

# Usability and Acceptability of a Mobile App for Emergency Room Providers to Examine Child Abuse Victims: A Mixed Methods Study

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## Background

SACA app's QR code for

Apple system



Android system



- We developed a mobile application called Sexual Assault Care Algorithm (SACA) for rapid decision-making and guidance for health care providers of child sex-abused victims, especially those working in the emergency room.
- The contents and logical rules of SACA follow the paper-based Child Abuse Medical Provider (CHAMP) program's guidelines. CHAMP is an initiative funded by the New York State Department of Health.
- The objective of this study is to provide a preliminary evaluation of the usability and acceptability of SACA.

## Data collection

	Observations	Survey	Interviews	Documentation
<b>Understanding scenarios and questions</b>	Data: Time to complete each question, including reading the scenarios Source: Researcher's observations and reflection note	N/A	Data: Participants' experience and perspectives about their understanding of the scenarios and questions Source: Interview transcript	N/A
<b>Interaction with paper-based guidelines</b>	Data: How and what evidence to highlight in the paper-based guidelines Source: Researcher's observation and reflection note	N/A	N/A	Data: Answers' accuracy rate Source: Participants' answer sheets and their notes on the paper-based guidelines
<b>Interaction with app</b>	Data: How and what evidence to look for in the app Source: Video of participants' finger interaction with app; transcript of participants' thoughts about	Data: Demographic information; usability score; acceptance scores Source: Online questionnaire	Data: Participants' perspectives about their use of the SACA app Source: Interview transcript	Data: Answers' accuracy rate Source: Participants' answer sheets and the app screenshots they took as evidence of the right answer
<b>Intent to use in the future</b>	N/A	N/A	Data: Participants' responses about where they will use the SACA app in the future Source: Interview transcript	N/A
<b>Suggestions to improve the app</b>	N/A	N/A	Data: Participants' suggestions for changes to improve the SACA app prototype Source: Interview transcript	N/A

