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Introduction

Diabetes is the third leading cause of mortality worldwide [42]. An estimated 96 million people have diabetes in the

project. Facilitators were selected based on experience, communications skills, demonstrated motivation and familiarity with the area. None of the facilitators had previous group facilitation experience, but 14/16 had worked in communities for non-governmental organisations (NGOs) and 12 had worked as data collectors in our baseline survey [15]. Facilitators were paid 8000 BDT per month (around US$95).

Facilitators were line-managed by two coordinators. Coordinators had previously supervised PLA interventions on maternal, newborn and child health. They were both married women, with a Masters level of education, living in Faridpur. Coordinators were line-managed by a District Coordinator (DM), who reported to a Senior Group Intervention Manager (SGIM). Both the DM and the SGIM had managed previous PLA interventions.

Facilitators used a manual to guide discussions (Table 1) . The intervention had four phases: problem identification, planning together, implementation and evaluation (Figs. 1 and 2). We used Diabetic Association of Bangladesh materials, and sought input on the manual design from an endocrinologist & diabetologist, a health education specialist and a nutritionist working in BIRDEM (Bangladesh Institute of Research and Rehabilitation in Diabetes Endocrine and Metabolic disorders) hospital in Dhaka. The manual was also informed by formative research [26]. For each meeting, the manual contained open questions to initiate discussions, and 'message boxes of important points. Meetings had facilitation tools, such as storytelling, games or body mapping to engage participants [8] and facilitators used picture cards and a pictorial chart to explain diabetes, its causes and symptoms, and ways to prevent and control it.

The SGIM trained the DM and coordinators on the manual content and meeting process, and they piloted meetings one to eight with four mens groups, and four womens groups in one non-study cluster. Piloting informed meeting length, topic sequencing and comprehension. On finalisation, facilitators were recruited and trained in phases. They received 4 days training from a diabetologist, and a nutritionist about diabetes prevention and control. The SGIM trained facilitators on PLA, community entry, and meetings one to eight (phase 1 problem identification) over 4 days. They subsequently received 4 days training for phase two (planning together) and three (implementation), and 2 days training for phase four (evaluation). Coordinators each supervised eight facilitators through monthly meetings in Faridpur, and community observation. Facilitators also used their own tools and methods and shared ideas in monthly meetings.

We planned a minimum coverage of one group per 200 population aged ≥ 30 years with at least one mens and one womens group in each intervention village. The requirement to have separate mens and womens groups resulted in a higher population coverage than planned, with 1 group per 145 population aged ≥ 30 years (range: 101 199). We engaged with village leaders and community members in each village to make social maps of household clusters, mosques and market areas to identify the most appropriate venues for group meetings. Coordinators and facilitators visited households to spread information about the groups and organized meetings in venues and at times convenient to participants. There were 122 groups facilitated by 16 facilitators, and each facilitator was responsible for 6 to 9 groups each month. Group attenders were not given any incentives.

Methods

Setting

Faridpur is around 2000 km^2 with a population of over 1.7 million, and a mainly agricultural economy of jute and rice farming. Primary healthcare is provided at the village level through Community Clinics (CC) and Family Welfare Centres (FWCs) [29] who have received diabetes screening and referral training. Glucometers and blood glucose testing strips should be available at CCs and FWCs but re-supply is irregular, and blood glucose testing was not routinely available. Village level private health care is available through informal health workers and drug vendors who provide blood glucose tests. Services for diabetics are provided in upazilla health complexes, and in Faridpur headquarters at the Diabetic Association of Bangladesh hospital, but these are too far away for many diabetics. There were 14 CCs, 22 FWCs, and three upazilla health complexes in PLA intervention areas. The population in Faridpur is mainly Bengali and 90% are Muslim [3]. 8.9% of men and 11.4% of women aged ≥30 years have diabetes with only 24.6% being aware of their status, and 75% of known diabetics had sub-optimal control [16].

