# Advancing Digital Health: Innovative Solutions for Equitable, Efficient, Affordable Maternal, Newborn and Child Health in Nigeria.

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Objectives of my research Project I. To identify digital health interventions to improve maternal, newborn, and child health (MNCH) service delivery in Nigeria.

II. To assess the cost-effectiveness of digital health solutions in improving MNCH outcomes in Nigeria.

III. To examine socio-cultural, economic, and gender-related factors influencing the adoption and use of digital health tools for MNCH.

IV. To evaluate the effectiveness of a digital health platform for improving MNCH outcomes in Nigeria.

V. To create a cost-effective and simple digital health platform for mothers, newborns, and children in Nigeria.

# Behaviours: My research Address

My research aims to influence multiple health-related and system-level behaviours among end-users (mothers, caregivers) and healthcare providers. Key behaviours include:

- Timely attendance of antenatal care (ANC) visits by pregnant women.
- Consistent use of digital reminders and health education features on the Familia app.
- Adoption of early newborn care practices (e.g., exclusive breastfeeding, postnatal checkups).
- Routine childhood immunisation attendance.
- Adherence to follow-up consultations via digital or telehealth systems.
- Healthcare workers' engagement with digital data capture and consultation tools.
- Use USSD-based services by digitally excluded or low-literacy users in rural areas.

How does the Fogg behaviour model help me address those behaviours?

The Fogg Behavior Model (FBM) posits that Behavior (B) occurs when Motivation (M), Ability (A), and a Prompt (P) converge at the same time.

FBM element

Alignment with my research



The app promotes intrinsic motivation by framing digital health tasks (e.g., ANC, immunisation) as vital for the safety of the mother and child. For healthcare workers, motivation stems from improved task efficiency and patient tracking.



Familia is designed to be user-friendly, multilingual, and USSD-compatible, lowering barriers for women with low digital literacy or limited internet access



Ability

Automated reminders (SMS, IVR), health tips, and checklists serve as prompts at key decision points (e.g., upcoming ANC visit). Push notifications also serve as nudges to reinforce behavior. How will behaviour change be measured? To assess behaviour change rigorously and ethically, my study deploys both quantitative and qualitative approaches, aligned with the study longitudinal mixed-methods design:

#### A. Quantitative Indicators (Pre- and Post-intervention Comparison)

- ANC attendance rates (1st, 2nd, 3rd visits)
- Timeliness and completeness of childhood immunisations
- Number of facility deliveries
- Frequency of digital platform use (log data from Familia app/USSD)
- User retention and engagement rates over 6–12 months
- Missed appointments vs. follow-up reminders triggered

#### **B.** Qualitative Indicators

- In-depth interviews with women and CHWS on ease of app use and perceived utility
- Focus group discussions on perceived behaviour shifts
- Narratives on decision-making (e.g., "I used to wait; now I act after a reminder" etc.)

#### **C. Behavioural Measurement Tools**

- Behaviour change is tracked through:
  - Self-reported behavioural recall surveys
  - Digital logs and analytics from the app/USSD platform
  - Routine service data extracted from PHC registers

Targeted Behaviour Change Domains Using the Fogg Behaviour Model (FBM) — behaviour occurs when motivation, ability, and a prompt converge:

Target Group	Desired Behaviour	Motivation (Why?)	Ability (Can?)	Prompt (Trigger)
Mothers/Caregivers	Attend ANC early & consistently	Health of baby & self	Transport, low cost	CHW visit, IVR/SMS reminders
Family decision-makers	Approve facility-based delivery	Safety & cost-benefit	Knowledge, transport access	Male-involvement sessions
Health workers	Follow neonatal care protocols	Saving lives, recognition	Equipment, skills training	Supervision, digital prompts
Community leaders	Promote immunization campaigns	Protect children, trust	Mobilization support	Community dialogue/Town hall

Behavioral Change Matrix for MNCH Intervention Design To operationalise the FAMILIA digital health intervention, we developed a Behavioural Change Matrix grounded in the Fogg Behaviour Model (FBM).

