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Misperception or Discrimination? Gender Bias in Health Communication on Anemia Prevention

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Gender Bias in Health Communication on Anemia Prevention

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Abstract

This study examines whether gender bias in health communication reduces the effectiveness of information provision and explores the mechanism behind it. Specifically, it investigates whether the bias is driven by statistical discrimination—misperceptions about women's competence—or by taste-based discrimination. We conducted a randomized controlled trial in Cambodia, where participants watched a video featuring either a male or female health instructor explaining the benefits of iron supplements for anemia prevention. To test the mechanism, half of those assigned to the female instructor condition received a corrective message addressing misperceptions about women's abilities. The results show that willingness to pay for the supplement was significantly lower when the information was delivered by a female instructor, but this gap disappeared when the corrective message was provided. Similar patterns were observed in a list experiment measuring implicit bias. These findings suggest that gender bias reduces the effectiveness of health communication and is primarily driven by misperceptions about women's competence rather than by taste-based discrimination.

Key words: anemia, gender bias, discrimination, misperception, list experiment

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1 Introduction

Anemia remains a major public health concern across many developing countries, particularly affecting women and children (Alem et al., 2023; Chaparro and Suchdev, 2019). Its consequences encompass a wide range of adverse outcomes, including direct health effects such as increased risks of child mortality and low birth weight (Bhalotra and Rawlings, 2011), as well as broader impacts beyond health, such as diminished labor productivity (Plessow et al., 2015; Shastry and Weil, 2003) and deepening socioeconomic inequality (Yang et al., 2018).

Despite the availability of proven interventions such as iron supplements (Bobonis et al., 2006; Camaschella, 2015) and double-fortified salt enriched with iron and iodine (Krämer et al., 2021b), the real-world impact of these measures is often underwhelming. A key constraint lies in limited awareness: when individuals do not understand the causes, symptoms, or consequences of anemia—or the benefits of preventive measures—they are unlikely to adopt or adhere to treatment (Banerjee et al., 2018). This has led to increasing interest in demand-side strategies, particularly the role of health communication in bridging this knowledge gap and promoting behavior change (Paul et al., 2022). However, the evidence on the effectiveness of such communication remains inconclusive. While some studies find that low-cost tools—such as short message service (SMS) reminders or educational videos—can improve knowledge and reduce anemia prevalence (Chong et al., 2016; Lenel et al., 2022), others report limited effects (Krämer et al., 2021a).

One potential factor limiting the effectiveness of health communication in developing countries could be gender bias toward health communicators. In developing countries, health information and guidance are typically delivered by government-appointed health instructors (Asefa and Huang, 2015). However, prevailing gender norms can shape how these messages are received, potentially leading to systematic differences in credibility and influence based on the communicator's gender. In fact, research in other domains has shown that information delivered by women is often perceived as less credible, resulting in their information being undervalued or dismissed (Ayalew et al., 2021; BenYishay et al., 2020). If such biases extend to health communication, identical information may have different effects based on the gender of the instructor. Although this could pose a significant barrier to the dissemination and uptake of critical health information, empirical research on gender bias in health communication remains limited.

The primary objective of this study is to investigate the presence of gender bias in health communication. In addition, this study aims to explore the underlying mechanisms driving this bias, with a particular focus on distinguishing between statistical discrimination and taste-based discrimination. Statistical discrimination refers to biased judgments rooted in misperceptions about women's abilities—specifically, the tendency to discount information from female communicators due to assumptions about their competence or credibility. In contrast, taste-based discrimination reflects deeper prejudices grounded in individual or societal preferences, including misogynistic attitudes and cultural or religious norms. By assessing both the existence and nature of gender bias in the effectiveness of health communication, this study seeks to provide empirical insight into how and why identical health messages may yield different outcomes depending on the gender of the communicator.

To investigate these questions, we conducted a randomized controlled trial (RCT) in Cambodia, where anemia remains a widespread and severe health issue. The experiment involved two types of interventions. The first intervention was the delivery of health information through a video presented by a health instructor. While all participants watched the same video content explaining the symptoms of anemia and the benefits of iron supplements, we randomly varied the gender of the instructor—assigning participants to either a male or female instructor.

