity session] like half nine till half ten,' (Group C).

With regard to diet there was some appreciation of the need for portion size control, for example by using a smaller plate. Sweet fizzy drinks were perceived as addictive, therefore difficult to regulate and better avoided. The dietary advice offered included information about reading food labels, which was reported as helpful for making decisions about food choices. The fact that some sweet foods, specifically intended for Asian festivals, did not have nutrition labels was mentioned by some of the women participants.

Emotion

Worry about the risk of diabetes, because of family members with the disease, and concern for relatives already suffering from diabetic complications was often mentioned, sometimes with regret for those who had not been able to make beneficial lifestyle changes. Retinopathy was specifically mentioned where it had affected younger aged relatives to the detriment of their quality of life.

There was also some mention of possible embarrassment about going to the gym, described as,

'Making a fool of myself,' (Group E)

In contrast the enjoyment experienced by participating in the activity sessions was often mentioned.

'We have a good laugh and we have good things.'(Group C)

But then the time flies by, you don't realised where the time has gone and you had a workout, but you had a laugh.' (Group E)

It's the motivation of seeing each other and as well as having a laugh, you enjoy your time here.'
(Group B)

Environment

The main environmental issue, as anticipated for this population group, was the provision of a female only facility. This is a broader criterion than just a single room, for example in a leisure centre, set aside for an hour. This requirement includes access to changing and toilet facilities with reassurance that the area would be securely restricted to women during the sessions and no man

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3 would accidentally just walk in. There were also environmental issues of concern around the cold
4 weather and the cost of attending sessions (once the free and subsidised period had expired).
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7 *'It's so cold. At the moment I've stopped walking because it's cold. (Group A)*

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9 *'In the park all friends go together but sometimes I said I don't want to go 'it's too cold' (Group D)*

10
11 *'You have to look at it from the financial point of view, how much is the charge going to be? If I*
12 *want to come three times a week how much is that going to be? (Group F)*

13
14
15 *'Everything is expensive nowadays, just your basic household things cost an arm and a leg, so*
16 *money is a big issue, but I think just for fitness the prices that they've got now are reasonable'*
17
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19 *(Group H)*

20 21 **Collateral health and social benefits**

22 23 **Psychological health**

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25 Participants' perspectives of their psychological health involve sub-themes relating to, 'safety and
26 freedom' (cultural acceptance and feeling comfortable) and 'positive affect' (feeling happier, less
27 isolated, and not depressed).
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31 Reference to Islamic culture used in engagement strategies was influential, as described by one
32 participant,
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34
35 *'The advert [Radio Ramadan] was talking Islamic, like people in Islam history, the women. In*
36 *those days women were like quite fit and strong and they had to be and that's what got me in [to*
37 *the programme] (Group D).*

38
39
40 Similar references were used by the community provider during the sessions and contributed to the
41 perspectives of cultural acceptance that made the women comfortable,
42
43

44
45 *'You know the instructor... and sometimes they talk in our own language and we just do jokes.'*
46
47 *(Group A)*

48
49 Feeling safe and comfortable was a regular and much emphasised theme, as described clearly by
50 members of one group,
51

52
53 *'i) It's easy for me to say, 'I'm going to a ladies only gym, there's no men there,' and I know there*
54 *will be no disapproval from the male side of our family.*

55
56 *ii) I felt like the whole mental pressure was lifted because I could justify to anyone that I am in an*
57 *entirely female environment.*
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3 *i) He [husband] is in the mind that my wife is in a safe environment. ii) It is completely peaceful in*
4 *mind. (Group F)*
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7 The relief from anxiety was expressed by one participant as,

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9 *'You can just do exercise, you are not like wary - is anyone [male] suddenly going to walk through*
10 *the door.'* (Group D)
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13 Other aspects of feeling safe were about confidence to exercise. For example,

14
15 *'That's what they teach you, 'listen to your own body', whatever your body allows you go to that*
16 *speed and level. With me being a blood pressure patient..... Absolutely I found no fear, no worry*
17 *and I was in a good safe environment.'* (Group F).
18
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21 The purposeful social grouping appeared to promote greater confidence within participants'
22 perceived role: as described by one woman when talking about cooking for the family,
23

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25 *'if you are the main cook then it's part of your role, if you got the knowledge [re: healthy food*
26 *choices] (Group G)*
27
28

29 Another woman talked about cooking for her husband,

30
31 *'When I go home I say, 'I'm going to cook and you are going to eat, this is how I am going to*
32 *cook.' Husband was a bit like, you know, like it is -isn't it? 'Ah, you are not going to cook like that?'*
33 *'Oh yes I am, but it will taste nice.'* (Group F).
34
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36

37 There were also explicit references to depression such as,

38
39 *'She [relative] spent time at home a lot and I think a lot of depression got to her'* (Group E)
40
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42 Two women in another group discussed depression in relation to the intervention and the difference
43 participation in a social and active group made to them in comparison to their previous behaviours.
44

45
46 *'i) If you stay home all day obviously it's different isn't it? I was very, very lazy. I didn't used to go*
47 *out. I just used to stay at home all the time.*
48

49 *ii) Watch TV.*

50
51 *i) Watch TV and just do the housework and just eat. Sit down in one place. So now I am very*
52 *active. This year we got the choice to get depressed or to go out and get fresh'. (Group A).*
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Family role and responsibility for the health of others

The women's pivotal role within the family as the main cook was perceived as conveying a responsibility for their family's health that was often explained such as,

'We have responsibility, we doing the shopping, we bring all the best things back for them' (Group D).

In relation to this there were clear statements that the knowledge and support the women had received through the programme would empower them to make healthy changes for their own benefit with the added consequence of influencing other family and community members. One person clearly spoke about this as:

'By educating the women I think what you are doing is you are empowering the women to sort of make decisions, informed decisions 'cos they know that, 'this is right', this is wrong'. Then they are in turn helping their younger, and extended elders.' (Group F)

Similarly another woman described how her perception of responsibility had changed,

'Now I go outside [of the house, to the sessions] I know what to do to my child you see. I want to give good things you know.' (Group D)

A description of specific changes was supplied by another group,

'We have stopped biscuits, we stopped cakes, we stopped crisps, we stopped everything, even we stopped white bread as well, we start brown bread and everything like brown rice.'

This confidence to change extended to encouraging their children to exercise and even jokingly to the possibility that they might influence their husbands as explained in discussion with laughter by one group,

*'i) 'I wanna send mine [husband].
ii) Yeah, I said to mine, 'Get out there'.
i) They are jealous wasn't it, looking at us, and now, 'Look we [imagining husbands' speaking] need to work out.' (Group G).*

There was also an appreciation by the women of the way their own health would impact on others as explained in the following,

'I'm the one that makes – does everything, if for some reason my health suffers then everyone else in our family suffers.' (Group E)

An ethos of inclusion and accommodation of differences

The Pakistani women within this group had a range of faith related preferences. A particular example was that some women did not want to participate in activities that involved music and the other women in the activity group were encouraged, by the trainer, to respect and accommodate these wishes so the issue was resolved. This issue and its resolution were reported by one or two groups,

'Then [the trainer] said, 'No, they don't like music on' then [everyone] agree as well. They said, 'Oh you are so kind, because we don't like music.' (Group C).

Although this intervention targeted ethnic minority participants, the additional PA sessions run by the community provider were open to other paying customers and attracted a few of the local women from the white population, who were welcomed as described by one woman,

'Four white women were there and we had such a laugh with them as well, you know trying to speak our lingo and we were like, we tried like, the one that do speak English they are trying to say their words... we are having a laugh and everything' (Group E).

This inclusivity was similarly described by another group,

*' i) The more the merrier and I think as long as it is women only it doesn't matter what ethnicity or what race or what age, we don't care .
ii) I'm sure women from non-Muslim background they will probably feel intimidated by gyms anyway and they might find coming to a women only gym- Wow this is great!'* (Group F).

The women themselves even encouraged wider participation,

'I've been recommending it to lots of Asians [and] English ladies, because they [all] like Bollywood music don't they?' (Group G).

The appreciation of issues that would be common to all women was described by one group member as,

'When women work together from different cultures we all find that we have the same fears, the same sort of issues about our bodies and how we want to look better'(Group F) .

DISCUSSION

Main findings

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3 The NLNY intervention is unusual in being centred on group delivered PA sessions. The Pakistani
4 women's appreciation of the opportunity to engage in group delivered PA sessions in a culturally
5 appropriate and socially supportive environment was an important finding. This qualitative study
6 suggests that provision of culturally appropriate PA sessions will facilitate the engagement of
7 Pakistani women and encourage their PA and dietary behaviour change. The study results emphasise
8 the importance of social influences and the women's own perceived social role and identity for
9 intervention development. The fact that the delivery staff were from the local Pakistani women's
10 own community contributed to recruitment and engagement of the participants.

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17 The engagement of Pakistani women in this culturally acceptable, social and proactively healthful
18 context may have important health and social benefits in addition to those specifically intended by
19 the intervention. We have described these unanticipated additional effects as 'collateral health and
20 social benefits' and they comprise: a potential positive impact on the women's own psychological
21 health including reduction in feelings of isolation and depression; improved knowledge and
22 confidence with which to fulfil their perceived role as having responsibility for providing healthy food
23 for their families and thus encouraging healthy lifestyles in their children; and an ethos of
24 accommodation for the range of different cultural variation within local groups of women.

25 26 27 28 29 30 31 **Strengths and limitations**

32 This qualitative study was conducted quite early in the life of the intervention programme, when the
33 women had been involved in the intervention for less than six months. It was not clear whether early
34 enthusiasm for the intervention would be sustained. The interviews were conducted in English,
35 which was not the participants' first language. Although participants could all speak some English
36 and were able to translate for each other to an extent, the accuracy of these translations remains
37 unclear. The small group, mostly dyadic, format for conducting the interviews, and the fact that they
38 took place alongside intervention sessions that the women would usually be attending, facilitated
39 study engagement. The disadvantage of this was that the interview rooms were not very quiet and
40 so some of the recordings were difficult for the staff undertaking the transcriptions. We were able to
41 call on an experienced staff team to ensure the transcriptions were as accurate as possible. The
42 interview arrangements were made by the intervention delivery staff, which could mean some bias
43 in the choice of respondents, although we accessed women from different areas of the town and we
44 were aware of a diverse range of cultural differences among Pakistani women who participated. The
45 researcher who conducted the interviews was not Pakistani and only spoke English; however, the
46 interviewees were open and friendly, keen to communicate their views and to do so in a way that
47 could be understood beyond their cultural group. The group of women who took part in the
48 interview study were aged from 27 years to 45 years and most were under 40 years of age. This is
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3 the younger age range of the typical target population for T2D prevention. We do not know how
4 effective the intervention will be in attracting older women. There was some suggestion that these
5 younger women might recruit older relations to take part in the intervention and it will be valuable
6 to assess the recruitment age profile over time.
7
8

9 10 **Comparison with other studies and implications**

11 The NICE guidance for risk identification and provision of preventive interventions for high-risk
12 individuals included recommendations for adults aged 25 to 39 of South Asian ethnicity, who are not
13 included in the NHS Health Checks programme.[1] The findings from a recent National Institute for
14 Health Research (NIHR) Health Technology Assessment evidence synthesis confirmed the
15 importance of adapting health promotion interventions for ethnic minority communities and
16 suggested that adaptation decisions should be based on detailed understanding of the target
17 community.[18] Our plans for the adaptation of the NLNY intervention [12 27] to engage people
18 from the local ethnic minority communities were therefore appropriate. The service commissioners
19 took the lead in convening an operational group that included representation from the evaluation
20 team. The commissioners were able to expand existing community links. Members of the local
21 ethnic minority communities were invited to a dissemination seminar that was arranged to promote
22 the NLNY intervention in its original format and invite interest in the adaptation.
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32 In the interview study reported here we sought to explore Pakistani female participants' views and
33 we were able to draw on information from our qualitative evaluation within the original NLNY
34 intervention.[11] As we experienced with the original NLNY intervention, community based
35 recruitment was successful. The benefit of community based recruitment procedures was also
36 experienced in the PODOSA trial.[9] The adapted NLNY intervention was unusual in being provided
37 through a CIC.[28] It was evident that some of the women interviewed knew the intervention
38 providers and that this positively affected their confidence and decision to participate.
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44 The social support engendered by the nature of the intervention was evident, as it was in the
45 original NLNY intervention, and this reflects the more general literature around social support and
46 behaviour change.[29] The social needs of this specific participant group to undertake various
47 physical activities were of paramount importance for their engagement and confidence to become
48 involved in the intervention. Whereas other interventions may be counselling based, NLNY
49 incorporates group delivered PA in a central role. The provision of occasional female only sessions in
50 local authority leisure centres does not constitute ideal provision of appropriate facilities (for
51 example if the toilets are in common areas). In this feasibility phase the provision of staff training so
52 that women from the Pakistani community could conduct PA sessions in appropriate and convenient
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3 community venues, including school premises, was of immediate importance for the continued
4 intervention delivery.
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7 The identification of beneficial effects on other aspects of participants' own health that may result
8 from their participation in PA intervention delivered in social groups and the 'spill over' effects of
9 health promotion on other family members is supported by other evidence. [30-33] This additional
10 benefit may have importance for health economic evaluation of interventions designed to promote
11 increased PA, especially where these are delivered to groups that are organised to promote social
12 support networks.
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16 17 **Unanswered questions and future research**

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19 The feasibility study of the adapted version of the NLNY intervention, which was planned to better
20 engage members of the local ethnic minority communities, is on-going and we plan to analyse the
21 recruitment, retention and outcomes at 12 months follow-up by sex and ethnic group. The entire
22 feasibility study, together with our previous work relating to the original NLNY intervention[10] and
23 the related qualitative studies, including the interview study reported here, [11] will inform plans for
24 optimisation of the intervention and options for definitive evaluation of the NLNY intervention for
25 effectiveness and cost effectiveness.
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35 those who gave their time for these interviews. We thank the project implementation team
36 including NHS health promotion staff and intervention delivery staff, especially Claire Robinson and
37 Shazia Noor.
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39

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41 Integral to the London 2012 Olympic and Paralympic Games was the aspiration that the Games
42 would encourage more people across the UK to participate in physical activity. In the North East of
43 England this Olympics vision and the regional health strategy provided the foundation for the 'New
44 life, New you' intervention that was originally funded as a 2012 Olympic Legacy Project by a
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54 necessarily those of the above named funders or UKCRC.
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Abbreviations

CIC Community Interest Company

FINDRISC Finnish Diabetes Risk Score

IMD UK Government Statistics index of multiple deprivation

NICE UK National Institute for Health and Care Excellence

NLNY 'New life, New you' intervention

T2D Type 2 diabetes

TDF Theoretical Domains Framework of behaviour change

REPS UK Register of exercise professionals

Authors' contributions

MW was a member of the Steering Group responsible securing funding and for the outline plan for the original NLNY intervention and evaluation. LP contributed to the development of the NLNY pilot intervention and designed the feasibility evaluation. Adaptation of the NLNY intervention was later planned to better engage local ethnic minority communities. This interview study was planned by LP as part of the evaluation of the adapted NLNY intervention. LP conducted the interviews. FFS, SUD and MW provided advice on the analysis. LP conducted the preliminary analysis which was then discussed and agreed with SUD. MW, FFS and SUD, reviewed, and contributed to the manuscript drafted by LP. All authors read and agreed the final version.

Competing interests

The business case and outline plan for the original 'New life, New you' study was determined by a steering committee. This included representatives from members of the organisations that comprised the funding consortium as well as the Principal Investigator for the evaluation, co-author MW. The detailed development of the intervention was then progressed by a small operational team including the evaluation researcher, co-author LP. The adapted version of the New life, New you intervention was funded by Middlesbrough PCT. The funders had no role in the collection, analysis, and interpretation of data, the writing of the article and a decision to submit it for publication. Co-authors: MW, FS, SD and LP receive salaries from Newcastle University, Institute of Health and Society that provide open access funding for the publication. The authors declare that they have no other competing interests.

