

# ASHABOT: AN LLM-POWERED CHATBOT TO SUPPORT THE INFORMATIONAL NEEDS OF COMMUNITY HEALTH WORKERS

Pragnya Ramjee\*, Mehak Chhokar\*, Bhuvan Sachdeva, Mahendra Meena, Hamid Abdullah, Aditya Vashistha, Ruchit Nagar, Mohit Jain





# ASHAs = COMMUNITY HEALTH WORKERS IN INDIA





# ASHAs NEED TIMELY, TRUSTWORTHY, AND PRECISE MEDICAL INFORMATION.

What to do when there is white discharge?

What is the use of Antara injection?

My friend smokes bidi.  
Will I also fall sick?

How much should a healthy newborn weigh?

What to do if a pregnant woman is HIV+?

What do I do if a baby is crying for more than three hours?



# IT'S DIFFICULT FOR ASHAs TO...

- Visit their supervisors in-person
- Be sure that their supervisors would have the answers
- Ask sensitive/rudimentary questions to their supervisors
- Find contextual medical information online



ASHAs' questions remain unanswered





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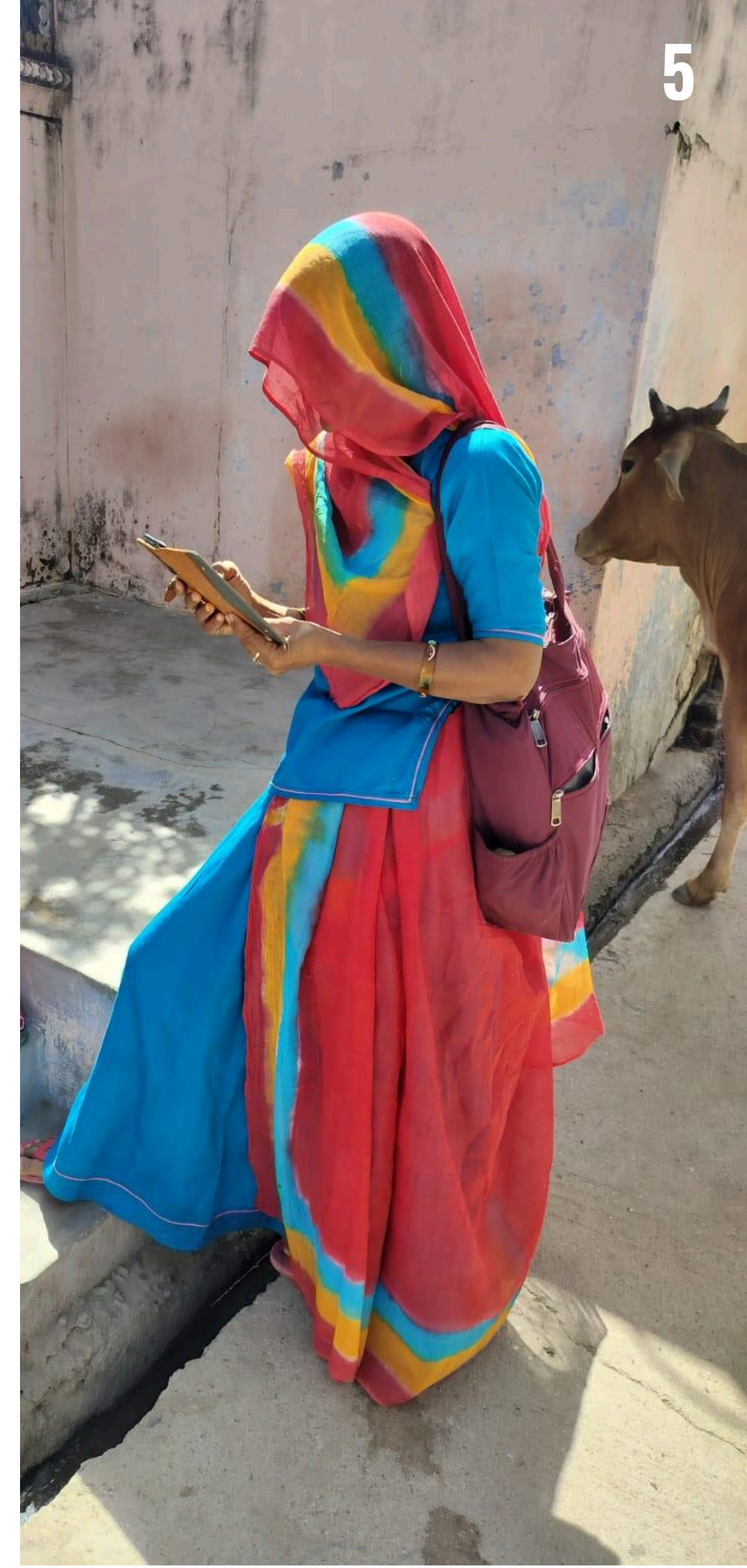


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## RELATED WORK

Vashistha et al. (2017), Yadav et al. (2019, 2021), Karusala et al. (2023), Majhi et al. (2024), Taylor et al. (2024), McPeak et al. (2024)...





