To,

Covering Letter

The Editor

**Sub:** Submission of Manuscript for publication

Dear Sir,

We intend to publish an article entitled **“EpiCollect5 software ease of use among Medical students: evaluation survey”** in your esteemed journal as an Original Article

On behalf of all the contributors I will act and guarantor and will correspond with the journal from this point onward.

Prior publication - Nil

Support - Nil

Conflicts of interest - Nil

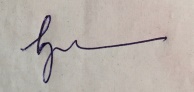
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Thanking you,

Yours’ sincerely,

Dr.Gnanamani.G (Gnanamani Gnanasabai)



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Encl: Contributor’s form signed by all the contributors

Checklist

### Contributors' form *(to be modified as applicable and one singed copy attached with the manuscript)*

Contributors’ form

**Manuscript Title:** ­

EpiCollect5 software ease of use among Medical students: evaluation survey

I/we certify that I/we have participated sufficiently in the intellectual content, conception and design of this work or the analysis and interpretation of the data (when applicable), as well as the writing of the manuscript, to take public responsibility for it and have agreed to have my/our name listed as a contributor. I/we believe the manuscript represents valid work. Neither this manuscript nor one with substantially similar content under my/our authorship has been published or is being considered for publication elsewhere, except as described in the covering letter. I/we certify that all the data collected during the study is presented in this manuscript and no data from the study has been or will be published separately. I/we attest that, if requested by the editors, I/we will provide the data/information or will cooperate fully in obtaining and providing the data/information on which the manuscript is based, for examination by the editors or their assignees. Financial interests, direct or indirect, that exist or may be perceived to exist for individual contributors in connection with the content of this paper have been disclosed in the cover letter. Sources of outside support of the project are named in the cover letter.

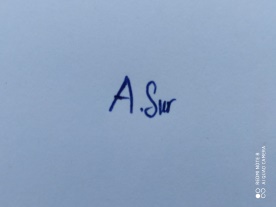
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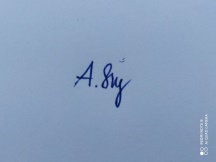
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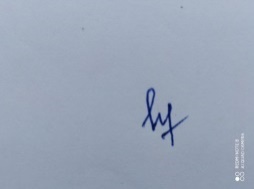
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**Name Signature Date signed**

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### Checklist *(to be tick marked, as applicable and one copy attached with the manuscript)*

Checklist

**Manuscript Title:**

**“EpiCollect5 software ease of use among Medical students: evaluation survey”**

**Covering letter**

* Signed by all contributors
* Previous publication / presentations mentioned
* Source of funding mentioned
* Conflicts of interest disclosed

**Authors**

* Middle name initials provided
* Author for correspondence, with e-mail address provided
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* Identity not revealed in paper except title page (e.g. name of the institute in material and methods, citing previous study as ‘our study’, names on figure labels, name of institute in photographs, etc.)

**Presentation and format**

* Double spacing
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* Running title provided (not more than 50 characters)
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* Uniformly British English
* Abbreviations spelt out in full for the first time
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Figures necessary and of good quality (colour)

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**Reporting Guidelines for Specific Study Designs**

STROBE Type of article: Original

Title Page

Title of the article:

**“EpiCollect5 software ease of use among Medical students: evaluation survey”**

Running title: Ease of use of EpiCollect5 software

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| Definition of intellectual content | Yes | Yes | Yes | Yes | Yes | Yes |
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Title of the article: Original

Abstract Page

**“EpiCollect5 software ease of use among Medical students: evaluation survey”**

Abstract:

**Background:**

Mobile and web based application like EpiCollect5 makes work easier by paving a way of paperless and easy way of data collection and exporting.

**Aim & Objective:**

To evaluate the ease of use of EpiCollect5 software among the medical undergraduates students who had used this application.

**Settings and Design:**

A Cross sectional study was conducted among undergraduate students in a tertiary care institute.