Data sharing

No additional data available

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4 **PERSPECTIVES OF UK PAKISTANI WOMEN ON THEIR BEHAVIOUR CHANGE TO**
5 **PREVENT TYPE 2 DIABETES: QUALITATIVE STUDY USING THE THEORY DOMAIN**
6 **FRAMEWORK**
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10 Linda Penn,^{1,2} Stephan U Dombrowski,³ Falko F Sniehotta,^{1,2} Martin White^{1,2}

11
12 ¹ Institute of Health and Society, Newcastle University, Baddiley Clark Building, Richardson
13 Road, Newcastle upon Tyne, NE2 4AX, UK.
14

15
16 ² Fuse, UKCRC Centre for Translational Research in Public Health
17

18
19 ³ School of Natural Sciences, Division of Psychology, University of Stirling, FK9 4LA
20
21

22
23
24 Linda Penn, Research Associate (corresponding author): linda.penn@ncl.ac.uk
25

26
27 Stephan U Dombrowski, Lecturer in Health Psychology: s.u.dombrowski@stir.ac.uk
28

29
30 Falko F Sniehotta, Reader in Health Psychology: falko.sniehotta@ncl.ac.uk
31

32
33 Martin White, Professor of Public Health: martin.white@ncl.ac.uk
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35 **Key Words**

36 Behaviour change

37 Community

38 Cultural adaptation

39 Ethnicity

40 Intervention

41 Type 2 diabetes

42 Intervention

43 Pakistani

44 Physical activity

45 Prevention

46 South Asian

47 Qualitative

48 **Word count = words**
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ABSTRACT

Background

Type 2 diabetes (T2D) is a debilitating disease, highly prevalent in UK South Asians, and preventable by lifestyle intervention. The 'New life, New you' (NLNY) physical activity (PA) and dietary intervention for T2D prevention was culturally adapted to better engage minority ethnic populations and tested for feasibility.

Objectives

To investigate Pakistani women participants' perspectives of their behaviour change and of salient intervention features.

Setting

A community based eight-week programme of group delivered PA sessions with behavioural counselling and dietary advice, culturally adapted for ethnic minority populations, in an area of socioeconomic deprivation. Participants to NLNY were recruited through screening events in community venues across the town.

Participants

Participants Interviews were conducted with twenty Pakistani women NLNY participants, aged 26-45 (mean 33.5) years, from different parts of town.

Results

Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified the importance of social factors relating to participants' own PA and dietary behaviour change. We also identified cross-cutting themes as collateral benefits of the intervention including: participants' 'psychological health'; 'responsibility' (for others' health, especially family members included in the new PA and diet regimes); and 'inclusion' (an ethos of accommodating differences).

Conclusions

Our findings suggest that culturally adapted interventions for Pakistani women at risk of T2D, delivered via group PA sessions with counselling and dietary advice, may encourage their PA and dietary behaviour change, and have collateral health and social benefits. The NLNY intervention appeared to be acceptable. We plan to evaluate recruitment, retention and likely effect of the intervention on participant behaviour prior to definitive evaluation.

ARTICLE SUMMARY

Article focus

The 'New life, New you' lifestyle intervention for diabetes prevention was culturally adapted for local Pakistani women and tested for feasibility. In an interview study we sought intervention participants' perspectives:

- On their behaviour change
- On the intervention procedures and cultural adaptations

Key messages

- We identified the importance of several social factors, relating to participants' engagement in the intervention and their physical activity and dietary behaviour change
- Participants reported intervention benefits regarding their psychological health and positive affect
- Participants expressed responsibility for improving their family's lifestyle and the intention to apply learning from the intervention

Strengths and limitations

This qualitative study:

- Highlighted cultural adaptations needed to engage Pakistani women in a lifestyle intervention
- Identified unanticipated intervention benefits
- Was limited by data collection early in the intervention timescale and the small study size

BACKGROUND

Type 2 diabetes (T2D) is a debilitating disease that carries an increased risk of eye, kidney, nerve, and vascular disease with decreased life expectancy.[1] Prevalence of T2D is greater in UK residents of ethnic minority heritage than in the general UK population and the disease often occurs at an earlier age in these population groups.[2 3] Although there is good research evidence for the efficacy of lifestyle interventions for prevention of T2D,[4 5] translation of such evidence to service provision remains challenging. [6 7] The UK National Institute for Health and Care Excellence (NICE) guidance for risk identification and preventive interventions for high-risk individuals was published in July 2012.[1] This NICE guidance addresses the need to provide services, including risk assessment for those aged 25 to 39 who are not included in the National Health Service (NHS) Health Checks

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3 programme. The need to provide risk assessment and preventive opportunities for younger adults is
4 particularly relevant for ethnic minorities.[1]

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7 The 'New life, New you' (NLNY) intervention for primary prevention of T2D was developed in
8 Middlesbrough and has to date been evaluated through a feasibility study.[10-12] According to UK
9 government statistics, Middlesbrough ranks as one of the ten most deprived areas in England based
10 on the index of multiple deprivation (IMD) ranks of localities defined as lower super output areas
11 (LSOA) within the town.[13] The original NLNY intervention primarily targeted middle and older aged
12 adults in low income groups, priority groups identified using market segmentation of the Sport
13 England Active People survey.[14] The NLNY intervention was designed to be delivered in leisure and
14 community settings and to recruit participants directly from the community, rather than relying on a
15 health services referral route. Recruits to the NLNY intervention were assessed for individual risk of
16 future T2D, using the Finnish diabetes risk score (FINDRISC).[15] The NLNY intervention promoted
17 increased physical activity, healthy eating and weight loss, in line with the UK National Institute for
18 Health and Care Excellence (NICE) guidance. The intervention was delivered through an eight week
19 programme of weekly supervised physical activity sessions, each followed by reflection, behavioural
20 counselling and advice,[16] with ongoing support and follow-up assessment at six and 12 months.
21 Details of the original NLNY intervention feasibility study has been published.[10 12]

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24 In Middlesbrough minority ethnic communities comprise about 9% of the total population. The
25 South Asian community is well established in the town and in 2011 comprised about 6.1 % of the
26 total population (8461 of a total population of 138,700).[17] Most of the South Asians in
27 Middlesbrough are of Pakistani heritage, although there are also people of Indian and Bangladeshi
28 heritage. Other ethnic groups in Middlesbrough include Black African and Chinese communities.

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31 Although participants from ethnic minorities were not excluded from the original NLNY intervention,
32 few were recruited. To better engage members of the local ethnic minority communities, we
33 planned a cultural adaptation of the NLNY intervention.[18 19] The feasibility study for the adapted
34 NLNY intervention is on-going. We are collecting recruitment data, including ethnicity and outcome
35 data comprising weight and waist measurements along with self-report data on PA, diet, and quality
36 of life at six and 12 months of follow-up in a before and after study.

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39 Recruitment of South Asian participants to preventive interventions has proved difficult.[8] We
40 anticipated that the cultural needs of Muslim women might deter their engagement in PA unless
41 these needs were recognised and addressed. In this paper, we report a qualitative interview study
42 that was conducted as part of the feasibility and acceptability evaluation of the adapted NLNY
43 intervention, in line with the MRC guidance for the development and evaluation of complex
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3 interventions to improve health.[20] Women from the Pakistani community were early recruits to
4 the adapted NLNY programme and this interview study was conducted at an early stage of the
5 programme. We aimed to investigate Pakistani Women's perspectives of their behaviour change and
6 salient features of the culturally adapted NLNY programme. We planned this investigation, along
7 with other outcomes of the feasibility study, to subsequently inform the optimisation of the
8 intervention via discussion with the commissioners. This feasibility assessment will also inform
9 future options for a definitive evaluation of the adapted NLNY programme.
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14 15 METHODS

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17 To develop the adapted intervention and its evaluation the NHS commissioners convened an
18 operational group that included community health champions as well as health and fitness workers.
19 The adapted NLNY intervention was informed by mapping the distribution of ethnic minority
20 communities within the Local Authority area, followed by stakeholder consultations. The project
21 delivery was managed by an NHS health improvement specialist. One adaptation of the NLNY
22 intervention specifically targeted Pakistani women. As anticipated, and confirmed in stakeholder
23 consultations, the main concern for local Pakistani women was the availability of culturally
24 appropriate services.[21] Thus the need for single sex PA group sessions was of paramount
25 importance in adapting the NLNY intervention for this population.
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32 Intervention

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34 The intervention that was provided for the Pakistani women was delivered through a Community
35 Interest Company (CIC). The CIC was founded and registered by three local women (two of Pakistani
36 and one of Arabic heritage) who are directors of the company (NUR FITNESS CIC registration number
37 08143445 <http://www.bis.gov.uk/cicregulator>). The intervention was delivered by one CIC founder
38 member, who recruited other local Pakistani women to assist with intervention delivery. These
39 women received training to qualify as fitness trainers or in some cases training to deliver the
40 nutritional aspects of the intervention. The researcher and the project manager also provided
41 training for the delivery staff that was specific to the NLNY intervention, including data collection
42 procedures, use of behavioural change techniques and information regarding the relevant NICE
43 guidance [1]. The NHS commissioners provided funding and facilitated these training opportunities.
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51 Participants were recruited to the adapted NLNY intervention for Pakistani women through women-
52 only assessment events that were organised by the project manager in consultation with the
53 intervention delivery staff and community health champions (members of the community who have
54 received training to promote health messages locally). These events took place in community venues
55 in the areas of the town partly populated by the Pakistani community. Initial individual risk
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3 assessment was based on FINDRISC scores. [15] [22] Other data were collected at the assessment
4 events, including self-report PA and dietary data. Follow-up assessments, as part of the service
5 delivery and feasibility evaluation, were planned at six and 12 months.
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9 Women recruited to the intervention took part in an eight week programme of weekly sessions,
10 delivered to groups of between 10 and 20 women. The sessions and comprised approximately 60
11 minutes of supervised group PA followed by 30 minutes of reflection and advice centred on dietary
12 information and action planning. Participant received a booklet, **written in English** that included
13 information, goal setting and action planning prompts with space for recording their progress. The
14 information provided about a healthy diet was specifically tailored to the participant group,
15 incorporating their preferred foods and cooking styles. The participants were also able to access
16 additional PA sessions at different times of the week, delivered by the same provider **(NUR FITNESS
17 CIC)**. These additional sessions were made available to participants both alongside and following the
18 eight week course. These sessions were provided at no cost to the participants for up to six months
19 and later at low cost. Most of the activity sessions were delivered in community halls, including
20 school halls. In the early stages of the programme the women had access to a community gym,
21 where their exclusive use was assured for some mornings, but this facility was later closed.
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30 The provider ensured that information about different sessions was easily available and regularly
31 updated. This was facilitated via a social networking page (i.e. Facebook) that the provider initiated;
32 others relied on text messages, also from the provider, **or accessed information by keeping in touch
33 with other women participants.**
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38 **Design and participants**

39 We obtained ethical approval for the study from Newcastle University Ethics Committee **(Number
40 0447)**. All participants received information and gave written informed consent prior to taking part
41 in the feasibility study and the interview study separately.
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45 For the qualitative interview study we purposively sampled participants to ensure representation
46 from the three different areas of the town where early recruitment and intervention delivery took
47 place. The interviews were scheduled **early in the feasibility study**, shortly after the first groups of
48 women, **all of whom were Pakistani**, had completed their eight week intervention programmes. The
49 NLNY evaluation team did not have access to participant contact details so the interview invitations
50 and arrangements were made by the intervention delivery staff following guidance from the
51 research team. The researcher who conducted the interviews did not know any of the participants
52 prior to the interviews. Our previous work [11] and the Theoretical Domains Framework (TDF), [23] a
53 framework that groups component constructs from relevant behavioural theories into theoretical
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3 domains, were used to inform the topic guide for this study. The topic guide was refined as the
4 interviews progressed.
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7 **Data collection**

8 Group interviews involving two or at most three participants were planned to encourage
9 participation and these were conducted in English language by the female researcher (LP, MSc,
10 Research Associate). Resources for an interpreter were not available. The interviews were
11 conducted in the community venues where the participants attended their PA sessions and were
12 conducted in parallel with on-going sessions although always in a separate room. Interviews lasted
13 between 60 and 75 minutes. As in previous work,[11] we allowed flexibility within the areas outlined
14 in the topic guide and the women were encouraged to report what mattered to them. Active
15 listening with prompts was employed to provide clarification and improve insight. Notes were made
16 of related topics introduced by the participants and the topic guide was developed as the interviews
17 progressed. All interviews were audio-recorded and transcribed, as close to verbatim as possible by
18 staff in the Institute of Health and Society at Newcastle University who have transcription expertise.
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27 **Analysis**

28 We used the Framework approach[24] for data analysis. Transcripts were read, checked, and
29 imported into NVivo V9 [25] to facilitate coding. The themes emerging from the data were first
30 classified according to the *a priori* theoretical domains identified from the TDF and included in the
31 topic guide as: intentions and goals; reinforcement; knowledge; nature of the activity; social role and
32 identity; social influences; capabilities and skills; behavioural regulation and decision; emotion; and
33 environment. LP performed the initial classification according to the TDF themes and these were
34 then checked by SUD, differences being resolved through discussion. The use of NVivo software and
35 the TDF defined *a priori* categories facilitated the analysis and promoted familiarisation with the
36 data. Further analysis of the data within each of the theoretical domains, and reference to an
37 empirical phenomenology approach, [26] which is primarily about retaining the appreciation of the
38 respondents' subjective world, led to the identification and agreement of cross cutting constructs.
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47 **RESULTS**

48 We conducted nine interviews (seven dyad interviews and two interviews with groups of three
49 participants). All 20 interview participants were recruited from among the first 78 female Pakistani
50 intervention recruits in three areas of the town (Breckon Hill, Abingdon and Green Lane), with ages
51 ranging from 26 to 45 years and a mean of 33.5 years. For this group of interview participants, their
52 baseline risk of future T2D based on FINDRISC score ranged from 11 to 22 with a mean score of 15.
53 Their English Index of Multiple Deprivation (IMD) scores, an ecological, composite measure based on
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routinely available data in seven categories of deprivation at the Lower Super Output Area (LSOA): a small administrative area with a population of about 1500) of residence from provided post-codes, ranged from 11 to 78 with a mean IMD score of 43 (which ranks among the most deprived English quintile). Details of participant characteristics are shown in Table 1.

Some women were less confident in their use of English language than others and the women tended to organise themselves so that the interview groups included at least one participant who was confident in her own ability to express herself in English. Sometimes the women would converse briefly between themselves in their first language to check their use of English. Those who were more confident tended to speak more, although this was sometimes to clarify what the other person had said for the benefit of the researcher, who only spoke English. Quotes are assigned to groups (Table 1) and where group discussion is reported we have used numerals (i, ii) to identify different speakers.

Table 1: Participant baseline variables: group means

Group identifier	Number in the group	Age (years)	FINDRISC score	IMD score *
A	2	33	20	46
B	2	30	12.5	52
C	2	31	13	78
D	3	35	15	69
E	2	36	13	20.5
F	2	40	14.5	37
G	3	32	14	18
H	2	29	14.5	29.6
I	2	45	17	34.5
All participants	20	34	15	43

* a higher score indicates a higher level of deprivation

Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified and analysed the anticipated theme relating to participants' own PA and dietary behaviours. We also identified three further cross-cutting themes which we have grouped as 'collateral health and social benefits'. These three composite themes related to participants' perspectives of (1) their psychological health, (2) their family role and

responsibility for the health of others, and (3) an ethos of inclusion and accommodation of differences.

Participants own physical activity and dietary behaviours

Intentions and goals

Health concerns were frequently stated as a reason for taking part in the intervention and associated with an appreciation of the opportunity afforded by the availability of this intervention programme. There was an understanding of the increased diabetes risk associated with Asian ethnicity as described by one woman,

'I just about got myself motivated that it's for health reasons ... especially with the diabetes... we as Asians, we get diabetes.' (Group I).

Occasionally less explicitly health associated reasons would be mentioned such as,

'Because we will gonna be like fit and we are gonna be smart and look nice.' (Group C)

The intervention documentation was organised by the provider to promote action planning. Participants were encouraged to write an action plan for themselves for the next week (such as drink a glass of water instead of a fizzy drink at lunchtime). This planning was recalled as explained in this quotation,

'Every week we give a self-challenge, we are not going to do this, we are not going to eat this, we are going to eat something else.' (Group C).

More generally goal setting was closely related to being part of the group and the need to engage with group activities,

'We have to go to the classes: we try our best to go to classes.' (Group A).

