Experiences in Using KoBo Collect and KoBo Toolbox in a Cross-Sectional Dog Population and Rabies Knowledge and Practices Household Survey in the Philippines

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Abstract

We used KoBo Collect and KoBo Toolbox as an electronic data capture platform for a dog population and rabies knowledge and practices community survey in the Philippines. It has allowed for easy design and deployment of an electronic form with minimal technical knowledge from the investigators. Using this platform allowed for shorter training for data collectors, minimal errors during data collection, and faster turnaround time for data cleaning and analysis.

Keywords:

Rabies; Health Knowledge, Attitudes, Practice; Electronic Data Capture

Introduction

Rabies is a fatal, yet easily preventable disease primarily spread by rabid dogs and estimated to cause 59,000 human deaths each year [2]. Despite the Philippine government's best efforts to control rabies in the country, there is no apparent downward trend in human rabies cases observed. The average number of cases between 2014 and 2018 was 231 (range 209-276) [4]. We conducted a study to determine gaps in the dog population and rabies knowledge in the Province of Bulacan, adjacent to the National Capital Region (NCR) [6]. In the study, six barangays (the smallest administrative unit in the Philippines) were chosen as a sampling unit to represent six municipalities.

One of the primary challenges in conducting household surveys in the Philippines, particularly in densely populated areas, is that there is no available household census in most barangays. Simple selection of households by following the main road would cause bias in household selection. To overcome this, we first conducted community mapping wherein the study team collected all households' Geographic Information System (GIS) coordinates for all barangays included in the study.

Since we needed to conduct household surveys in densely populated urban and sparsely populated rural communities, we needed a platform that allows for offline data entry if mobile data is not available. We also needed a platform that provides differentiated user privileges for data collectors, field managers, and researchers. Since both English and Filipino are spoken in the chosen site, we needed support for multi-lingual forms. We also had a limited budget and time, so we preferred a platform that does not require server setup. Finally, to facilitate more accessible data collection and less training time, we wanted a platform that allows for skip logic and compute functions. We identified KoBo Toolbox as our electronic research data collection platform as it meets all our study's needs. KoBo

Toolbox is free and open-source software initially developed for humanitarian use by the Harvard Humanitarian Initiative, Harvard TH Chan School of Public Health, and the Brigham and Women's Hospital [7]. Although KoBo is rarely discussed in the informatics literature, it is currently being used in different research studies, particularly in Africa [1,3,5].

Methods

Community mapping

We conducted community mapping to ensure that households for the survey were systematically selected in the absence of a registry. Our study staff obtained the Geographic Information System (GIS) coordinates of all households in the target barangays using Garmin eTrex 10 (Kansas City, Missouri, USA) and assigned a unique ID to each. The target households for the survey were determined electronically using Microsoft Excel based on the sampling interval specified by the study protocol.

Data Collection Setup

After finalizing the contents of the data collection instrument, the electronic form was created on Microsoft Excel using the XLSForm standard. Range, logical checks, and skipping logic were integrated into the electronic form. Syntax was checked using XLSForm Online v2.x (https://getodk.org/xlsform/). The XLSForm was then uploaded through the KoBo Toolbox website (Cambridge, Massachusetts, USA, version 2.019.42). KoBo Toolbox also allows for form design using its web-based form designer. The electronic form underwent field testing to determine if there are any errors or logic faults.

We used twelve (12) Android smartphones with KoBo Collect (version 1.25.1), and each was assigned to one data collector for the whole duration of the data collection. The data collectors were also provided power banks in the event that their smartphone battery was depleted. Each smartphone had a Google account and KoBo account, which allowed us to associate the collected data to a specific smartphone and data collector. We conducted a one-day training on February 14, 2020, for our data collectors on informed consent administration and the use of KoBo Collect.

The blank form was downloaded from the KoBo Toolbox server to the smartphones. After each data collection day, the completed form data was sent from the smartphones to the server. The platform does not allow smartphones to access the aggregated collected data from the server, which adds another layer of security.

Results

Community mapping and survey results

Community mapping was done from January 15 to 31, 2020, and we identified a total of 9,173 households in the target barangays. The survey was done from February 4 to 19, 2020, among 727 households. No smartphones used failed in the study, and the study team did not encounter any issues during data transfers from the smartphones to the server. Minor reconfiguration of the electronic form was done during the first few days of data collection to correct some range and logic checks.

Discussion

Experiences during data collection

KoBo Collect allowed data collectors to reach even remote areas without the difficulty of bringing heavy paper forms. This made traveling by foot a lot easier, especially during hot and humid days. KoBo Collect was also very useful in locations with no or weak cellular data since it does not require internet connectivity. Data could be collected and stored even the device is offline. Electricity was not also a problem during the data collection process as long as the device has been fully charged before field data collection.

Experiences during data cleaning

The study team reported that checking the data after a day of collection was easier and faster using Kobo Toolbox as it had a feature where the field managers could review the collected data. This way, the field managers could monitor the data gathered remotely and prompt the data collectors if there is a discrepancy. Reports were generated once new data is sent to the server. Downloading datasets from the system was straightforward given the CSV export format, which could be easily be converted and used in statistical software for data processing, cleaning, and analysis. Data cleaning was easier also, as KoboToolbox had strict built-in validation to ensure the completeness of collected data. The skip logic condition and validation criteria were well-handled by the platform.

Recommendations

We conducted the community mapping using dedicated GIS devices due to concerns that using smartphones would not be as accurate. The Garmin eTrex 10 devices used were relatively slow as device navigation, and data input was limited to a 5-way navigation stick. For future studies, we recommend that smartphones gather GIS data once its accuracy is validated. This would also allow for faster data entry.

KoBo Toolbox, although developed for field data collection in humanitarian crises, functioned successfully for research data collection in our setting. To expand as a research tool, the KoBo platform could benefit from an electronic consent framework, which would allow for a completely paper-free data collection.

Conclusions

We successfully conducted a household survey using KoBo as our electronic data capture platform. The use of the platform provided the study team with an economical, time-saving, and more straightforward method of data collection as compared to traditional, paper-based methods. Based on our experiences, we recommend that the KoBo platform be used primarily for cross-sectional studies. One major strength of the platform is its ease of deployment and integration of multi-lingual forms. Based on its design, we do not recommend its use on longitudinal studies wherein data is needed to be downloaded from the server to the data collection device.

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