# Development of OSOMO Prompt Mobile Application on Elderly Population for Village Health Volunteers Using the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) Model

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**Abstract.** This paper aims to describe the use ADDIE model in developing a digital health tool, OSOMO Prompt app, and discuss evaluation outcomes of using this digital tool by village health volunteers (VHV) in rural areas in Thailand. The OSOMO prompt app was developed and implemented in elderly populations in eight rural areas. The Technology Acceptance Model (TAM) was used to test the acceptance of the app four month after the implementation. There were 601 VHVs voluntarily involved in the evaluation phase. The ADDIE model was successfully employed to guide the research team to develop the OSOMO Prompt app consisting of four services delivered to elderly populations by VHVs, including: 1) health assessment; 2) home visit; 3) knowledge management; and 4) emergency report. The findings from the evaluation phase reported that the OSOMO Prompt app was accepted as utility and simplicity (score 3.95+.62); and valuable digital tool (score 3.97+.68). The app received the highest score for being a useful tool assisting VHVs in achieving their work goals and improving work performance (score 4.0+.66). The OSOMO Prompt app could be modified for other healthcare services in different

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populations. Further investigation in long-term use and its impact on healthcare system is warranted.

**Keywords.** ADDIE model, Mobile Application, Digital Health Technology, Elderly, Village Health Volunteer

## 1. Introduction

Digital transformation has been implemented into healthcare system globally to improve health provisions, strategies, and operations through digital technology. Different types of digital tools have been developed and used in many health organisations such as mobile applications, computerized-based data system, and tracing system. This digitalization has enhanced a quality of health data in various aspects, including the timely and accurate information, optimizing data collection, and efficient data analysis which led to effectiveness and sustainability of healthcare practices (1,2). Mobile applications have been considered as a beneficial technology integrated in epidemiological research to cope with the challenges in data collection process (3).

In Thailand, health-related data in communities have been collected manually by the health volunteers on paper based practices for many decades which has posed significant challenges to quality of data collection and also burden of work. There is limited evidence of using digital tools in health data collection in rural area in Thailand. To improve the data collection and data analysis procedure at community level, the specific mobile application has been developed for community healthcare workers. This paper aims to describe the development of mobile application for village health volunteers (VHV) using the ADDIE model and discuss evaluation outcomes of this digital tool at a community level in Thailand.

## 2. Methods

OSOMO prompt mobile application is a digital tool developed for health volunteer workers to collect health data of elderly populations in rural communities. The Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model was used to guide the development of this mobile app. This research project has been approved by the Maha Sarakham Provincial Public Health Office's Ethical Review Committee for Human Research, chairperson: Mr. Pakee Sappipat (No. 6/2564).

### 2.1. Analysis phase

The survey was conducted to gain insight into socioeconomic and health status of elderly group, including nine domains: 1) Socioeconomic status, 2) Heath status, 3) Stress levels, 4) Quality of life,5) Activities of Daily Living (ADL), 6) Health knowledge, 7) Attitude toward health, 8) Health literacy, and 9) Health behavior.

### 2.2. Design and Development Phase

The content was designed upon on data analysis and using geographic information systems on smartphones and were transformed to  a hybrid application, including a web-

based app and mobile apps for iOS and Android. The smartphone application has been entitled 'OSOMO Prompt' (Figure 2). There were 8,348 of aged populations and 1,019 VHV involved in this phase covering eight areas of four provinces in the Northeast region of Thailand (Roi Et, Khon Kaen, Maha Sarakham, and Kalasin) (Figure 1).
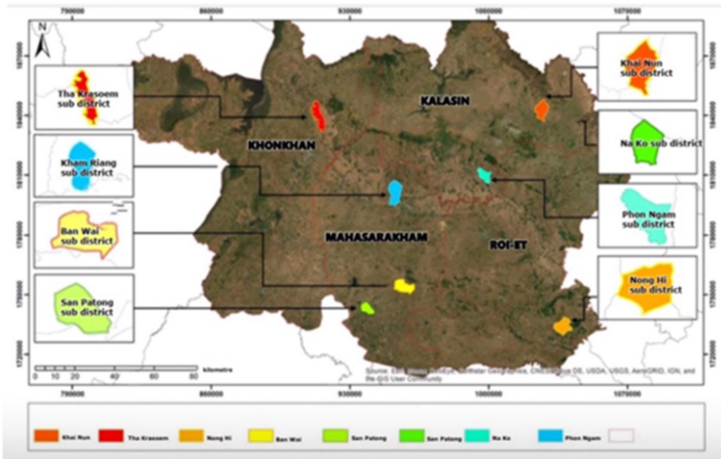


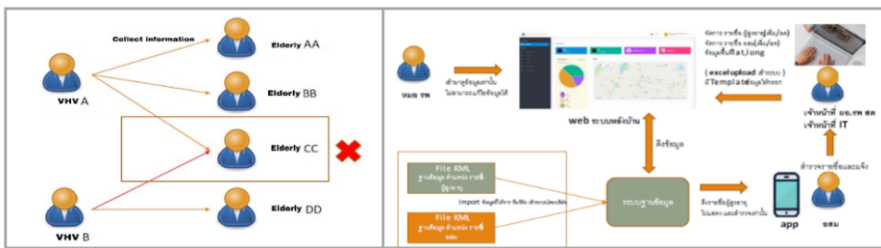**Figure 1.** Map of the eight study areas in the Northeast region of Thailand



