



Introduction

High-risk pregnancies particularly among women <20 or >35 years, with short birth intervals or medical complications—significantly contribute to maternal and neonatal morbidity and mortality. These risks are amplified in rural and low-resource settings due to limited access to antenatal care. The COVID-19 pandemic further disrupted maternal health services globally. Over half of countries reported interruptions in facility-based maternal care, contributing to rising mortality. In Indonesia, maternal deaths increased from 4,627 in 2020 to 7,389 in 2021, with nearly 3,000 related to COVID-19. West Java and Garut district also experienced significant increases, largely due to complications in high-risk pregnancies. To address access gaps, the World Health Organization promotes telemedicine as a solution. *Kotak Dokter* is a telehealth initiative enabling online consultations between rural midwives and physicians. This study explores the implementation of Kotak Dokter in rural Garut district, Indonesia, focusing on its use especially for high-risk pregnant women.

Objectives

- To explore the experiences and challenges faced by high-risk pregnant women in accessing rural maternal health services in Garut District, Indonesia.
- To assess the satisfaction and acceptability of the *Kotak Dokter* telemedicine trial among patients and providers.
- To identify key barriers and facilitators in the implementation of *Kotak Dokter* in rural maternal care.



Methods

Procedure:

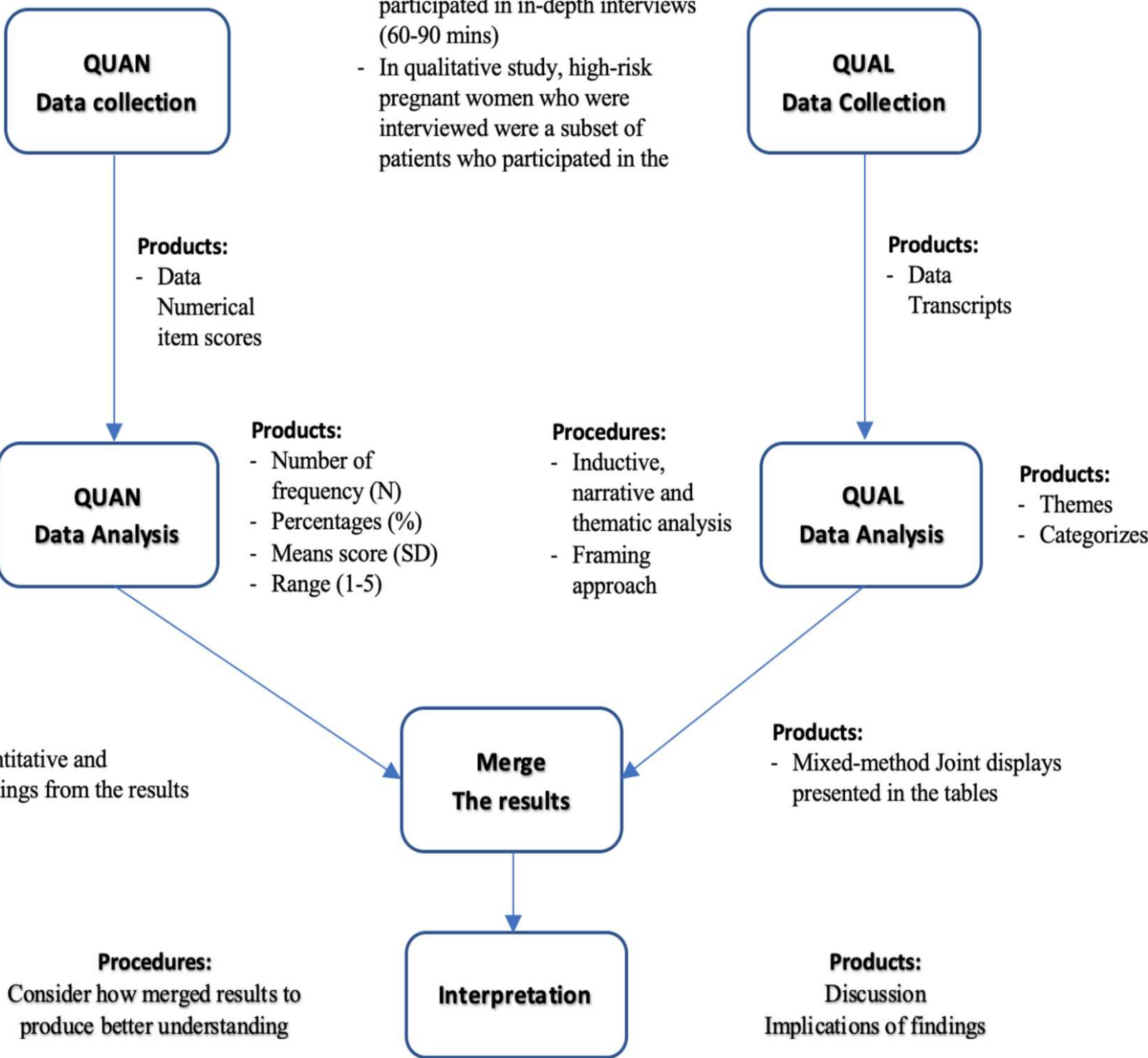
- 74 high-risk pregnant women and 8 health care providers participated in survey questionnaires (20-25 mins)
- Immediately following each online consultation, a short survey questionnaire were filled by doctors (5-10 mins)
- We used modified Telehealth Usability Questionnaires (TUQ) in surveys