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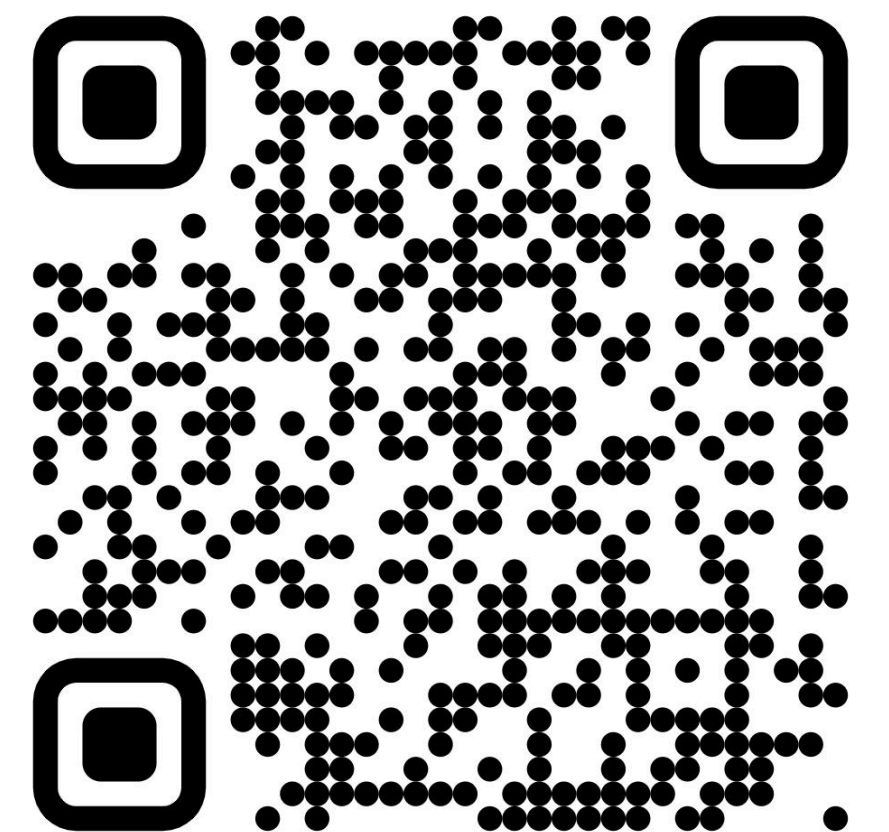


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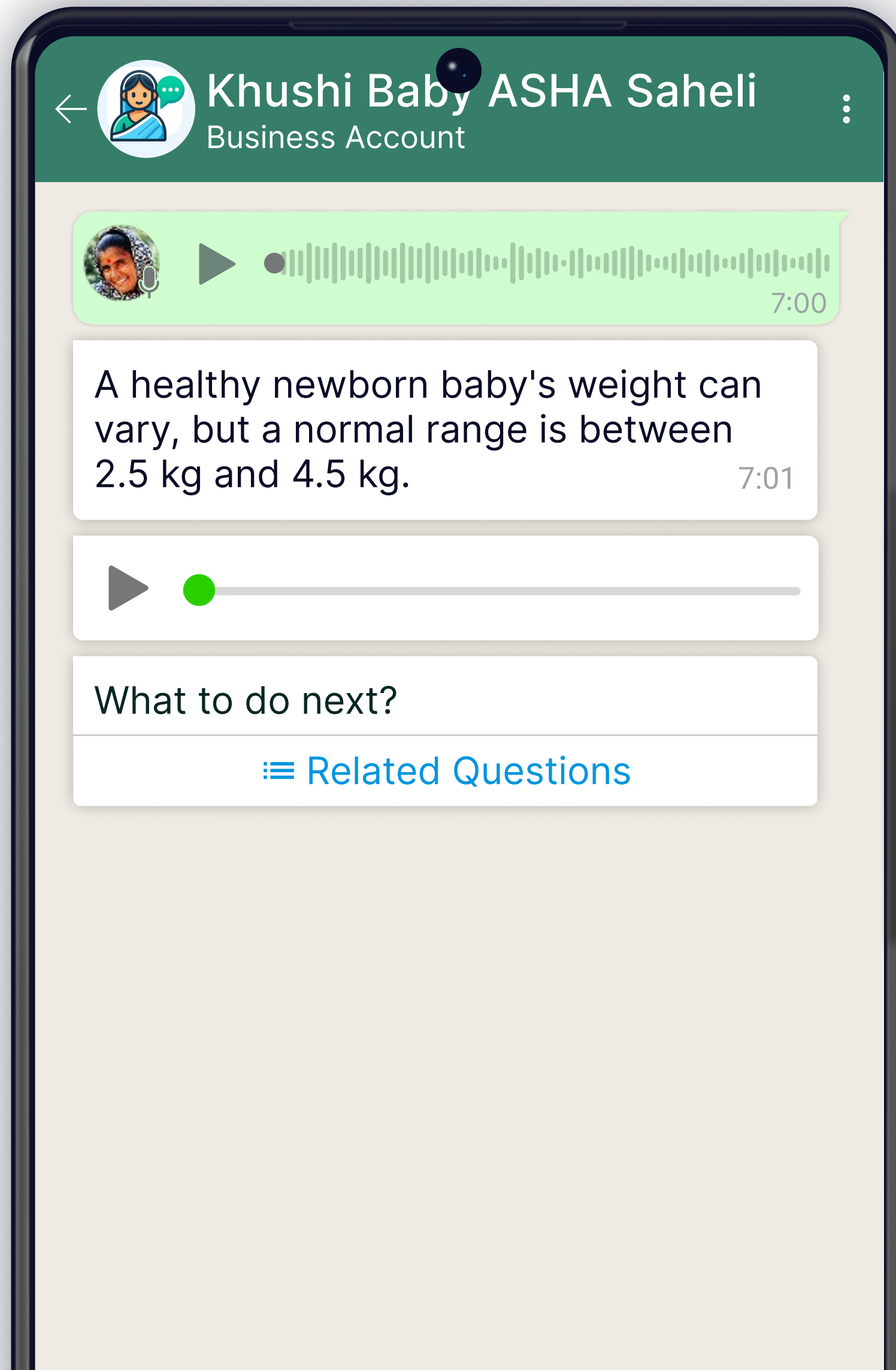
## OUR SOLUTION: ASHABOT EXPERTS-IN-THE-LOOP CHATBOT\*