Data collection

The intervention was participatory and complex and therefore we used the Medical Research Council framework [21] for process evaluation research to 1) evaluate the fidelity of the intervention to the participatory theory and method 2) describe the implementation of the intervention, and 3) explore how the implementation of the intervention affected its effectiveness. We used structured observation, narrative observation, and focus group discussions to collect data using a concurrent nested mixed-methods research design [11]. We collected qualitative and quantitative data at the same time and used qualitative data to validate and explore quantitative results every 4 months. Facilitators recorded attendance on paper forms and presented reports to coordinators. Coordinators supported facilitators, and

Table 1 [illegible] *(Continued)*

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	122	[illegible]
[illegible]	[illegible]	[illegible]	0	[illegible]

planned to observe and collect data at a minimum of 30 meetings per month. Coordinators conducted narrative

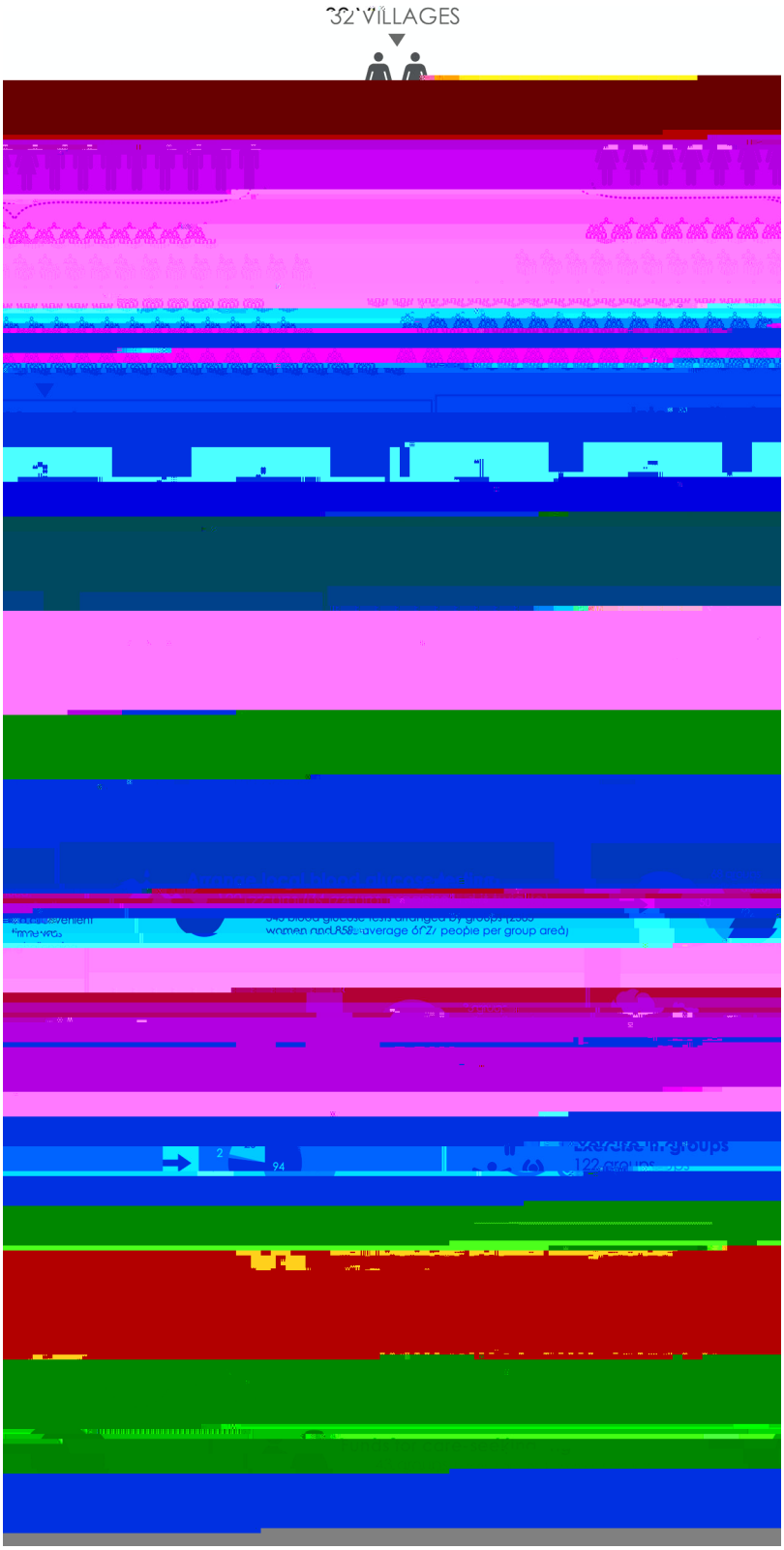

Fig. 2

Data management and anal sis

Table 2

		122	
		43	
		122	
		122	
		122	

Table 3

success. With some strategies, groups did not reflect on whether their strategy had affected the identified barrier. For example, the fund was not used frequently, but groups evaluated it against criteria of its continued existence, and regular contribution of attenders. Harassment was a barrier to physical activity for women, but groups did not evaluate the extent to which harassment had decreased. Those groups who engaged with a health worker or a politician did not evaluate these strategies. After evaluation, all groups decided to continue awareness raising, and group physical activity. All groups with a fund ($n = 43$) decided to continue this strategy. No groups added strategies. Coordinators felt that groups needed more time to implement their strategies fully before evaluating them: Two years is too short for group activities. (PE Observation notes, October 2017).

When funded support for the group meeting came to an end, a handover community meeting was proposed but attenders were too busy with farm work. Instead, groups invited two or three village leaders to attend a handover meeting and request support in future planning. Groups nominated a volunteer facilitator, and they received facilitation training. The volunteer facilitator was confirmed at the handover meeting, and most groups said they would continue meeting.

Discussion

Intervention implementation is integral to its success or failure [12] and comprehensive reporting can enable interventions to be transferred to different settings [5, 22]. We evaluate the fidelity of the intervention to the theory-driven method, explore how implementation affected the effectiveness of the intervention and discuss how this affects the external validity of the intervention.