Reinforcement

Most of the reinforcement centred on feedback from other people, especially others in the group, for example,

'It was pointed out that I was getting more defined on my waist and that was like really brilliant. It was a great motivator.' (Group F)

Knowledge

Tailoring of dietary advice was much appreciated. There was frequent reporting of quantities of oil and salt to include in making home cooked curries, often introduced with an air of disbelief

1
2
3 regarding how much oil and salt they had previously added to cooked food. They appreciated advice
4 to reduce these quantities gradually so that the change in taste was less obvious, but they explained
5 that as they became used to the different tastes they even preferred them.
6
7

8 Perhaps surprisingly the risk effect of family history needed clarification, as explained here,
9

10
11 *'I know my uncle in Pakistani, he's got diabetes and his leg is quite bad actually. I didn't know, I*
12 *didn't realise I would be at risk, because he's an uncle, he's not my dad and then it was quite a bit*
13 *of a shock when they said no actually he's part of your family.'* (Group E).
14
15

16 **Nature of the activity, capabilities and skills**

17
18 There was a range of experience within this group of women. Many were quite new to the physical
19 activities that were presented in the programme and were gradually attuned to them by the
20 trainers, as explained by one woman,
21
22

23
24 *'They proper explain it, they do exercise and they keep telling us as well both ways.'* (Group A)
25

26 Generally the opportunity to participate in PA was valued and the women were pleased with what
27 they had achieved. One woman described her effort and the beneficial effects she felt,
28
29

30
31 *'Trust me when I do work-out I'll be drenched, you know, and there's lots of ladies that really put*
32 *the effort in, but it's like built your confidence.'* (Group G).
33

34 **Social role and identity, and Social influences**

35
36 These domains were particularly important for this group of Pakistani women and additionally
37 contribute to the cross-cutting collateral benefits that we identified (detailed below). The women
38 were mostly homemakers and mothers and often described themselves in relation to this role,
39
40

41
42 *'You put yourself back and you give your children more.'* (Group F).
43

44 The social responsibility to provide hospitality was sometimes seen as detrimental to their progress
45 in achieving a healthy lifestyle,
46
47

48
49 *'I have to buy some unhealthy foods in, just because it's the norm, people expect something like*
50 *that on the table and what happens is, if I bought it in I'll end up eating it myself.'* (Group F).
51

52
53 There was an expectation that the CIC providers would understand and accept the social and cultural
54 issues that were pertinent to this participant group, because the delivery staff themselves were from
55 the Muslim community as described by one woman,
56
57
58
59
60

1
2
3 *'Because she's [trainer] Asian as well, she knows how to change basically, she knows the things*
4 *that Asians ...whereas English people have different diet to what Asians do, our diet is totally*
5 *different, whereas she helped us a lot by telling us small changes that we could make in our daily*
6 *intake of food and the like type of cooking that we could do.'*
7
8

9
10 The appreciation of the efforts that were being made by the CIC providers who were known to many
11 of the women participants was evident. This was described by one interviewee,
12

13
14 *'I think [they are] helping our Asian community ladies, especially the oldies to come out [of the*
15 *house]. ... They give her [the trainer] blessing.'* (Group D).
16

17
18 Recruitment by word of mouth was emphasised; people described how they had been encouraged
19 to come by reassurance from those already engaged in the programme such as:
20

21
22 *'Friends are like encouraging you. 'no you have to come, you have to come,' just it helps*
23 *socialising and get out as well, because you don't realise you can get out,'* (Group G), and *' it*
24 *really helps to have someone saying actually it's ok to come,'* (Group B).
25
26

27
28 The women also described how later on they themselves had encouraged others and become
29 'champions' in promoting the intervention,
30

31
32 *'And then after I tell them it's really nice, come you see, it's really, really nice'* (Group B).
33

34 **Regulation and decision**

35
36 Regulation centred on attending the PA sessions, where prompts to attend were naturally provided
37 as part of the women's usual routine. For example after taking the children to school the women
38 could attend a session in an adjacent community venue.
39

40
41 *'Every Monday we go, [to the activity session] like half nine till half ten,'* (Group C).
42
43

44
45 With regard to diet there was some appreciation of the need for portion size control, for example by
46 using a smaller plate. Sweet fizzy drinks were perceived as addictive, therefore difficult to regulate
47 and better avoided. The dietary advice offered included information about reading food labels,
48 which was reported as helpful for making decisions about food choices. The fact that some sweet
49 foods, specifically intended for Asian festivals, did not have nutrition labels was mentioned by some
50 of the women participants.
51
52

53 **Emotion**

54
55 Worry about the risk of diabetes, because of family members with the disease, and concern for
56 relatives already suffering from diabetic complications was often mentioned, sometimes with regret
57
58
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60

1
2
3 for those who had not been able to make beneficial lifestyle changes. Retinopathy was specifically
4 mentioned where it had affected younger aged relatives to the detriment of their quality of life.
5
6

7 There was also some mention of possible embarrassment about going to the gym, described as,
8

9 *'Making a fool of myself,' (Group E)*
10

11 In contrast the enjoyment experienced by participating in the activity sessions was often mentioned.
12

13 *'We have a good laugh and we have good things.'(Group C)*
14

15 *But then the time flies by, you don't realised where the time has gone and you had a workout, but*
16 *you had a laugh.'* (Group E)
17
18

19 *It's the motivation of seeing each other and as well as having a laugh, you enjoy your time here.'*
20
21 (Group B)
22
23

24 **Environment**

25 The main environmental issue, as anticipated for this population group, was the provision of a
26 female only facility. This is a broader criterion than just a single room, for example in a leisure
27 centre, set aside for an hour. This requirement includes access to changing and toilet facilities with
28 reassurance that the area would be securely restricted to women during the sessions and no man
29 would accidentally just walk in. There were also environmental issues of concern around the cold
30 weather and the cost of attending sessions (once the free and subsidised period had expired).
31
32
33
34
35

36 *'It's so cold. At the moment I've stopped walking because it's cold. (Group A)*
37

38 *'In the park all friends go together but sometimes I said I don't want to go 'it's too cold' (Group D)*
39

40 *'You have to look at it from the financial point of view, how much is the charge going to be? If I*
41 *want to come three times a week how much is that going to be? (Group F)*
42

43 *'Everything is expensive nowadays, just your basic household things cost an arm and a leg, so*
44 *money is a big issue, but I think just for fitness the prices that they've got now are reasonable'*
45
46 (Group H)
47
48
49
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51 **Collateral health and social benefits**

52 **Psychological health**

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54
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56
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2
3 Participants' perspectives of their psychological health involve sub-themes relating to, 'safety and
4 freedom' (cultural acceptance and feeling comfortable) and 'positive affect' (feeling happier, less
5 isolated, and not depressed).
6
7

8
9 Reference to Islamic culture used in engagement strategies was influential, as described by one
10 participant,

11
12 *'The advert [Radio Ramadan] was talking Islamic, like people in Islam history, the women. In*
13 *those days women were like quite fit and strong and they had to be and that's what got me in [to*
14 *the programme] (Group D).*
15
16

17
18 Similar references were used by the community provider during the sessions and contributed to the
19 perspectives of cultural acceptance that made the women comfortable,
20

21
22 *'You know the instructor... and sometimes they talk in our own language and we just do jokes.'*
23 *(Group A)*
24
25

26
27 Feeling safe and comfortable was a regular and much emphasised theme, as described clearly by
28 members of one group,
29

30
31 *'i) It's easy for me to say, 'I'm going to a ladies only gym, there's no men there,' and I know there*
32 *will be no disapproval from the male side of our family.*
33

34
35 *ii) I felt like the whole mental pressure was lifted because I could justify to anyone that I am in an*
36 *entirely female environment.*

37
38 *i) He [husband] is in the mind that my wife is in a safe environment. ii) It is completely peaceful in*
39 *mind. (Group F)*
40

41
42 The relief from anxiety was expressed by one participant as,

43
44 *'You can just do exercise, you are not like wary - is anyone [male] suddenly going to walk through*
45 *the door.'* (Group D)
46
47

48
49 Other aspects of feeling safe were about confidence to exercise. For example,

50
51 *'That's what they teach you, 'listen to your own body', whatever your body allows you go to that*
52 *speed and level. With me being a blood pressure patient..... Absolutely I found no fear, no worry*
53 *and I was in a good safe environment.'* (Group F).
54

55
56 The purposeful social grouping appeared to promote greater confidence within participants'
57 perceived role: as described by one woman when talking about cooking for the family,
58
59
60

1
2
3 *'if you are the main cook then it's part of your role, if you got the knowledge [re: healthy food*
4 *choices] (Group G)*

5
6
7 Another woman talked about cooking for her husband,

8
9 *'When I go home I say, 'I'm going to cook and you are going to eat, this is how I am going to*
10 *cook.' Husband was a bit like, you know, like it is -isn't it? 'Ah, you are not going to cook like that?'*
11 *'Oh yes I am, but it will taste nice.'* (Group F).

12
13
14
15 There were also explicit references to depression such as,

16
17 *'She [relative] spent time at home a lot and I think a lot of depression got to her' (Group E)*

18
19
20 Two women in another group discussed depression in relation to the intervention and the difference
21 participation in a social and active group made to them in comparison to their previous behaviours.

22
23
24 *'i) If you stay home all day obviously it's different isn't it? I was very, very lazy. I didn't used to go*
25 *out. I just used to stay at home all the time.*

26
27 *ii) Watch TV.*

28
29 *i) Watch TV and just do the housework and just eat. Sit down in one place. So now I am very*
30 *active. This year we got the choice to get depressed or to go out and get fresh'. (Group A).*

31 32 33 **Family role and responsibility for the health of others**

34 The women's pivotal role within the family as the main cook was perceived as conveying a
35 responsibility for their family's health that was often explained such as,

36
37
38 *'We have responsibility, we doing the shopping, we bring all the best things back for them' (Group*
39 *D).*

40
41
42 In relation to this there were clear statements that the knowledge and support the women had
43 received through the programme would empower them to make healthy changes for their own
44 benefit with the added consequence of influencing other family and community members. One
45 person clearly spoke about this as:

46
47
48
49 *'By educating the women I think what you are doing is you are empowering the women to sort of*
50 *make decisions, informed decisions 'cos they know that, 'this is right', this is wrong'. Then they are*
51 *in turn helping their younger, and extended elders.'* (Group F)

52
53
54
55 Similarly another woman described how her perception of responsibility had changed,

1
2
3 *'Now I go outside [of the house, to the sessions] I know what to do to my child you see. I want*
4 *to give good things you know.'* (Group D)

5
6
7 A description of specific changes was supplied by another group,

8
9 *'We have stopped biscuits, we stopped cakes, we stopped crisps, we stopped everything, even*
10 *we stopped white bread as well, we start brown bread and everything like brown rice.'*

11
12
13 This confidence to change extended to encouraging their children to exercise and even jokingly to
14 the possibility that they might influence their husbands as explained in discussion with laughter
15 by one group,

16
17 *'i) I wanna send mine [husband].*

18
19 *ii) Yeah, I said to mine, 'Get out there'.*

20
21 *i) They are jealous wasn't it, looking at us, and now, 'Look we [imagining husbands' speaking]*
22 *need to work out.'* (Group G).

23
24
25
26 There was also an appreciation by the women of the way their own health would impact on others
27 as explained in the following,

28
29 *'I'm the one that makes – does everything, if for some reason my health suffers then everyone*
30 *else in our family suffers.'* (Group E)

31 32 33 **An ethos of inclusion and accommodation of differences**

34
35 The Pakistani women within this group had a range of faith related preferences. A particular
36 example was that some women did not want to participate in activities that involved music and the
37 other women in the activity group were encouraged, by the trainer, to respect and accommodate
38 these wishes so the issue was resolved. This issue and its resolution were reported by one or two
39 groups,

40
41 *'Then [the trainer] said, 'No, they don't like music on' then [everyone] agree as well. They said,*
42 *'Oh you are so kind, because we don't like music.'* (Group C).

43
44
45 Although this intervention targeted ethnic minority participants, the additional PA sessions run by
46 the community provider were open to other paying customers and attracted a few of the local
47 women from the white population, who were welcomed as described by one woman,

48
49 *'Four white women were there and we had such a laugh with them as well, you know trying to*
50 *speak our lingo and we were like, we tried like, the one that do speak English they are trying to*
51 *say their words... we are having a laugh and everything'* (Group E).

1
2
3 This inclusivity was similarly described by another group,
4

5 *'i) The more the merrier and I think as long as it is women only it doesn't matter what ethnicity or*
6 *what race or what age, we don't care .*

7
8 *ii) I'm sure women from non-Muslim background they will probably feel intimidated by gyms*
9 *anyway and they might find coming to a women only gym- Wow this is great!' (Group F).*
10
11

12 The women themselves even encouraged wider participation,
13

14
15 *'I've been recommending it to lots of Asians [and] English ladies, because they [all] like Bollywood*
16 *music don't they?' (Group G).*
17
18

19 The appreciation of issues that would be common to all women was described by one group
20 member as,
21

22
23 *'When women work together from different cultures we all find that we have the same fears, the*
24 *same sort of issues about our bodies and how we want to look better'(Group F) .*
25
26

27 **DISCUSSION**

28 **Main findings**

29
30 **The NLNY intervention is unusual in being centred on group delivered PA sessions. The Pakistani**
31 **women's appreciation of the opportunity to engage in group delivered PA sessions in a culturally**
32 **appropriate and socially supportive environment was an important finding. This qualitative study**
33 **suggests that provision of culturally appropriate PA sessions will facilitate the engagement of**
34 **Pakistani women and encourage their PA and dietary behaviour change.** The study results emphasise
35 the importance of social influences and the women's own perceived social role and identity for
36 intervention development. The fact that the delivery staff were from the local Pakistani women's
37 own community contributed to recruitment and engagement of the participants.
38
39

40
41 The engagement of Pakistani women in this culturally acceptable, social and proactively healthful
42 context may have important health and social benefits in addition to those specifically intended by
43 the intervention. We have described these unanticipated additional effects as 'collateral health and
44 social benefits' and they comprise: a potential positive impact on the women's own psychological
45 health including reduction in feelings of isolation and depression; improved knowledge and
46 confidence with which to fulfil their perceived role as having responsibility for providing healthy food
47 for their families and thus encouraging healthy lifestyles in their children; and an ethos of
48 **accommodation** for the range of different cultural variation within local groups of women.
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Strengths and limitations

This qualitative study was conducted quite early in the life of the intervention programme, when the women had been involved in the intervention for less than six months. It was not clear whether early enthusiasm for the intervention would be sustained. The interviews were conducted in English, which was not the participants' first language. Although participants could all speak some English and were able to translate for each other to an extent, the accuracy of these translations remains unclear. The small group, mostly dyadic, format for conducting the interviews, and the fact that they took place alongside intervention sessions that the women would usually be attending, facilitated study engagement. The disadvantage of this was that the interview rooms were not very quiet and so some of the recordings were difficult for the staff undertaking the transcriptions. We were able to call on an experienced staff team to ensure the transcriptions were as accurate as possible. The interview arrangements were made by the intervention delivery staff, which could mean some bias in the choice of respondents, although we accessed women from different areas of the town and we were aware of a diverse range of cultural differences among Pakistani women who participated. The researcher who conducted the interviews was not Pakistani and only spoke English; however, the interviewees were open and friendly, keen to communicate their views and to do so in a way that could be understood beyond their cultural group. The group of women who took part in the interview study were aged from 27 years to 45 years and most were under 40 years of age. This is the younger age range of the typical target population for T2D prevention. We do not know how effective the intervention will be in attracting older women. There was some suggestion that these younger women might recruit older relations to take part in the intervention and it will be valuable to assess the recruitment age profile over time.

