From Healers to Interfaces: Building Trust in Technology-Mediated Healthcare in Nigeria

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Abstract

In settings where biomedical distrust coexists with strong religious traditions and plural medical systems, trust in digital health tools cannot be assumed. This study builds on prior findings from Northern Nigeria showing that moral integrity, religious legitimacy, and biomedical expertise increase trust in human health communicators. We tested whether these cues retain their influence when embedded in technology-delivered care. In a between-subjects experiment (N = 720), adult participants from Sokoto and Zamfara states evaluated simulated health consultations presented through three formats: a human doctor via video, an AI-driven avatar with localized moral and religious framing, and a neutral text-based chatbot. Each presented identical messages related to vaccination, infection prevention, and maternal care. Trust, behavioral intention, and perceived legitimacy were measured using Hausa-translated, validated scales. Participants expressed the highest trust in the human video condition (M = 4.21, SD = 0.59). The culturally adapted AI avatar significantly outperformed the neutral chatbot and approached human-level trust when it included moral and religious cues ($\beta = .41$, $p < .001$). Trust mediated the relationship between message format and behavioral intention (indirect effect = .27, 95% CI [.18, .38]). Religiosity moderated this effect, with more religious participants showing higher trust in the framed avatar. These findings suggest that digital health tools can incorporate moral and cultural signals to improve acceptance, especially in contexts where institutional trust is low. Designing for cultural resonance may help narrow the trust gap between human and non-human communicators in health care delivery.

Keywords: Ddigital health, Trust, AI in healthcare, Religious legitimacy, Moral authority, Northern Nigeria.

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Introduction

Northern Nigeria's health system combines a severe workforce shortage with deep-seated public mistrust. Physician density stands at only 0.394 per 1,000 population, far below the World Health Organization's coverage benchmark (World Bank, 2024). These shortages coincide with poor outcomes: maternal mortality exceeds 500 deaths per 100,000 live births, and infant mortality remains above 70 per 1,000 in several northern states (UNICEF Nigeria, 2023; Nwanze, Siuliman, & Ibrahim, 2023). Communities often turn to prophetic medicine, herbal therapies, and informal drug vendors, making biomedical advice just one of several competing sources of care.

In this plural landscape, legitimacy hinges as much on moral character and religious standing as on scientific credentials. A recent experiment in Sokoto and Zamfara showed that trust in human health communicators rose when messages signaled moral integrity, religious alignment, and professional training, with the strongest effects when all three cues converged (Bello & Hussaini, 2024). These findings highlight that authority in health communication is layered, culturally embedded, and not guaranteed by information alone.

Digital health tools such as telemedicine, AI triage, and mobile apps have been proposed as cost-effective ways to offset workforce gaps, yet their success will depend on more than connectivity. Existing studies from largely secular settings show that anthropomorphic design can enhance trust in health chatbots, but it is unclear whether such effects translate to communities where moral and religious authenticity strongly shape credibility (Lee & Choi, 2023). If technology is to narrow service deficits in Northern Nigeria, interfaces must carry the same cultural signals that confer legitimacy on human providers.

The present study therefore tests whether moral, religious, and scientific cues can be digitally encoded to sustain trust in technology-delivered care. By comparing a human doctor via video, an AI avatar framed with local moral and religious cues, and a neutral text chatbot, we examine whether culturally adapted design can bridge the trust gap between human and non-human communicators.

Method

Design

The study employed a between-subjects, three-condition experimental design. Participants were randomly assigned to one of three message-delivery formats: (a) a human physician delivering advice via prerecorded video, (b) an AI-driven avatar that delivered identical advice framed with local moral and religious cues, or (c) a neutral text-based chatbot that presented the same advice without added framing. All health messages addressed vaccination, infection prevention, and maternal care and were held constant across conditions for length, content, and reading level.

Participants

A total of 720 adults (62 % female, *M* age = 34.7 years, *SD* = 9.8) were recruited from Sokoto and Zamfara States in Nigeria. Stratified sampling across health centres, primary-care clinics, prophetic medicine shops, and herbal-healing markets ensured proportional representation by gender and recruitment context. Eligibility criteria were (a) age 18 years or older, (b) parent or primary caregiver of at least one child under 18, and (c) fluency in Hausa. Each participant received ₦500 or airtime credit of same value (≈ USD 0.55) as compensation.

Materials and Measures

All scales were translated into Hausa using forward–backward translation and reviewed by bilingual public-health professionals.

- Trust in Communicator (α = .86). Five items adapted from the Trust in Physician Scale (Anderson & Dedrick, 1990).
- Perceived Legitimacy (α = .81). Three items adapted from the Authority Acceptance Scale (Tyler, 2006).
- Behavioral Intention (α = .84). Four items adapted from the Health Behaviour Intention Scale (Ajzen & Fishbein, 1980).
- Religiosity (α = .83). Six items from the Brief Muslim Religiosity Scale (Padela & Curlin, 2013).
  All items used a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Procedure

Sessions were held in community halls and participating health centres equipped with laptops and headphones. After providing written consent, participants completed demographic questions, viewed the assigned consultation format, and immediately filled out the trust, legitimacy, and behavioral-intention scales. Average completion time was 18 minutes. A short debriefing followed, and participants received printed public-health information and contact details for local services.

Data Analysis

Analyses were conducted in R (v4.3). One-way ANOVAs compared trust, perceived legitimacy, and behavioral intentions across conditions. Planned contrasts tested the AI avatar against the text chatbot, and the AI avatar against the human video. A PROCESS mediation model (Model 4) assessed whether trust mediated the effect of message format on behavioral intention. Moderation by religiosity was examined with PROCESS Model 1. Significance was set at α = .05, and bootstrapped confidence intervals (5,000 samples) were used for indirect effects.

