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FAMAPP: A Mobile System to Improve Family Planning Uptake among Ugandan Youth

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***Abstract* - Low utilization of family planning (FP) among Ugandan youth contributes to unintended pregnancies, sexually transmitted infections, and maternal morbidity and mortality. To address this, we designed, implemented, and evaluated a mobile system (FamApp) to improve FP uptake among youth in Uganda, following a Design Science Research approach. We investigated needs and iteratively developed an mHealth artifact informed by surveys of young adults (n=369; ages 20–35) and stakeholder input. The prototype integrates an information library on FP methods, a healthcare provider finder, a peer discussion/news feed, menstrual and contraceptive tracking, teleconsultations, and an in-app shop for contraceptives. Findings indicate that many youths are familiar with modern methods but cite non-use due to lack of sexual activity, waiting until marriage, and concerns about side effects. Notably, 58% (214/369) reported using FP-related mobile apps, and 89% agreed a purpose-built mobile system could increase adoption. Participants prioritized period tracking, detailed method information, and access to expert advice, underscoring the value of a user-centred, comprehensive design. Overall, the results suggest that FamApp can help bridge information and access gaps by delivering accurate content, personalized reminders, and linkages to services; effective scale-up should pair the app with education and awareness efforts and integration into existing service delivery to maximize impact.**

Keywords: mHealth; Family Planning; Ugandan Youth; Mobile Application (FamApp); Design Science Research; Contraceptive Uptake; Reproductive Health; Menstrual Tracking; Teleconsultation; Health Facility Finder.

I. INTRODUCTION

Low utilization of family planning (FP) among youth in Uganda persists despite the availability of services, contributing to unintended pregnancies, sexually transmitted infections including HIV, and associated maternal morbidity and mortality (WHO (2016), UNICEF (2022)). Underlying barriers include inadequate access to modern contraceptives and shortcomings of traditional information channels (television, newspapers, conferences) in effectively reaching and engaging young audiences. Evidence underscores that youth-centered, targeted communication is pivotal for correcting misconceptions and improving FP uptake (Alege, S. G., *et al.* (2016), Joan, M. K., *et al.* (2018)).

Globally, information and communication technologies (ICT) have been leveraged to expand access to reproductive health information and services, with demonstrable success in high-income settings (e.g., telemedicine chat/text services and interactive adolescent platforms) (United Nations (2019), Bongaarts, J., & Casterline, J. (2019), United Nations, DESA (2013)). In contrast, adoption in low- and middle-income contexts remains nascent; while Ugandan initiatives such as FamilyConnect, U-Report, HelloMama, mCenas and YouthConnect show promise, further investment and tailored interventions are needed to address local constraints and reach marginalized populations.

This study responds to these gaps by exploring an ICT-enabled, youth-centered approach to FP: the design and evaluation of a mobile health (mHealth) system—**FamApp**—to improve awareness, access, and informed decision-making among Ugandan youth (Labrique, A. B., *et al.* (2013), Tomlinson, M., Rotheram-Borus, M. J., *et al.* (2013), Jennings, L. G., *et al.* (2019), Knop, M. N.-H., *et al.* (2022)). The overarching objective is to improve FP uptake through the development and implementation of a mobile system. Grounded in current literature and a communication strategy tailored to youth preferences, the project aims to empower young people with accurate information and timely linkages to services.

Our contributions are fourfold:

(i) Eliciting requirements for FP use among Ugandan youth.
(ii) Designing and developing a mobile system to enhance access and utilization.
(iii) Deploying and integrating the system within the existing service landscape; and
(iv) Validating its usability and effectiveness.

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At a high level, the resulting artifact integrates core functionalities aligned to these needs: an FP information library, a healthcare-provider finder, a peer discussion/news feed, menstrual and contraceptive tracking, and teleconsultation services—features intended to reduce information gaps, normalize positive behaviours, and simplify pathways to care.

The remainder of the paper presents related work, formalizes the problem, details the methodology and system design, reports results and discussion, and concludes with implications and future directions.

II. LITERATURE SURVEY

Research on family planning (FP) consistently shows substantial unmet need worldwide, with particularly acute gaps in low- and middle-income countries (United Nations (2019), United Nations, DESA (2013), Bongaarts, J., & Casterline, J. (2019)). In 2019, of 1.11 billion women of reproductive age who needed FP, only 842 million used modern methods—leaving about 270 million without access; unmet need is concentrated in the developing world. Sub-Saharan Africa and South Asia bear disproportionate burdens, influenced by socioeconomic status, education, and religion.

In Uganda, unmet need remains high across age groups: roughly one-third of married women report unmet FP needs. Empirical studies attribute persistent gaps to information deficits, access barriers, and social-cultural factors, echoing broader regional findings (Jude, O. (2020), Ahinkorah, B. (2020), Abdou, G., *et al.* (2015), Kabagenyi, A., *et al.* (2014), Stella, M., Edith, T. A., Agnes, M. F., & Shigeko, H. (2020)). Key reasons for non-use include method-related concerns (notably fear of side effects), postpartum considerations, partner or religious opposition, and perceived infrequent sexual activity. Information dissemination campaigns are effective when well designed and targeted, underscoring the role of communication in influencing FP behavior (Uganda Bureau of Statistics (UBOS) & ICF (2017), UBOS (2022)). In Uganda, FP knowledge is nearly universal, and health professionals are trusted sources; exposure to FP messages across media correlates with knowledge and use (Uganda Bureau of Statistics (2023)).

Information and communication technologies (ICTs) have been leveraged to improve access to sexual and reproductive health information. In high-income settings, interventions such as Planned Parenthood's chat/text telemedicine and the UK's TeenSMART platform demonstrate how confidential counseling, and interactive education can engage adolescents and young adults (Joan, M. K., *et al.* (2018)). In Uganda, ICT-enabled initiatives (FamilyConnect, U-Report, HelloMama, mCenas, YouthConnect) show promise but remain nascent, pointing to the need for tailored, scalable solutions and community engagement to reach marginalized groups. Conceptually, e-health frames these efforts as part of a broader commitment to improve care through ICT at local to global levels (Labrique, A. B., *et al.* (2013), Tomlinson, M., Rotheram-Borus, M. J., *et al.* (2013), Jennings, L. G., *et al.* (2019), Knop, M. N.-H., *et al.* (2022)).

Against this backdrop, mobile health (mHealth) apps have emerged with features such as method libraries, provider finders, peer forums, cycle/contraceptive tracking, and remote consultations to address information and access barriers (Kim, Y. J. (2023), Johnson, H. L. (2022)). The present thesis situates FamApp within this landscape and provides a structured comparison with existing systems to highlight functional gaps the app is designed to close. Overall, the literature supports a youth-centered, ICT-enabled approach that combines accurate content, behavior-supporting features, and service linkages to reduce unmet need and improve FP uptake in Uganda.

III. PROBLEM DEFINITION

Despite the availability of services, family planning (FP) utilization among Ugandan youth remains low, contributing to unintended pregnancies, sexually transmitted infections (including HIV), and maternal morbidity and mortality (Uganda Bureau of Statistics (UBOS) & ICF (2017), UBOS (2022)). Persistent barriers include limited access to modern contraceptives, ineffective traditional information channels (e.g., TV, newspapers, conferences) for youth engagement, and entrenched misconceptions about methods. Targeted, youth-centered communication has been shown to influence behaviour, yet existing approaches by government and NGOs often miss youth preferences, yielding limited behaviour change.