Comparison with other studies and implications

The NICE guidance for risk identification and provision of preventive interventions for high-risk individuals included recommendations for adults aged 25 to 39 of South Asian ethnicity, who are not included in the NHS Health Checks programme.[1] The findings from a recent National Institute for Health Research (NIHR) Health Technology Assessment evidence synthesis confirmed the importance of adapting health promotion interventions for ethnic minority communities and suggested that adaptation decisions should be based on detailed understanding of the target community.[18] Our plans for the adaptation of the NLNY intervention [12 27] to engage people from the local ethnic minority communities were therefore appropriate. The service commissioners took the lead in convening an operational group that included representation from the evaluation team. The commissioners were able to expand existing community links. Members of the local

1
2
3 ethnic minority communities were invited to a dissemination seminar that was arranged to promote
4 the NLNY intervention in its original format and invite interest in the adaptation.
5
6

7 In the interview study reported here we sought to explore Pakistani female participants' views and
8 we were able to draw on information from our qualitative evaluation within the original NLNY
9 intervention.[11] As we experienced with the original NLNY intervention, community based
10 recruitment was successful. The benefit of community based recruitment procedures was also
11 experienced in the PODOSA trial.[9] The adapted NLNY intervention was unusual in being provided
12 through a CIC.[28] It was evident that some of the women interviewed knew the intervention
13 providers and that this positively affected their confidence and decision to participate.
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18 The social support engendered by the nature of the intervention was evident, as it was in the
19 original NLNY intervention, and this reflects the more general literature around social support and
20 behaviour change.[29] The social needs of this specific participant group to undertake various
21 physical activities were of paramount importance for their engagement and confidence to become
22 involved in the intervention. Whereas other interventions may be counselling based, NLNY
23 incorporates group delivered PA in a central role. The provision of occasional female only sessions in
24 local authority leisure centres does not constitute ideal provision of appropriate facilities (for
25 example if the toilets are in common areas). In this feasibility phase the provision of staff training so
26 that women from the Pakistani community could conduct PA sessions in appropriate and convenient
27 community venues, including school premises, was of immediate importance for the continued
28 intervention delivery.
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38 The identification of beneficial effects on other aspects of participants' own health that may result
39 from their participation in PA intervention delivered in social groups and the 'spill over' effects of
40 health promotion on other family members is supported by other evidence. [30-33] This additional
41 benefit may have importance for health economic evaluation of interventions designed to promote
42 increased PA, especially where these are delivered to groups that are organised to promote social
43 support networks.
44
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48 **Unanswered questions and future research**

49 The feasibility study of the adapted version of the NLNY intervention, which was planned to better
50 engage members of the local ethnic minority communities, is on-going and we plan to analyse the
51 recruitment, retention and outcomes at 12 months follow-up by sex and ethnic group. The entire
52 feasibility study, together with our previous work relating to the original NLNY intervention[10] and
53 the related qualitative studies, including the interview study reported here, [11] will inform plans for
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1
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3 optimisation of the intervention and options for definitive evaluation of the NLNY intervention for
4 effectiveness and cost effectiveness.
5
6
7
8

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38 **Abbreviations**

39 CIC Community Interest Company

40 FINDRISC Finnish Diabetes Risk Score

41 IMD UK Government Statistics index of multiple deprivation

42 NICE UK National Institute for Health and Care Excellence

43 NLNY 'New life, New you' intervention

44 T2D Type 2 diabetes

45 TDF Theoretical Domains Framework of behaviour change

46 REPS UK Register of exercise professionals

47 **Authors' contributions**

48 MW was a member of the Steering Group responsible securing funding and for the outline plan for
49 the original NLNY intervention and evaluation. LP contributed to the development of the NLNY pilot
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3 intervention and designed the feasibility evaluation. Adaptation of the NLNY intervention was later
4 planned to better engage local ethnic minority communities. This interview study was planned by LP
5 as part of the evaluation of the adapted NLNY intervention. LP conducted the interviews. FFS, SUD
6 and MW provided advice on the analysis. LP conducted the preliminary analysis which was then
7 discussed and agreed with SUD. MW, FFS and SUD, reviewed, and contributed to the manuscript
8 drafted by LP. All authors read and agreed the final version.
9
10

11 **Competing interests**

12 The business case and outline plan for the original 'New life, New you' study was determined by a
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22
23
24

25 **Data sharing**

26 There is no additional data available
27
28

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Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:

Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
<i>Personal Characteristics</i>		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	6
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	6
3. Occupation	What was their occupation at the time of the study?	6
4. Gender	Was the researcher male or female?	6
5. Experience and training	What experience or training did the researcher have?	6
<i>Relationship with participants</i>		
6. Relationship established	Was a relationship established prior to study commencement?	6
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	6
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	6
Domain 2: study design		
<i>Theoretical framework</i>		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	6
<i>Participant selection</i>		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	6
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	6
12. Sample size	How many participants were in the study?	7
13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A
<i>Setting</i>		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	6
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	6
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	7

<i>Data collection</i>		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	6
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	No
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	6
20. Field notes	Were field notes made during and/or after the inter view or focus group?	6
21. Duration	What was the duration of the inter views or focus group?	6
22. Data saturation	Was data saturation discussed?	No
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No
Domain 3: analysis and findings		
<i>Data analysis</i>		
24. Number of data coders	How many data coders coded the data?	7
25. Description of the coding tree	Did authors provide a description of the coding tree?	7
26. Derivation of themes	Were themes identified in advance or derived from the data?	7
27. Software	What software, if applicable, was used to manage the data?	7
28. Participant checking	Did participants provide feedback on the findings?	No
<i>Reporting</i>		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	8 - 15
30. Data and findings consistent	Was there consistency between the data presented and the findings?	N/A
31. Clarity of major themes	Were major themes clearly presented in the findings?	8 - 15
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	N/A

Once you have completed this checklist, please save a copy and upload it as part of your submission. When requested to do so as part of the upload process, please select the file type: *Checklist*. You will NOT be able to proceed with submission unless the checklist has been uploaded. Please DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

BMJ Open

PERSPECTIVES OF UK PAKISTANI WOMEN ON THEIR BEHAVIOUR CHANGE TO PREVENT TYPE 2 DIABETES: QUALITATIVE STUDY USING THE THEORY DOMAIN FRAMEWORK

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4 **PERSPECTIVES OF UK PAKISTANI WOMEN ON THEIR BEHAVIOUR CHANGE TO**
5 **PREVENT TYPE 2 DIABETES: QUALITATIVE STUDY USING THE THEORY DOMAIN**
6 **FRAMEWORK**
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10 Linda Penn,^{1,2} Stephan U Dombrowski,³ Falko F Sniehotta,^{1,2} Martin White^{1,2}

11
12 ¹ Institute of Health and Society, Newcastle University, Baddiley Clark Building, Richardson
13 Road, Newcastle upon Tyne, NE2 4AX, UK.

14
15
16 ² Fuse, UKCRC Centre for Translational Research in Public Health

17
18
19 ³ School of Natural Sciences, Division of Psychology, University of Stirling, FK9 4LA
20

21
22
23
24 Linda Penn, Research Associate (corresponding author): linda.penn@ncl.ac.uk

25
26
27 Stephan U Dombrowski, Lecturer in Health Psychology: s.u.dombrowski@stir.ac.uk

28
29
30 Falko F Sniehotta, Reader in Health Psychology: falko.sniehotta@ncl.ac.uk

31
32 Martin White, Professor of Public Health: martin.white@ncl.ac.uk
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34 **Key Words**

35 Behaviour change

36 Community

37 Cultural adaptation

38 Ethnicity

39 Intervention

40 Type 2 diabetes

41 Intervention

42 Pakistani

43 Physical activity

44 Prevention

45 South Asian

46 Qualitative

47 **Word count = words**
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ABSTRACT

Background

Type 2 diabetes (T2D) is a debilitating disease, highly prevalent in UK South Asians, and preventable by lifestyle intervention. The 'New life, New you' (NLNY) physical activity (PA) and dietary intervention for T2D prevention was culturally adapted to better engage minority ethnic populations and tested for feasibility.

Objectives

To investigate Pakistani women participants' perspectives of their behaviour change and of salient intervention features.

Setting

A community based eight-week programme of group delivered PA sessions with behavioural counselling and dietary advice, culturally adapted for ethnic minority populations, in an area of socioeconomic deprivation. Participants to NLNY were recruited through screening events in community venues across the town.

Participants

Interviews were conducted with twenty Pakistani women NLNY participants, aged 26-45 (mean 33.5) years, from different parts of town.

Results

Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified the importance of social factors relating to participants' own PA and dietary behaviour change. We also identified cross-cutting themes as collateral benefits of the intervention including: participants' 'psychological health'; 'responsibility' (for others' health, especially family members included in the new PA and diet regimes); and 'inclusion' (an ethos of accommodating differences).

Conclusions

Our findings suggest that culturally adapted interventions for Pakistani women at risk of T2D, delivered via group PA sessions with counselling and dietary advice, may encourage their PA and dietary behaviour change, and have collateral health and social benefits. The NLNY intervention appeared to be acceptable. We plan to evaluate recruitment, retention and likely effect of the intervention on participant behaviour prior to definitive evaluation.

ARTICLE SUMMARY

Article focus

The 'New life, New you' lifestyle intervention for diabetes prevention was culturally adapted for local Pakistani women and tested for feasibility. In an interview study we sought intervention participants' perspectives:

- On their behaviour change
- On the intervention procedures and cultural adaptations

Key messages

- We identified the importance of several social factors, relating to participants' engagement in the intervention and their physical activity and dietary behaviour change
- Participants reported intervention benefits regarding their psychological health and positive affect
- Participants expressed responsibility for improving their family's lifestyle and the intention to apply learning from the intervention

Strengths and limitations

This qualitative study:

- Highlighted cultural adaptations needed to engage Pakistani women in a lifestyle intervention
- Identified unanticipated intervention benefits
- Was limited by data collection early in the intervention timescale and the small study size

BACKGROUND

Type 2 diabetes (T2D) is a debilitating disease that carries an increased risk of eye, kidney, nerve, and vascular disease with decreased life expectancy.[1] Prevalence of T2D is greater in UK residents of ethnic minority heritage than in the general UK population and the disease often occurs at an earlier age in these population groups.[2 3] Although there is good research evidence for the efficacy of lifestyle interventions for prevention of T2D,[4 5] translation of such evidence to service provision remains challenging. [6 7] The UK National Institute for Health and Care Excellence (NICE) guidance for risk identification and preventive interventions for high-risk individuals was published in July 2012.[1] This NICE guidance addresses the need to provide services, including risk assessment for those aged 25 to 39 years who are not included in the National Health Service (NHS) Health Checks programme. The need to provide risk assessment and preventive opportunities for - adults younger than those included in the NHS Health checks is particularly relevant for ethnic minorities.[1]

The 'New life, New you' (NLNY) intervention for primary prevention of T2D was developed in Middlesbrough and has to date been evaluated through a feasibility study.[8-10] According to UK government statistics, Middlesbrough ranks as one of the ten most deprived areas in England based on the index of multiple deprivation (IMD) ranks of localities within the town.[11] The original NLNY intervention primarily targeted middle and older aged adults in low income groups, priority groups identified using market segmentation of the Sport England Active People survey.[12] The NLNY intervention was designed to be delivered in leisure and community settings and to recruit participants directly from the community, rather than relying on a health services referral route. Recruits to the NLNY intervention were assessed for individual risk of future T2D, using the Finnish diabetes risk score (FINDRISC).[13] The NLNY intervention promoted increased physical activity, healthy eating and weight loss, in line with the UK National Institute for Health and Care Excellence (NICE) guidance.[1] The intervention was delivered through an eight week programme of weekly supervised physical activity sessions, each followed by reflection, behavioural counselling and advice, with ongoing support and follow-up assessment at six and 12 months.[14] Details of the original NLNY intervention feasibility study has been published.[8 10] We have described the design of the eight week programme in terms of experiential learning, which emphasises the central role of a 'here and now' experience (in this case experience of a physical activity) along with observation and reflection in promoting actions.[14]

In Middlesbrough minority ethnic communities comprise about 9% of the total population. The South Asian community is well established in the town and in 2011 comprised about 6.1 % of the total population (8461 of a total population of 138,700).[15] Most of the South Asians in Middlesbrough are of Pakistani heritage, although there are also people of Indian and Bangladeshi

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3 heritage. Other ethnic groups in Middlesbrough include Black African and Chinese communities.
4 Although participants from ethnic minorities were not excluded from the original NLNY intervention,
5 few were recruited. To better engage members of the local ethnic minority communities, we
6 planned a cultural adaptation of the NLNY intervention. We also extended the age range of people
7 that were eligible for the programme to include adults over 25 years with no upper age limit.[16 17]
8 The feasibility study for the adapted NLNY intervention, for both men and women, is on-going. We
9 are collecting recruitment data, including ethnicity and outcome data comprising weight and waist
10 measurements along with self-report data on PA, diet, and quality of life at six and 12 months of
11 follow-up in a before and after study.
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18 Recruitment of South Asian participants to preventive interventions has proved difficult.[18] We
19 anticipated that the cultural needs of Muslim women might deter their engagement in PA unless
20 these needs were recognised and addressed. In this paper, we report a qualitative interview study
21 that was conducted as part of the feasibility and acceptability evaluation of the adapted NLNY
22 intervention, in line with the MRC guidance for the development and evaluation of complex
23 interventions to improve health.[19] Women from the Pakistani community were early recruits to
24 the adapted NLNY programme and this interview study was conducted at an early stage of the
25 programme. We aimed to investigate Pakistani Women's perspectives of their behaviour change and
26 salient features of the culturally adapted NLNY programme. We planned this investigation, along
27 with other outcomes of the feasibility study, to subsequently inform the optimisation of the
28 intervention via discussion with the commissioners. This feasibility assessment will also inform
29 future options for a definitive evaluation of the adapted NLNY programme.
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38 **METHODS**

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40 To develop the adapted intervention and its evaluation, the NHS commissioners convened an
41 operational group that included community health champions as well as health and fitness workers.
42 The adapted NLNY intervention was informed by mapping the distribution of ethnic minority
43 communities within the Local Authority area, followed by stakeholder consultations. The project
44 delivery was managed by an NHS health improvement specialist. One adaptation of the NLNY
45 intervention specifically targeted Pakistani women. As anticipated, and confirmed in stakeholder
46 consultations, the main concern for local Pakistani women was the availability of culturally
47 appropriate services.[20] Thus the need for single sex PA group sessions was of paramount
48 importance in adapting the NLNY intervention for this population. It was also evident that
49 assessment events would need to be restricted to women only and would need to be conducted in
50 community venues that were convenient and where possible familiar to the women. In addition the
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3 commissioners anticipated that the women might be more likely to respond to trainers who had an
4 appreciation of their Islamic cultural heritage and were able to commission a suitable provider and
5 provide some funding for intervention specific provider training.
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8 **Intervention**

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10 The intervention that was provided for the Pakistani women was delivered through a Community
11 Interest Company (CIC). The CIC was founded and registered by three local women (two of Pakistani
12 and one of Arabic heritage) who are directors of the company (NUR FITNESS CIC registration number
13 08143445 <http://www.bis.gov.uk/cicregulator>). The intervention was delivered by one CIC founder
14 member, who recruited other local Pakistani women to assist with intervention delivery. These
15 women received training to qualify as fitness trainers or in some cases training to deliver the
16 nutritional aspects of the intervention. The researcher and the project manager also provided
17 training for the delivery staff that was specific to the NLNY intervention, including data collection
18 procedures, use of behavioural change techniques and information regarding the relevant NICE
19 guidance [1]. The NHS commissioners provided funding and facilitated these training opportunities.
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23 Participants were recruited to the adapted NLNY intervention for Pakistani women through women-
24 only assessment events that were organised by the project manager in consultation with the
25 intervention delivery staff and community health champions (members of the community who have
26 received training to promote health messages locally). These events took place in community venues
27 in the areas of the town partly populated by the Pakistani community. Initial individual risk
28 assessment was based on FINDRISC scores. [13] [21] Other data were collected at the assessment
29 events, including self-report PA and dietary data. Follow-up assessments, as part of the service
30 delivery and feasibility evaluation, were planned at six and 12 months.
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34 Women recruited to the intervention took part in an eight week programme of weekly sessions,
35 delivered to groups of between 10 and 20 women. The sessions and comprised approximately 60
36 minutes of supervised group PA followed by 30 minutes of reflection and advice centred on dietary
37 information and action planning. Participant received a booklet, written in English that included
38 information, goal setting and action planning prompts with space for recording their progress. The
39 information provided about a healthy diet was specifically tailored to the participant group,
40 incorporating their preferred foods and cooking styles. The participants were also able to access
41 additional PA sessions at different times of the week, delivered by the same provider (NUR FITNESS
42 CIC). These additional sessions were made available to participants both alongside and following the
43 eight week course. These sessions were provided at no cost to the participants for up to six months
44 and later at low cost. Most of the activity sessions were delivered in community halls, including
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3 school halls. In the early stages of the programme the women had access to a community gym,
4 where their exclusive use was assured for some mornings, but this facility was later closed.
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7 The provider ensured that information about different sessions was easily available and regularly
8 updated. This was facilitated via a social networking page (i.e. Facebook) that the provider initiated;
9 others relied on text messages, also from the provider, or accessed information by keeping in touch
10 with other women participants.
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13 **Design and participants**

14 We obtained ethical approval for the study from Newcastle University Ethics Committee (Number
15 0447). All participants received information and gave written informed consent prior to taking part
16 in the feasibility study and the interview study separately.
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20 For the qualitative interview study we purposively sampled participants to ensure representation
21 from the three different areas of the town where early recruitment and intervention delivery took
22 place. The interviews were scheduled early in the feasibility study, shortly after the first groups of
23 women, all of whom were Pakistani, had completed their eight week intervention programmes. The
24 NLNY evaluation team did not have access to participant contact details so the interview invitations
25 and arrangements were made by the intervention delivery staff following guidance from the
26 research team. The researcher who conducted the interviews did not know any of the participants
27 prior to the interviews. Our previous work [9] and the Theoretical Domains Framework (TDF), [22] a
28 framework that groups component constructs from relevant behavioural theories into theoretical
29 domains, were used to inform the topic guide for this study. The topic guide was refined as the
30 interviews progressed.
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40 **Data collection**

41 Group interviews involving two or at most three participants were planned to encourage
42 participation and these were conducted in English language by the female researcher (LP, MSc,
43 Research Associate). Resources for an interpreter were not available. The interviews were
44 conducted in the community venues where the participants attended their PA sessions and were
45 conducted in parallel with on-going sessions although always in a separate room. Interviews lasted
46 between 60 and 75 minutes. As in previous work,[9] we allowed flexibility within the areas outlined
47 in the topic guide and the women were encouraged to report what mattered to them. Active
48 listening with prompts was employed to provide clarification and improve insight. Notes were made
49 of related topics introduced by the participants and the topic guide was developed as the interviews
50 progressed. All interviews were audio-recorded and transcribed, as close to verbatim as possible by
51 staff in the Institute of Health and Society at Newcastle University who have transcription expertise.
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Analysis

We used the Framework approach[23] for data analysis. Transcripts were read, checked, and imported into NVivo V9 [24] to facilitate coding. The themes emerging from the data were first classified according to the *a priori* theoretical domains identified from the TDF and included in the topic guide as: intentions and goals; reinforcement; knowledge; nature of the activity; social role and identity; social influences; capabilities and skills; behavioural regulation and decision; emotion; and environment. LP performed the initial classification according to the TDF themes and these were then checked by SUD, differences being resolved through discussion. The use of NVivo software and the TDF defined *a priori* categories facilitated the analysis and promoted familiarisation with the data. Further analysis of the data within each of the theoretical domains, and reference to an empirical phenomenology approach, [25] which is primarily about retaining the appreciation of the respondents' subjective world, led to the identification and agreement of cross cutting constructs.

