

# Choosing a Scaleup Framework, A case study from Kerala, India

**K R Thankappan**

Professor, Department of Public Health &  
Community Medicine,  
Central University of Kerala

Email: [kr.thankappan@gmail.com](mailto:kr.thankappan@gmail.com)

**Brian Oldenburg**

Professor of Public Health,  
Baker Heart and Diabetes Institute

Email: [brian.oldenburg2@baker.edu.au](mailto:brian.oldenburg2@baker.edu.au)

# Overview

- **Kerala Diabetes Prevention Program (KDPP) was a cluster randomized controlled trial in One sub-district of Kerala State in India**
- **How KDPP was scaled up in three other culturally different districts (~ 10 million population) of Kerala will be presented as a case study.**
- **Framework used in the scale up also will be discussed**

# Introduction

- Diabetes prevention programs in Finland, USA, and China have demonstrated a reduction in Type 2 Diabetes Mellitus incidence between 42-58%
- In the Kerala Diabetes Prevention Program (KDPP), **after a median follow-up of 24 months** diabetes developed in 17.1% of control participants and 14.9% of intervention participants ( $p = 0.36$ ). The incidence of diabetes in the IGT (Impaired Glucose Tolerance) subgroup was significantly lower in the intervention group ( $p=0.038$ )
- **Compared with the control group, intervention participants had a significant reduction in major cardiovascular risk factors and significant increase in physical functioning score of the Health Related Quality of Life scale** ( $p = 0.016$ )

# Cultural Adaptation

The KDPP was adapted to Kerala, India from evidence-based lifestyle interventions implemented in high income countries, namely, Finland, United States and Australia.

The adaptation process was undertaken in five phases:

- 1) needs assessment
- 2) formulation of program objectives
- 3) program adaptation and development
- 4) piloting of the program and its delivery
- 5) program refinement and active implementation

Mathews et al. *BMC Public Health* (2017) 17:974  
DOI 10.1186/s12889-017-4986-0

BMC Public Health

RESEARCH ARTICLE

Open Access



## Cultural adaptation of a peer-led lifestyle intervention program for diabetes prevention in India: the Kerala diabetes prevention program (K-DPP)

Elezebeth Mathews<sup>1,2†</sup>, Emma Thomas<sup>3††</sup>, Pilvikki Absetz<sup>4,5,6</sup>, Fabrizio D'Esposito<sup>3</sup>, Zahra Aziz<sup>3</sup>, Sajitha Balachandran<sup>1</sup>, Meena Daivadanam<sup>7,8</sup>, Kavumpurathu Raman Thankappan<sup>1</sup> and Brian Oldenburg<sup>3</sup>

### Abstract

**Background:** Type 2 diabetes mellitus (T2DM) is now one of the leading causes of disease-related deaths globally. India has the world's second largest number of individuals living with diabetes. Lifestyle change has been proven to be an effective means by which to reduce risk of T2DM and a number of "real world" diabetes prevention trials have been undertaken in high income countries. However, systematic efforts to adapt such interventions for T2DM prevention in low- and middle-income countries have been very limited to date. This research-to-action gap is now widely recognised as a major challenge to the prevention and control of diabetes. Reducing the gap is associated with reductions in morbidity and mortality and reduced health care costs. The aim of this article is to describe the adaptation, development and refinement of diabetes prevention programs from the USA, Finland and Australia to the State of Kerala, India.

**Methods:** The Kerala Diabetes Prevention Program (K-DPP) was adapted to Kerala, India from evidence-based lifestyle interventions implemented in high income countries, namely, Finland, United States and Australia. The

