A GACD Implementation Science e-Hub Case Study

Community-based diabetes prevention

This case study was developed based on the work of

Adaptation and implementation of a community-based Diabetes Prevention Program in Kerala, India: Kerala Diabetes Prevention Program

Project team members

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Case study summary

The Kerala Diabetes Prevention Program (K-DPP) formally commenced in 2013, however, since that time, more than 40 journal articles have been published and several successful international grants awarded. Learnings from this research have now also informed similar programs in several other countries. Following a hybrid type II design, the K-DPP study utilized implementation science principles and methods for evaluating effectiveness and implementation outcomes of a lifestyle intervention that had been culturally adapted from earlier efficacy and effectiveness trials. You can read the articles about the original needs assessment, study protocol, cultural adaptation, effectiveness and cost-effectiveness evaluation, implementation evaluation, as well as the scale-up of the K-DPP study. You can also watch an introduction video about the K-DPP study here.

This case study overviews most of the steps of implementation science cycle (see Figure 1). This case study focuses particularly on how the original K-DPP study intervention was developed and adapted for real world implementation in Kerala, India. The learnings and the challenges are also discussed.

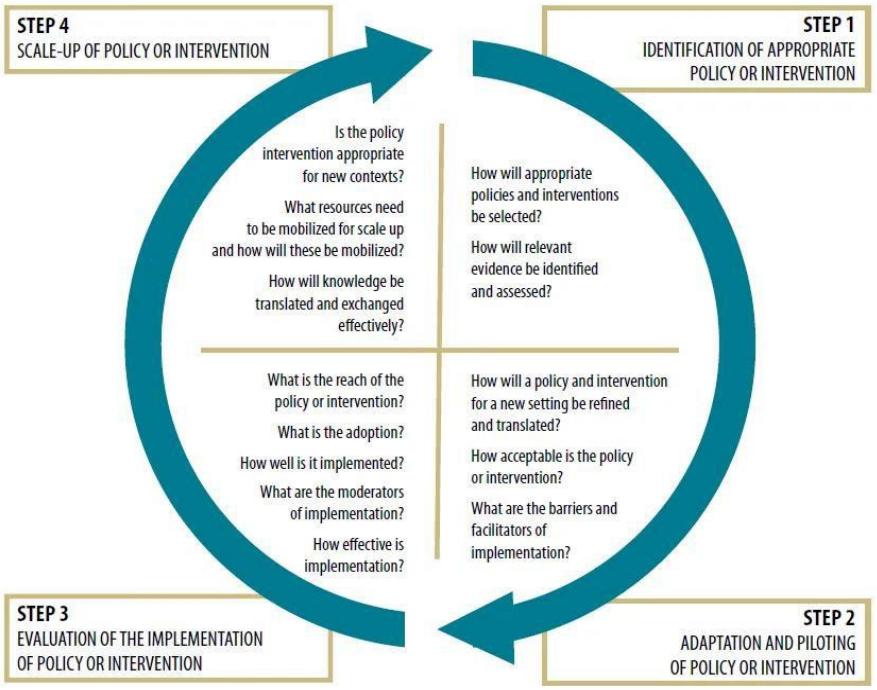

Figure 1. The implementation research cycle

Identification and characterization of implementation issues

Globally, India has the second largest number of people with Type 2 Diabetes Mellitus (T2DM) and this is predicted to double by 2040. India also has the largest number of individuals with impaired glucose tolerance (IGT) and prediabetes, conditions with a high risk of progression to T2DM. The high burden of T2DM puts an enormous burden on affected individuals, their families, and healthcare systems.

This required urgent action from program planners and policymakers to prevent and control T2DM including delaying the onset of the disease in high-risk individuals, particularly in low- and middle-income countries (LMICs) like India.

Several large randomized controlled trials(RCTs) from the USA, China, Finland, India and Japan had demonstrated in the early 2000s that lifestyle-related interventions could prevent T2DM by up to 60% among individuals with IGT. Furthermore, these effects have been maintained for up to 20 years. However, while studies testing real-world effectiveness of lifestyle interventions to prevent type 2 diabetes started emerging rapidly in high-income countries after the efficacy trial findings had been published, very few community-based studies tested these interventions in LMICs. Therefore, the K-DPP study (community-based research) was to fill in the gap by testing adapted interventions to prevent type 2 diabetes from other settings in India.

Selection, adaptation, and application of implementation strategies

Due to the lack of evidence-based diabetes prevention programs in India and other LMICs, the K-DPP program adapted to Kerala, India was from the GOAL lifestyle Implementation Trial in Finland, the US DPP and the GGT DPP in Australia.

Using the Intervention Mapping approach, the adaptation process was undertaken in five phases:

1. Needs assessment
2. Formulation of program objectives, and identification of key determinants and behaviour change techniques (BCTs)
3. Program adaptation and development
4. Piloting of the program and its delivery
5. Program refinement and active implementation.

The resulting Kerala Diabetes Prevention Program (K-DPP) was a group-based peer-support lifestyle intervention aimed at reducing the risk of T2DM in high-risk community-dwelling individuals. The intervention program involved four core components: (1) a group-based peer-support program consisting of 15 sessions for high-risk individuals based on the Health Action Process Approach model and evidence-based BCTs such as self-monitoring, goal setting, action planning, and social support, (2) peer-leader training and ongoing support for intervention delivery, (3) diabetes education resource materials and (4) strategies to stimulate broader community engagement such as walking programs and kitchen garden training.