RESULTS

We conducted nine interviews (seven dyad interviews and two interviews with groups of three participants). All 20 interview participants were recruited from among the first 78 female Pakistani intervention recruits in three areas of the town (Breckon Hill, Abingdon and Green Lane), with ages ranging from 26 to 45 years and a mean of 33.5 years. For this group of interview participants, their baseline risk of future T2D based on FINDRISC score ranged from 11 to 22 with a mean score of 15. A FINDRISC score of 11 to 14 represents moderate risk, with one in six likely to develop T2D within ten years and a FINDRISC score of 15 to 20 represents high risk with two in six likely to develop T2D within 10 years. The participants' English Index of Multiple Deprivation (IMD) scores, based on their postcodes of residence, ranged from 11 to 78 with a mean IMD score of 43 (which ranks among the most deprived English quintile). IMD scores are an ecological, composite measure based on routinely available data in seven categories of deprivation assessed at the Lower Super Output Area (LSOA): a small administrative area with a population of about 1500. . Details of participant characteristics are shown in Table 1.

Some women were less confident in their use of English language than others and the women tended to organise themselves so that the interview groups included at least one participant who was confident in her own ability to express herself in English. Sometimes the women would converse briefly between themselves in their first language to check their use of English. Those who were more confident tended to speak more, although this was sometimes to clarify what the other person had said for the benefit of the researcher, who only spoke English. Quotes are assigned to groups

(Table 1) and where group discussion is reported we have used numerals (i, ii) to identify different speakers.

Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified and analysed the anticipated themes relating to participants' own PA and dietary behaviours. We also identified three further cross-cutting themes which we have grouped as 'collateral health and social benefits'. These three composite themes related to participants' perspectives of (1) their psychological health, (2) their family role and responsibility for the health of others, and (3) an ethos of inclusion and accommodation of differences.

Table 1: Participant baseline variables: group means

Group identifier	Number in the group	Age (years)	FINDRISC score	IMD score *
A	2	33	20	46
B	2	30	12.5	52
C	2	31	13	78
D	3	35	15	69
E	2	36	13	20.5
F	2	40	14.5	37
G	3	32	14	18
H	2	29	14.5	29.6
I	2	45	17	34.5
All participants	20	34	15	43

* a higher score indicates a higher level of deprivation

Participants own physical activity and dietary behaviours

Intentions and goals

Health concerns were frequently stated as a reason for taking part in the intervention and associated with an appreciation of the opportunity afforded by the availability of this intervention programme. There was an understanding of the increased diabetes risk associated with Asian ethnicity as described by one woman,

'I just about got myself motivated that it's for health reasons ... especially with the diabetes... we as Asians, we get diabetes.' (Group I).

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3 Occasionally less explicitly health associated reasons would be mentioned such as,
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5 *'Because we will gonna be like fit and we are gonna be smart and look nice.'* (Group C)
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8 The intervention documentation was organised by the provider to promote action planning.
9 Participants were encouraged to write an action plan for themselves for the next week (such as drink
10 a glass of water instead of a fizzy drink at lunchtime). This planning was recalled as explained in this
11 quotation,
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14 *'Every week we give a self-challenge, we are not going to do this, we are not going to eat this, we
15 are going to eat something else.'* (Group C).
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18 More generally goal setting was closely related to being part of the group and the need to engage
19 with group activities,
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22 *'We have to go to the classes: we try our best to go to classes.'* (Group A).
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25 **Reinforcement**

26 Most of the reinforcement centred on feedback from other people, especially others in the group,
27 for example,
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30 *'It was pointed out that I was getting more defined on my waist and that was like really brilliant.
31 It was a great motivator.'* (Group F)
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34 **Knowledge**

35 Tailoring of dietary advice was much appreciated. There was frequent reporting of quantities of oil
36 and salt to include in making home cooked curries, often introduced with an air of disbelief
37 regarding how much oil and salt they had previously added to cooked food. They appreciated advice
38 to reduce these quantities gradually so that the change in taste was less obvious, but they explained
39 that as they became used to the different tastes they even preferred them.
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45 Perhaps surprisingly the risk effect of family history needed clarification, as explained here,
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48 *'I know my uncle in Pakistani, he's got diabetes and his leg is quite bad actually. I didn't know, I
49 didn't realise I would be at risk, because he's an uncle, he's not my dad and then it was quite a bit
50 of a shock when they said no actually he's part of your family.'* (Group E).
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53 **Nature of the activity, capabilities and skills**

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3 There was a range of experience within this group of women. Many were quite new to the physical
4 activities that were presented in the programme and were gradually attuned to them by the
5 trainers, as explained by one woman,
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9 *'They proper explain it, they do exercise and they keep telling us as well both ways.'* (Group A)

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11 Generally the opportunity to participate in PA was valued and the women were pleased with what
12 they had achieved. One woman described her effort and the beneficial effects she felt,
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14
15 *'Trust me when I do work-out I'll be drenched, you know, and there's lots of ladies that really put*
16 *the effort in, but it's like built your confidence.'* (Group G).
17

18 19 **Social role and identity, and social influences**

20 These domains were particularly important for this group of Pakistani women and additionally
21 contribute to the cross-cutting collateral benefits that we identified (detailed below). The women
22 were mostly homemakers and mothers and often described themselves in relation to this role,
23
24

25
26 *'You put yourself back and you give your children more.'* (Group F).
27

28
29 The social responsibility to provide hospitality was sometimes seen as detrimental to their progress
30 in achieving a healthy lifestyle,
31

32
33 *'I have to buy some unhealthy foods in, just because it's the norm, people expect something like*
34 *that on the table and what happens is, if I bought it in I'll end up eating it myself.'* (Group F).
35

36
37 There was an expectation that the CIC providers would understand and accept the social and cultural
38 issues that were pertinent to this participant group, because the delivery staff themselves were from
39 the Muslim community as described by one woman,
40
41

42
43 *'Because she's [trainer] Asian as well, she knows how to change basically, she knows the things*
44 *that Asians ...whereas English people have different diet to what Asians do, our diet is totally*
45 *different, whereas she helped us a lot by telling us small changes that we could make in our daily*
46 *intake of food and the like type of cooking that we could do.'*
47
48

49
50 The appreciation of the efforts that were being made by the CIC providers who were known to many
51 of the women participants was evident. This was described by one interviewee,
52

53
54 *'I think [they are] helping our Asian community ladies, especially the oldies to come out [of the*
55 *house]. ... They give her [the trainer] blessing.'* (Group D).
56
57
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3 Recruitment by word of mouth was emphasised; people described how they had been encouraged
4 to come by reassurance from those already engaged in the programme such as:
5
6

7 *'Friends are like encouraging you. 'no you have to come, you have to come,' just it helps*
8 *socialising and get out as well, because you don't realise you can get out,' (Group G), and ' it*
9 *really helps to have someone saying actually it's ok to come,' (Group B).*
10
11

12 The women also described how later on they themselves had encouraged others and become
13 'champions' in promoting the intervention,
14

15 *'And then after I tell them it's really nice, come you see, it's really, really nice' (Group B).*
16
17

18 **Regulation and decision**

19
20 Regulation centred on attending the PA sessions, where prompts to attend were naturally provided
21 as part of the women's usual routine. For example after taking the children to school the women
22 could attend a session in an adjacent community venue.
23
24

25 *'Every Monday we go, [to the activity session] like half nine till half ten,' (Group C).*
26
27

28
29 With regard to diet there was some appreciation of the need for portion size control, for example by
30 using a smaller plate. Sweet fizzy drinks were perceived as addictive, therefore difficult to regulate
31 and better avoided. The dietary advice offered included information about reading food labels,
32 which was reported as helpful for making decisions about food choices. The fact that some sweet
33 foods, specifically intended for Asian festivals, did not have nutrition labels was mentioned by some
34 of the women participants.
35
36
37

38 **Emotion**

39
40 Worry about the risk of diabetes, because of family members with the disease, and concern for
41 relatives already suffering from diabetic complications was often mentioned, sometimes with regret
42 for those who had not been able to make beneficial lifestyle changes. Retinopathy was specifically
43 mentioned where it had affected younger aged relatives to the detriment of their quality of life.
44
45
46

47
48 There was also some mention of possible embarrassment about going to the gym, described as,
49

50 *'Making a fool of myself,' (Group E)*
51
52

53 In contrast the enjoyment experienced by participating in the activity sessions was often mentioned.
54

55 *'We have a good laugh and we have good things.'(Group C)*
56
57
58
59
60

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3 *But then the time flies by, you don't realised where the time has gone and you had a workout, but*
4 *you had a laugh.'* (Group E)

5
6
7 *It's the motivation of seeing each other and as well as having a laugh, you enjoy your time here.'*
8
9 (Group B)

10 11 **Environment**

12 The main environmental issue, as anticipated for this population group, was the provision of a
13 female only facility. This is a broader criterion than just a single room, for example in a leisure
14 centre, set aside for an hour. This requirement includes access to changing and toilet facilities with
15 reassurance that the area would be securely restricted to women during the sessions and no man
16 would accidentally just walk in. There were also environmental issues of concern around the cold
17 weather and the cost of attending sessions (once the free and subsidised period had expired).

18
19
20
21
22
23 *'It's so cold. At the moment I've stopped walking because it's cold.* (Group A)

24
25
26 *'In the park all friends go together but sometimes I said I don't want to go 'it's too cold'* (Group D)

27
28 *'You have to look at it from the financial point of view, how much is the charge going to be? If I*
29 *want to come three times a week how much is that going to be?* (Group F)

30
31
32 *'Everything is expensive nowadays, just your basic household things cost an arm and a leg, so*
33 *money is a big issue, but I think just for fitness the prices that they've got now are reasonable'*
34
35 (Group H)

36 37 38 **Collateral health and social benefits**

39 40 **Psychological health**

41 Participants' perspectives of their psychological health involve sub-themes relating to, 'safety and
42 freedom' (cultural acceptance and feeling comfortable) and 'positive affect' (feeling happier, less
43 isolated, and not depressed).

44
45
46
47 Reference to Islamic culture used in recruitment strategies was influential, as described by one
48 participant,

49
50
51 *'The advert [Radio Ramadan] was talking Islamic, like people in Islam history, the women. In*
52 *those days women were like quite fit and strong and they had to be and that's what got me in [to*
53 *the programme]* (Group D).
54
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3 Similar references were used by the community provider during the sessions and contributed to the
4 engagement strategies. This was reflected in perspectives of cultural acceptance that made the
5 women comfortable,
6
7

8
9 *'You know the instructor... and sometimes they talk in our own language and we just do jokes.'*
10 (Group A)
11

12 Feeling safe and comfortable was a regular and much emphasised theme, as described clearly by
13 members of one group,
14

15
16 *'i) It's easy for me to say, 'I'm going to a ladies only gym, there's no men there,' and I know there*
17 *will be no disapproval from the male side of our family.*
18

19 *ii) I felt like the whole mental pressure was lifted because I could justify to anyone that I am in an*
20 *entirely female environment.*
21

22 *i) He [husband] is in the mind that my wife is in a safe environment. ii) It is completely peaceful in*
23 *mind. (Group F)*
24
25
26

27 The relief from anxiety was expressed by one participant as,
28

29
30 *'You can just do exercise, you are not like wary - is anyone [male] suddenly going to walk through*
31 *the door.'* (Group D)
32
33

34 Other aspects of feeling safe were about confidence to exercise. For example,
35

36
37 *'That's what they teach you, 'listen to your own body', whatever your body allows you go to that*
38 *speed and level. With me being a blood pressure patient..... Absolutely I found no fear, no worry*
39 *and I was in a good safe environment.'* (Group F).
40
41

42 The purposeful social grouping, and the opportunity this presented for women to talk together and
43 support each other appeared to promote greater confidence within participants' perceived role: as
44 described by one woman when talking about cooking for the family,
45
46

47
48 *'if you are the main cook then it's part of your role, if you got the knowledge [re: healthy food*
49 *choices] (Group G)*
50

51 Another woman talked about cooking for her husband,
52

53
54 *'When I go home I say, 'I'm going to cook and you are going to eat, this is how I am going to*
55 *cook.' Husband was a bit like, you know, like it is -isn't it? 'Ah, you are not going to cook like that?'*
56 *'Oh yes I am, but it will taste nice.'* (Group F).
57
58
59
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1
2
3 There were also explicit references to depression and isolation such as,
4

5 *'She [relative] spent time at home a lot and I think a lot of depression got to her' (Group E)*
6
7

8 Contrast was made between this relative's experience and the beneficial effect they perceived
9 through the option to participate in appropriate social meeting.
10

11 Two women in another group discussed depression in explicit relation to the intervention and the
12 difference participation in a social and active group made to them in comparison to their previous
13 behaviours.
14
15

16
17 *'i) If you stay home all day obviously it's different isn't it? I was very, very lazy. I didn't used to go*
18 *out. I just used to stay at home all the time.*
19

20
21 *ii) Watch TV.*

22 *i) Watch TV and just do the housework and just eat. Sit down in one place. So now I am very*
23 *active. This year we got the choice to get depressed or to go out and get fresh'. (Group A).*
24
25

26 Another woman talked about how she had lived in the area for six years, but previous to joining the
27 programme had only known one friend. She explained how she had now been welcomed by the
28 group and how she communicated with other women outside the sessions, such as about transport
29 arrangements to get to classes where needed.
30
31
32

33 **Family role and responsibility for the health of others**

34 The women's pivotal role within the family as the main cook was perceived as conveying a
35 responsibility for their family's health that was often explained such as,
36
37

38
39 *'We have responsibility, we doing the shopping, we bring all the best things back for them' (Group*
40 *D).*
41
42

43 In relation to this there were clear statements that the knowledge and support the women had
44 received through the programme would empower them to make healthy changes for their own
45 benefit with the added consequence of influencing other family and community members. One
46 person clearly spoke about this as:
47
48
49

50
51 *'By educating the women I think what you are doing is you are empowering the women to sort of*
52 *make decisions, informed decisions 'cos they know that, 'this is right', this is wrong'. Then they are*
53 *in turn helping their younger, and extended elders.'* (Group F)
54
55