Fidelit to participator methods

We expected high fidelity to participatory methods within groups because senior staff and coordinators were experienced in the methods, tools and approach, and, based on our experience with PLA interventions, attenders feel more comfortable participating over time, as they become familiar with each other and the method. An experienced senior team led to strong and consistent mentoring and motivation of facilitators, and meetings were conducted in a progressively participatory way. In order to develop the skills to supervise participatory approaches, more time should be spent in the formative project phase developing communication skills and being mentored in the development of participatory skills. Previous group-based interventions have had lower attendance than reported here [17]. High attendance could have hampered participation in methods and games, but we did not observe this.

Fidelit to the method of raising critical conscio sness

Formative research and the process of problem identification enabled critical reflection about the determinants of behaviours among attenders, facilitators, coordinators and the senior team. All groups received active dialogical education throughout the intervention, conducted the planned number of meetings, took action, and reflected on their progress. Groups implemented similar strategies because (1) Our formative research showed that the barriers to healthy behaviours were similar across study areas and (2) Groups were keen to act, but often unsure about what to do. Strategy examples were given in the manual, and between-group sharing of ideas was enabled by coordinator and facilitator meetings. In order to engage with community and systems barriers more effectively, future interventions implemented over a longer time could include examples of policy and advocacy approaches to address issues such as blood glucose testing at CCs. This could include tools and methods such as photovoice, film and/or theatre to communicate with policy makers and advocate for change [28, 33, 39]; mapping of policy stakeholders and local champions to advocate for systems change [6]; providing information to coordinators about national policies and plans to enable

community and policy efforts to act in synergy [40]; and specific capacity building to enable coordinators and SGIM to support group engagement with policy makers and health workers.

E ternal . alidit of the PLA approach

Consent for p blication

Competing interests

A thor details

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References