Empirical evidence from Uganda further indicates that non-use is driven less by sheer unavailability and more by method-related concerns (notably fear of side effects), postpartum factors, partner/religious opposition, and perceived infrequent sexual activity—factors that information and counselling could address (Jude, O. (2020), Ahinkorah, B. (2020), Abdou, G., *et al.* (2015), Kabagenyi, A., *et al.* (2014), Stella, M., Edith, T. A., Agnes, M. F., & Shigeko, H. (2020)).

3.1 Problem Statement

There is no effective, youth-centered, ICT-enabled mechanism that reliably delivers accurate FP information, counters misconceptions, and links young people to services in ways aligned with their media habits and needs. This gap sustains low FP uptake and its adverse outcomes among

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Ugandan youth (Jennings, L. G., *et al.* (2019), Kim, Y. J. (2023), Knop, M. N.-H., *et al.* (2022)).

3.2 Study aim (scope anchor)

In response, this study develops and evaluates a mobile system (FamApp) to improve FP uptake among Ugandan youth, by eliciting user requirements, building the app, integrating it with the service landscape, and validating its usability and effectiveness.

IV. METHODOLOGY/APPROACH

4.1 Research Philosophy: Critical Realism: This study is guided by the Critical Realism (CR) paradigm, which combines ontological realism (causal mechanisms exist whether or not they are observed) with epistemic fallibilism (our knowledge of them is partial and revisable). CR emphasizes how outcomes arise from the interplay of agency (what young people and providers do) and structure (social norms, gender relations, service availability, policy and information ecosystems). Much like an "iceberg," observable events (e.g., reported non-use of FP) sit above deeper, often unobserved mechanisms (e.g., fear of side-effects, privacy concerns, access frictions) that generate those events in specific contexts (Bennett & Elman, 2021).

Operationally, CR supports our explanatory aims and justifies:

(i) **Retroduction** - moving from survey/interview patterns to plausible underlying mechanisms.
(ii) **Abduction** - re-framing these patterns through theory to design targeted features; and
(iii) **Design-evaluation cycles** in **Design Science Research (DSR)**, where the artefact (FamApp) is both a solution and a probe for how mechanisms are enabled or constrained.

Concretely, features such as an evidence-based method library (to counter myths), reminders and cycle tracking (to support adherence and self-efficacy), and a provider finder/tele-counseling (to reduce access and stigma frictions) are mechanism-informed interventions whose effects are then evaluated and iteratively refined. In short, CR provides the meta-theoretical bridge between the technical design and the social determinants of FP uptake, and it underpins our mixed-methods strategy and DSR approach (Bhaskar, 1978; Sayer, 2000; Bennett & Elman, 2021).

4.2 Research design: We adopted a Design Science Research (DSR) approach to engineer and evaluate an artefact—a mobile system ("Famapp") that addresses low uptake of family planning among Ugandan youth (Jennings, L. G., *et al.* (2019), Knop, M. N.-H., *et al.* (2022)). The DSR cycle covered:

(i) Problem identification and requirements scoping via literature and stakeholder consultations.
(ii) Artefact design using UML (use cases, activity diagrams) with a user-centered focus.
(iii) Artefact evaluation; and
(iv) Iterative refinement based on feedback.

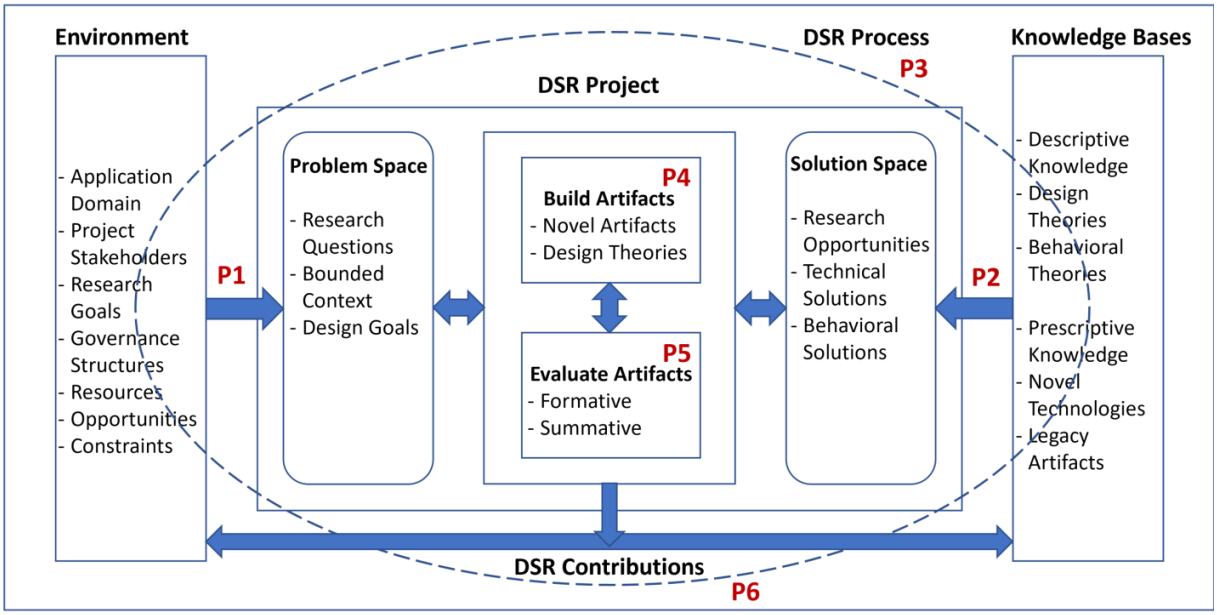

Figure 1: Design Science Research Context Diagram

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4.3 Sampling and sample size: Given imprecise census data for Kikoni, we first applied purposive sampling to recruit participants who met our priori inclusion criteria, youth residing in the study area and within the target age band. Field staff screened for age and place of residence and enrolled eligible respondents. To extend reach within the same population, each enrolled participant was then invited to refer additional eligible peers, implementing a snowball procedure to identify harder-to-reach youth and accelerate accrual.

Purposive sampling ensured that data collection focused on the target group (youth residents of Kikoni), while snowball referrals helped surface participants connected via peer networks who might not be captured through venue-based recruitment alone. All referrals were re-screened for the same eligibility criteria (age, residence) to preserve the sampling frame; participation remained voluntary with informed consent and privacy protections, consistent with the study's ethics protocol. The survey size was computed using Cochran's formula for proportions at 95% confidence and 5% margin of error, with an assumed 40% non-use of family planning in the target area, yielding a required sample of **n = 369** (achieved).

4.4 Data collection: We used a convergent mixed-methods approach: parallel qualitative interviews for depth and quantitative questionnaires for breadth, then integrated the insights at analysis. We conducted in-depth, semi-structured interviews to surface user needs, barriers, and feature preferences. Interviews were held in English or a regional dialect with support from fluent translators to ensure inclusivity and nuance capture.

In parallel, we administered a structured questionnaire with scaled items to quantify FP knowledge, access, and use, as well as attitudes toward an FP mobile system. This produced analyzable measures suitable for descriptive statistics and subgroup comparisons. All participants provided informed consent; privacy/confidentiality protections were enforced throughout data collection. Quantitative responses were converted to numerical form and summarized with descriptive statistics (e.g., frequencies, averages) and visualized using graphs and frequency tables to detect patterns/outliers; qualitative insights were then used to contextualize these patterns and explain mechanisms behind them.