**Methods and Material:**

The present study was conducted using a pre-tested semi structured and self-reported questionnaire to obtain information on ease of use of EpiCollect5 software from the medical undergraduates.

**Statistical analysis used:**

The data entry was done in Epidata 3.1 while analysis was done by using Epidata 2.2.2.182.

**Results:**

It was easy and simple to use the EpiCollect5 software reported by majority (94%) of the students and almost 90.6% of the participants felt that the software is user friendly.

**Conclusion:**

Majority of the students agreed with the user-friendly nature of the software and its applicability in collecting data from the community.

**Key-words:**

Software, Data collection, EpiCollect5, Mobile application

**Key Messages**: The research is on evaluation of ease of use of EpiCollect5 software among medical undergraduate students.

**Introduction**:

Text

Epidemiologists often collect data in the field and need to enter their data into a database for further analysis. The increasing availability and decreasing cost of mobile devices running the Android (4.4+) and iOS (8+) which has both GPS and Google Maps among the other existing features, which provides new opportunities for developing mobile phone applications, which in conjunction with web applications, allow two-way communication between field workers and their project databases.1 One such mobile and web based application is EpiCollect5 which is free and easy for data collection. Data are collected (including GPS and media) using multiple devices and all data can be viewed on a central server (via map, tables and charts). And more conveniently, all these data can be exported into suitable csv and json format. With increasing acceptance and being an easy tool for data collection, we conducted a study among the medical undergraduates students’ of our institution who had used this application during their field survey to evaluate the ease of use of this EpiCollect5 software.

**Aim & Objective(s):**

To evaluate the ease of use of EpiCollect5 software among the medical undergraduates students who had used this application.

**Materials and Methods:**

**Study design & setting:** The present cross sectional study was conducted in a medical college, Pondicherry.

**Study population:** The study was conducted among the medical undergraduate students who used the EpiCollect5 software for data collection in their field survey.

**Study period:** The current study was conducted between April - May 2019 (2 months).

**Study instrument:** A pre-tested semi structured and self-reported questionnaire was used to get information from the medical undergraduates.

**Inclusion criteria:** Students who used the software for data collection.

**Exclusion criteria:** The students who were not present at the time of data collection were excluded.

**Methodology:** The quantitative data was collected by the study investigator by administrating self-reported questionnaire among 149 medical undergraduates students’. Information regarding ease of use of software was obtained.

**Statistical analysis:** The quantitative data entry was done in Epidata 3.1 while analysis was done by using Epidata 2.2.2.182. The data is presented in the form of numbers, distribution and percentages, median and IQR (Inter quartile range) in tables and figures.

**Ethical consideration**: Ethical permission was obtained from Institutional Ethical Committee before conducting the present study. All the information collected was kept confidential by the researcher and the study guide during the study period and after the study.

**Results**: The present study was conducted using a pre-tested semi structured and self-reported questionnaire to obtain information on the usage of EpiCollect5 software from the medical undergraduates. All the undergraduate students in this university were exposed to the EpiCollect5 software during the community posting which is held in the second year of the medical curriculum. Total of 149 medical undergraduates were enrolled in the study. Majority of the students belong to the age of 19±1.8 years. Around 72% of the students were girls and almost all the participants were from urban residence. The results of this study will be presented in three domains namely user-friendliness, software related and applicability related issues. Responses of the study participants regarding the ease of use of EpiCollect5 software are represented in Table 1.

User friendliness:

Around 94% of the students agreed that it was easy and simple to use the EpiCollect5 software and almost 90.6% of the participants felt that the software is user friendly.

About half of the study participants (56.4%) perceived that they can use the software without written instructions. More than two third of the students (76.5%) did not notice any inconsistencies while using the software. Only a minimal number of students (1.3%) disagreed from the fact that they learned to use it quickly. Some of the students (7.3%) felt that it was hard to remember about how to use the software. Hence, the EpiCollect5 software is user friendly and it is preferred by many students.