56 Similarly another woman described how her perception of responsibility had changed,
57
58
59
60

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3 *'Now I go outside [of the house, to the sessions] I know what to do to my child you see. I want*
4 *to give good things you know.'* (Group D)
5
6

7 A description of specific changes was supplied by another group,
8

9 *'We have stopped biscuits, we stopped cakes, we stopped crisps, we stopped everything, even*
10 *we stopped white bread as well, we start brown bread and everything like brown rice.'*
11
12

13 This confidence to change extended to encouraging their children to exercise and even jokingly to
14 the possibility that they might influence their husbands as explained in discussion with laughter
15 by one group,
16
17

18 *'i) I wanna send mine [husband].*
19

20 *ii) Yeah, I said to mine, 'Get out there'.*
21

22 *i) They are jealous wasn't it, looking at us, and now, 'Look we [imagining husbands' speaking]*
23 *need to work out.'* (Group G).
24
25

26 There was also an appreciation by the women of the way their own health would impact on others
27 as explained in the following,
28
29

30 *'I'm the one that makes – does everything, if for some reason my health suffers then everyone*
31 *else in our family suffers.'* (Group E)
32
33

34 **An ethos of inclusion and accommodation of differences**

35 The Pakistani women within this group had a range of faith related preferences. A particular
36 example was that some women did not want to participate in activities that involved music and the
37 other women in the activity group were encouraged, by the trainer, to respect and accommodate
38 these wishes so the issue was resolved. This issue and its resolution were reported by one or two
39 groups,
40
41
42

43 *'Then [the trainer] said, 'No, they don't like music on' then [everyone] agree as well. They said,*
44 *'Oh you are so kind, because we don't like music.'* (Group C).
45
46
47

48 Although this intervention targeted ethnic minority participants, the additional PA sessions run by
49 the community provider were open to other paying customers and attracted a few of the local
50 women from the white population, who were welcomed as described by one woman,
51
52

53 *'Four white women were there and we had such a laugh with them as well, you know trying to*
54 *speak our lingo and we were like, we tried like, the one that do speak English they are trying to*
55 *say their words... we are having a laugh and everything'* (Group E).
56
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3 This inclusivity was similarly described by another group,
4

5 *'i) The more the merrier and I think as long as it is women only it doesn't matter what ethnicity or*
6 *what race or what age, we don't care .*

7
8 *ii) I'm sure women from non-Muslim background they will probably feel intimidated by gyms*
9 *anyway and they might find coming to a women only gym- Wow this is great!' (Group F).*
10
11

12 The women themselves even encouraged wider participation,
13

14
15 *'I've been recommending it to lots of Asians [and] English ladies, because they [all] like Bollywood*
16 *music don't they?' (Group G).*
17
18

19 The appreciation of issues that would be common to all women was described by one group
20 member as,
21

22
23 *'When women work together from different cultures we all find that we have the same fears, the*
24 *same sort of issues about our bodies and how we want to look better'(Group F) .*
25
26

27 **DISCUSSION**

28 **Main findings**

29
30 The NLNY intervention is unusual in being centred on group delivered PA sessions. The Pakistani
31 women's appreciation of the opportunity to engage in group delivered PA sessions in a culturally
32 appropriate and socially supportive environment was an important finding. This qualitative study
33 suggests that provision of culturally appropriate PA sessions will facilitate the engagement of
34 Pakistani women and encourage their PA and dietary behaviour change. The study results emphasise
35 the importance of social influences and the women's own perceived social role and identity for
36 intervention development. The fact that the delivery staff were from the local Pakistani women's
37 own community contributed to recruitment and engagement of the participants.
38
39

40
41 The engagement of Pakistani women in this culturally acceptable, social and proactively healthful
42 context may have important health and social benefits in addition to those specifically intended by
43 the intervention. We have described these unanticipated additional effects as 'collateral health and
44 social benefits' and they comprise: a potential positive impact on the women's own psychological
45 health including reduction in feelings of isolation and depression; improved knowledge and
46 confidence with which to fulfil their perceived role as having responsibility for providing healthy food
47 for their families and thus encouraging healthy lifestyles in their children; and an ethos of
48 accommodation for the range of different cultural variation within local groups of women.
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Strengths and limitations

This qualitative study was conducted quite early in the life of the intervention programme, when the women had been involved in the intervention for less than six months. It was not clear whether early enthusiasm for the intervention would be sustained. The interviews were conducted in English, which was not the participants' first language. Although participants could all speak some English and were able to translate for each other to an extent, the accuracy of these translations remains unclear. The small group, mostly dyadic, format for conducting the interviews, and the fact that they took place alongside intervention sessions that the women would usually be attending, facilitated study engagement. The disadvantage of this was that the interview rooms were not very quiet and so some of the recordings were difficult for the staff undertaking the transcriptions. We were able to call on an experienced staff team to ensure the transcriptions were as accurate as possible. The interview arrangements were made by the intervention delivery staff, which could mean some bias in the choice of respondents, although we accessed women from different areas of the town and we were aware of a diverse range of cultural differences among Pakistani women who participated. The researcher who conducted the interviews was not Pakistani and only spoke English; however, the interviewees were open and friendly, keen to communicate their views and to do so in a way that could be understood beyond their cultural group. The group of women who took part in the interview study were aged from 27 years to 45 years and most were under 40 years of age. This is the younger age range of the typical target population for T2D prevention. We do not know how effective the intervention will be in attracting older women. There was some suggestion that these younger women might recruit older relations to take part in the intervention and it will be valuable to assess the recruitment age profile over time.

Comparison with other studies and implications

The NICE guidance for risk identification and provision of preventive interventions for high-risk individuals included recommendations for adults aged 25 to 39 of South Asian ethnicity, who are not included in the NHS Health Checks programme.[1] The findings from a recent National Institute for Health Research (NIHR) Health Technology Assessment evidence synthesis confirmed the importance of adapting health promotion interventions for ethnic minority communities and suggested that adaptation decisions should be based on detailed understanding of the target community.[16] Our plans for the adaptation of the NLNY intervention [10 26] to engage people from the local ethnic minority communities were therefore appropriate. The service commissioners took the lead in convening an operational group that included representation from the evaluation team. The commissioners were able to expand existing community links. Members of the local

1
2
3 ethnic minority communities were invited to a dissemination seminar that was arranged to promote
4 the NLNY intervention in its original format and invite interest in the adaptation.
5
6

7 In the interview study reported here we sought to explore Pakistani female participants' views and,
8 particularly in preparing the topic guide, we were able to draw on information from our qualitative
9 evaluation within the original NLNY intervention.[9] In the original NLNY intervention, community
10 based recruitment was successful, with 218 participants recruited to the programme from 367
11 registers of interest in under two years. The benefit of community based recruitment procedures
12 was also experienced in the PODOSA trial.[27] Early indications from this interview study suggest the
13 potential of community based recruitment strategies for Pakistani Women. The adapted NLNY
14 intervention was unusual in being provided through a CIC.[28] It was evident that some of the
15 women interviewed knew the intervention providers and that this positively affected their
16 confidence and decision to participate.
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23 The social support engendered by the nature of the intervention was evident, as it was in the
24 original NLNY intervention, and this reflects the more general literature around social support and
25 behaviour change.[29] The social needs of this specific participant group to undertake various
26 physical activities were of paramount importance for their engagement and confidence to become
27 involved in the intervention. Whereas other interventions may be counselling based, whether this is
28 individually or group delivered, NLNY centres on group delivered PA, which is provided as a
29 fundamental pre-requisite of experiential learning. The provision of occasional female only sessions
30 in local authority leisure centres does not constitute ideal provision of appropriate facilities (for
31 example if the toilets are in common areas). In this feasibility phase the provision of staff training so
32 that women from the Pakistani community could conduct PA sessions in appropriate and convenient
33 community venues, including school premises, was of immediate importance for the continued
34 intervention delivery.
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43 The identification of beneficial effects on other aspects of participants' own health that may result
44 from their participation in PA intervention delivered in social groups and the 'spill over' effects of
45 health promotion on other family members is supported by other evidence. [30-33] This additional
46 benefit may have importance for health economic evaluation of interventions designed to promote
47 increased PA, especially where these are delivered to groups that are organised to promote social
48 support networks.
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54 **Unanswered questions and future research**

55 The feasibility study of the adapted version of the NLNY intervention, which was planned to better
56 engage members of the local ethnic minority communities, is on-going and we plan to analyse the
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1
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3 recruitment, retention and outcomes at 12 months follow-up by sex and ethnic group. The entire
4 feasibility study, together with our previous work relating to the original NLNY intervention[8] and
5 the related qualitative studies, including the interview study reported here, [9] will inform plans for
6 optimisation of the intervention and options for definitive evaluation of the NLNY intervention for
7 effectiveness and cost effectiveness.
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Authors' contributions

MW was a member of the Steering Group responsible securing funding and for the outline plan for the original NLNY intervention and evaluation. LP contributed to the development of the NLNY pilot intervention and designed the feasibility evaluation. Adaptation of the NLNY intervention was later planned to better engage local ethnic minority communities. This interview study was planned by LP as part of the evaluation of the adapted NLNY intervention. LP conducted the interviews. FFS, SUD and MW provided advice on the analysis. LP conducted the preliminary analysis which was then discussed and agreed with SUD. MW, FFS and SUD, reviewed, and contributed to the manuscript drafted by LP. All authors read and agreed the final version.

Competing interests

The business case and outline plan for the original 'New life, New you' study was determined by a steering committee. This included representatives from members of the organisations that comprised the funding consortium as well as the Principal Investigator for the evaluation, co-author MW. The detailed development of the intervention was then progressed by a small operational team including the evaluation researcher, co-author LP. The adapted version of the New life, New you intervention was funded by Middlesbrough PCT. The funders had no role in the collection, analysis, and interpretation of data, the writing of the article and a decision to submit it for publication. Co-authors: MW, FS, SD and LP receive salaries from Newcastle University, Institute of Health and Society that provide open access funding for the publication. The authors declare that they have no other competing interests.

Data sharing

no additional data available

Abbreviations

CIC Community Interest Company

FINDRISC Finnish Diabetes Risk Score

IMD UK Government Statistics index of multiple deprivation

NICE UK National Institute for Health and Care Excellence

NLNY 'New life, New you' intervention

T2D Type 2 diabetes

TDF Theoretical Domains Framework of behaviour change

REPS UK Register of exercise professionals

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4 **PERSPECTIVES OF UK PAKISTANI WOMEN ON THEIR BEHAVIOUR CHANGE TO**
5 **PREVENT TYPE 2 DIABETES: QUALITATIVE STUDY USING THE THEORY DOMAIN**
6 **FRAMEWORK**
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10 Linda Penn,^{1,2} Stephan U Dombrowski,³ Falko F Sniehotta,^{1,2} Martin White^{1,2}
11

12 ¹ Institute of Health and Society, Newcastle University, Baddiley Clark Building, Richardson
13 Road, Newcastle upon Tyne, NE2 4AX, UK.
14

15 ² Fuse, UKCRC Centre for Translational Research in Public Health
16
17

18 ³ School of Natural Sciences, Division of Psychology, University of Stirling, FK9 4LA
19
20
21
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24 Linda Penn, Research Associate (corresponding author): linda.penn@ncl.ac.uk
25
26

27 Stephan U Dombrowski, Lecturer in Health Psychology: s.u.dombrowski@stir.ac.uk
28
29

30 Falko F Sniehotta, Reader in Health Psychology: falko.sniehotta@ncl.ac.uk
31
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33 Martin White, Professor of Public Health: martin.white@ncl.ac.uk
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35 **Key Words**

36 Behaviour change

37 Community

38 Cultural adaptation

39 Ethnicity

40 Intervention

41 Type 2 diabetes

42 Intervention

43 Pakistani

44 Physical activity

45 Prevention

46 South Asian

47 Qualitative

48 **Word count = words**
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ABSTRACT

Background

Type 2 diabetes (T2D) is a debilitating disease, highly prevalent in UK South Asians, and preventable by lifestyle intervention. The 'New life, New you' (NLNY) physical activity (PA) and dietary intervention for T2D prevention was culturally adapted to better engage minority ethnic populations and tested for feasibility.

Objectives

To investigate Pakistani women participants' perspectives of their behaviour change and of salient intervention features.

Setting

A community based eight-week programme of group delivered PA sessions with behavioural counselling and dietary advice, culturally adapted for ethnic minority populations, in an area of socioeconomic deprivation. Participants to NLNY were recruited through screening events in community venues across the town.

Participants

Interviews were conducted with twenty Pakistani women NLNY participants, aged 26-45 (mean 33.5) years, from different parts of town.

Results

Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified the importance of social factors relating to participants' own PA and dietary behaviour change. We also identified cross-cutting themes as collateral benefits of the intervention including: participants' 'psychological health'; 'responsibility' (for others' health, especially family members included in the new PA and diet regimes); and 'inclusion' (an ethos of accommodating differences).

Conclusions

Our findings suggest that culturally adapted interventions for Pakistani women at risk of T2D, delivered via group PA sessions with counselling and dietary advice, may encourage their PA and dietary behaviour change, and have collateral health and social benefits. The NLNY intervention appeared to be acceptable. We plan to evaluate recruitment, retention and likely effect of the intervention on participant behaviour prior to definitive evaluation.

ARTICLE SUMMARY

Article focus

The 'New life, New you' lifestyle intervention for diabetes prevention was culturally adapted for local Pakistani women and tested for feasibility. In an interview study we sought intervention participants' perspectives:

- On their behaviour change
- On the intervention procedures and cultural adaptations

Key messages

- We identified the importance of several social factors, relating to participants' engagement in the intervention and their physical activity and dietary behaviour change
- Participants reported intervention benefits regarding their psychological health and positive affect
- Participants expressed responsibility for improving their family's lifestyle and the intention to apply learning from the intervention

Strengths and limitations

This qualitative study:

- Highlighted cultural adaptations needed to engage Pakistani women in a lifestyle intervention
- Identified unanticipated intervention benefits
- Was limited by data collection early in the intervention timescale and the small study size

BACKGROUND

Type 2 diabetes (T2D) is a debilitating disease that carries an increased risk of eye, kidney, nerve, and vascular disease with decreased life expectancy.[1] Prevalence of T2D is greater in UK residents of ethnic minority heritage than in the general UK population and the disease often occurs at an earlier age in these population groups.[2 3] Although there is good research evidence for the efficacy of lifestyle interventions for prevention of T2D,[4 5] translation of such evidence to service provision remains challenging. [6 7] The UK National Institute for Health and Care Excellence (NICE) guidance for risk identification and preventive interventions for high-risk individuals was published in July 2012.[1] This NICE guidance addresses the need to provide services, including risk assessment for those aged 25 to 39 years who are not included in the National Health Service (NHS) Health Checks programme. The need to provide risk assessment and preventive opportunities for younger_ adults

younger than those included in the NHS Health checks is particularly relevant for ethnic minorities.[1]

The 'New life, New you' (NLNY) intervention for primary prevention of T2D was developed in Middlesbrough and has to date been evaluated through a feasibility study.[8-10] According to UK government statistics, Middlesbrough ranks as one of the ten most deprived areas in England based on the index of multiple deprivation (IMD) ranks of localities defined as lower super output areas (LSOA) within the town.[11] The original NLNY intervention primarily targeted middle and older aged adults in low income groups, priority groups identified using market segmentation of the Sport England Active People survey.[12] The NLNY intervention was designed to be delivered in leisure and community settings and to recruit participants directly from the community, rather than relying on a health services referral route. Recruits to the NLNY intervention were assessed for individual risk of future T2D, using the Finnish diabetes risk score (FINDRISC).[13] The NLNY intervention promoted increased physical activity, healthy eating and weight loss, in line with the UK National Institute for Health and Care Excellence (NICE) guidance.[1] The intervention was delivered through an eight week programme of weekly supervised physical activity sessions, each followed by reflection, behavioural counselling and advice, with ongoing support and follow-up assessment at six and 12 months.[14] Details of the original NLNY intervention feasibility study has been published.[8 10] We have described the design of the eight week programme in terms of experiential learning, which emphasises the central role of a 'here and now' experience (in this case experience of a physical activity) along with observation and reflection in promoting actions.[14]

In Middlesbrough minority ethnic communities comprise about 9% of the total population. The South Asian community is well established in the town and in 2011 comprised about 6.1 % of the total population (8461 of a total population of 138,700).[15] Most of the South Asians in Middlesbrough are of Pakistani heritage, although there are also people of Indian and Bangladeshi heritage. Other ethnic groups in Middlesbrough include Black African and Chinese communities. Although participants from ethnic minorities were not excluded from the original NLNY intervention, few were recruited. To better engage members of the local ethnic minority communities, we planned a cultural adaptation of the NLNY intervention. We also extended the age range of people that were eligible for the programme to include adults over 25 years with no upper age limit.[16 17] The feasibility study for the adapted NLNY intervention, for both men and women, is on-going. We are collecting recruitment data, including ethnicity and outcome data comprising weight and waist measurements along with self-report data on PA, diet, and quality of life at six and 12 months of follow-up in a before and after study.