# Scale up of the KDPP

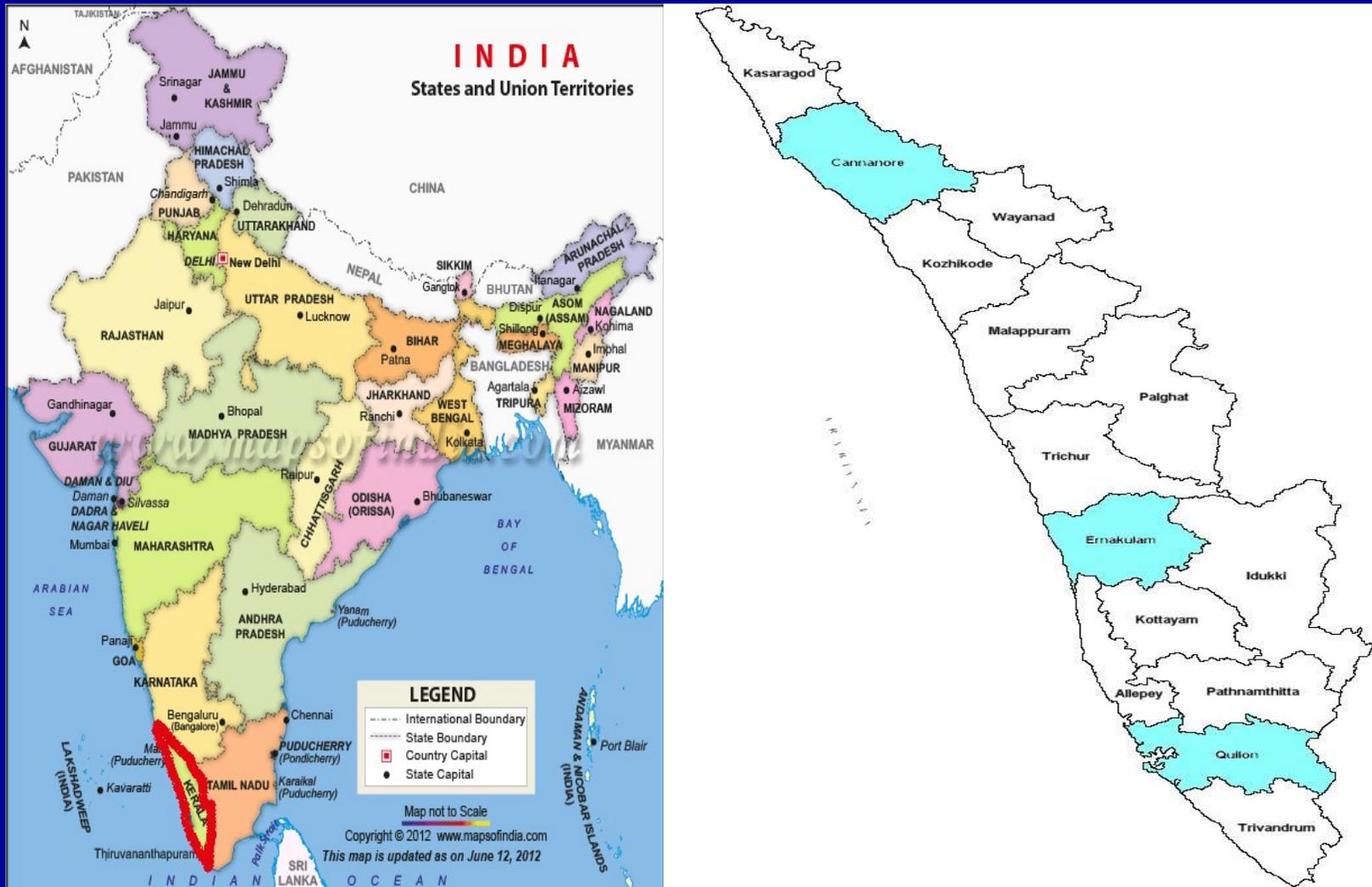
## Objectives

1. To develop a program delivery model for diabetes prevention and related capacity building in the Indian state of Kerala that can be further scaled up to whole of India in the future
2. To achieve significant improvements in the behavioral risk factors.

# Methodology

- Conducted in partnership with *Kudumbasree State Mission (KSM)*. KSM is the largest women's organization with more than 4.2 million members spread all over Kerala State
- Three geographically and culturally distinct districts ( about 3 million population each) were selected, one each from the south, central and northern Kerala for the scale up of KDPP
- In each district the plan was to train 40 KSM trainers (total 120).Each KSM trainer was expected to train 125 peer leaders of Neighborhood Groups (NGs). In each district 5000 peer leaders were expect to get trained making a total of 15000 in the state