Applicability issues:

Majority of the medical undergraduates (78.6%) agreed that EpiCollect5 software helped them to be more effective and productive when compared to other commonly used softwares such as Microsoft excel and around 18.1% of the students were undecided about the same. Near to half of the participants, 41.7% agreed that there is a misconception among public for using mobile for collecting data but one-fourth of the participants disagreed from the same fact (24.1%).

Software related issues:

The medical undergraduates were asked about the ease of installation of the EpiCollect5 software. Around 78.5% of the study participants felt that the software was easy to install and use it. But then around 10.8% of the students disagreed that the EpiCollect5 software can be usable on multiple platforms. Almost 79.2% of the students felt that using the EpiCollect5 software is time saving and also it was easy for the participants to view, analyze and export data from the software. More than half of the participants (55.1%) were aware that capturing location using GPS becomes ease in EpiCollect5 software and they agreed on it. About 59% of the students felt that it was easy to edit the questions in EpiCollect5 software. Half of the medical graduates (57%) faced network issues while uploading data.

**Discussion**:

In the present study, almost 76.5% of the study participants agreed that they did not notice any inconsistencies while using the software. This result can be compared with the study done in Sweden on ‘Proposal of a Mobile Health Data Collection and Reporting System for the Developing World’ by Deo et al, in 2012 also reported that there is incomplete or incorrect data due to lack of understanding of the flow of health data which is subject to inconsistency and under-reporting of the health data to the management level. Participants of this study also suggested that involvement of more stakeholders for processing data and analysing data will help to improve maximum utilisation of data.2,3

‘Offline mobile data capture module for Health and Demographic Surveillance System (HDSS) studies’ has been surveyed by Baguiya et al among HDSS sites in Asia, Africa and Oceania in the year 2016. The study reported that 60% of the study sites used paper-based data collection methods and 34% used mobile devices. In the study sites which used mobile devices for data collection, data managers were asked about the reason behind choosing this method. The responses were, they considered mobile devices for the process because that will guarantee both data quality and timeliness. Some of them also mentioned that they used mobile devices since the software for data collection was available free of cost and they had the skills to do the same. Similarly, in our study also, the medical undergraduates were asked about the applicability of using EpiCollect5 software for data collection for research purposes. More than two-third of the participants (78.6%)felt that this software helped them to be more effective and productive when compared to Microsoft Excel. They also felt that it is time saving and easy to view, analyse and export data from the software.4,5

In our study, when we explored the software related issues, half of the study participants (57%) stated that they faced network issues while uploading data. A study done by Baguiya et al also showed the similar results that lack of skills for setup and maintenance of the system and unreliable internet connectivity were the reasons for not opting for mobile based data collection. Though we have so many advantages in using mobile phones for various purposes, constraints such as changes in data management plans, infrastructure and equipment also exists at the same time. These facts acts as barriers for the usage of mobile devices. Though we have so many advantages in using mobile phones for various purposes, constraints such as changes in data management plans, infrastructure and equipment also exists at the same time. These facts act as barriers for the usage of mobile devices.4,6,7

Respondents of our study agreed that the software is simple and easy to use and the software is user friendly and also the students were able to use it without written instructions which is comparable with the study done by Mahadeen et al on ‘Factors affecting the readiness of medical doctors and patients with chronic conditions toward the usage of smartphones in the Saudi Arabian healthcare sector’ where the participants considered using smartphone and its applications for communication among them; they also reported that it has enhanced the willingness of the patients. Multiple factors such as trust, ease of use, perceived usefulness also plays a major role in the use of software applications in the health sector.8

Capturing location becomes ease using GPS while using the EpiCollect5 software for data collection and other research purposes and majority of the participants had agreed upon this fact in the present study. The results of our study were comparable to a study done by Madder et al which suggests that the power of EpiCollect5 is its real-time and online mapping facility. The stakeholders and the data managers will be able to access, analyse and import the data from the project website, once it is synchronized. This feature will be more pronounced and helps in disseminating information and while planning for rapid intervention in case of emerging diseases.7

Besides the advantages of using software for data collection and research purposes, the study also captures the hidden facts such as applicability issues and other constraints from the user’s perspectives. It is important to incorporate the observations from this study for further enhancements in the software and also to integrate these methods in medical education, public health administration and research.