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3 Recruitment of South Asian participants to preventive interventions has proved difficult.[18] We
4 anticipated that the cultural needs of Muslim women might deter their engagement in PA unless
5 these needs were recognised and addressed. In this paper, we report a qualitative interview study
6 that was conducted as part of the feasibility and acceptability evaluation of the adapted NLNY
7 intervention, in line with the MRC guidance for the development and evaluation of complex
8 interventions to improve health.[19] Women from the Pakistani community were early recruits to
9 the adapted NLNY programme and this interview study was conducted at an early stage of the
10 programme. We aimed to investigate Pakistani Women's perspectives of their behaviour change and
11 salient features of the culturally adapted NLNY programme. We planned this investigation, along
12 with other outcomes of the feasibility study, to subsequently inform the optimisation of the
13 intervention via discussion with the commissioners. This feasibility assessment will also inform
14 future options for a definitive evaluation of the adapted NLNY programme.
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23 METHODS

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25 To develop the adapted intervention and its evaluation, the NHS commissioners convened an
26 operational group that included community health champions as well as health and fitness workers.
27 The adapted NLNY intervention was informed by mapping the distribution of ethnic minority
28 communities within the Local Authority area, followed by stakeholder consultations. The project
29 delivery was managed by an NHS health improvement specialist. One adaptation of the NLNY
30 intervention specifically targeted Pakistani women. As anticipated, and confirmed in stakeholder
31 consultations, the main concern for local Pakistani women was the availability of culturally
32 appropriate services.[20] Thus the need for single sex PA group sessions was of paramount
33 importance in adapting the NLNY intervention for this population. It was also evident that
34 assessment events would need to be restricted to women only and would need to be conducted in
35 community venues that were convenient and where possible familiar to the women. In addition the
36 commissioners anticipated that the women might be more likely to respond to trainers who had an
37 appreciation of their Islamic cultural heritage and were able to commission a suitable provider and
38 provide some funding for intervention specific provider training.
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49 Intervention

50 The intervention that was provided for the Pakistani women was delivered through a Community
51 Interest Company (CIC). The CIC was founded and registered by three local women (two of Pakistani
52 and one of Arabic heritage) who are directors of the company (NUR FITNESS CIC registration number
53 08143445 <http://www.bis.gov.uk/cicregulator>). The intervention was delivered by one CIC founder
54 member, who recruited other local Pakistani women to assist with intervention delivery. These
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3 women received training to qualify as fitness trainers or in some cases training to deliver the
4 nutritional aspects of the intervention. The researcher and the project manager also provided
5 training for the delivery staff that was specific to the NLNY intervention, including data collection
6 procedures, use of behavioural change techniques and information regarding the relevant NICE
7 guidance [1]. The NHS commissioners provided funding and facilitated these training opportunities.
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11 Participants were recruited to the adapted NLNY intervention for Pakistani women through women-
12 only assessment events that were organised by the project manager in consultation with the
13 intervention delivery staff and community health champions (members of the community who have
14 received training to promote health messages locally). These events took place in community venues
15 in the areas of the town partly populated by the Pakistani community. Initial individual risk
16 assessment was based on FINDRISC scores. [13] [21] Other data were collected at the assessment
17 events, including self-report PA and dietary data. Follow-up assessments, as part of the service
18 delivery and feasibility evaluation, were planned at six and 12 months.
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22 Women recruited to the intervention took part in an eight week programme of weekly sessions,
23 delivered to groups of between 10 and 20 women. The sessions and comprised approximately 60
24 minutes of supervised group PA followed by 30 minutes of reflection and advice centred on dietary
25 information and action planning. Participant received a booklet, written in English that included
26 information, goal setting and action planning prompts with space for recording their progress. The
27 information provided about a healthy diet was specifically tailored to the participant group,
28 incorporating their preferred foods and cooking styles. The participants were also able to access
29 additional PA sessions at different times of the week, delivered by the same provider (NUR FITNESS
30 CIC). These additional sessions were made available to participants both alongside and following the
31 eight week course. These sessions were provided at no cost to the participants for up to six months
32 and later at low cost. Most of the activity sessions were delivered in community halls, including
33 school halls. In the early stages of the programme the women had access to a community gym,
34 where their exclusive use was assured for some mornings, but this facility was later closed.
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38 The provider ensured that information about different sessions was easily available and regularly
39 updated. This was facilitated via a social networking page (i.e. Facebook) that the provider initiated;
40 others relied on text messages, also from the provider, or accessed information by keeping in touch
41 with other women participants.
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Design and participants

We obtained ethical approval for the study from Newcastle University Ethics Committee (Number 0447). All participants received information and gave written informed consent prior to taking part in the feasibility study and the interview study separately.

For the qualitative interview study we purposively sampled participants to ensure representation from the three different areas of the town where early recruitment and intervention delivery took place. The interviews were scheduled early in the feasibility study, shortly after the first groups of women, all of whom were Pakistani, had completed their eight week intervention programmes. The NLNY evaluation team did not have access to participant contact details so the interview invitations and arrangements were made by the intervention delivery staff following guidance from the research team. The researcher who conducted the interviews did not know any of the participants prior to the interviews. Our previous work [9] and the Theoretical Domains Framework (TDF), [22] a framework that groups component constructs from relevant behavioural theories into theoretical domains, were used to inform the topic guide for this study. The topic guide was refined as the interviews progressed.

Data collection

Group interviews involving two or at most three participants were planned to encourage participation and these were conducted in English language by the female researcher (LP, MSc, Research Associate). Resources for an interpreter were not available. The interviews were conducted in the community venues where the participants attended their PA sessions and were conducted in parallel with on-going sessions although always in a separate room. Interviews lasted between 60 and 75 minutes. As in previous work, [9] we allowed flexibility within the areas outlined in the topic guide and the women were encouraged to report what mattered to them. Active listening with prompts was employed to provide clarification and improve insight. Notes were made of related topics introduced by the participants and the topic guide was developed as the interviews progressed. All interviews were audio-recorded and transcribed, as close to verbatim as possible by staff in the Institute of Health and Society at Newcastle University who have transcription expertise.

Analysis

We used the Framework approach [23] for data analysis. Transcripts were read, checked, and imported into NVivo V9 [24] to facilitate coding. The themes emerging from the data were first classified according to the *a priori* theoretical domains identified from the TDF and included in the topic guide as: intentions and goals; reinforcement; knowledge; nature of the activity; social role and identity; social influences; capabilities and skills; behavioural regulation and decision; emotion; and

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environment. LP performed the initial classification according to the TDF themes and these were then checked by SUD, differences being resolved through discussion. The use of NVivo software and the TDF defined *a priori* categories facilitated the analysis and promoted familiarisation with the data. Further analysis of the data within each of the theoretical domains, and reference to an empirical phenomenology approach, [25] which is primarily about retaining the appreciation of the respondents' subjective world, led to the identification and agreement of cross cutting constructs.

RESULTS

We conducted nine interviews (seven dyad interviews and two interviews with groups of three participants). All 20 interview participants were recruited from among the first 78 female Pakistani intervention recruits in three areas of the town (Breckon Hill, Abingdon and Green Lane), with ages ranging from 26 to 45 years and a mean of 33.5 years. For this group of interview participants, their baseline risk of future T2D based on FINDRISC score ranged from 11 to 22 with a mean score of 15. A FINDRISC score of 11 to 14 represents moderate risk, with one in six likely to develop T2D within ten years and a FINDRISC score of 15 to 20 represents high risk with two in six likely to develop T2D within 10 years. The participants' English Index of Multiple Deprivation (IMD) scores, based on their postcodes of residence, ranged from 11 to 78 with a mean IMD score of 43 (which ranks among the most deprived English quintile); IMD scores are an ecological, composite measure based on routinely available data in seven categories of deprivation assessed, at the Lower Super Output Area (LSOA): a small administrative area with a population of about 1500. ~~of residence from provided post-codes, ranged from 11 to 78 with a mean IMD score of 43 (which ranks among the most deprived English quintile).~~ Details of participant characteristics are shown in Table 1.

Some women were less confident in their use of English language than others and the women tended to organise themselves so that the interview groups included at least one participant who was confident in her own ability to express herself in English. Sometimes the women would converse briefly between themselves in their first language to check their use of English. Those who were more confident tended to speak more, although this was sometimes to clarify what the other person had said for the benefit of the researcher, who only spoke English. Quotes are assigned to groups (Table 1) and where group discussion is reported we have used numerals (i, ii) to identify different speakers.

Within the *a priori* TDF domains, (intentions and goals, reinforcement, knowledge, nature of the activity, social role and identity, social influences, capabilities and skills, regulation and decision, emotion, and environment), we identified and analysed the anticipated themes relating to participants' own PA and dietary behaviours. We also identified three further cross-cutting themes

which we have grouped as 'collateral health and social benefits'. These three composite themes related to participants' perspectives of (1) their psychological health, (2) their family role and responsibility for the health of others, and (3) an ethos of inclusion and accommodation of differences.

Table 1: Participant baseline variables: group means

Group identifier	Number in the group	Age (years)	FINDRISC score	IMD score *
A	2	33	20	46
B	2	30	12.5	52
C	2	31	13	78
D	3	35	15	69
E	2	36	13	20.5
F	2	40	14.5	37
G	3	32	14	18
H	2	29	14.5	29.6
I	2	45	17	34.5
All participants	20	34	15	43

* a higher score indicates a higher level of deprivation

Participants own physical activity and dietary behaviours

Intentions and goals

Health concerns were frequently stated as a reason for taking part in the intervention and associated with an appreciation of the opportunity afforded by the availability of this intervention programme. There was an understanding of the increased diabetes risk associated with Asian ethnicity as described by one woman,

'I just about got myself motivated that it's for health reasons ... especially with the diabetes... we as Asians, we get diabetes.' (Group I).

Occasionally less explicitly health associated reasons would be mentioned such as,

'Because we will gonna be like fit and we are gonna be smart and look nice.' (Group C)

The intervention documentation was organised by the provider to promote action planning.

Participants were encouraged to write an action plan for themselves for the next week (such as drink

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3 a glass of water instead of a fizzy drink at lunchtime). This planning was recalled as explained in this
4 quotation,
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7 *'Every week we give a self-challenge, we are not going to do this, we are not going to eat this, we*
8 *are going to eat something else.'* (Group C).
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11 More generally goal setting was closely related to being part of the group and the need to engage
12 with group activities,
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15 *'We have to go to the classes: we try our best to go to classes.'* (Group A).
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17 **Reinforcement**

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19 Most of the reinforcement centred on feedback from other people, especially others in the group,
20 for example,
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23 *'It was pointed out that I was getting more defined on my waist and that was like really brilliant.*
24 *It was a great motivator.'* (Group F)
25

26 **Knowledge**

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28 Tailoring of dietary advice was much appreciated. There was frequent reporting of quantities of oil
29 and salt to include in making home cooked curries, often introduced with an air of disbelief
30 regarding how much oil and salt they had previously added to cooked food. They appreciated advice
31 to reduce these quantities gradually so that the change in taste was less obvious, but they explained
32 that as they became used to the different tastes they even preferred them.
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36 Perhaps surprisingly the risk effect of family history needed clarification, as explained here,
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39 *'I know my uncle in Pakistani, he's got diabetes and his leg is quite bad actually. I didn't know, I*
40 *didn't realise I would be at risk, because he's an uncle, he's not my dad and then it was quite a bit*
41 *of a shock when they said no actually he's part of your family.'* (Group E).
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45 **Nature of the activity, capabilities and skills**

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47 There was a range of experience within this group of women. Many were quite new to the physical
48 activities that were presented in the programme and were gradually attuned to them by the
49 trainers, as explained by one woman,
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52 *'They proper explain it, they do exercise and they keep telling us as well both ways.'* (Group A)
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55 Generally the opportunity to participate in PA was valued and the women were pleased with what
56 they had achieved. One woman described her effort and the beneficial effects she felt,
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3 *'Trust me when I do work-out I'll be drenched, you know, and there's lots of ladies that really put*
4 *the effort in, but it's like built your confidence.'* (Group G).

7 **Social role and identity, and social influences**

8 These domains were particularly important for this group of Pakistani women and additionally
9 contribute to the cross-cutting collateral benefits that we identified (detailed below). The women
10 were mostly homemakers and mothers and often described themselves in relation to this role,
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14 *'You put yourself back and you give your children more.'* (Group F).

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16 The social responsibility to provide hospitality was sometimes seen as detrimental to their progress
17 in achieving a healthy lifestyle,
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21 *'I have to buy some unhealthy foods in, just because it's the norm, people expect something like*
22 *that on the table and what happens is, if I bought it in I'll end up eating it myself.'* (Group F).

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25 There was an expectation that the CIC providers would understand and accept the social and cultural
26 issues that were pertinent to this participant group, because the delivery staff themselves were from
27 the Muslim community as described by one woman,
28

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31 *'Because she's [trainer] Asian as well, she knows how to change basically, she knows the things*
32 *that Asians ... whereas English people have different diet to what Asians do, our diet is totally*
33 *different, whereas she helped us a lot by telling us small changes that we could make in our daily*
34 *intake of food and the like type of cooking that we could do.'*

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37 The appreciation of the efforts that were being made by the CIC providers who were known to many
38 of the women participants was evident. This was described by one interviewee,
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42 *'I think [they are] helping our Asian community ladies, especially the oldies to come out [of the*
43 *house]. ... They give her [the trainer] blessing.'* (Group D).

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46 Recruitment by word of mouth was emphasised; people described how they had been encouraged
47 to come by reassurance from those already engaged in the programme such as:
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51 *'Friends are like encouraging you. 'no you have to come, you have to come,' just it helps*
52 *socialising and get out as well, because you don't realise you can get out,'* (Group G), and *' it*
53 *really helps to have someone saying actually it's ok to come,'* (Group B).

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56 The women also described how later on they themselves had encouraged others and become
57 'champions' in promoting the intervention,
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'And then after I tell them it's really nice, come you see, it's really, really nice' (Group B).

Regulation and decision

Regulation centred on attending the PA sessions, where prompts to attend were naturally provided as part of the women's usual routine. For example after taking the children to school the women could attend a session in an adjacent community venue.

'Every Monday we go, [to the activity session] like half nine till half ten,' (Group C).

With regard to diet there was some appreciation of the need for portion size control, for example by using a smaller plate. Sweet fizzy drinks were perceived as addictive, therefore difficult to regulate and better avoided. The dietary advice offered included information about reading food labels, which was reported as helpful for making decisions about food choices. The fact that some sweet foods, specifically intended for Asian festivals, did not have nutrition labels was mentioned by some of the women participants.

Emotion

Worry about the risk of diabetes, because of family members with the disease, and concern for relatives already suffering from diabetic complications was often mentioned, sometimes with regret for those who had not been able to make beneficial lifestyle changes. Retinopathy was specifically mentioned where it had affected younger aged relatives to the detriment of their quality of life.

There was also some mention of possible embarrassment about going to the gym, described as,

'Making a fool of myself,' (Group E)

In contrast the enjoyment experienced by participating in the activity sessions was often mentioned.

'We have a good laugh and we have good things.'(Group C)

But then the time flies by, you don't realised where the time has gone and you had a workout, but you had a laugh.' (Group E)

It's the motivation of seeing each other and as well as having a laugh, you enjoy your time here.'
(Group B)

Environment

The main environmental issue, as anticipated for this population group, was the provision of a female only facility. This is a broader criterion than just a single room, for example in a leisure centre, set aside for an hour. This requirement includes access to changing and toilet facilities with

reassurance that the area would be securely restricted to women during the sessions and no man would accidentally just walk in. There were also environmental issues of concern around the cold weather and the cost of attending sessions (once the free and subsidised period had expired).