# Study Districts in KDPP Scale up program

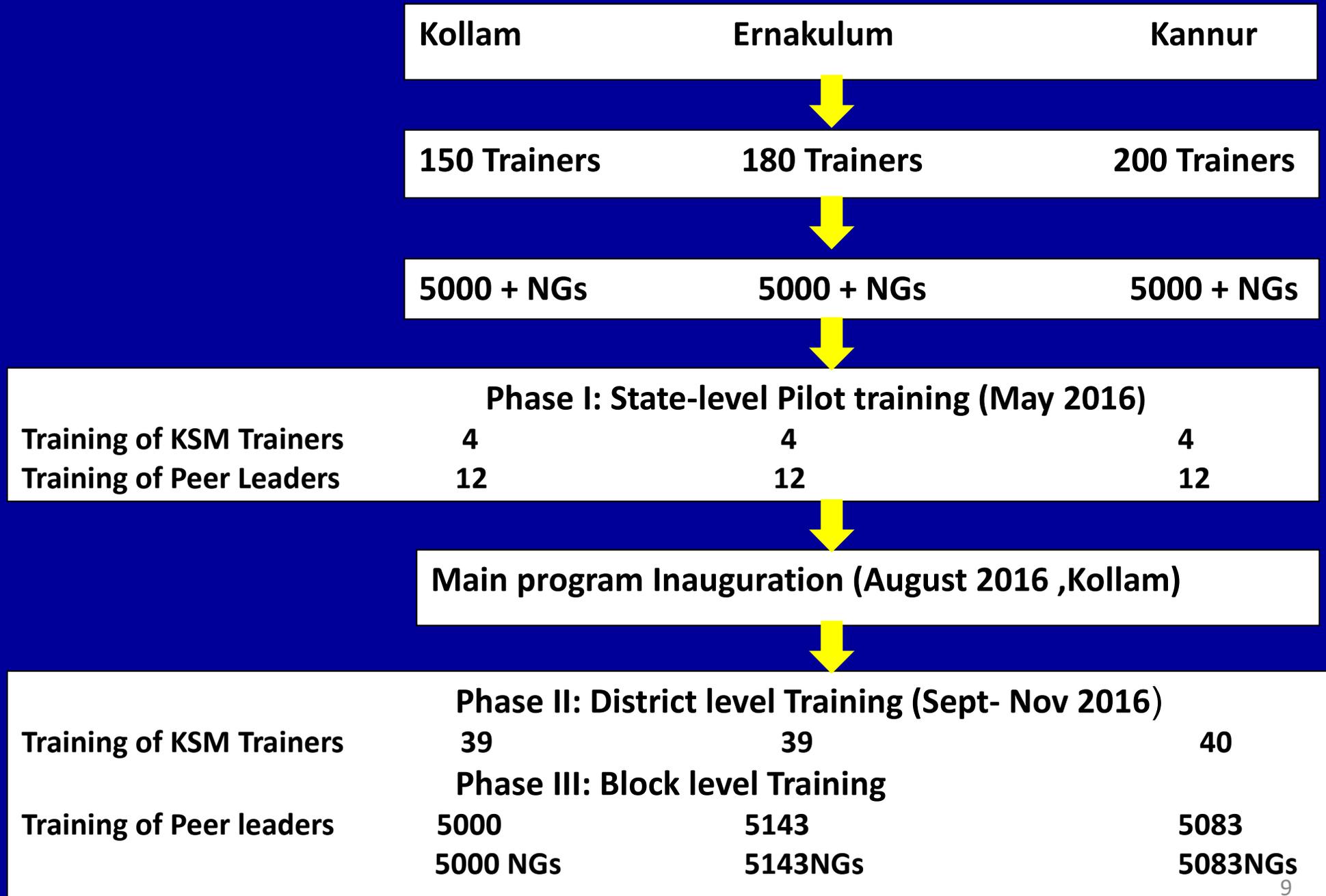


Kollam in the south, Ernakulam in the middle and Kannur in North

# Methodology contd.

- Each of these peer leaders was expected to take 12 monthly sessions to their NGs
- An NG consist of nearly 25 women. Thus we planned to reach at least 3,75,000 women and their family members over a period of one year
- The materials for the sessions were adapted from KDPP-RCT and modified and distributed by the community development chairpersons to the peer leaders (Table 1)
- Twelve monthly sessions were planned over a period of one year to be conducted at each NG by the peer leaders (Table2)

# Fig 1: Training Framework



# Scale up program Inauguration (August 2016)



Dr. K. T. Jaleel, Hon. Minister for Local Administration inaugurated the Kerala Diabetes Prevention Program (KDPP) implemented jointly by SCTIMST and the Kerala Kudumbashree Mission on August 18,2016 at Kottarakara. Adv. P. Aisha Potti , MLA, Kottarakkara presided over the function

Kudumbashree peer leaders and members who attended the inaugural function of the KDPP.