## Mixed methods joint display table

Survey items	Level of ranking	QL themes & categories	Sample quotes from interviews	Notes from observation and documentation
<b>Overall, I am satisfied with how easy it is to use this app.</b>	1	Ease of use	Feeling easy and comfortable The app is easy to use.	Only P4 looked frustrated when using app.
<b>It was simple to use this app.</b>			Easier than paper: "Targets information specifically and do not have to go through the entire paper"; "Easy to start by selecting the type of patients to get exact information needed."	N/A
<b>I liked using the interface of this app.</b>			User-friendly screen and features	N/A
<b>I felt comfortable using this app.</b>			Similar to current workflow: "People are used to computerized things"; "As a sexual assault provider, we have a piece of paper. We check things off. The app is similar to that piece of paper."	N/A
<b>It was easy to learn to use this app.</b>			N/A	Most of them learned how to use the app fast and asked no questions while interacting with the app.
<b>The information provided for the app was easy to understand.</b>			Easy to understand. However, P4 said she was confused by the questions asked in the app.	
<b>The interface of this app was pleasant.</b>		Positive emotion	N/A	All participants were focused.
<b>How much did you enjoy using this app?</b>				
<b>Was the amount of time it took to complete this app acceptable?</b>			Shorter time to complete app	N/A They had shorter times with similar accuracy rates using app compared to using paper-based guidelines.
		Usefulness		
<b>I was able to efficiently complete the tasks and scenarios using this app.</b>	2	Efficiently complete the tasks and scenarios	N/A	All of them completed the questions using the app.
<b>How helpful was this app in describing what you want to know when facing a client/patient?</b>		Helpful in front of patients	Handy (on the phone, not on paper). "The information is right around you when you need it. What applies to patients is in front of you and it guides you with the response to the treatment."	N/A
n/a	N/A	Helpful to teamwork	Helps working with team members: "Everyone would be on the same page in treatment response to the patients"; "With the app, I can show other providers what we should be doing based on the guidelines."	N/A
<b>This app has all the functions and capabilities I expected it to have.</b>	2	Functions and capabilities	Adding how to calculate and validate the elapsed time.	N/A
<b>The information provided for this app was effective in helping me complete the tasks and scenarios.</b>		Information	Need training on how to use this app based on scenarios, including how to calculate time; need explanation on some buttons for better future use.	Participants have different reading comprehension levels. P1 understood the questions very quickly without any problems. P2 verified the info, which she said is accurate. P3 and P4 had difficulty comprehending the scenarios and questions, including the elapsed time in the questions. They read slowly and repeatedly read the same questions several times. While reading, P3 highlighted some words of the questions to help her comprehension.
<b>The information provided for this app (online help, documentation) was clear.</b>			Explain some buttons, such as "follow up" to whom and "mandatory report" to whom.	
<b>The organization of information on the app screens was clear.</b>	3	Organization	"The app is organized."	There were two ways they got started on the first page.
<b>It was easy to find the information I needed.</b>			Faster than paper: "It will not take too much time trying to get all the details, especially when I am there with the patients."	P1 and P4 chose the option, "If you know the time elapsed since the abuse or assault, please click here." The only difference is that P1 was confident in knowing where to go from there, while P4 looked frustrated and confused afterwards. Their average times to answer each question using the app were 1 and 2 minutes; the accuracy rates were 100% and 33%.
<b>Whenever I made a mistake using the app, I could recover easily and quickly.</b>	3	Error message	N/A	P2 and P3 chose another option on the start page of the app: "If you know the type of algorithm, please click here." Their average times to answer each question using the app were 2.3 and 2.6 minutes, which were longer than those of the other two participants; their accuracy rates were 67% and 33%, which were not as high as the other two.
<b>The app gave error messages that clearly told me how to fix problems.</b>	4			
<b>Overall, I am satisfied with this app.</b>	3	Overall	All but P4 would use the app in the future.	N/A
			All participants would recommend the app to others. P1 would like to know more about the app before she recommends it to others. P4 only wants to recommend it to novices.	
<b>How would you rate your overall satisfaction with this app?</b>				All but P1 suggested training on how to use the app based on scenarios.

## Results

Participant #	P1	P2	P3	P4	Mean	SD
<b>Group</b>	1 (paper-app)	1 (paper-app)	A (app-paper)	A (app-paper)		
<b>Professional title</b>	Registered Nurse	Registered Nurse	Registered Nurse	Registered Nurse		
<b>Employment status</b>	Full time	Full time	Full time	Full time		
<b>Number of sexual assault examinations previously performed</b>	40	90	100	Over 400		
<b>Years of work experience in the related field</b>	3.5	4	5	20		
<b>Highest degree or level of education</b>	Bachelor's degree	Graduate or professional degree	Graduate or professional degree	Associate's degree		
<b>Age</b>	35-44	45-54	25-34	55-64		
<b>Gender</b>	F	F	F	F		
<b>Race/ethnicity (that best represents you)</b>	White	White	White	White		
<b>Understanding scenarios and questions</b>	Focused; quick	Focused	Focused; frustrated	Focused; frustrated		
<b>Observed interaction with paper-based guidelines</b>	Highlighted simple keywords	Highlighted paragraphs; used table; verified information	Highlighted paragraphs; used table	Highlighted simple keywords		
<b>Observed interaction with app</b>	Started with the time elapsed; confident	Started with the type of algorithm	Started with the type of algorithm	Started with the time elapsed; frustrated		
<b>Average time (minutes) per question using paper-based guidelines</b>	1	5.3	3	1	2.583	
<b>Average time (minutes) per question using SACA app</b>	1	2.3	2.6	2	2	
<b>Overall average time (minutes) per question using guidelines</b>	1	3.83	2.83	1.5	2.29	
<b>Accuracy rate using paper-based guidelines</b>	1.00	1.00	0.33	0.33	0.67	0.39
<b>Accuracy rate using SACA app</b>	1.00	0.67	0.33	0.67	0.67	0.27
<b>Average usability score</b>	4.69	3.88	4.19	2.06	3.70	1.21
<b>Average acceptance score</b>	4.83	4.00	4.17	2.17	3.79	1.14
<b>Perception of app</b>	Easy to use; useful	Easy to use; useful	Easy to use; useful	Not very easy to use; useful to novice		
<b>Suggestions for app revisions</b>	No	Training based on scenarios; elapsed time calculation	Training based on scenarios; elapsed time calculation; explain buttons	Training based on scenarios; explain buttons		
<b>Use app in the future?</b>	Yes	Yes	Yes	Yes		
<b>Recommend app to others?</b>	Know more before recommending it to others	Yes	Yes	Yes, to novice		