4.5 Data analysis: Audio-recorded, semi-structured interviews were transcribed (and, where applicable, translated to English), then analyzed thematically. We used an inductive–deductive approach consistent with the study's Critical Realism stance: initial open coding to surface salient concepts; focused coding to group concepts into themes (e.g., access frictions, privacy concerns, method-related fears); and retroduction/abduction to interpret how underlying mechanisms might produce observed behaviors in specific contexts. Themes were iteratively refined against the data and summarized with illustrative quotes to preserve participants' meaning.

Questionnaire responses were cleaned and coded; ordinal items (Likert-type) were retained as ordered categories. We generated descriptive statistics—frequencies, percentages, means, and measures of variability—and visualized results with bar/column charts and frequency tables to identify trends and outliers. Where useful for interpretation, we produced simple cross-tabulations (e.g., awareness and use) to compare subgroups, keeping inference descriptive and aligned to the study aims.

Findings were integrated through a convergent, side-by-side synthesis: quantitative patterns established scope and magnitude (e.g., familiarity vs. use), while qualitative themes explained those patterns (e.g., fears, norms, and access constraints), informing the mechanism-targeted design choices reported in the Results & Discussion.

4.6 Behavioural framing: Design choices and evaluation instruments were guided by Technology Acceptance Model and Theory of Planned Behavior constructs (perceived usefulness/ease, norms, and control), to anticipate adoption and usability among adolescents and young adults (Johnson, H. L. (2022), Kim, Y. J. (2023)).

4.7 Artefact implementation (Design & Build): We engineered a functional prototype of FamApp using a modular, service-oriented architecture: a .NET/C# backend exposing RESTful services, an Angular/JavaScript web front end, a Flutter mobile client (Android beta, distributed as APK), and a PostgreSQL relational database. This stack was selected for rapid iteration, cross-platform reach, and straightforward integration with external services. System scope and interactions were specified with use-case and activity diagrams to keep user and provider journeys explicit and testable (see Fig. 2 use-case; Fig. 3 sequence diagram). These artefacts informed interface states, API contracts, and data entities, reducing rework during implementation.

Core features (mechanism-informed). Guided by the behavioral and service gaps identified in Section 3, the prototype delivers:

(i) An evidence-based FP method library (myth-busting, side-effects, guidance)
(ii) A provider finder (facilities, directions, and contact/booking pathways).

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(iii) Menstrual/contraceptive tracking with configurable reminders.
(iv) Tele-counseling/tele-advice pathways for discreet support; and
(v) Notifications to support adherence and continuity.

Representative UI screens are shown in the composite Fig. 4-6 (Telemedicine Services + Provider Finder + Tracking calendar).

The APK build was deployed to a pilot test group for hands-on evaluation (see Section 5 for usability and satisfaction outcomes). Feedback from this deployment cycle drove fixes and minor UX refinements before analysis.

The feature set and roll-out pattern align with established mHealth behavior-change and implementation guidance for LMIC context prioritizing accurate content, privacy, reminders, and service linkages (Jennings, L. G., *et al.* (2019), Knop, M. N.-H., *et al.* (2022)).

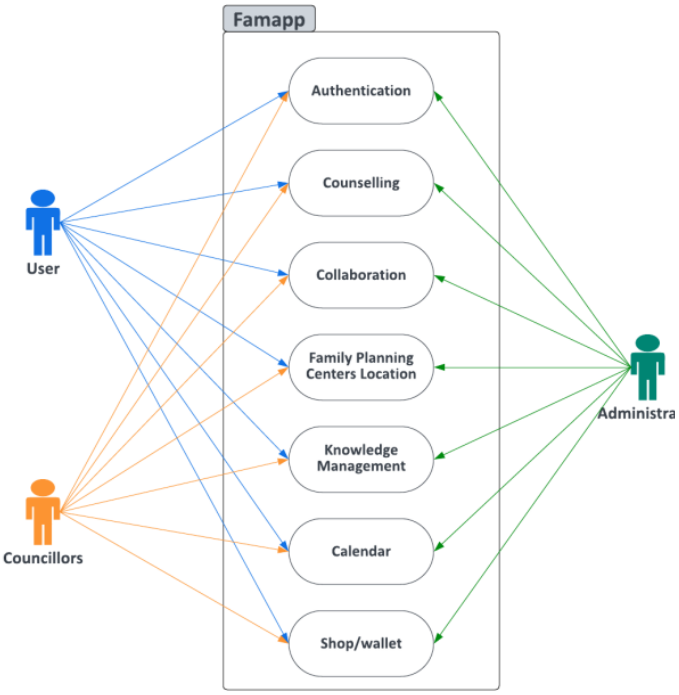

Figure 2: Use case diagram

Figure 3: Sequence diagram

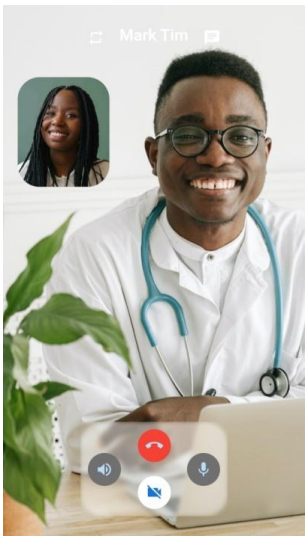

Figure 4: Telemedicine services

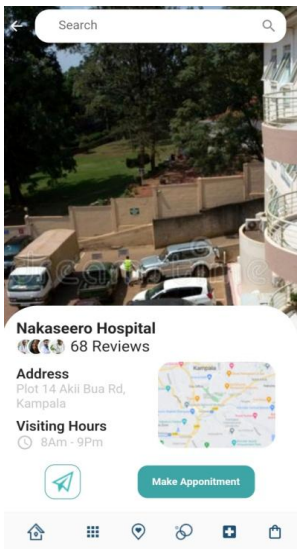

Figure 5: Health Care Provider Finder

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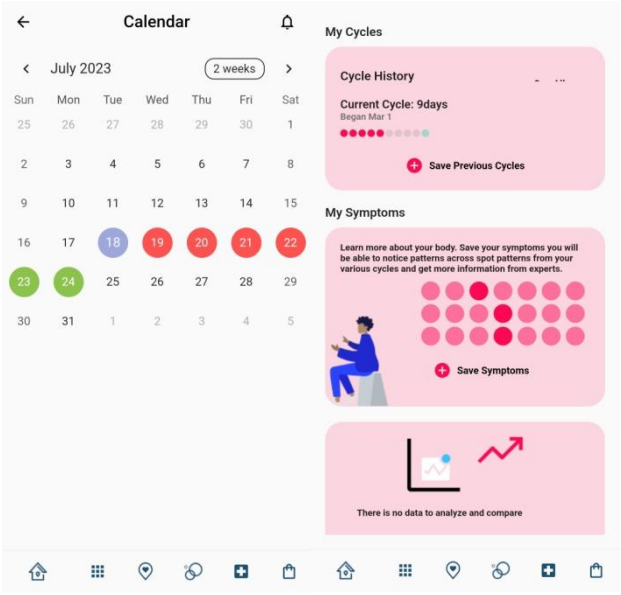

Figure 6: Menstrual Cyle Tracking and Monitoring

4.8 Evaluation: We evaluated the artefact on two fronts:

(i) User questionnaires capturing perceived usefulness, satisfaction, reliability; and

(ii) (Software testing, combining white-box checks of implementation quality/standards with black-box tests to validate end-to-end behavior against the stated functional and non-functional requirements.