# Table 1: Resources distributed to the KDPP Study participants

Resources	
<b>KSM Training (Training of Trainers)</b>	
	Training manual
	Flip chart
	Measuring Tapes
<b>Peer leader Training</b>	
	Training manual
	Flip chart
	Measuring tapes
	Report form for 12 monthly sessions
<b>Participants</b>	
	Receive classes (no resources)
<b>Data collectors</b>	
	Weighing scales
	Measuring tapes

## **Table 2: Contents of small group sessions**

<b>Session No</b>	<b>Topics</b>
<b>1</b>	<b>Inaugural meeting</b>
<b>2</b>	<b>How to control diabetes</b>
<b>3</b>	<b>Prevention of diabetes: an overview</b>
<b>4</b>	<b>Self-monitoring of behaviors: diet and physical activity</b>
<b>5</b>	<b>Identifying the components in diet behavior that require modification and goal setting for diet</b>
<b>6</b>	<b>Identifying the components in physical activity behavior that require modification and goal setting for physical activity</b>
<b>7</b>	<b>Goal evaluation on diet</b>
<b>8</b>	<b>Goal evaluation on physical activity</b>
<b>9</b>	<b>Tobacco use and alcohol consumption</b>
<b>10</b>	<b>Sharing of the changes made in individual lifestyle with the group members</b>
<b>11</b>	<b>Evaluation of goal attainment</b>
<b>12</b>	<b>Evaluation of the program impact at individual and community level</b>

# Evaluation Framework

- Behavioral evaluation-Intended to collect information from 1200 participants (400 from each district) selected using a systematic random sampling technique and an interview schedule before and after the intervention.
- Planned to collect data from 20 NGOs from each district (total 60 NGOs in three districts) at baseline and one year after the intervention.
- All the participants (women and their family members) from each of these selected 60 NGOs were contacted to participate in the behavioral evaluation
- Participants unwilling to provide consent and unable to contact on 3<sup>rd</sup> consecutive house visit were considered as unavailable to participate in the study.

# Clinical and Biochemical evaluation

- Out of the 60 randomly selected NGs in 3 districts where evaluations of behavioral risk factors were done, 24 NGs were randomly selected for blood tests and clinical measurements
- At least thirteen individuals (7 women and 6 men) per NG were randomly selected for these purpose ( $13 * 24=312$ ) .
- 387 participants enrolled for the baseline study and 321 individuals participated in the post –intervention evaluation. All the measurements were taken free of cost at mobile clinics.

**Table 3: Measurement domains and survey tools at baseline and 12 months**

<b>Variable</b>	<b>Components</b>	<b>Measurement tools/questions</b>
<b>Demographic measures</b>		<b>Age, sex, education, occupation, and monthly household expenditure</b>
<b>Scalability</b>		<b>REAIM (Reach ,Effectiveness Adoption, Implementation,Maintanance Framework</b>
<b>Behavioural measures</b>	<b>Physical activity</b>	<b>Modified Global Physical Activity Questionnaire (GPAQ)</b>
	<b>Tobacco use</b>	<b>WHO STEPS question</b>
	<b>Alcohol use</b>	<b>WHO STEPS question</b>
	<b>Diet</b>	<b>Modified Food Frequency Questionnaire (FFQ)</b>
<b>Clinical measures</b>		<b>Waist circumference; weight</b>
<b>Biochemical measures</b>		<b>Fasting Blood Sugar (FBS),2 hr OGTT, lipid profile (Total cholesterol, HDL, LDL, triglycerides)</b>

