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Adopting a Tech-based Interactive Voice Response System to Build Awareness and Positive Behaviours among Communities within Non-Communicable Disease (NCD) Programs in Karnataka

Introduction

IVRS or Interactive Voice Response System is a technology that allows a computer to interact with humans through the use of voice input via a telephone keypad or by speech recognition. The system is automated and responds with pre-recorded voice messages. The IVR system helps to handle high volume of both the outbound as well as incoming calls. Currently, IVR systems are in use for various purposes such as banking, retailing, utilities, travel information and weather updates etc. In the healthcare sector, its use is still minimal though not new[1].

Context

Technology is best utilised if it could improve quality, reduce demands for human intervention, increase speed, improve efficiency and augment the reach of services. The public health system in India, especially in urban settings, faces a lot of challenges while tackling the increasing prevalence of chronic diseases, which include shortage of man power, inefficient drugs and logistics supply systems and complex nature of services. This offers greater scope for use of technology to add value to the existing interventions and enable effective delivery of health services. Programs for non-communicable diseases (NCDs) involve extended periods of engagement for activities that include promotion of healthy life styles among the community, regular and periodic screening, timely registration of newly diagnosed patients and sustained provision of services, often lasting an entire lifetime. Of these, health promotion and NCD prevention initiatives through behaviour change have gained significant ground as an important public health response to the NCD problem. In this background, the IVRS is a potential cost-effective solution which can reach a larger number of people with standardised healthy lifestyle related messages quickly.

We are currently implementing a project aimed at developing a comprehensive model to strengthen continuum of care for select NCDs (diabetes and hypertension) in an urban primary health centre (PHC) in Mysore city. As part of this project, we are using IVRS enabled audio messages to deliver educational messages for behaviour change (Box 2) among the target populations. We are also testing the feasibility and scalability of this system for delivery of health education and follow up among adults with NCDs and its risk factors (Fig 1).

[1]Haeok Lee, Mary Ellen, Friedman, PeterCukor, David Ahern. Interactive voice response system (IVRS) in health care services. Nursing Outlook; Vol 51 (6), December 2003, 277-283.

Objectives

The objectives for this solution are the following:

1. To ascertain the efficacy of an IVRS based system for health education aimed at promoting healthy lifestyles among communities in urban settings.
2. To support early registration/ enrolment of people and their compliance to NCD treatment and care.
3. To understand community acceptance and response to an IVRS based service, especially for a health care related service.