**Conclusion**

The current study highlights the importance of utilizing EpiCollect5 software among undergraduate medical students for community postings. Majority of the students agreed with the user-friendly nature of the software and its applicability in collecting data from the community. Only a smaller proportion of students had software related issues which could be improved by adequate training for installation and data collection process.

**Recommendation**

As technological tools become further integrated into medical research with young people, the academic community needs to think carefully about how digital technologies are conceived, designed, applied and analyzed—ethically and appropriately. We advocate for meaningful, ethical, participatory interactions with young participants, where young people are co-designers, co-analyzers and co-disseminators in the use of app-based data—this gives opportunities for in-depth, multi-method research into young lives and provides opportunity for wider societal impact.

**Relevance of the study**

The study is unique which have evaluated the use of EpiCollect5 software.

**Acknowledgement**

All the authors have contributed equally.

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**Tables**

**Table 1: User -friendliness of EpiCollect5 software among the respondents (n=149)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| User friendliness | **Strongly Disagree**  **n(%)** | **Disagree**  **n(%)** | **Undecided**  **n(%)** | **Agree**  **n(%)** | **Strongly Agree**  **n(%)** |
| It was easy & simple to use this software | 2(1.3) | 1(0.7) | 6(4) | 96(64.4) | 44(29.5) |
| It was user friendly | 0 | 4(2.7) | 10(6.7) | 93(62.4) | 42(28.2) |
| I can use it without written instructions | 0 | 17(11.4) | 30(20.1) | 84(56.4) | 18(12.1) |
| I didn't notice any inconsistencies | 1(0.7) | 13(8.7) | 21(14.1) | 100(67.1) | 14(9.4) |
| I learned to use it quickly | 0 | 2(1.3) | 7(4.7) | 108(72.5) | 32(21.5) |
| I easily remember how to use it | 2(1.3) | 9(6) | 25(16.8) | 81(54.4) | 32(21.5) |

**Table 2: Applicability issues of the EpiCollect5 software (n=149)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Applicability issues | **Strongly Disagree**  **n(%)** | **Disagree**  **n(%)** | **Undecided**  **n(%)** | **Agree**  **n(%)** | **Strongly Agree**  **n(%)** |
| It helps me more effective & productive (compared to excel) | 0 | 5(3.4) | 27(18.1) | 81(54.4) | 36(24.2) |
| Misconception among public for using mobile for collecting data | 6(4) | 30(20.1) | 51(34.2) | 50(33.6) | 12(8.1) |

**Table 3: Software related issues while using EpiCollect5 (n=149)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Software related issues | **Strongly Disagree**  **n(%)** | **Disagree**  **n(%)** | **Undecided**  **n(%)** | **Agree**  **n(%)** | **Strongly Agree**  **n(%)** |
| Ease of installation | 3(2) | 7(4.7) | 22(14.8) | 78(52.3) | 39(26.2) |
| Usable on multiple platforms | 1(0.7) | 15(10.1) | 23(15.4) | 82(55) | 28(18.8) |
| Time saving | 0 | 10(6.7) | 20(13.4) | 74(49.7) | 45(30.2) |
| Easy to view, analyze and export data | 1(0.7) | 14(9.4) | 16(10.7) | 88(59.1) | 30(20.1) |
| Capturing location becomes ease using GPS | 4(2.7) | 15(10.1) | 48(32.2) | 71(47.7) | 11(7.4) |
| Easy to edit the questions | 1(0.7) | 26(17.4) | 34(22.8) | 79(53) | 9(6) |
| Network is a problem while uploading data | 4(2.7) | 26(17.4) | 34(22.8) | 69(46.3) | 16(10.7) |