Procedures:

- 40 high-risk pregnant women and also 8 health care providers participated in in-depth interviews (60-90 mins)
- In qualitative study, high-risk pregnant women who were interviewed were a subset of patients who participated in the

Procedures:

- Descriptive Statistics
- All quantitative findings are presented in the tables
- Analysis was performed using STATA Version 17.0 for Mac basic edition

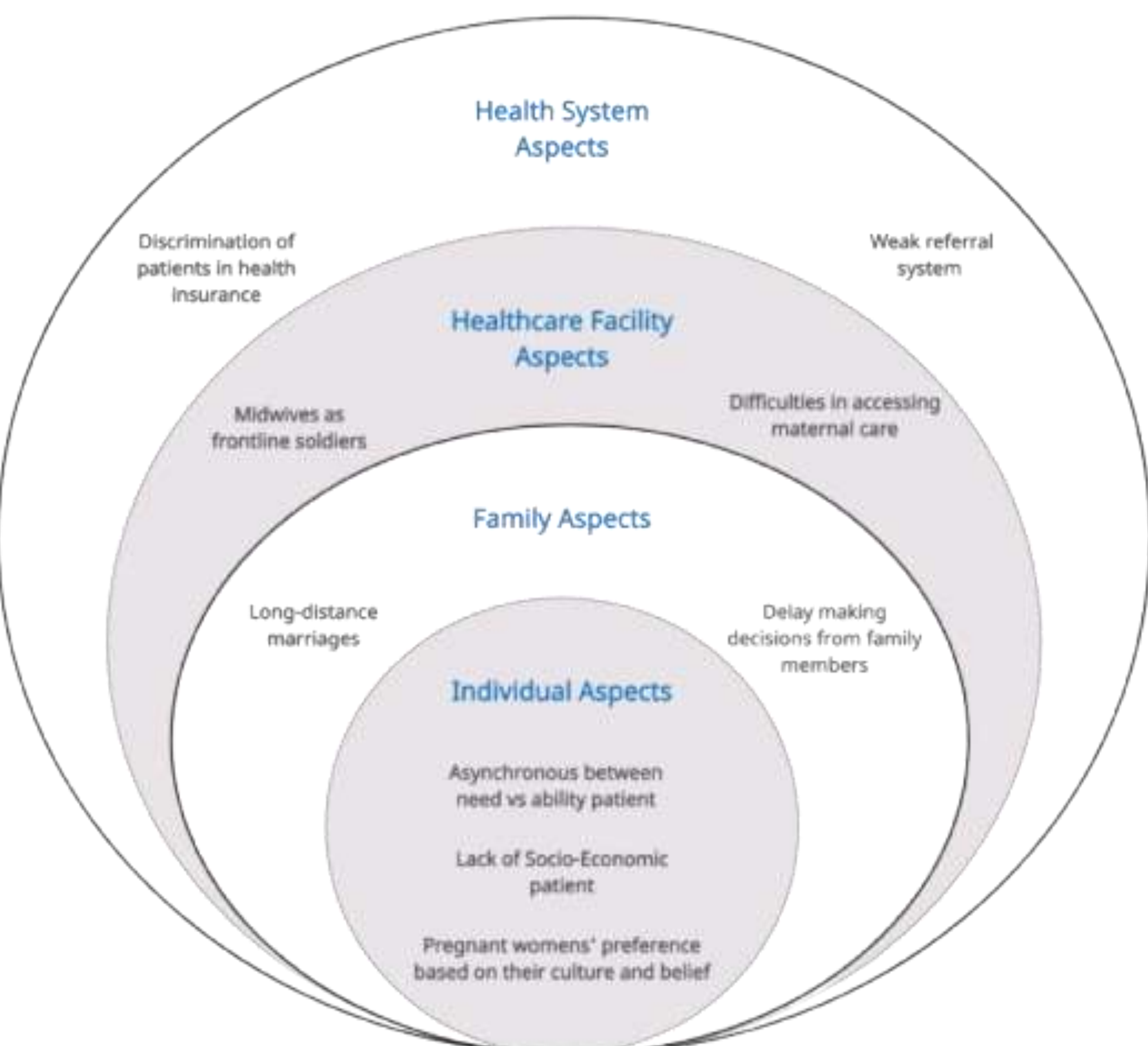


Convergent Mixed-Method Study

Demographic Characteristics of Participants

High-Risk Pregnant Women Characteristics (n=74)			Healthcare Providers Characteristics (n=8)		
	Mean age in years (SD, range)	N (%) or Mean (range)		Mean age in years (SD, range)	N (%) or Mean (range)
Age		29 (7.4, 16-44)			37 (6.61, 31-47)
Main Health Profession			Doctors		2 (25%)
			Midwives		6 (75%)
Level of Education			Last Higher Education		
Elementary School		12 (16%)	Diploma		6 (75%)
High School		34 (47%)	University		2 (25%)
Diploma		27 (36%)	How long have you been practicing as doctor, midwife or nurse?		
University		1 (1%)	6-10 years		3 (37%)
Main Occupation			11-15 years		2 (26%)
Market Vendor		3 (4%)	More than 15 years		3 (37%)
Tailor		1 (1%)	How long have you been practicing as healthcare providers in this community health center (Puskesmas)?		
Housewife		69 (94%)	1-5 years		2 (25%)
Teacher		1 (1%)	6-10 years		3 (37%)
Village			11-15 years		2 (25%)
Kersamanah		12 (16%)	More than 15 years		1 (13%)
Sukamerang		11 (15%)	Where are you currently living?		
Nanjung Jaya		11 (15%)	Kersamanah village		1 (12%)
Girijaya		12 (16%)	Sukamerang village		2 (26%)
Sukamaju		16 (22%)	Nanjung Jaya village		1 (12%)