# Outcomes

<b>Outcomes</b>	<b>Variables</b>
<i>Primary</i>	
<b>Scale up</b>	<b>REAIM Framework</b>
<b>Incidence of T2DM</b>	<b>Fasting Blood Sugar (FBS) and 2 hr Oral Glucose Tolerance Test (OGTT)</b>
<i>Secondary</i>	
<b>Glycemic control</b>	<b>Fasting glucose, post load glucose</b>
<b>Lipid profile</b>	<b>Total cholesterol, Triglycerides, HDL, LDL cholesterol</b>
<b>Behavioral measures</b>	<b>Diet, physical activity, tobacco use, alcohol use</b>

# Major Findings

- **After a follow-up of 12 months**

**118 KSM trainers of three districts trained 15,226 peer leaders (5082 in Kannur, 5143 in Ernakulum, 5000 in Kollam) thus 15,226 NGs were established in the state.**

**Each peer leader provided training to an average of 25 people in a NG, reaching a total of 3,80,650 women and their family members**

**Out of the 387 participants in the baseline 23% were diabetics (Fasting Blood Sugar (FBS)  $\geq$ 126 mg /dl and 38.5% were pre-diabetics (FBS 100-125 mg/dl)**

## Major Findings (contd.)

- Compared with the baseline evaluation, post intervention evaluation showed reduction in
  - alcohol use ( $p = 0.018$ ) (men only)
  - body weight ( $p=0.05$ )
  - waist circumference ( $p=0.03$ )
  - total cholesterol ( $p=0.06$ )

### A greater increase

- in fruit and vegetable intake ( $p = 0.038$ )
- physical activity ( $0.03$ )

# What was adapted to the new context?

- **Emphasis on peer support through group rather than individual contacts**
- **Group members were mostly women and the effort was to change the behavior through women**
- **Men participation was limited**
- **Dietary behavior can be better implemented through women in Kerala**

# How was the adaptation process conducted?

- **Formative evaluation: interviews with professionals, administrators, and those with diabetes**
- **State level steering committee was constituted with director of medical education, director of health services, KSM state leaders, experts in the area of diabetes management, physical activity, nutrition, tobacco use and alcohol use.**
- **District level implementation committee with District Panchayat President, District KSM mission coordinator, KSM district leaders, secretaries of accredited training groups of KSM.**

# How was adaptation and implementation evaluated in the new context?

- **First level on the effectiveness of scale up**
  - This was done through the number of peer leaders expected to be trained and actual number trained
  - Number of sessions conducted by each peer leader in each of the 15,000 NGs
  - Number participated in each of the 15,000 NGs (both men and women separately (This is still ongoing))
- **Second level on change in risk factors**
  - Change in behaviour risk factors after one year intervention
  - Change in clinical and biochemical risk factors

# Major learning's so far? How would you do things differently next time?

- Scale-up was successful and reached 15,000 peer leaders and their family members
- Evaluation of the outcome was found to be difficult as we were unable to collect majority of the feedback forms from the field.
- The Voice feedback system (VFS) to monitor the effectiveness of the monthly sessions was difficult due to the low response rates from the participants.
- Next time we should focus on feedback forms at the beginning and reiterate during the implementation phase
- Integrate the intervention program with the Government health system particularly with the lower level functionaries such as the accredited social health activists (ASHAs)



icmr  
INDIAN COUNCIL OF  
MEDICAL RESEARCH

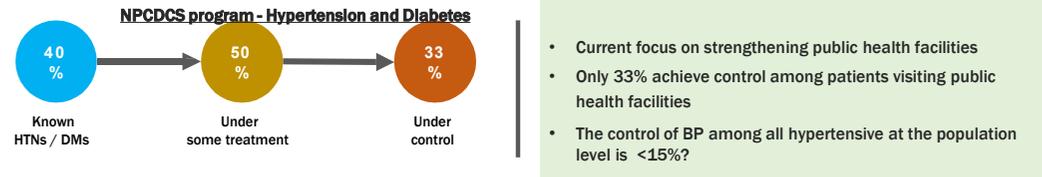
NIE  
NATIONAL INSTITUTE OF  
EPIDEMIOLOGICAL