\* <https://github.com/microsoft/byoeb>





# DESIGN DECISIONS



## ASHAs are...

Not always  
(English) literate

Usually novice  
tech users

## ASHABot is...

- **Multilingual  
(Hindi and English)**  
While these examples are in English, all ASHAs and supervisors interacted with ASHABot in Hindi.
- **Multimodal  
(Text and Audio)**
- Built entirely on WhatsApp



# DEPLOYMENT SAFEGUARDS

Knowledge Base curated by medical doctors, Expert evaluation of answers

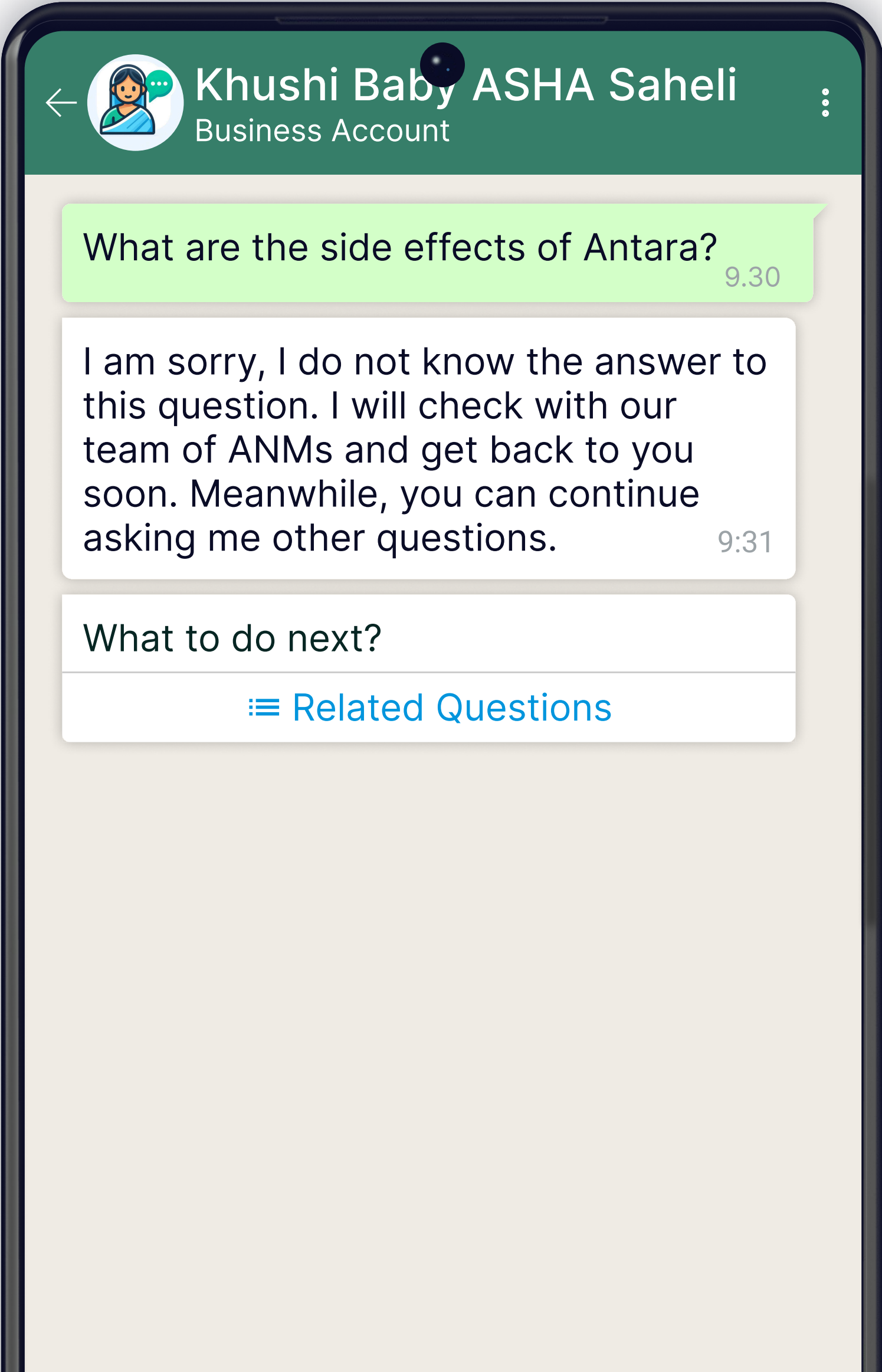
Ground truth	ASHABot's Accuracy	
Doctor	88%	LLM evaluation
ASHA Supervisors	96%	
Doctor	90%	Manual evaluation