4.8.1 User questionnaires: Participants completed a structured, Likert-style questionnaire after hands-on use, rating feature usefulness (library, provider finder, tracking, tele-counseling, notifications), overall satisfaction, and perceived reliability. This data triangulated the software test outcomes and informed minor UX refinements.

4.8.2 Black-box testing: We treated the app as a closed box and derived tests directly from requirements, user stories, and UI flows. Each test case specified pre-conditions, steps, expected results, acceptance criteria, and pass/fail status. Design techniques included equivalence partitioning, boundary-value analysis, state-transition checks (for multi-step flows), and negative/error-handling tests.

- **Functional suites (end-to-end):**

    1. **Onboarding & authentication** - new account creation, login, logout, password reset, error states (e.g., invalid credentials, network loss).
    2. **FP information library** - browse by method, search, open method details, verify presence of risks/side-effects sections, and offline/readability fallbacks.
    3. **Provider finder** - location permission prompts; geolocation on/off; list + map rendering; facility detail view; call/route actions; graceful fallback when GPS is denied.
    4. **Tracking & reminders** - create/edit cycle dates; compute next events; schedule/edit/delete reminders; notification receipt while app is backgrounded.
    5. **Tele-counseling pathway** - launch contact/tele-advice, verify completion/abort flows, and privacy notices.
    6. **Notifications** - timeliness, deep-linking to the correct screen, and duplicate-suppression.

- **Non-functional suites:**

    1. **Performance/smoothness** - cold start and screen transitions complete within acceptable thresholds; list rendering remains responsive for typical payload sizes.
    2. **Reliability/stability** - no crashes or dead-ends during 30-minute exploratory sessions spanning core flows; graceful recovery from network toggles.
    3. **Compatibility** - smoke tests across representative Android versions/devices (small/large screens).
    4. **Privacy/security behaviours** - HTTPS (HyperText Transfer Protocol Secure) for network calls, no sensitive content in notifications, permission gating for location/camera/storage, and no PII in logs.

- **Acceptance criteria (illustrative examples):**

    1. **Provider finder:** when location is enabled, the app returns nearby facilities and opens the native map intent; when denied, it shows a clear prompt and allows manual search.
    2. **Tracking:** saving a period start date immediately updates the next-cycle projection and schedules a reminder visible in system notifications.
    3. **Library:** each method page renders indications, contraindications, side-effects, and guidance without broken links or empty sections.

4.8.3 White-box testing: We complemented black-box tests with targeted unit and component tests (validation, date/interval calculations, API (Application Programming Interface) response parsing) and static checks for code quality/standards conformance. These helped localize defects found by end-to-end tests and ensured internal correctness, but decisioning on release readiness was driven primarily by black-box acceptance.

4.8.4 Traceability & outcomes: Test cases were traceable to requirements and user stories; defects were logged, fixed, and

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re-tested before the usability survey window. The combined approach—questionnaires plus black-box validation—supports our claim that the artefact meets its functional intent and non-functional baselines for a pilot deployment

4.9 Ethical considerations: This study received institutional ethics approval from. All participants provided informed consent, with the study explained in English or a regional dialect and, where needed, facilitated by fluent translators to ensure comprehension. Participants were informed of the voluntary nature of participation, their right to withdraw at any time, and how their data would be used and protected. To preserve confidentiality, we collected only minimal identifiers; interview materials were pseudonymised, access-controlled, and stored on encrypted drives. Only the core research team had access to the de-identified dataset. For sensitive SRH topics, we provided referral information to youth-friendly services when requested. During the app pilot, we followed privacy-by-design practices: no sensitive content in push notifications, permission gating for location and storage, and no personally identifying information in logs. Additional safeguards were emphasized for young women, consistent with the protocol.

4.10 Summary: This methodology integrates a Critical Realist stance, a Design Science Research programme for artefact creation, and convergent mixed methods (qualitative interviews + quantitative survey) to elicit requirements, build the mobile system, and evaluate it rigorously. Quantitative analyses establish scope and patterns; qualitative themes explain mechanisms; and black-box acceptance tests verify end-to-end behaviour against functional and non-functional criteria. Together, these choices ensure both technical soundness and contextual fitness for improving youth access to family-planning information and services.

V. RESULTS & DISCUSSION

1. **Sample and baseline.** We analyzed 369 respondents—predominantly youth—with 90% aged 15–30 years (24% were 15–20; 53% were 21–25; 18% were 26–30; 5% were 31–35). Awareness of modern family planning (FP) was high (82%), yet ever-use lagged (45%), underscoring a persistent intention–action gap among young people. Among those who had used FP, the most common methods were emergency contraception (46%), condoms (36%), oral pills (31%), and IUDs (26%). Reasons for non-use centered on abstinence, waiting until marriage, concerns about side effects and "interfering with the body," and deferring decisions until after studies—signals of both values-based and information-related barriers (Uganda Bureau of Statistics (UBOS) & ICF (2017) UBOS (2022)).

Table 1: Age registration

Age Bracket of Respondents	Number of Respondents	Percentage
15 - 20 years	90	24%
21 – 25 years	195	53%
26 – 30 years	65	18%
31 – 35 years	19	5%

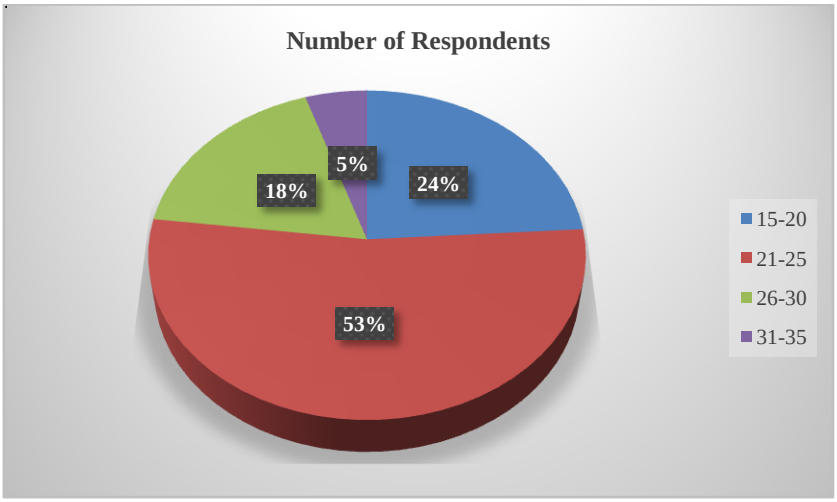

Figure 7: Age Registration in %

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Table 2: Familiarity with modern family planning methods

Familiarity with Modern FP methods	Number of Respondents	Percentage
Yes	301	82%
No	68	18%