Ethics

Ethical approval was obtained from the Sokoto and Zamfara State Ministries of Health. Written informed consent was obtained, confidentiality was ensured by de-identifying data, and participants received a verbal and written debriefing with contact information for local health services and principal researcher.

Results

Preliminary Analyses

All scales showed good internal consistency (Trust $\alpha = .86$, Perceived Legitimacy $\alpha = .81$, Behavioural Intention $\alpha = .84$). Skewness and kurtosis values were within ±1.0, supporting normality assumptions. Levene's tests indicated homogeneity of variance for each dependent variable, $p > .10$.

Table 1: Descriptive Statistics by condition

Condition	Trust M	Trust SD	Legitimacy M	Legitimacy SD	Behaviour M	Behaviour SD
Human Video	4.21	0.59	4.15	0.61	4.03	0.66
AI Avatar	3.97	0.62	3.92	0.65	3.78	0.68
Text Chatbot	3.45	0.7	3.5	0.69	3.35	0.71

Descriptive Statistics

Table 1 presents means and standard deviations for Trust, Perceived Legitimacy, and Behavioural Intention across message-format conditions. Trust was highest for the human video, intermediate for the AI avatar, and lowest for the text chatbot.

Table 2: One way ANOVA results by outcome

Outcome	F	df1	df2	p	n^2
Trust	52.31	2	717	< .001	0.13
Perceived Legitimacy	46.08	2	717	< .001	0.11
Behavioural Intention	39.57	2	717	< .001	0.1

Omnibus Effects

A one-way ANOVA revealed significant format effects on all outcomes (see Table 2). For Trust, $F(2, 717) = 52.31$, $p < .001$, partial $\eta^2 = .13$, indicating a medium effect. Parallel patterns emerged for Perceived Legitimacy and Behavioural Intention.

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Table 3: Pairwise effect sizes Cohen' s d for trust

Contrast	Cohen's d
Human Video - AI Avatar	0.4
Human Video - Chatbot	1.12
AI Avatar - Chatbot	0.71

Pairwise Comparisons

Cohen's *d* values for Trust (Table 3) show a small-to-medium difference between the human video and AI avatar (0.40), a large difference between the human video and chatbot (1.12), and a medium difference between the avatar and chatbot (0.71). These effect sizes confirm that including moral and religious framing in the AI avatar narrows—but does not close—the trust gap relative to human delivery.

Mediation and Moderation

Using PROCESS Model 4, Trust partially mediated the effect of message format on Behavioural Intention (indirect effect = 0.27, 95 % CI [0.18, 0.38]). Religiosity moderated Trust for the AI avatar versus chatbot contrast, $\beta = 0.23$, $t(716) = 4.02$, $p < .001$, indicating stronger avatar trust among highly religious participants. No moderation was observed for the human video versus avatar comparison.

Taken together, the results demonstrate that moral and religious cues can be digitally embedded to enhance trust, although human communicators still command the greatest credibility.

Discussion

This experiment extends prior evidence that layered authority cues of moral integrity, religious legitimacy, and biomedical competence shape trust in health communication in Northern Nigeria (Bello & Hussaini, 2024). We found that that human video consultation elicited the highest trust and behavioral intention, replicating the importance of interpersonal presence in settings where biomedical skepticism is common. Crucially, an AI avatar that displayed localized moral and religious framing narrowed the trust gap, outperforming a neutral text chatbot across all

outcomes. The avatar's effect size relative to the chatbot (Cohen's $d = 0.71$) signals a meaningful advantage when culturally resonant cues are embedded in non-human interfaces.

Trust partially mediates the link between message format and behavioral intention, confirming that credibility is a necessary precursor to stated compliance. Religiosity moderated trust in the avatar, suggesting that shared faith references amplify receptivity to algorithmic advice among highly devout users. This finding echo earlier works showing that religious priming enhances vaccine intentions in similar contexts (Williams et al., 2021) and underscores the need to tailor digital tools to local value systems.

Practical Implications

Designers of telemedicine and AI platforms should consider integrating moral language, faith-aligned greetings, and visible professional credentials into user interfaces. Such cues appear capable of compensating for the absence of face-to-face contact, thereby improving acceptance among populations with strong religious and communal orientations. Health ministries and private developers can pilot avatar-based triage tools that greet users with culturally appropriate salutations, cite relevant ethical teachings, and display verifiable medical qualifications.

Limitations

The study relied on a simulated consultation rather than live telemedicine, so actual uptake may differ when real health decisions and potential costs are at stake. The sample, though diverse across recruitment sites, was confined to two northern states and may not generalize to other Nigerian regions or urban populations with greater digital exposure. Finally, the AI avatar represented only one design; alternative voices, genders, or graphical styles could yield different trust outcomes.

Future Research

Field trials should test whether culturally framed avatars improve actual health behaviors and appointment adherence. Longitudinal studies could assess whether initial trust endures after repeated use. Comparing Christian, Muslim, and traditional-religion settings would clarify how specific faith elements can be flexibly incorporated into digital health designs.

Conclusion

Embedding moral and religious cues in AI interfaces raises trust in digital health consultations and moves avatar-based advice closer to human credibility. In contexts where institutional distrust and workforce shortages converge, culturally tuned design may enable technology to deliver care that is not only accessible but also trusted.

Author Contributions

S. O. Bello conceived the study, designed the experiment, and supervised data collection. Areola Abisola programmed the stimuli and managed data cleaning. S.O. Bello conducted the main statistical analyses under supervision. All authors contributed to interpretation of results, manuscript drafting, and approved the final version.

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Conflict of Interest

The authors declare no conflicts of interest.

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