Target Group	Desired Behavior	Motivation	Ability	Prompt	Intervention Strategy
Pregnant Women	Early ANC attendance	Desire for healthy pregnancy outcomes	Access to nearby clinics, knowledge of ANC importance	IVR/SMS reminders, community health worker (CHW) visits	Educational sessions, transportation support
Mothers/ Caregivers	Complete child immunisation	Protect the child from diseases	Understanding the immunisation schedule, access to vaccines	Appointment reminders, community mobilisation	Health talks, mobile immunisation clinics
Healthcare Workers	Adherence to MNCH protocols	Professional commitment, recognition	Training, availability of resources	Supervisory feedback, non- monetary performance incentives	Continuous professional development, supportive supervision
Community Leaders	Advocacy for MNCH services	Community well-being, leadership role	Knowledge of MNCH benefits	Engagement meetings, success stories	Capacity building workshops, community forums
Policy Makers	Allocation of resources to MNCH	Public health impact, political will	Budgetary control, data on MNCH outcomes	Policy briefs, stakeholder meetings	Advocacy campaigns, evidence- based 7 presentations

Behaviour of interest: Early and timely ANC attendance

#### Motivation

- Reminders,
- Request for feedback
- Key messages on benefits
- The system has some gamification aspects where women accumulate points and can get discounts

#### **Barriers**

- Lack of phones for women
- Long distance from facilities
- Internet infrastructure

#### How will you measure the behaviour

- Facilities connected via the app will record/track the attendance
- Using the back channel to track those who did not visit the facilities/close the loop
- ANC register

#### What data collection method is most feasible?

- Standard survey tools
- Facility data
- FAMILIA health report

# Familia Software Release Cycle



#### https://www.familiasolutions.org/

# Thank you for Listening

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# Behavior 2: Attending the Behavioral Science Made Easy Course.

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Identify the motivation, ability, and prompt factors influencing the assigned behaviour

### Motivation (Why would someone attend?)

- Intrinsic Motivation
- Extrinsic Motivation
- Social Motivation

### • Ability (How easy is it to attend?)

- Facilitators of Ability
- Barriers to Ability

## Prompt (What triggers the action?)

- Calendar reminders and email invitations
- WhatsApp or SMS nudges from peers or organisers
- Verbal reminders during previous sessionsSocial media buzz or endorsements

Measurement Framework for Attendance Behavior

	Component	Measurement Indicator	Data Source	Frequency	Insight it provides
	Awareness	% of registrants who open emails	Email analytics	Pre-session	Prompt effectiveness
	Attendance	% of total registrants who attend live	Zoom logs Mini evaluation after every session	Each session	Engagement levels
	Retention	% who attend 3+ sessions	Attendance history	Cumulative	Sustainability of behaviour
	Motivation	Self-reported reasons for attending (survey)	Post-session form	After sessions	Key behavioural drivers
	Ability	% reporting tech or time challenges	Mid-course poll	Mid-course	Barriers to address
	Prompt Impact	% citing reminder as attendance reason	Quick polls	During session	Prompt effectiveness
	Maintenance	% of participants who continued to engage (CoP) after the course	Network database	Quarterly	Improved quality of Behavioural science work

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Recommendations to Enhance Behavior

### •Enhance Prompts:

- Personalised WhatsApp reminders 1 hour before the session
- Add ICS calendar invites at registration
- Peer accountability

### •Reduce Ability Barriers:

- Provide session replays with short highlights
- Offer flexible timing for different time zones
- Share the agenda earlier so people can plan

### •Boost Motivation:

- Introduce gamification (e.g., badges for consistency)
- Share testimonials or career wins from past participants
- Public recognition during sessions for active contributors

"People don't always do what they intend to, but we can help them succeed by making the action easier, more timely, and more meaningful."



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