# Improving control of Hypertension and Diabetes in Kerala and TamilNadu

Scaling up interventions - Leveraging India's national NCD program

## What is known?

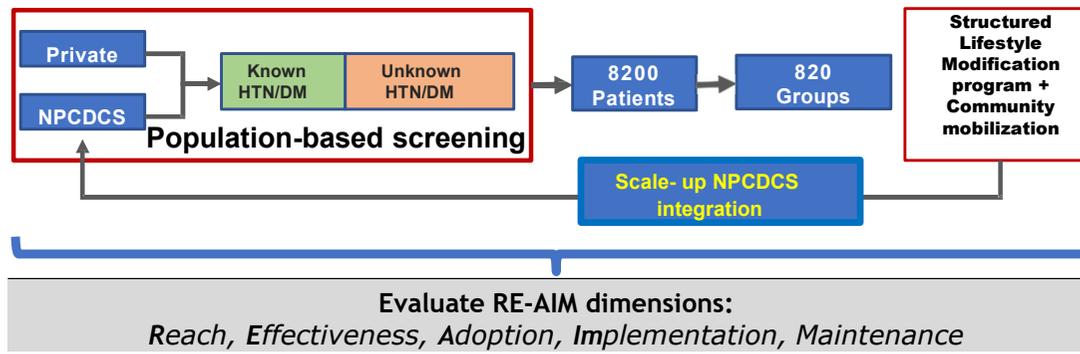


The team has published trials **on structured lifestyle modification (SLM), linking community engagement strategies, delivery by lay health workers and technology-enabled decision support** to improve cardiovascular and diabetes outcomes

## What is unknown? What we will answer ?

- How to integrate community-led SLM strategies into NPCDCS?
- How to improve population-level BP and blood sugar control in individuals with hypertension and diabetes ?
- Implementation outcomes of the SLM program?
- Enablers and barriers to future scale-up?
- Value and return on investment of the SLM program?

## How we will do it ? 82 Clusters



## TIMELINE



# Dissemination Meetings at Block level



**Kudumbashree peer leaders and members who attended the dissemination meeting of the KDPP at Chittumala Block, Kollam on Feb 1,2019.**

# Dissemination Meetings at Block level



**Kudumbashree peer leaders and members who attended the dissemination meeting of the KDPP Panoor Block, Kannur on Jan 25,2019.**

# Key messages

- **Diabetes is one of the major NCDs in Kerala (20% adults in Kerala have diabetes) an ideal condition for scaleup**
- **One of the largest women's groups in Kerala, the *Kudumbasree* Mission (KSM) and an Institute of national importance (SCTIMST) collaborated to implement this program**
- **Important to have political support; Kerala Government supported this program**
- **Used existing resources of KSM making it cost effective and sustainable**

# References

- Rabindranath R et al. Scale-up of the Kerala Diabetes Prevention Program (K-DPP) in Kerala, India: Implementation Evaluation Findings. *TBM* 2020; 10: 5-12. DOI 10.1093/tbm/ibz197
- Mathews E et al. Cultural adaptation of a peer-led lifestyle intervention program for diabetes prevention in India: the Kerala diabetes prevention program (KDPP). *BMC Public Health* 2017, 17:974
- Sathish T et al. Cluster randomised controlled trial of a peer-led lifestyle intervention program: study protocol for the Kerala diabetes prevention program. *BMC Public Health*. 2013 Nov 4;13:1035. doi: 10.1186/1471-2458-13-1035
- Aziz Z et al. A group-based lifestyle intervention for diabetes prevention in low- and middle-income country: Implementation evaluation of the Kerala Diabetes Prevention Program. *Implementation Science* (2018) 13:97 <https://doi.org/10.1186/s13012-018-0791-0>
- Thankappan KR et al. A peer-support lifestyle intervention for preventing type 2 diabetes in India: a cluster-randomized controlled trial of the Kerala Diabetes Prevention Program. *PLoS Med*. 2018 Jun 6; 15(6):e1002575. doi: 10.1371/journal.pmed.1002575. eCollection 2018 Jun
- Sathish T et al. Cost-effectiveness of a peer-support lifestyle intervention in high-risk individuals for type 2 diabetes in India: Trial-based analysis of the Kerala Diabetes Prevention Program. *BMC Med*. 2020 Sep 4;18(1):251. doi: 10.1186/s12916-020-01704-9
- Daivadanam M et al. Lifestyle change in Kerala, India: Needs assessment and planning for a community-based diabetes prevention trial. *BMC Public Health* 2013 Feb 1;13(1):95

**Thank You**