Mekaraya		12 (16%)	Girijaya village		1 (12%)
Marital Status			Sukamaju village		2 (26%)
Married		74 (100%)	Mekaraya village		1 (12%)
Partner's Main Occupation			Marital status		8 (100%)
Construction laborers		18 (24%)	Married		8 (100%)
Trader		24 (32%)	Partner's main occupation		
Employee		12 (16%)	Military		2 (26%)
			Employee		3 (38%)
			Lawyer		1 (12%)
			Teacher		1 (12%)
			Nurse		1 (12%)

Conceptual Framework of Problem in Accessing Maternal Care



Results

Barriers and Facilitators of The Telemedicine Kotak Dokter Implementation

In line with the vision and mission of Puskesmas

"In my opinion personally, the implementation of Kotak Dokter can help and align with the mission of the Puskesmas to improve patients' outcome and reduce maternal and infant mortality rates. I think it can be accepted, and it will help the quality of services provided by the Puskesmas." (HP 06 - Midwife)

Kotak Dokter provided a secure privacy

"I've done something similar using the zoom but that's for more people like teaching students or seminars not for health consultations. The Kotak Dokter feels more personal because it is only me and the Doctor so that I feel secure and my privacy is maintained when consulting with the Doctor" (P26 - High Risk Pregnant Patient)

Kotak Dokter was convenient and easy to use

It's very convenient, because the Kotak Dokter is portable and can be carried anywhere, so it's practical and easy." (HP 07 - Doctor)

"In my opinion, it is very easy to operate as long as there is a password and username, so I do not have any problem when using this Kotak Dokter, it is easy to use" (HP 06 - Midwife)