## Ranks of ratings for the usability and acceptance survey items

Usability Survey Items	P1	P2	P3	P4	Mean	Rank
<b>Overall, I am satisfied with how easy it is to use this app.</b>	5	4	5	2	4	1
<b>It was simple to use this app.</b>	5	4	5	2	4	1
<b>It was easy to learn to use this app.</b>	5	4	5	2	4	1
<b>I felt comfortable using this app.</b>	5	4	5	2	4	1
<b>The interface of this app was pleasant.</b>	5	4	5	2	4	1
<b>I liked using the interface of this app.</b>	5	4	5	2	4	1
<b>The information provided for the app was easy to understand.</b>	5	4	5	2	4	1
<b>This app has all the functions and capabilities I expected it to have.</b>	5	4	4	2	3.8	2
<b>I was able to efficiently complete the tasks and scenarios using this app.</b>	4	4	4	3	3.8	2
<b>The information provided for this app (online help, documentation) was clear.</b>	5	3	5	2	3.8	2
<b>The information provided for this app was effective in helping me complete the tasks and scenarios.</b>	5	4	4	2	3.8	2
<b>Overall, I am satisfied with this app.</b>	5	4	3	2	3.5	3
<b>The organization of information on the app screens was clear.</b>	5	4	3	2	3.5	3
<b>Whenever I made a mistake using the app, I could recover easily and quickly.</b>	3	4	5	2	3.5	3
<b>It was easy to find the information I needed.</b>	5	4	3	2	3.5	3
<b>The app gave error messages that clearly told me how to fix problems.</b>	3	3	1	2	2.3	4
<b>Mean</b>	4.7	3.9	4.2	2.1	3.7	
<b>Acceptance Survey Items</b>	P1	P2	P3	P4	Mean	Rank
<b>How much did you enjoy using this app?</b>	5	4	5	2	4	1
<b>Was the amount of time it took to complete this app acceptable?</b>	5	4	5	2	4	1
<b>How helpful was this app in describing what you want to know when facing a client/patient?</b>	5	4	4	2	3.8	2
<b>How would you rate your overall satisfaction with this app?</b>	5	4	3	2	3.5	3
<b>Mean</b>	5	4	4.3	2	3.8	

## Research questions

- What were the users' reactions and experiences when using SACA prototype?
- What concerns about SACA do developers need to address to optimize users' experience?