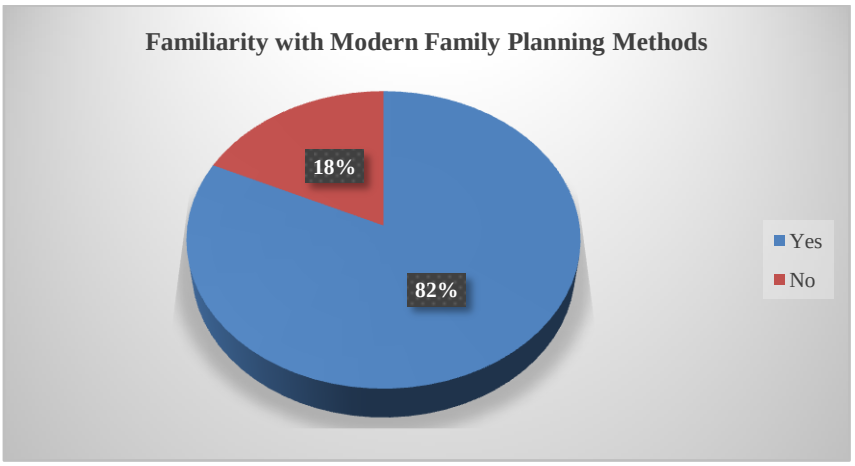

Figure 8: Familiarity with modern family planning methods in %

Table 3: Usage of modern family planning methods

Usage of Modern FP methods	Number of Respondents	Percentage
Yes	166	45%
No	203	55%

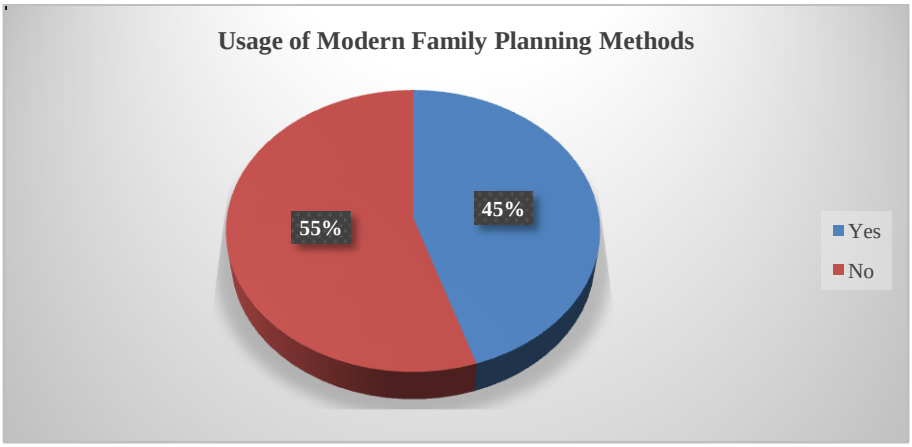

Figure 9: Usage of modern family planning methods in %

2. **Information barriers and current channels.** A striking 87% perceived lack of information/access as a barrier to modern FP use, validating the project's core premise. Youth reported turning to health facilities, the internet, social media/peers, and formal education to fill gaps—patterns that favor a mobile, on-demand channel.

Table 4: Perception of the lack of Information Access as a Barrier

Perception of Information Access as a Barrier	Number of Respondents	Percentage
Yes	321	87%
No	48	13%

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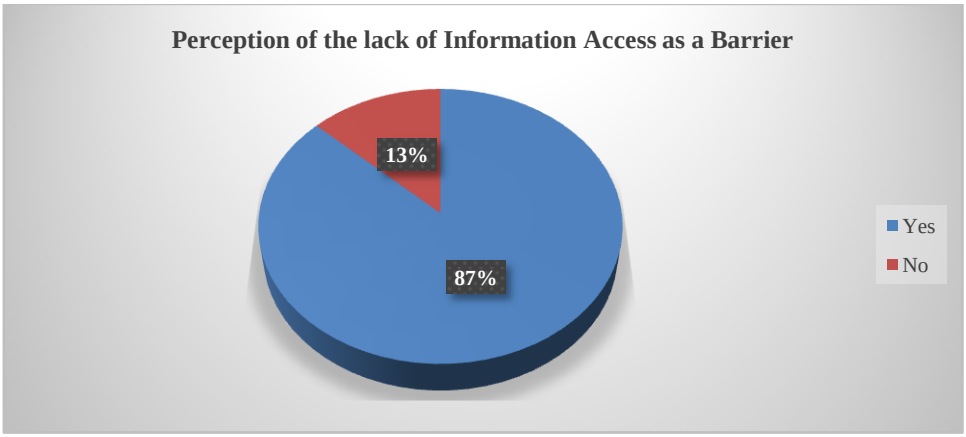

Figure 10: Perception of the lack of Information Access as a Barrier in %

3. **App appetite and adoption readiness.** Interest in a mobile system for FP information was high (88%), and 89% believed such a system would increase uptake. Even before our intervention, 58% already used SRH/FP apps (e.g., Flo, Sauti Plus), suggesting market familiarity and reduced adoption friction (Kim, Y. J. (2023)). When asked how often they would prefer to use an FP mobile system, most chose monthly (63%), with 17% each for daily and weekly, and 3% hourly, implying periodic check-ins for information and reminders.

Table 5: Interest in Mobile System for Family Planning Information

Interest in using Mobile System to access information on FP methods	Number of Respondents	Percentage
Yes	324	88%
No	45	12%

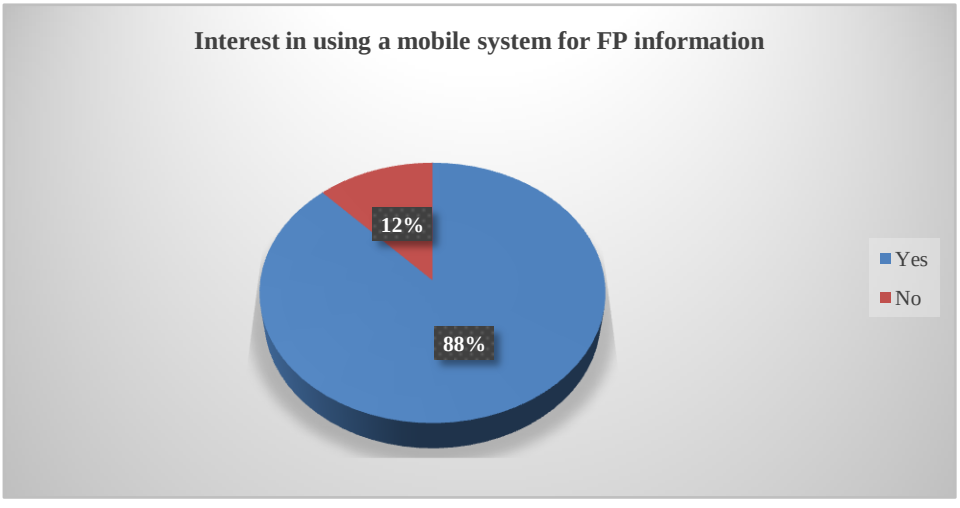

Figure 11: Interest in Mobile System for Family Planning Information in %

Table 6: Potential impact of Mobile System

Potential impact of Mobile System to increase uptake of modern FP methods	Number of Respondents	Percentage
Yes	328	89%
No	41	11%