During deployment:

- 85% of response = Generated using Knowledge Base
- 15% of responses = IDK → experts-in-the-loop

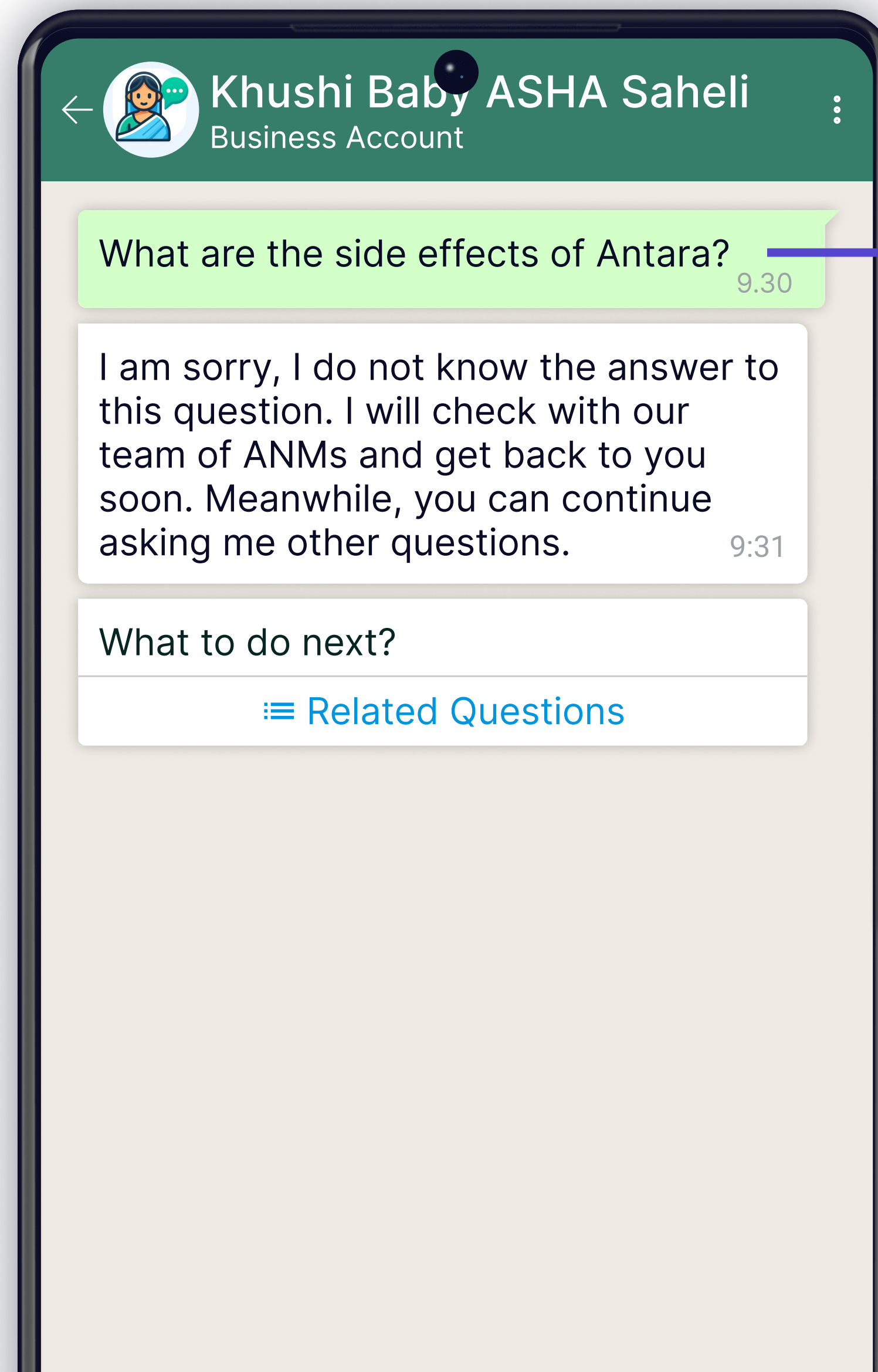


# EXPERTS-IN-THE-LOOP

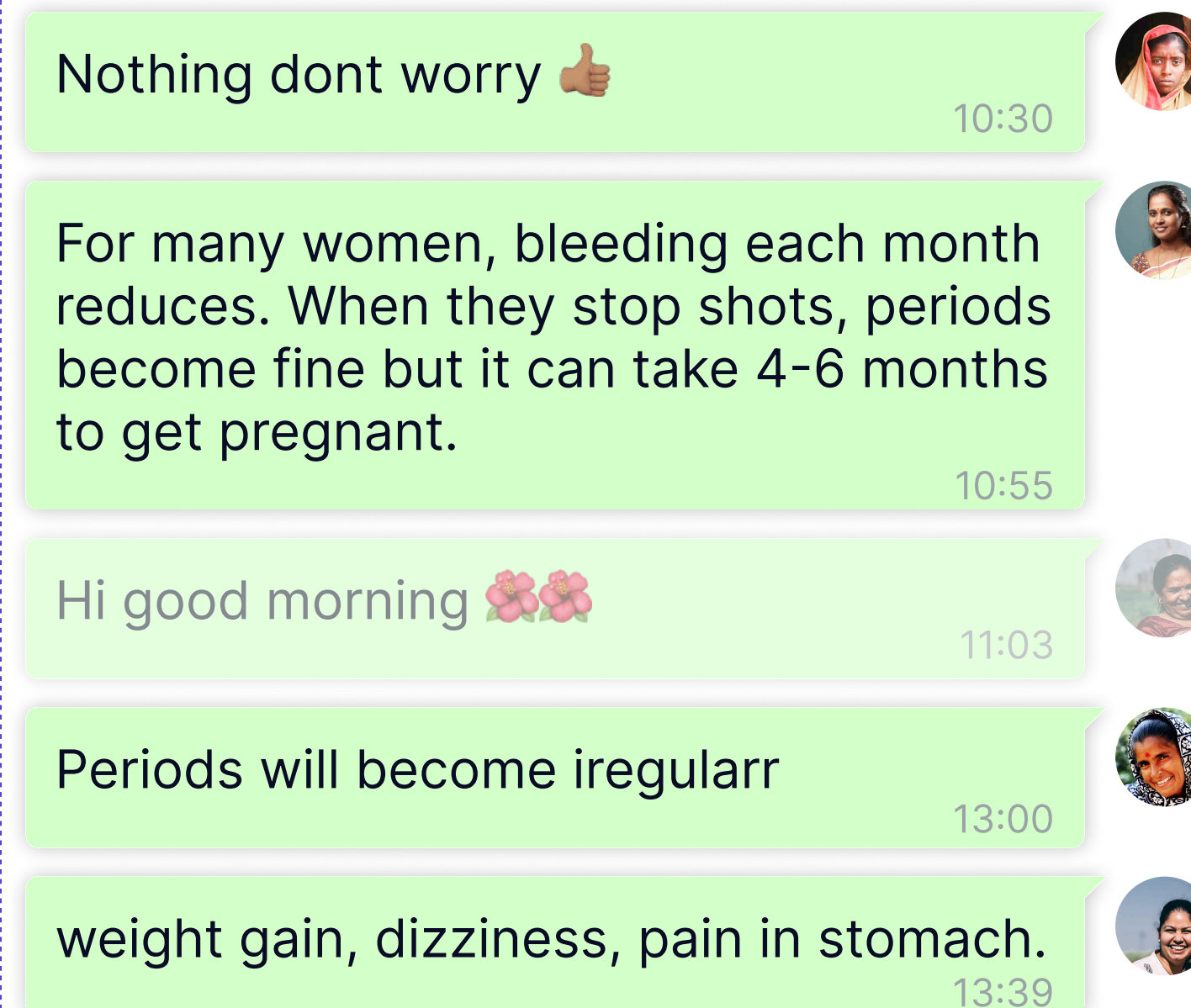




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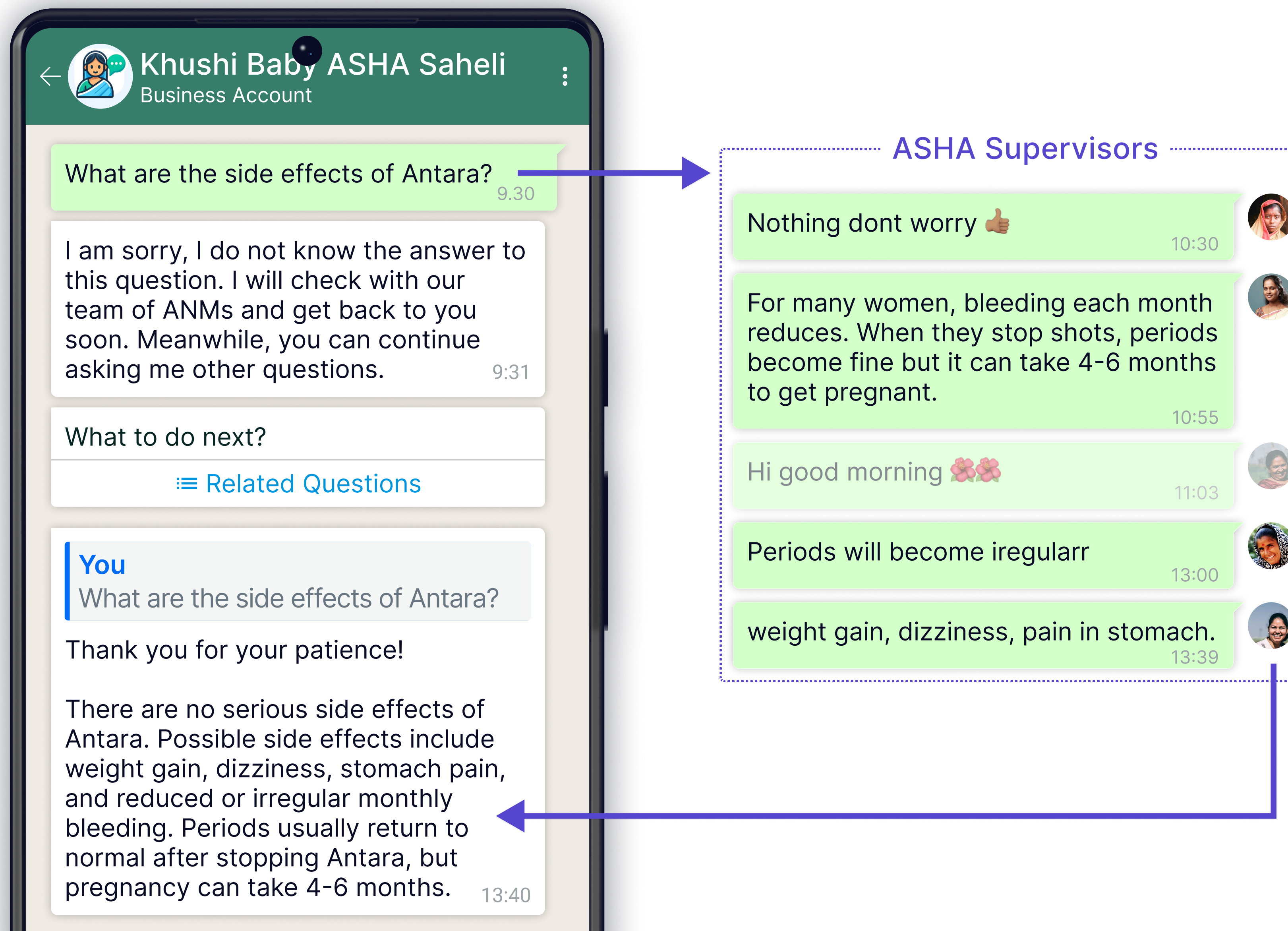


## ASHA Supervisors





# EXPERTS-IN-THE-LOOP





# DEPLOYMENT

25 ASHAs, 10 ASHA supervisors  
Salumbar, Rajasthan, India

May - August 2024 (3.5 months)  
1700+ queries





# SEMI-STRUCTURED INTERVIEWS

18 ASHAs, 10 ASHA supervisors

- (RQ1) How did ASHAs and their supervisors use ASHABot?