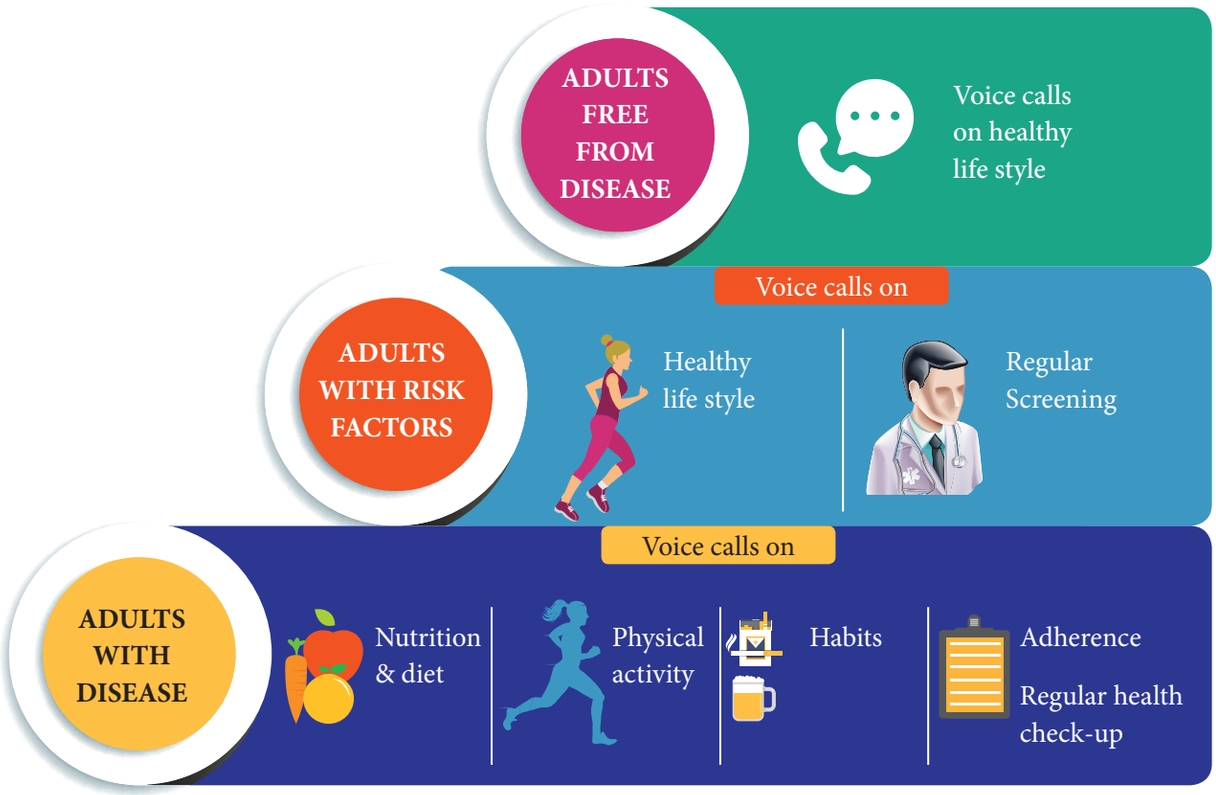

Fig 1: IVRS based intervention package

Description of proposed solution

The envisaged technology-based IVRS solution complements the overall strategy of the program and is integrated into the roll out of the intervention package in the field. The health workers of the project enrol adults after explaining the benefits of the IVRS and obtaining written consent from them.

Pre-recorded educational and counselling voice messages are sent once a week, in the language preferred and time indicated by the client. These messages also include timely reminders for visiting a health facility for follow-up diagnosis

The proposed system is completely hardware independent and virtual as it functions on a cloud-based server. The ICT support team drives its implementation along with routine operational maintenance. Outgoing calls are made through the IVRS system based on predefined logic, carrying intended voice messages and capturing simple user response through the phone keypad. Data on the calls made and user responses are stored within the server. Though the IVRS system can be configured to operate in a multi-lingual mode, the current system is providing its service in the local language Kannada. This would help keep the costs low and the operations simple.

Call structure

- Each registered client receives one message, approximately two minutes long, once a week
- If the call goes "unanswered" or non-responsive for any reason, four repeat attempts will be made to call the client
- Each attempt to call will be made 30 minutes apart

Box 1: Modules planned for the IVRS system

1. Referral and diagnosis tracking module

This module helps assist those clients who are screened to visit the facility for confirmation of diagnosis.

2. Education and communication module

IVRS system provides first level education and counselling, and guides the newly diagnosed client (either with diabetes or hypertension or both) on the next steps to be taken by him/her. Further, the system also assists in linking them to the concerned service providers and field staff. The system reaches all the registered clients on a periodic basis educating them on the importance of adopting healthy life styles, information on complications and treatment adherence.

3. Alerts and report generation module

The system generates a variety of outputs required to improve efficiency of the field operations such as: community reach, number of calls made, duration of calls, interest of target audience in IVRS calls etc. These outputs are generated in the form of periodic consolidated dashboard reports. The system also generates specific alerts to signal project health worker and beneficiary to a follow-up date of next visit.

Fig 2: Message delivery in phases

Messages in phase 1	Messages in phase 2
Basics of diabetes and hypertension	Wellness centres
Importance of drug adherence and regular follow-up	Yoga and meditation
Complications and management	Adverse effects of alcohol and tobacco use
Healthy diet	Side effects of common anti-diabetic and anti-hypertensive drugs
Physical activity	Client experience
Diabetic foot care	
Hypoglycaemia and treatment	

Implementation experience and initial results

The initial results of the solution are promising offering greater confidence among the project implementation team. The IVRS pilot intervention commenced early June 2018. Figure 3 depicts the implementation steps of the IVRS solution undertaken so far and figure 4 demonstrates the current data reflecting the client interest in the IVRS calls. The implementation steps start with promoting the system in the community to improve registrations and completes with delivery of voice calls. As per the latest information (until Sept 2018) retrieved from the system, 310 clients have registered to the service. Out of them 287 (93%) clients have answered at least one call. Of the 1590 calls scheduled by the system so far, 1276 (80%) calls have been answered by the clients. Around 65% of the clients listened to more than 90 secs of the voice message (Fig 3).