The findings from the four developmental phases then informed program implementation as part of a cluster randomized control trial. Participants (intervention arm, n = 500; control arm, n = 507) were recruited directly from the community through home visits. Participants were at high-risk of diabetes (Indian Diabetes Risk Score ≥ 60 and were without T2DM on oral glucose tolerance test), aged 30-60 years (mean age 46.0 ± 7.5 years) and 47.2% were women. During the implementation, the focus broadened from fostering engagement and participation in the K-DPP peer groups to preparation, adoption and maintenance of behaviour changes by individuals and their families; and finally, to community empowerment.

The K-DPP curricular activities include two diabetes education sessions (DPES 1 and DPES 2) that were delivered by local healthcare experts. The program also included twelve peer-led small group sessions delivered by peer leaders. Peer-leaders, both male and female, were nominated from each group based on their level of education, willingness to lead the group, social credibility, and acceptance by their group members. Peer-leaders underwent two training blocks of two days duration each. The first training block focused on knowledge and skill building in relation to diabetes prevention and group facilitation. In the second training block, taking place after the fifth small group session, experiences in conducting sessions were shared, and strengths as well as need for support from the K-DPP team and ways to improve the conduct of the sessions were identified.

Each K-DPP group comprised 10-20 people recruited from the same community. The small group sessions were delivered at locations convenient for participants, such as community centers, local reading rooms, and schools. The first four sessions took place fortnightly, and subsequent sessions were conducted monthly over the duration of ten months. Each session lasted for 60 to 90 min. The program started with an inaugural small group session, where participants were briefed about the program and provided with the participant resource material. Subsequent small group sessions covered six topics: a) healthy diet; b) approaches to increase physical activity; c) weight loss; d) tobacco control and cessation; e) alcohol consumption reduction; and f) adequate sleep. Sessions were planned to be flexible in style and management. The local resource person informed the participants of the time and venue of the sessions either by home visit or telephone call and followed up attendance. Participants were encouraged to send another family member to any small group sessions where they were unable to attend themselves. This provided an opportunity for participants to understand what occurred during the sessions they may have missed and to spread the knowledge of the program among family members. If a participant missed two or more consecutive sessions, telephone calls were made to the participant by the K-DPP research team, followed by house visits by the local resource persons.

Results and key findings from the hybrid type II cluster randomized trial

A total of 1007 individuals (53% men) were randomized and enrolled into 30 control (507 individuals) and 30 intervention (500 individuals) arms. Twenty-nine out of 30 intervention groups organized all 15 group-based sessions over the 12 months duration. On an average, the participants attended eight sessions. Almost half (49%) of the participants attended 10 or more sessions with 11% attending all 15 sessions. Ten percent of the participants did not attend any sessions.

The K-DPP team distributed a Participant Handbook and a Participant Workbook to each participant. These resources were written in the local language (Malayalam). Participant Workbook was regularly used during group sessions. The participants also received a non-elastic measuring tape and were taught to measure their waist circumference to assess the progress towards their weight loss goals. All peer leaders used their handbook while preparing for group sessions, 78% found it ‘very useful’, and 22% found it ‘somewhat useful’. There were 77% and 23% gathered ‘a lot of information’ and ‘some information’ from the Peer-leader Handbook respectively.

To assist participants in attaining behaviour change goals, peer leaders with the support of local resource persons organized various community-based activities outside the peer-group sessions, such as yoga sessions, walking groups, and kitchen garden training. The participants were encouraged to bring family

members and other community members to take part in these activities. At 24 months, the incidence of T2DM was 14.9% in the intervention arm as compared to 17.1% in the control arm (p = 0.36).

Success factors and challenges

Success factors

- Home visits (for recruitment drive) guaranteed reasonably high reach.
- Educational resource materials were perceived useful and actively used by peer leaders and participants.
- Family/friends support
- K-DPP intervention team has provided ongoing support to peer leaders.
- Local resource persons were instrumental in supporting peer leaders in practical arrangements as well as linking them with community.
- The engagement of community organisations and members to participate activities
- Local communities organized various activities to stimulate community's interest and awareness towards healthy living including diabetes quiz competition, healthy living drawing competition, essay writing on diabetes, cooking competitions and sporting activities for children.
- Some of the community groups (sub activities) also conducted seminars delivered by doctors from the local primary healthcare clinics.

Next steps

The community engagement approach could be highly beneficial for wider implementation of sustainable lifestyle modifications programs in LMICs and this has been scaled up to 375,000 adults in three districts of Kerala in collaboration with the Kudumbashree Mission, a state organization with high coverage in the population and an existing community group structure and a training-to-trainers model already in place.

Our findings will be useful to inform the future development, adaptation, and implementation of diabetes prevention programs to reduce long-term diabetes risk in India and other LMICs.

Key learning objectives

1. Learn how to culturally adapt and tailor health interventions to meet the specific needs of different populations.
2. Understand the importance of community engagement and the role of peer leaders in driving successful health behaviour change.
3. Explore strategies for evaluating intervention effectiveness and scaling programs sustainably in low-resource settings.