Saving money and time

I think this is much more economical and also practical for patients because the socio-economic situation in this area is still relatively limited. For me, the fare for taking a motorcycle taxi round-trip can be Rp. 50,000, especially for those who sometimes are still thinking about how to buy food, do not think about paying for transportation to go to the puskesmas. They have difficulty accessing it because the village is far away, and if you consult with a doctor, you have to go to the Puskesmas. Indeed, by doing online we are not able to do physical examinations directly, and not be able touch patients. However, at least they can immediately consult a doctor through the Kotak Dokter without going to the puskesmas, and this service is free." (HP 07 - Doctor)

BARRIERS AND FACILITATORS OF KOTAK DOKTER IMPLEMENTATION

Health care providers said - Implementation of Kotak Dokter was fit with the vision, mission and innovation program in Puskesmas 8 (100%)

High-risk pregnant women said - The platform Kotak Dokter provided a secure privacy 62 (91%)

High-risk pregnant women said - Satisfied with the Kotak Dokter system 68 (93%)

Health care providers said - Lack of health care providers acceptance due to resistance to change, No = 5 (62%)

High risk pregnant women said - Reduce travel time 55 (79%) Saving time 71 (96%)

Health care providers said - Concerned of increased workload, No = 7 (88%)

High-risk pregnant women said - Concern of unfamiliarity with the new innovations and technology 51 (69%)

High-risk pregnant women said - Concern involving technology issues and failures such as poor connections, communication delay, suboptimal image clarity & video freezing 64 (88%)

Health care providers said - Lack of health care providers acceptance due to resistance to change, No = 5 (62%)

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The imbalance between the large workload of program and limited human resources at Puskesmas

There is a challenge in implementation due to the large workload of the Puskesmas, for example, we have just finished with the COVID-19 vaccination program, but then there is an additional program from the government this month that must be completed, BIAN and BIAS health program in the Puskesmas. Hence, due to the large workload factor at the Puskesmas, it might be able to influence the implementation of Kotak Dokter in the future. With only 50 health workers at the puskesmas and also with so many burden services and programs from the government, to be honest we are quite overwhelmed" (HP 08 - Doctor)

Not familiar with technology

"I only use my cellphone as needed (like WhatsApp) because I do not keep updated with the technological things. After the training, I can use it however, it's still nerve-wracking to do a consultation using Kotak Dokter because commonly we only consult via chat on WhatsApp with doctor not using vcall like in Kotak Dokter" (HP 02 - Midwife)

Bad or slow internet connections

"Yes, for example, if we want to have a consultation and we are in a location with a bad signal or internet connection, it will be difficult because not all areas are covered with a good signal. I took Kotak Dokter to the mountainous area for home visit patients, but the signal was not good, so the consultation was hampered. Online consultations doctor can still be carried out, even though several times it was intermittent due to signal and network problems" (HP 06 - Midwife)

Struggling to fit with doctors' schedule

"I do not like when I make a consultation call, the doctor is not on standby. Maybe it was because the doctor is still examining a patient at the puskesmas. We must know the busy schedule of the doctor and schedule it according to the availability of the doctor's schedule so that it can expedite and make it easier to conduct consultations" (HP 01 - Midwife)

"The service at the puskesmas is quite busy from 8 to 11 o'clock the patients at the puskesmas have already queued, but we have to take the time in between to conduct patient consultations online through the Kotak Dokter. So that it becomes rather difficult in managing patient flow if there are patients here (at Puskesmas) and in the field which also who need online consultations" (HP 08 - Doctor)

User Satisfaction with The Telemedicine of Kotak Dokter

No	Doctors' satisfaction on using Kotak Dokter in each of online consultation with high - risk pregnant women (n=74)		N (%)
1	Were there any changes in clinical care or management after doing online consultation using Kotak Dokter for this patient?	No	6 (8%)
		Yes	68 (92%)
		Bad	3 (4%)
2	What was the interaction quality of using Kotak Dokter for online consultation for this patient?	Neutral	1 (1%)
		Good	45 (61%)
		Very Good	6 (8%)

Conclusions

- Telemedicine through *Kotak Dokter* provided significant benefits for high-risk pregnant women in rural areas, despite implementation challenges.
- Providers reported changes in clinical care following teleconsultations, and both patients & providers expressed high satisfaction with *Kotak Dokter* implementation
- Several barriers of the telemedicine *Kotak Dokter* implementation in this study are barriers from patients, healthcare providers, technology and health systems.