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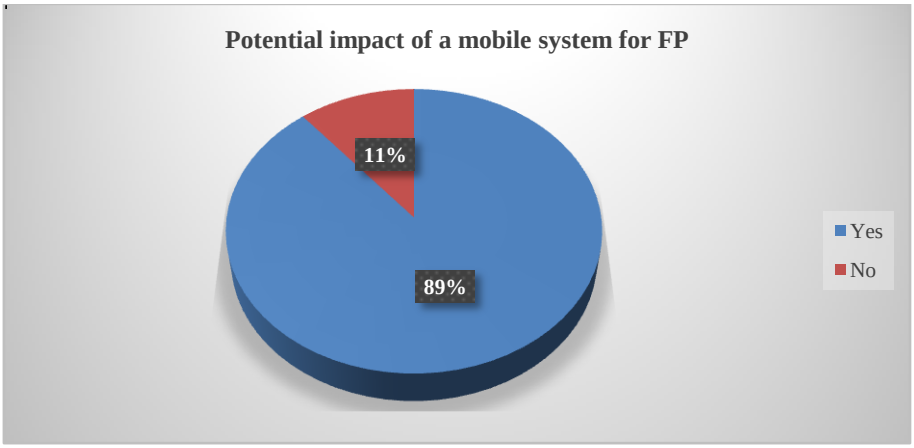

Figure 12: Potential impact of Mobile System in %

Table 7: Frequency of Mobile System Usage

Frequency of Mobile System Usage	Number of respondents	Percentage
Hourly	13	3%
Daily	62	17%
Weekly	62	17%
Monthly	232	63%

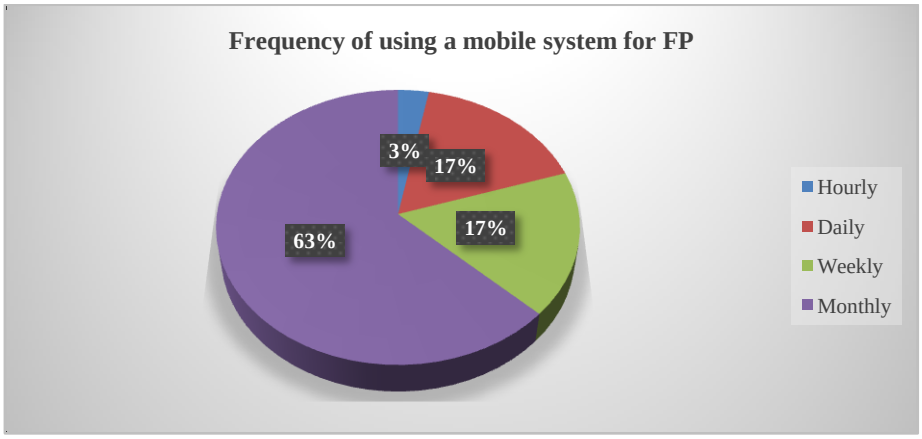

Figure 13: Frequency of Mobile System Usage in %

4. **Usability and experience with the deployed app (FamApp).** A focused usability survey (n=104) showed strong engagement: 50% used FamApp daily; 20% weekly; 20% were first-time users; 10% several times a week. Discovery skewed heavily to word-of-mouth (90%), indicating organic diffusion but also an opportunity to diversify outreach via providers and social platforms. Overall satisfaction was high (40% "strongly agree," 50% "agree"), and users emphasized that the system was "a good mobile system," had the "required features," and was "educative and quick to learn."

Table 8: Frequency of Famapp Mobile System Usage

Frequency of Famapp Mobile system usage	Number of Respondents	Percentage
Daily	52	50%
Once a week	21	20%
This was my first time using it	21	20%
Several times a week	10	10%
Less than once a week	0	0%

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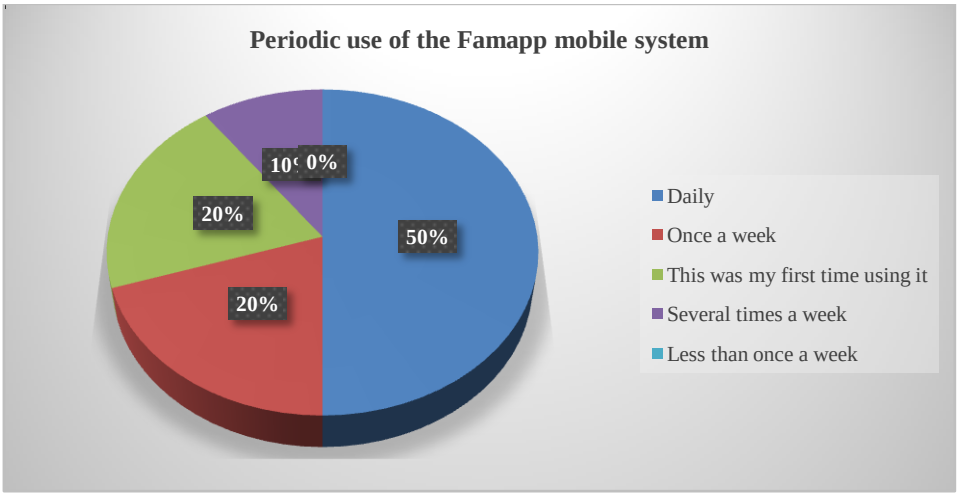

Figure 14: Frequency of Famapp Mobile System Usage in %

5. **Feature utility and trust.** All core features—library/education, provider locator, menstrual tracking, tele-counseling, and shop—were rated useful by 100% of respondents; peer support was close behind at 90%. The interface was unanimously described as intuitive (100%), and information quality as "very accurate and reliable" (100%). No respondent reported technical issues, and 100% said they were "very likely" to recommend FamApp—rare signals of both stability and perceived value in early deployment. FamApp also exceeded expectations for 90% of users, with the remainder agreeing it met expectations; privacy/security ratings were very high (n=94 "strongly agree," n=10 "agree").

Table 9: Useful Features for Family Planning in Famapp Mobile System

Useful features of the Famapp mobile System	Percentage
Library/Educational resources	100%
Health care provider finder (Location)	100%
Tracking and monitoring menstrual cycles (Calendar)	100%
Access to telemedicine services (Counselor)	100%
Shop feature	100%
Peer support (Discussions Forum)	90%

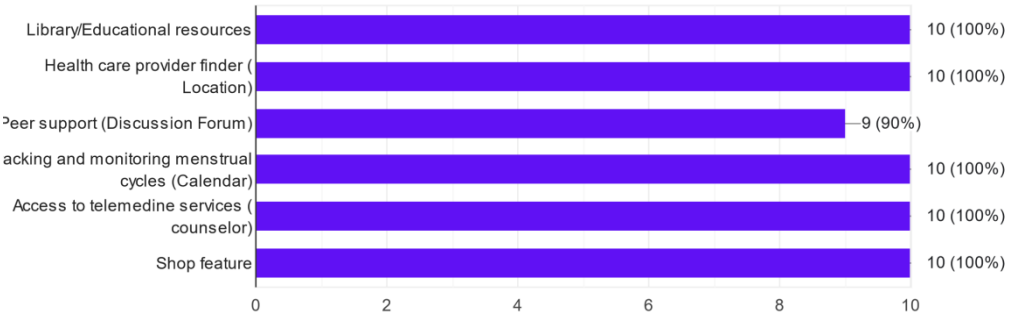

Figure 15: Useful Features for Family Planning in Famapp Mobile System

Table 10: Intuitiveness of Famapp Mobile System Interface

Intuitiveness of Famapp Mobile System interface	Number of Respondents	Percentage
Yes	104	100%
No	0	0%
Not sure	0	0%