- (RQ2) What factors influenced their engagement with ASHABot?
- (RQ3) How effective is ASHABot in addressing ASHAs' information needs?

Key findings →





ASHAs

**Reasons  
for bot  
usage**

Anytime, anywhere access



## ASHAs

### Reasons for bot usage

Anytime, anywhere access

I use it while traveling by bus.

I can use it at night also.



ASHAs

ASHA Supervisors

Reasons  
for bot  
usage

Anytime, anywhere access —————> More workload

I use it while traveling by bus.

I can use it at night also.



ASHAs

Reasons  
for bot  
usage

Privacy



## ASHAs

### Reasons for bot usage

#### Privacy

“The bot is better... **I cannot openly ask the Doctor about white discharge**, about itching and burning...”

## ASHAs

### Reasons for bot usage

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“The bot is better... **I cannot openly ask the Doctor** about white discharge, about itching and burning...”

“(e.g., Once) there was a crowd, it was chaotic, and **I mistakenly gave the vaccine (intended) for a 3.5-month-old child to a 2.5-month-old and vice versa**. I asked ASHABot... It said that ‘You can give the missed vaccine next month... so the babies can get vaccinated within 6 months.’ I was relaxed... Otherwise, I would have visited those children’s homes again and again to make sure that they were okay.”