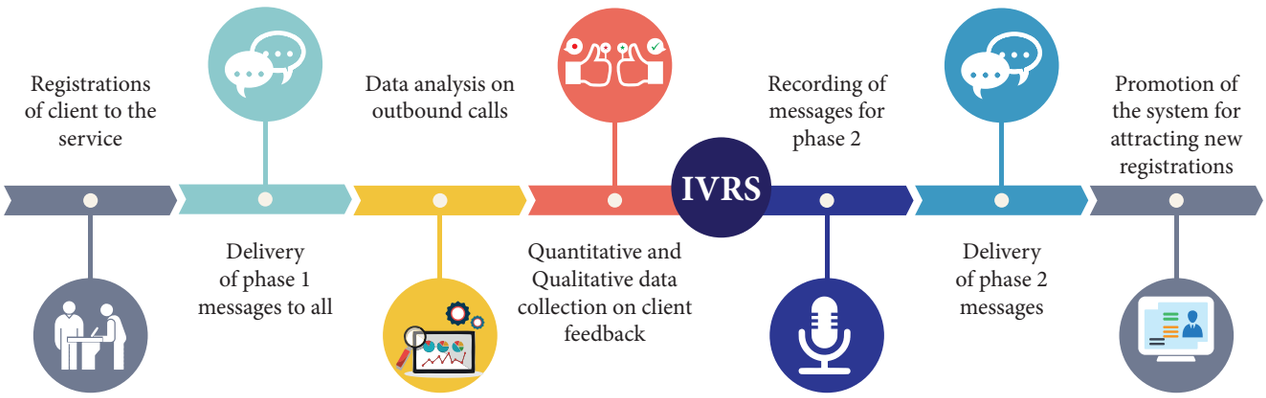

Fig 3: The implementation steps of the IVRS solution at Mysore NCD project (till 22nd Sep 2018)

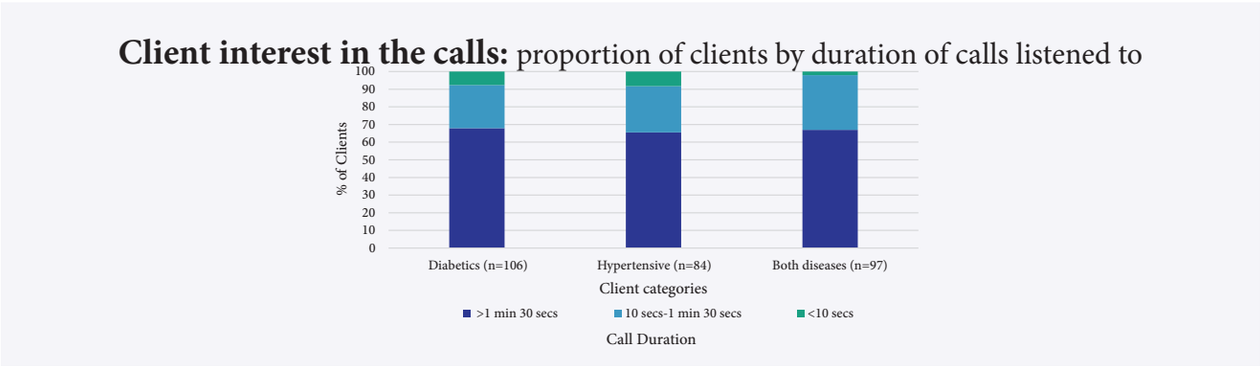

Fig 4: Client interest in IVRS calls (project monitoring data from 1st June 2018 to 22nd Sep 2018)

Way forward

The project implementation team is prepared to recruit more clients by actively advertising about the IVRS service both at government and private health facilities. The team is working towards 100% automation of the existing three operational modules. Additionally, the project is considering the inclusion of the modules mentioned below into the system.

- Follow up and services linkage module-This module will provide information on the need for repeated follow up at every stage of the client's treatment and care. This includes sending routine reminders on scheduled health check-ups and other related services.
- Data collection and linking module-This module allows for the collection of data on the field activities directly from the field level workers.

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