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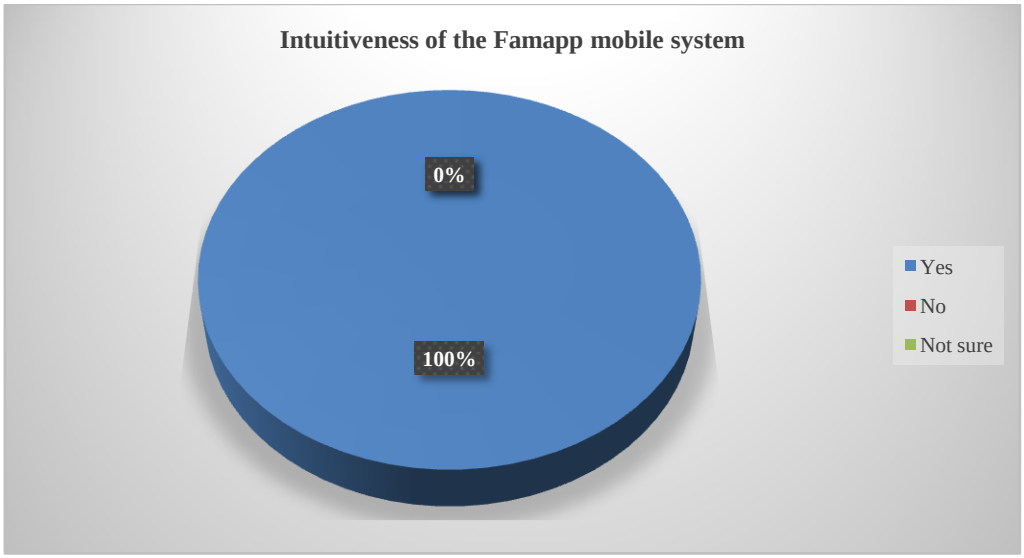

Figure 16: Intuitiveness of Famapp Mobile System Interface in %

Table 11: Technical Issues Encountered in Famapp Mobile System

Technical issues encountered in Famapp mobile system	Number of Respondents	Percentage
Yes	0	0%
No	104	100%

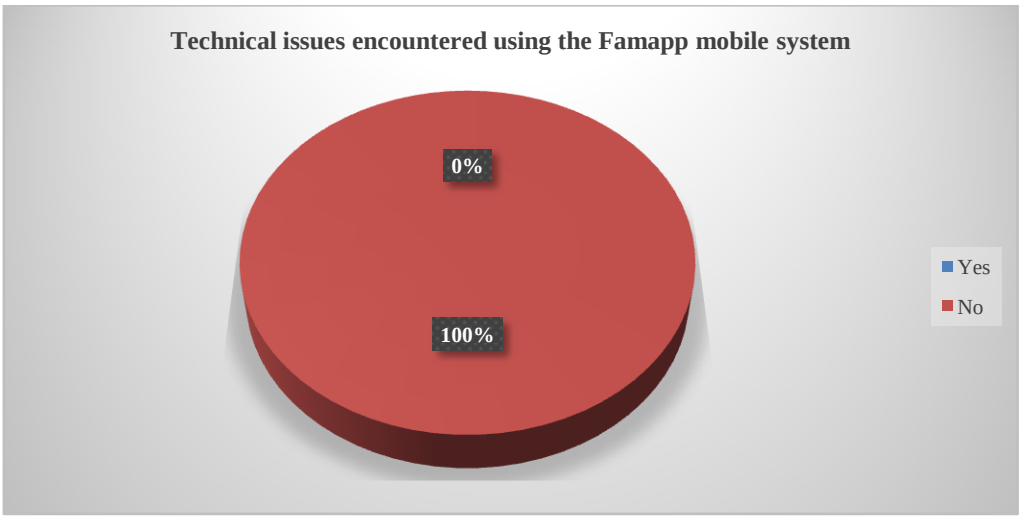

Figure 17: Technical Issues Encountered in Famapp Mobile System in %

Table 12: Likelihood to Recommend Famapp Mobile System

Likelihood to Recommend Famapp Mobile System	Number of Respondents	Percentage
Very unlikely	0	0%
Somewhat unlikely	0	0%
Neutral	0	0%
Somewhat likely	0	0%
Very likely	104	100%

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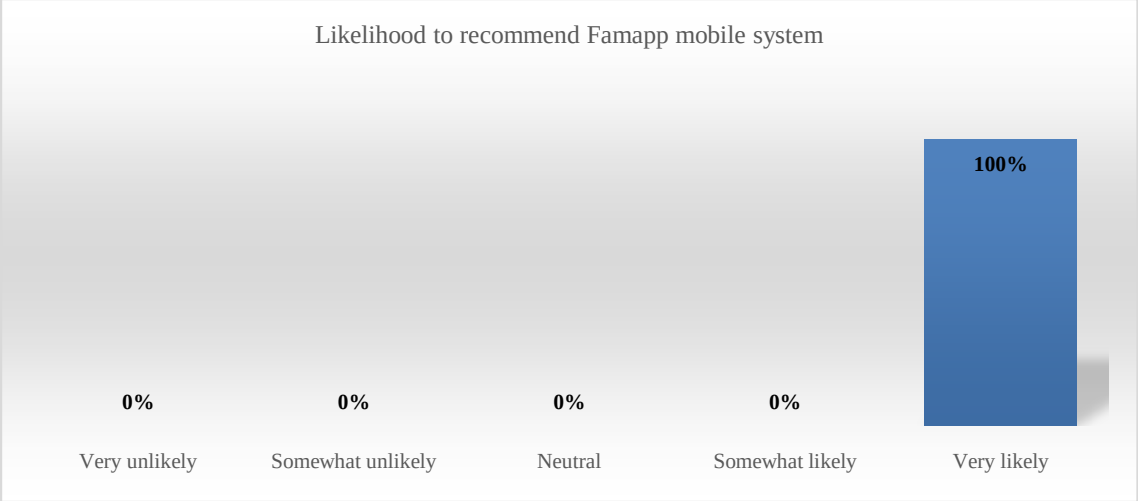

Figure 18: Likelihood to Recommend Famapp Mobile System in %

Table 13: Alignment of Famapp Mobile System with users Expectations

Alignment of Famapp Mobile system with user Expectations	Number of Respondents	Percentage
Strongly Disagree	0	0%
Disagree	0	0%
Neutral	0	0%
Agree	10	10%
Strongly Agree	94	90%