## ASHAs

## ASHA Supervisors

Reasons  
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“Sometimes there are **so many silly questions...** ASHAs have years of experience, they should know these things.”

ASHAs

ASHA Supervisors

Barriers  
to bot  
usage

Translation and transcription technologies



ASHAs

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Barriers  
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Translation and transcription technologies

ASHAs said...	ASHABot understood...
“Tell me about <b>Antara.</b> ”	“Tell me about <b>Antarctica.</b> ”
“The baby’s <b>breath (saans)</b> is slow. What to do?”	“The baby’s <b>mother in law (saas)</b> is slow. What to do?”

ASHAs

ASHA Supervisors

Barriers  
to bot  
usage

Accountability



ASHAs

ASHA Supervisors

Barriers  
to bot  
usage

Accountability

*Asked as many questions as possible*

“Everyone will know that I don’t know the answer... What if it is a simple question? They will judge me.”

ASHAs

**Manner  
of bot  
usage**

As an authority



## ASHAs

**Manner  
of bot  
usage****As an authority**

“Because most women don’t take Antara... and they [the ones who have taken Antara] ask us about their [irregular] periods... How to make them understand? **I asked about this yesterday to the bot. It told me, ‘Irregularities are just the side effects of the injection... it is temporary and does not cause infertility.’ In the evening I explained to the two women about this,** even showed them the bot’s answer... and this morning both of them came to get the injection.”



# SUMMARY

## Findings: ASHABot..

- provided detailed responses
- facilitated (peer) learning
- supported decision-making

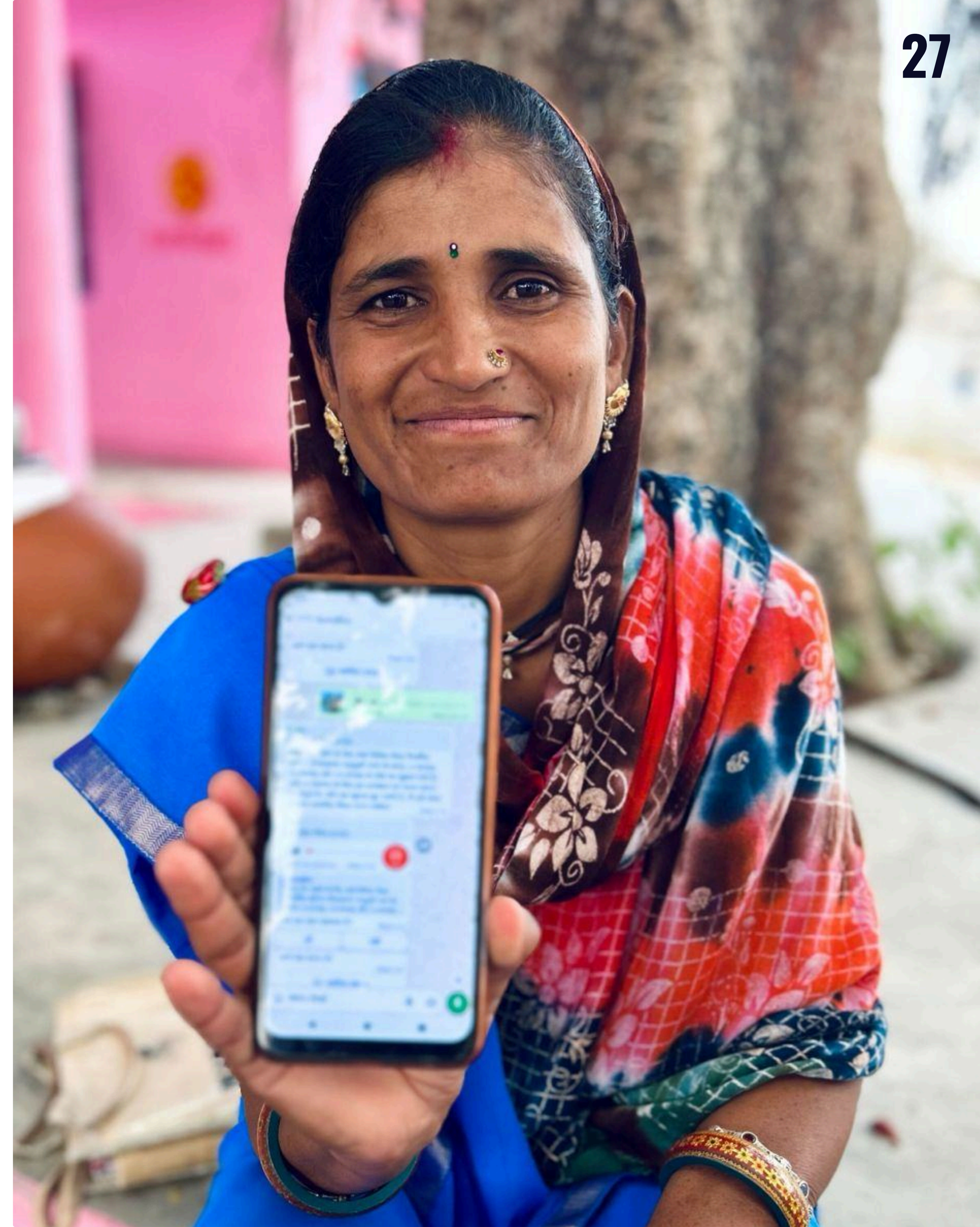
## Discussion

- over-reliance?
- value alignment and surveillance
- limited multilingual/multimodal support
- overburdened supervisors

## Future Directions

- visual modality, personalization...