**Figure 2.** Responsibility diagram and the fetched information of OSOMO app

## 2.3. Implementation Phase

A pilot study deployed a quasi-experimental study design (before-after trial) were conducted in eight areas, including 30 VHVs selected from each area. In total, 240 VHVs were recruited in this phase. The participants were asked to use the OSOMO Prompt app to help manage their routine tasks and collect health data in four domains: 1) health assessment, 2) home visit, 3) knowledge management, and 4) emergency report. The pilot study revealed the efficacy of the OSOMO Prompt app and the results have been published elsewhere (4). The app was then implemented in VHV practices in eight areas of the project.

## 2.4. Evaluation Phase

There were two stages of the evaluation process. The first stage was a preliminary evaluation occurred during the design and development phase before the implementation. It was a system evaluation performed by three experts to assess for appropriate language,

computer language, and accuracy. The second evaluation occurred four months after the implementation using the Technology Acceptance Model (TAM) to assess acceptability and feasibility of the app (5). Data were voluntarily collected from 601 VHVs who used this app and worked in the eight areas of the project. The full report of TAM has been published elsewhere (6).

## 3. Results

The OSOMO Prompt app was successfully developed and implemented using the ADDIE model. The main menu consists of four services delivered by VHVs to the elderly populations in rural areas: 1) health assessment; 2) home visit; 3) knowledge management; and 4) emergency report (Figure 3). Evaluation data were collected based on the two key aspects of the OSOMO prompt app. The findings derived from a pilot study revealed a significant increase in acceptance score of before and after using the OSOMO prompt (10.49+2.53 and 12.18+2.76 respectively $p<0.001$). Additionally, the results of evaluation phase revealed that majority of participants reported the OSOMO prompt app as utility and simplicity. The app was reported as easy to use tool (score 3.95+.62) and was accepted as a valuable tool in VHV work (score 3.97+.68). 'Using OSOMO prompt app makes it easy to accomplish VHV jobs' received the highest mean score at 4.0+.66.
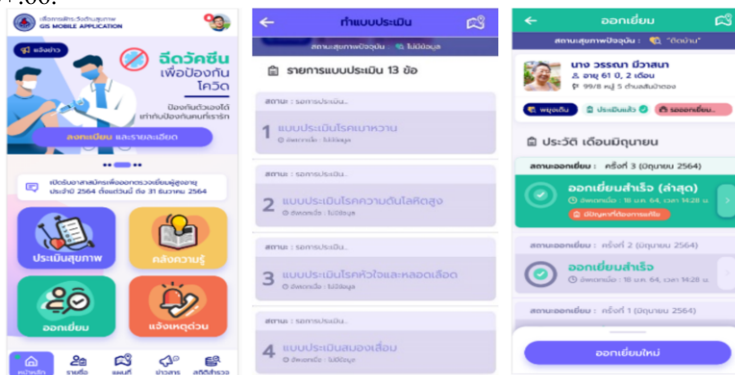


**Figure 3.** The main menus of OSOMO prompt mobile application.

## 4. Discussion

The results showed that the ADDIE model were successfully applied to guide the research team in developing a digital tool, the OSOMO Prompt app, for healthcare service and health data collection in rural areas. The ADDIE model was originally developed for a learning media and has been applied to several studies in care management such as Educare app, a mobile application for clinical duty of nursing students and nurse educators (7) and application for managing post-surgical symptoms for patients (8). The findings of evaluation phase revealed that VHVs perceived the OSOMO Prompt app as a helpful and useful tool for their work. This positively indicates the efficacy and acceptability of integrating digital innovation into healthcare practices in rural areas to improve quality of provision and increase professional development.

The high score in acceptance confirmed that digital technology is an acceptable tool among communities with low socioeconomic status and it is also been considered as a practical tool in relation to data collection and data analysis for healthcare system. The findings of this study provide evidence-based practice for healthcare provision delivered by health volunteers at community level in Thailand. Assessing sustainability and long-term outcomes of this app would be a plan for the next step. Additionally, it is warranted for a future study in using OSOMO Prompt app in different health services and different populations such as tracking pregnancy and prenatal care among unreported pregnancy in rural areas and monitoring self-management for chronic disease in ethnic groups.

## 5. Conclusion

The outcomes of this study demonstrated the achievement of using the ADDIE model to guide the development of the OSOMO Prompt mobile app for Village health volunteers to deliver healthcare services to elderly populations in rural areas in Thailand. The OSOMO Prompt app has been accepted as a utility and simplicity tool among the users and also assist VHVs to improve quality of their works and career development. The OSOMO Prompt app could be adapted and implemented in different healthcare services for different populations. Future research in long-term outcomes from using this digital tool is warranted.

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