'It's so cold. At the moment I've stopped walking because it's cold. (Group A)

'In the park all friends go together but sometimes I said I don't want to go 'it's too cold' (Group D)

'You have to look at it from the financial point of view, how much is the charge going to be? If I want to come three times a week how much is that going to be? (Group F)

'Everything is expensive nowadays, just your basic household things cost an arm and a leg, so money is a big issue, but I think just for fitness the prices that they've got now are reasonable' (Group H)

Collateral health and social benefits

Psychological health

Participants' perspectives of their psychological health involve sub-themes relating to, 'safety and freedom' (cultural acceptance and feeling comfortable) and 'positive affect' (feeling happier, less isolated, and not depressed).

Reference to Islamic culture used in [recruitment/engagement](#) strategies was influential, as described by one participant,

'The advert [Radio Ramadan] was talking Islamic, like people in Islam history, the women. In those days women were like quite fit and strong and they had to be and that's what got me in [to the programme] (Group D).

Similar references were used by the community provider during the sessions and contributed to the [engagement strategies. This was reflected in](#) perspectives of cultural acceptance that made the women comfortable,

'You know the instructor... and sometimes they talk in our own language and we just do jokes.'
(Group A)

Feeling safe and comfortable was a regular and much emphasised theme, as described clearly by members of one group,

'i) It's easy for me to say, 'I'm going to a ladies only gym, there's no men there,' and I know there will be no disapproval from the male side of our family.

ii) I felt like the whole mental pressure was lifted because I could justify to anyone that I am in an entirely female environment.

i) He [husband] is in the mind that my wife is in a safe environment. ii) It is completely peaceful in mind. (Group F)

The relief from anxiety was expressed by one participant as,

'You can just do exercise, you are not like wary - is anyone [male] suddenly going to walk through the door.' (Group D)

Other aspects of feeling safe were about confidence to exercise. For example,

'That's what they teach you, 'listen to your own body', whatever your body allows you go to that speed and level. With me being a blood pressure patient..... Absolutely I found no fear, no worry and I was in a good safe environment.' (Group F).

The purposeful social grouping, and the opportunity this presented for women to talk together and support each other appeared to promote greater confidence within participants' perceived role: as described by one woman when talking about cooking for the family,

'if you are the main cook then it's part of your role, if you got the knowledge [re: healthy food choices] (Group G)

Another woman talked about cooking for her husband,

'When I go home I say, 'I'm going to cook and you are going to eat, this is how I am going to cook.' Husband was a bit like, you know, like it is -isn't it? 'Ah, you are not going to cook like that?' 'Oh yes I am, but it will taste nice.' (Group F).

There were also explicit references to depression and isolation such as,

'She [relative] spent time at home a lot and I think a lot of depression got to her' (Group E)

Contrast was made between this relative's experience and the beneficial effect they perceived through the option to participate in appropriate social meeting.

Two women in another group discussed depression in explicit relation to the intervention and the difference participation in a social and active group made to them in comparison to their previous behaviours.

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3 *'i) If you stay home all day obviously it's different isn't it? I was very, very lazy. I didn't used to go*
4 *out. I just used to stay at home all the time.*

5
6 *ii) Watch TV.*

7
8 *i) Watch TV and just do the housework and just eat. Sit down in one place. So now I am very*
9 *active. This year we got the choice to get depressed or to go out and get fresh'. (Group A).*

10
11 Another woman talked about how she had lived in the area for six years, but previous to joining the
12 programme had only known one friend. She explained how she had now been welcomed by the
13 group and how she communicated with other women outside the sessions, such as about transport
14 arrangements to get to classes where needed.
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19 **Family role and responsibility for the health of others**

20 The women's pivotal role within the family as the main cook was perceived as conveying a
21 responsibility for their family's health that was often explained such as,
22

23
24 *'We have responsibility, we doing the shopping, we bring all the best things back for them' (Group*
25 *D).*
26
27

28
29 In relation to this there were clear statements that the knowledge and support the women had
30 received through the programme would empower them to make healthy changes for their own
31 benefit with the added consequence of influencing other family and community members. One
32 person clearly spoke about this as:
33
34

35
36 *'By educating the women I think what you are doing is you are empowering the women to sort of*
37 *make decisions, informed decisions 'cos they know that, 'this is right', this is wrong'. Then they are*
38 *in turn helping their younger, and extended elders.' (Group F)*
39
40
41

42 Similarly another woman described how her perception of responsibility had changed,
43

44 *'Now I go outside [of the house, to the sessions] I know what to do to my child you see. I want*
45 *to give good things you know.' (Group D)*
46
47

48 A description of specific changes was supplied by another group,
49

50 *'We have stopped biscuits, we stopped cakes, we stopped crisps, we stopped everything, even*
51 *we stopped white bread as well, we start brown bread and everything like brown rice.'*
52
53

54
55 This confidence to change extended to encouraging their children to exercise and even jokingly to
56 the possibility that they might influence their husbands as explained in discussion with laughter
57 by one group,
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3 *'i) I wanna send mine [husband].*

4 *ii) Yeah, I said to mine, 'Get out there'.*

5
6 *i) They are jealous wasn't it, looking at us, and now, 'Look we [imagining husbands' speaking]*
7
8 *need to work out.'* (Group G).

9
10 There was also an appreciation by the women of the way their own health would impact on others
11 as explained in the following,

12
13
14 *'I'm the one that makes – does everything, if for some reason my health suffers then everyone*
15 *else in our family suffers.'* (Group E)

16 17 18 **An ethos of inclusion and accommodation of differences**

19 The Pakistani women within this group had a range of faith related preferences. A particular
20 example was that some women did not want to participate in activities that involved music and the
21 other women in the activity group were encouraged, by the trainer, to respect and accommodate
22 these wishes so the issue was resolved. This issue and its resolution were reported by one or two
23 groups,
24
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27
28 *'Then [the trainer] said, 'No, they don't like music on' then [everyone] agree as well. They said,*
29 *'Oh you are so kind, because we don't like music.'* (Group C).

30
31
32 Although this intervention targeted ethnic minority participants, the additional PA sessions run by
33 the community provider were open to other paying customers and attracted a few of the local
34 women from the white population, who were welcomed as described by one woman,
35
36

37
38 *'Four white women were there and we had such a laugh with them as well, you know trying to*
39 *speak our lingo and we were like, we tried like, the one that do speak English they are trying to*
40 *say their words... we are having a laugh and everything'* (Group E).

41
42
43 This inclusivity was similarly described by another group,
44

45
46 *' i) The more the merrier and I think as long as it is women only it doesn't matter what ethnicity or*
47 *what race or what age, we don't care .*

48
49 *ii) I'm sure women from non-Muslim background they will probably feel intimidated by gyms*
50 *anyway and they might find coming to a women only gym- Wow this is great!' (Group F).*

51
52
53 The women themselves even encouraged wider participation,
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55
56 *'I've been recommending it to lots of Asians [and] English ladies, because they [all] like Bollywood*
57 *music don't they?'* (Group G).

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3 The appreciation of issues that would be common to all women was described by one group
4 member as,

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7 *'When women work together from different cultures we all find that we have the same fears, the*
8 *same sort of issues about our bodies and how we want to look better'(Group F) .*
9

10 11 **DISCUSSION**

12 13 **Main findings**

14
15 The NLNY intervention is unusual in being centred on group delivered PA sessions. The Pakistani
16 women's appreciation of the opportunity to engage in group delivered PA sessions in a culturally
17 appropriate and socially supportive environment was an important finding. This qualitative study
18 suggests that provision of culturally appropriate PA sessions will facilitate the engagement of
19 Pakistani women and encourage their PA and dietary behaviour change. The study results emphasise
20 the importance of social influences and the women's own perceived social role and identity for
21 intervention development. The fact that the delivery staff were from the local Pakistani women's
22 own community contributed to recruitment and engagement of the participants.
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25
26 The engagement of Pakistani women in this culturally acceptable, social and proactively healthful
27 context may have important health and social benefits in addition to those specifically intended by
28 the intervention. We have described these unanticipated additional effects as 'collateral health and
29 social benefits' and they comprise: a potential positive impact on the women's own psychological
30 health including reduction in feelings of isolation and depression; improved knowledge and
31 confidence with which to fulfil their perceived role as having responsibility for providing healthy food
32 for their families and thus encouraging healthy lifestyles in their children; and an ethos of
33 accommodation for the range of different cultural variation within local groups of women.
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36 37 **Strengths and limitations**

38
39 This qualitative study was conducted quite early in the life of the intervention programme, when the
40 women had been involved in the intervention for less than six months. It was not clear whether early
41 enthusiasm for the intervention would be sustained. The interviews were conducted in English,
42 which was not the participants' first language. Although participants could all speak some English
43 and were able to translate for each other to an extent, the accuracy of these translations remains
44 unclear. The small group, mostly dyadic, format for conducting the interviews, and the fact that they
45 took place alongside intervention sessions that the women would usually be attending, facilitated
46 study engagement. The disadvantage of this was that the interview rooms were not very quiet and
47 so some of the recordings were difficult for the staff undertaking the transcriptions. We were able to
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3 call on an experienced staff team to ensure the transcriptions were as accurate as possible. The
4 interview arrangements were made by the intervention delivery staff, which could mean some bias
5 in the choice of respondents, although we accessed women from different areas of the town and we
6 were aware of a diverse range of cultural differences among Pakistani women who participated. The
7 researcher who conducted the interviews was not Pakistani and only spoke English; however, the
8 interviewees were open and friendly, keen to communicate their views and to do so in a way that
9 could be understood beyond their cultural group. The group of women who took part in the
10 interview study were aged from 27 years to 45 years and most were under 40 years of age. This is
11 the younger age range of the typical target population for T2D prevention. We do not know how
12 effective the intervention will be in attracting older women. There was some suggestion that these
13 younger women might recruit older relations to take part in the intervention and it will be valuable
14 to assess the recruitment age profile over time.

23 **Comparison with other studies and implications**

24 The NICE guidance for risk identification and provision of preventive interventions for high-risk
25 individuals included recommendations for adults aged 25 to 39 of South Asian ethnicity, who are not
26 included in the NHS Health Checks programme.[1] The findings from a recent National Institute for
27 Health Research (NIHR) Health Technology Assessment evidence synthesis confirmed the
28 importance of adapting health promotion interventions for ethnic minority communities and
29 suggested that adaptation decisions should be based on detailed understanding of the target
30 community.[16] Our plans for the adaptation of the NLNY intervention [10 26] to engage people
31 from the local ethnic minority communities were therefore appropriate. The service commissioners
32 took the lead in convening an operational group that included representation from the evaluation
33 team. The commissioners were able to expand existing community links. Members of the local
34 ethnic minority communities were invited to a dissemination seminar that was arranged to promote
35 the NLNY intervention in its original format and invite interest in the adaptation.

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45 In the interview study reported here we sought to explore Pakistani female participants' views and,
46 particularly in preparing the topic guide, we were able to draw on information from our qualitative
47 evaluation within the original NLNY intervention.[9] ~~As we experienced with In-~~ the original NLNY
48 intervention, community based recruitment was successful, with 218 participants recruited to the
49 programme from 367 registers of interest in under two years. The benefit of community based
50 recruitment procedures was also experienced in the PODOSA trial.[27] Early indications from this
51 interview study suggest the potential of community based recruitment strategies for Pakistani
52 Women. The adapted NLNY intervention was unusual in being provided through a CIC.[28] It was

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3 evident that some of the women interviewed knew the intervention providers and that this
4 positively affected their confidence and decision to participate.
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7 The social support engendered by the nature of the intervention was evident, as it was in the
8 original NLNY intervention, and this reflects the more general literature around social support and
9 behaviour change.[29] The social needs of this specific participant group to undertake various
10 physical activities were of paramount importance for their engagement and confidence to become
11 involved in the intervention. Whereas other interventions may be counselling based, whether this is
12 individually or group delivered, NLNY ~~centres on incorporates~~ group delivered PA, which is provided
13 as a fundamental pre-requisite of experiential learning, in a central role. The provision of occasional
14 female only sessions in local authority leisure centres does not constitute ideal provision of
15 appropriate facilities (for example if the toilets are in common areas). In this feasibility phase the
16 provision of staff training so that women from the Pakistani community could conduct PA sessions in
17 appropriate and convenient community venues, including school premises, was of immediate
18 importance for the continued intervention delivery.
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27 The identification of beneficial effects on other aspects of participants' own health that may result
28 from their participation in PA intervention delivered in social groups and the 'spill over' effects of
29 health promotion on other family members is supported by other evidence. [30-33] This additional
30 benefit may have importance for health economic evaluation of interventions designed to promote
31 increased PA, especially where these are delivered to groups that are organised to promote social
32 support networks.
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38 **Unanswered questions and future research**

39 The feasibility study of the adapted version of the NLNY intervention, which was planned to better
40 engage members of the local ethnic minority communities, is on-going and we plan to analyse the
41 recruitment, retention and outcomes at 12 months follow-up by sex and ethnic group. The entire
42 feasibility study, together with our previous work relating to the original NLNY intervention[8] and
43 the related qualitative studies, including the interview study reported here, [9] will inform plans for
44 optimisation of the intervention and options for definitive evaluation of the NLNY intervention for
45 effectiveness and cost effectiveness.
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56 those who gave their time for these interviews. We thank the project implementation team
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Abbreviations

CIC Community Interest Company

FINDRISC Finnish Diabetes Risk Score

IMD UK Government Statistics index of multiple deprivation

NICE UK National Institute for Health and Care Excellence

NLNY 'New life, New you' intervention

T2D Type 2 diabetes

TDF Theoretical Domains Framework of behaviour change

REPS UK Register of exercise professionals

Authors' contributions

MW was a member of the Steering Group responsible securing funding and for the outline plan for the original NLNY intervention and evaluation. LP contributed to the development of the NLNY pilot intervention and designed the feasibility evaluation. Adaptation of the NLNY intervention was later planned to better engage local ethnic minority communities. This interview study was planned by LP as part of the evaluation of the adapted NLNY intervention. LP conducted the interviews. FFS, SUD and MW provided advice on the analysis. LP conducted the preliminary analysis which was then discussed and agreed with SUD. MW, FFS and SUD, reviewed, and contributed to the manuscript drafted by LP. All authors read and agreed the final version.

Competing interests

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The business case and outline plan for the original 'New life, New you' study was determined by a steering committee. This included representatives from members of the organisations that comprised the funding consortium as well as the Principal Investigator for the evaluation, co-author MW. The detailed development of the intervention was then progressed by a small operational team including the evaluation researcher, co-author LP. The adapted version of the New life, New you intervention was funded by Middlesbrough PCT. The funders had no role in the collection, analysis, and interpretation of data, the writing of the article and a decision to submit it for publication. Co-authors: MW, FS, SD and LP receive salaries from Newcastle University, Institute of Health and Society that provide open access funding for the publication. The authors declare that they have no other competing interests.

Data sharing

There is no additional data available

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Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:

Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
<i>Personal Characteristics</i>		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	6
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	6
3. Occupation	What was their occupation at the time of the study?	6
4. Gender	Was the researcher male or female?	6
5. Experience and training	What experience or training did the researcher have?	6
<i>Relationship with participants</i>		
6. Relationship established	Was a relationship established prior to study commencement?	6
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	6
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	6
Domain 2: study design		
<i>Theoretical framework</i>		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	6
<i>Participant selection</i>		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	6
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	6
12. Sample size	How many participants were in the study?	7
13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A
<i>Setting</i>		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	6
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	6
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	7

1	<i>Data collection</i>		
2	17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	6
3	18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	No
4	19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	6
5	20. Field notes	Were field notes made during and/or after the inter view or focus group?	6
6	21. Duration	What was the duration of the inter views or focus group?	6
7	22. Data saturation	Was data saturation discussed?	No
8	23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No
9	Domain 3: analysis and findings		
10	<i>Data analysis</i>		
11	24. Number of data coders	How many data coders coded the data?	7
12	25. Description of the coding tree	Did authors provide a description of the coding tree?	7
13	26. Derivation of themes	Were themes identified in advance or derived from the data?	7
14	27. Software	What software, if applicable, was used to manage the data?	7
15	28. Participant checking	Did participants provide feedback on the findings?	No
16	<i>Reporting</i>		
17	29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	8 - 15
18	30. Data and findings consistent	Was there consistency between the data presented and the findings?	N/A
19	31. Clarity of major themes	Were major themes clearly presented in the findings?	8 - 15
20	32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	N/A

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Once you have completed this checklist, please save a copy and upload it as part of your submission. When requested to do so as part of the upload process, please select the file type: *Checklist*. You will NOT be able to proceed with submission unless the checklist has been uploaded. Please DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.