👉 **LLMs as supplemental, fallible tools** within the community health ecosystem. 👉





**Pragnya Ramjee\***

Microsoft Research Lab India  
pragnyar@stanford.edu

**Mehak Chhokar\***

Khushi Baby  
mehak@khushibaby.org

**Bhuvan Sachdeva**

Microsoft Research Lab India  
b-bsachdeva@microsoft.com

**Mahendra Meena**

Khushi Baby  
mahendra@khushibaby.org

**Hamid Abdullah**

Khushi Baby  
hamid@khushibaby.org

**Aditya Vashistha**

Cornell University  
adityav@cornell.edu

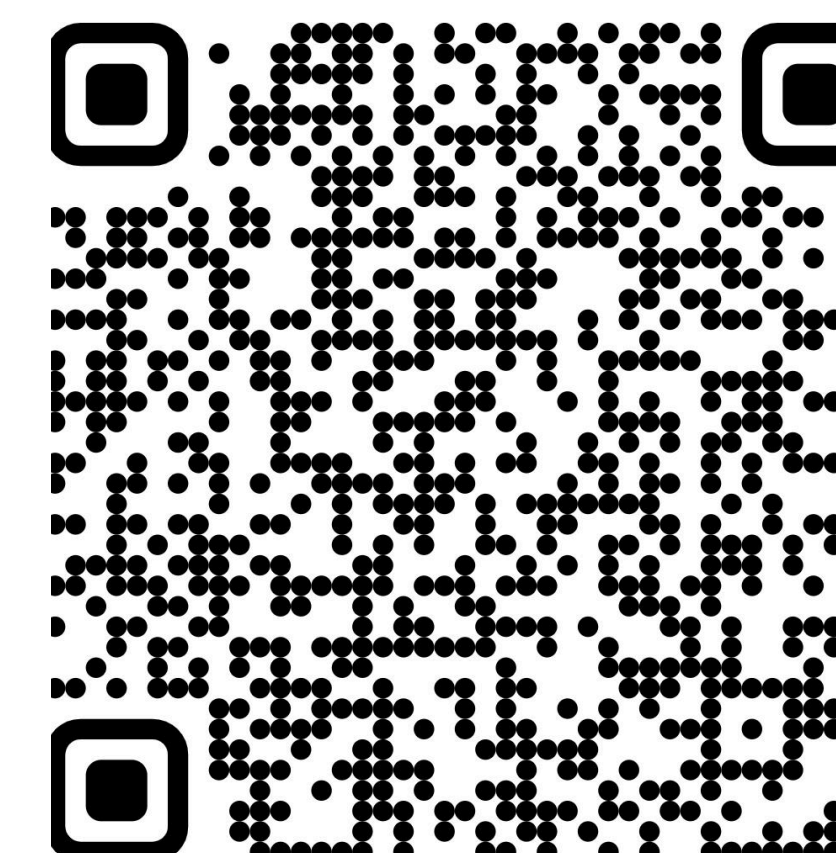
**Ruchit Nagar**

Khushi Baby  
ruchit@khushibaby.org

**Mohit Jain**

Microsoft Research Lab India  
mohja@microsoft.com

★ full paper ★



# OVERRELIANCE?

Deployment safeguards: expectation setting during onboarding

ASHA's belief (factually incorrect)	ASHABot's advice (factually correct)	What next?
Take iron tablets at night after food	Take iron tablets in the morning on empty stomach.	Supervisor confirmed ASHAs' belief
ASHA's responsibilities are only health-related	ASHA's responsibilities include assisting victims of domestic violence	ASHA ignored bot



# ACCOUNTABILITY?

Technology for frontline health workers = usually focused on tracking and monitoring.

“I want to ask (the bot), but I can’t, because it will take a toll on the woman’s family... **I was scared that if I ask the bot, you will have all the details that (this) ASHA has asked certain questions...** It’s in the records... If that gets leaked, then I will be asked more questions.”

ASHA

# REASON FOR USAGE: DETAILED INFORMATION

“I asked about haemoglobin deficiency... The bot said ‘If you eat this vegetable, this will happen, eat daal [lentils], eat this, eat that.’ **It’s a detailed explanation, so I understand it well. But ma’am [supervisor] only tells me the main point:** ‘The haemoglobin needs to be at this level... take the medicines, done.’ The (bot) is better, because the patient might not even need to take medicines.”

ASHA