## Methodology

- An explanatory sequential mixed methods research design

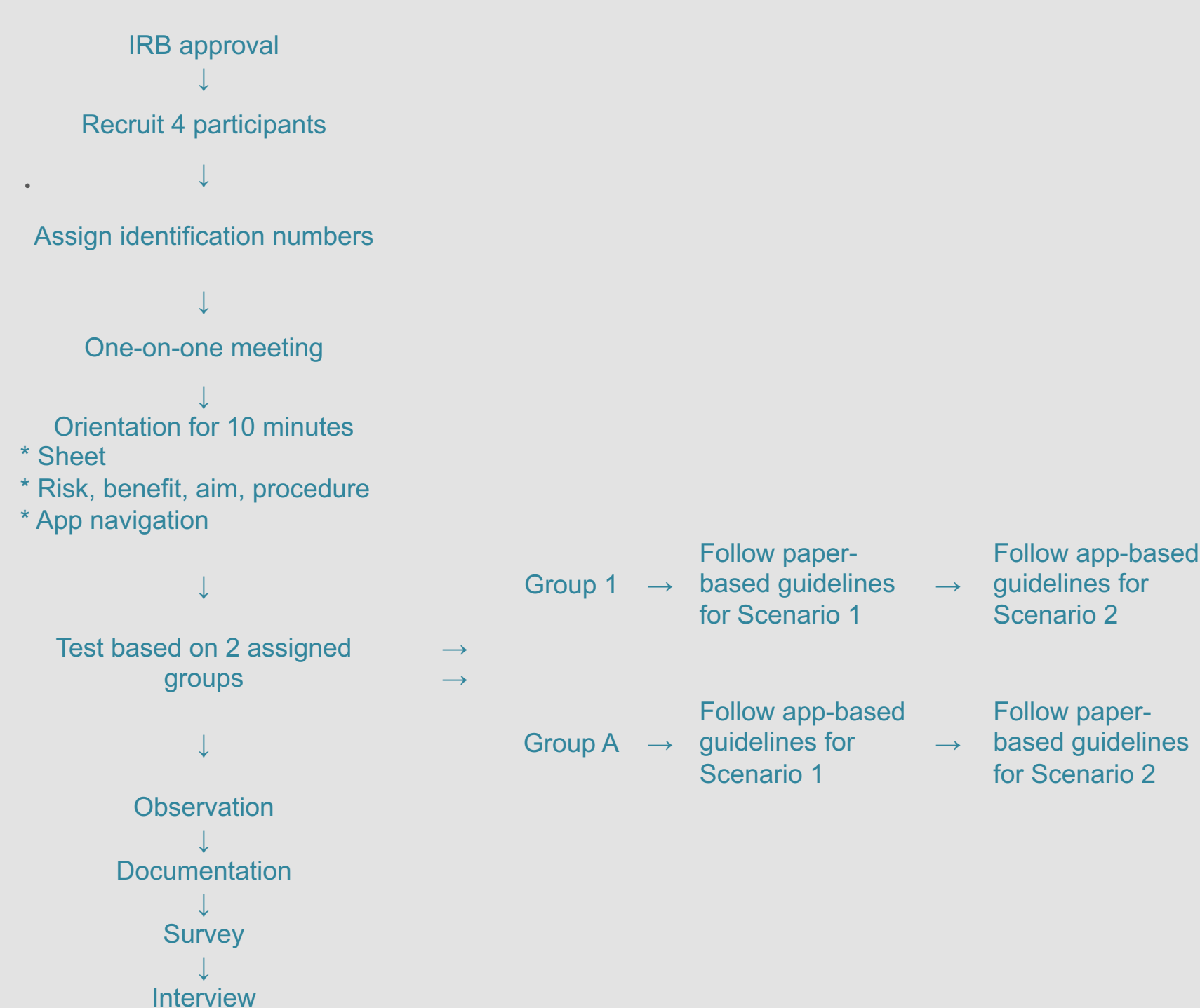
## Participants

- A convenience sample of volunteer participants (N = 4) over a 2-month period
- Eligible participants were trained nurses in the CHAMP program

## Setting

- A quiet and private area of a university

## Research procedures



## Survey

- 11-item demographic information
- 16-item Post-Study System Usability Questionnaire (PSSUQ)
- 6-item Acceptability e-Scale

## Implications in app training

- Design individualized training based on users' real-life workflow to give them a meaningful learning experience
- Teach future users how to calculate patients' elapsed time accurately
- Consider users' age, reading comprehension level, prior knowledge, work experience, and thinking process when using SACA

## Conclusions

- SACA app has high usability and acceptability in a sample of providers
- Mobile app has the potential to improve provider's compliance with the decision-making guidelines for testing and treatment plans for children who might be sexually abused or assaulted