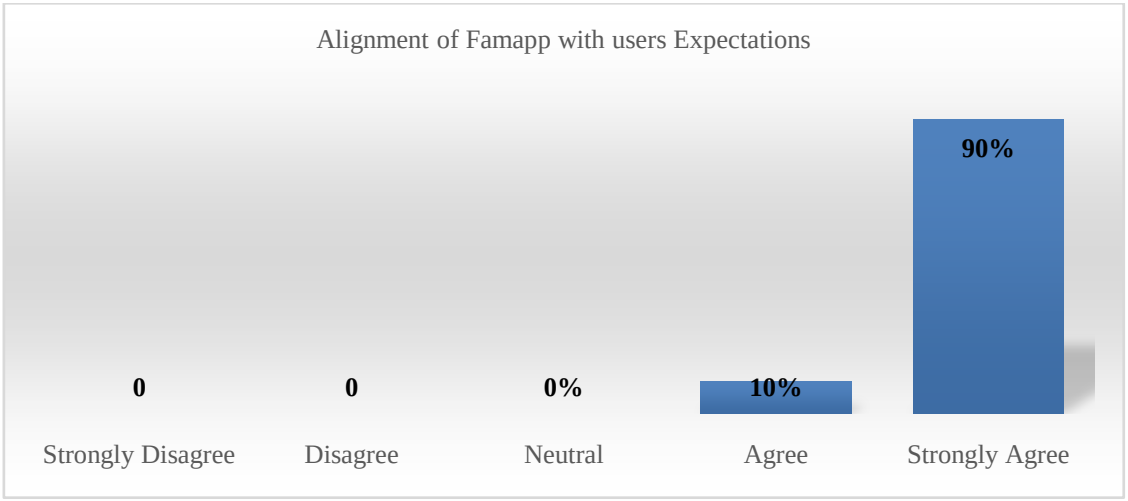

Figure 19: Alignment of Famapp Mobile System with users Expectations in %

Table 14: Privacy and Security Evaluation of Famapp Mobile System

High Level of privacy and security of Famapp mobile system	Number of Respondents	Percentage
Strongly Disagree	0	0%
Disagree	0	0%
Neutral	0	0%
Agree	10	10%
Strongly Agree	94	94%

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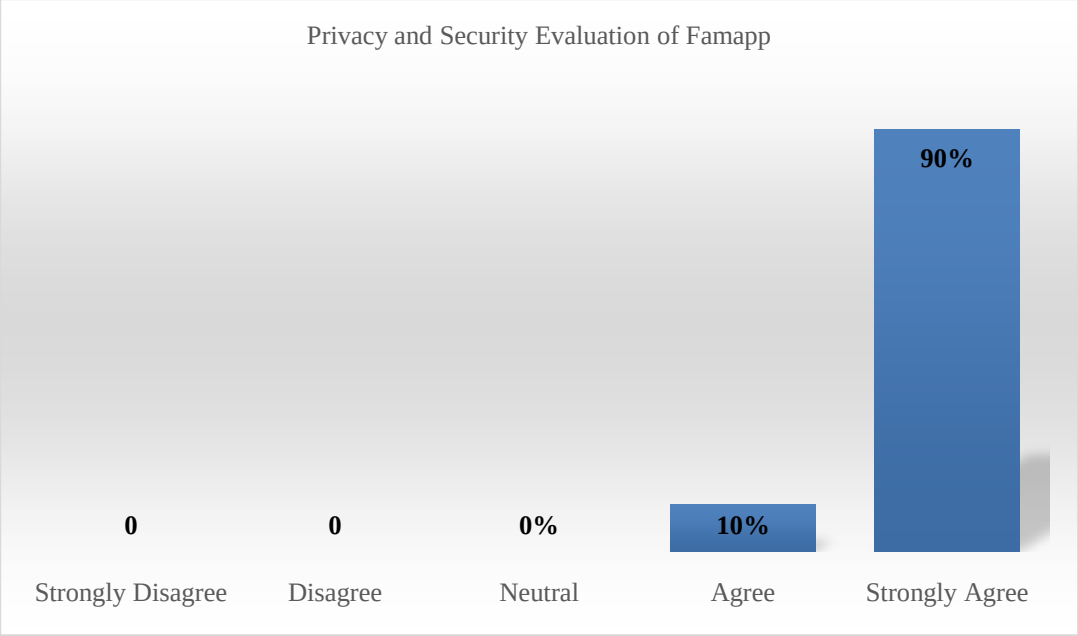

Figure 20: Privacy and Security Evaluation of Famapp Mobile System in %

6. **Interpretation.** Together, the data suggest a clear *need–solution fit*: despite high baseline awareness, young people face information and confidence barriers that a mobile system can address with evidence-based content, discreet access, and supportive tools (reminders, cycle tracking, provider navigation). The contrast between the general sample's *stated* monthly-use preference and FamApp users *observed* daily use likely reflects utility for time-sensitive features (e.g., cycle tracking and dosing reminders), where day-to-day interaction adds value. The dominance of word-of-mouth in discovery implies high perceived relevance within peer networks; formalizing outreach through healthcare providers and targeted social campaigns could broaden reach to non-users who cite fear and side-effects as reasons for avoidance.

7. **Limitations and implications.** The exceptionally positive FamApp ratings (100% accuracy; 100% recommendation; 0% bugs) likely reflect early-adopter and social desirability effects in a convenience sample (n=104). Larger, more diverse field evaluations with behavioral outcomes (method initiation/continuation) and passive analytics are warranted to validate impact and detect edge-case issues. Still, alignment between what youth say they need (trusted information; reminders; cycle/calendar; clinic finder; counseling; privacy) and what FamApp delivers—and users' rate highly—supports continued investment in scale-up with rigorous monitoring.

VI. CONCLUSION

This study demonstrates that a youth-centered mobile health intervention can meaningfully address persistent gaps in family planning (FP) knowledge, confidence, and access among Ugandan youth (Knop, M. N.-H., *et al.* (2022), Jennings, L. G., *et al.* (2019)). By following a Design Science Research process to build and iteratively refine **FamApp**, we delivered an artefact that improved awareness with reliable, comprehensive FP information and tools aligned to user needs.

Evaluation findings point to positive behavioural and experiential outcomes: users reported increased uptake and more consistent use of modern methods, supported by reminders, cycle tracking, and access to expert advice; satisfaction and engagement with the app were high. The system was explicitly designed to mitigate common barriers, including fear of side effects and socio-cultural constraints—by pairing tailored content with supportive features, thereby strengthening willingness to adopt FP.

At a public-health level, integrating mobile technology into FP services offers scalable pathways to reduce unintended pregnancies and improve reproductive health outcomes for young people. Given strong expressed interest in such solutions, the results support continued investment in user-friendly, trusted mHealth platforms that combine accurate information, reminders, and linkages to care.

Overall, the research provides evidence that FamApp can help bridge the intention–action gap in FP and complements existing service delivery. Future work should assess long-term impact at scale and deepen feature sets based on ongoing user feedback.

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VII. FUTURE SCOPE

1. **Impact at scale:** Run longitudinal evaluations (e.g., cohort or pragmatic trials) to measure long-term outcomes such as method initiation/continuation, adherence, and unintended pregnancy rates among youth.
2. **Continuous product iteration:** Establish an in-app feedback loop and analytics-driven A/B testing to refine usability, content, and reminders, guided by real-world usage patterns and user input.
3. **Integration with health systems:** Interoperate with national/regional HIS (e.g., referrals, appointment/stock visibility, provider directories) to create seamless pathways from information to services and reduce duplication.
4. **Reach and equity:** Expand outreach via universities, CBOs/NGOs, and trusted influencers; localize to multiple languages and strengthen offline access to serve connectivity-constrained users.
5. **Privacy and security by design:** Continuously harden data protection, clarify consent/data-use notices, and align with best-practice security updates to maintain trust.
6. **Personalization/intelligent support:** Explore AI/ML for tailored content, adherence nudges, and triage (while safeguarding privacy), to enhance relevance and effectiveness.
7. **Monitoring & evaluation framework:** Develop robust M&E and reporting pipelines (dashboards, outcome tracking) to address known gaps in assessing mHealth FP interventions.
8. **Policy, partnerships, and sustainability:** Co-design with MoH and partners to navigate regulatory frameworks and build financing/ownership models that outlast pilots.

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