The second intervention targeted participants assigned to the female instructor condition. Prior to viewing the video, half of these participants were provided additional information highlighting the qualifications and competence of female health professionals. This "corrective message" aimed to address potential misperceptions about women's abilities in medical roles. If gender bias in health communication stems from statistical discrimination, such a message is expected to reduce bias by correcting inaccurate beliefs about female competence. Thus, participants were randomly assigned to one of three groups: (1) viewed the video with a male instructor; (2) viewed the video with a female instructor without corrective information; and (3) viewed the video with a female instructor after receiving corrective information.

For the outcome measures, we first assessed participants' willingness to pay (WTP) for the iron supplement featured in the video. In addition, we evaluated participants' perceptions of the instructor shown in the video along three dimensions: perceived knowledge, trustworthiness, and likability. Furthermore, to mitigate social desirability bias and experimenter demand effects, we employed a list experiment—a method commonly used to reduce respondents' reluctance to report sensitive attitudes or behaviors (Lépine et al., 2020).

The results show that, compared to participants in the male instructor group, those in the female instructor group without the corrective message exhibited a significantly lower WTP for the iron supplement by 0.26 standard deviation (SD). This suggests that even when the content of the information is identical, its impact diminishes when delivered by a woman, indicating the presence of gender bias that leads to the undervaluation of information conveyed by female communicators.

In contrast, the WTP of participants who received the corrective message before viewing the female instructor video was not significantly different from that of the male instructor group. Moreover, their WTP was significantly higher than that of participants in the female instructor group without the corrective message. These results indicate that the corrective message effectively reduced the gender bias, suggesting that the bias is driven by misperceptions about women's competence—i.e., statistical discrimination—rather than pure prejudice.

These findings are further confirmed by participants' evaluations of the instructors. In the group exposed to the female instructor without the corrective message, the instructor was rated significantly lower in perceived knowledge compared to the male instructor. However, this gap was no longer observed among participants who received the corrective message beforehand. By contrast, no significant differences were found for trustworthiness or likability across treatment groups. Moreover, consistent with these results, the list experiment revealed that the corrective message mitigated gender bias in respondents' attitudes.

This study contributes to the literature on health communication, a field that plays a vital role in promoting behavioral change and improving health outcomes. There has been considerable interest in identifying effective strategies to enhance health communication, including SMS-based mHealth campaigns (Lenel et al., 2022), performance-based incentives (Singh and Masters, 2017), group-based incentives linked to collective compliance (Lagarde and Herl, 2025), and outreach through community ambassadors (Islam et al., 2024). These efforts build on a broader policy interest in identifying scalable and cost-effective ways to encourage healthier behaviors (Bronsoler et al., 2022; Fabre and Straub, 2023).

Attention has also been given to factors that may undermine the effectiveness of health communication. For example, race-based mismatches between healthcare providers and patients have been shown to reduce communication quality (Ye and Yi, 2023). Despite increasing attention to such barriers, the potential role of gender bias—particularly toward female health communicators—remains underexplored in empirical research.

This study also contributes to the literature on gender bias and misperceptions. Gender bias has been documented in various contexts, including workplace evaluations (Abel, 2024), promotion decisions (Espinosa and Ferreira, 2022), student evaluations in education (Boring, 2017; Mengel et al., 2019), and academia careers (Ersoy and Pate, 2023; Hechtman et al., 2018). More directly relevant to this study, Ayalew et al. (2021) and BenYishay et al. (2020) find that gender bias can impede the adoption of technical guidance, such as agricultural or business advice, when delivered by women, even if the information is identical to that provided by men. This study offers new empirical evidence on gender bias in health communication and highlights misperception of female competence as a potential underlying mechanism.

Furthermore, this study provides important policy implications for addressing gender bias in health communication. Our findings suggest that, even when the information being delivered is critical to public health, its effectiveness may be diminished simply because it is conveyed by a female communicator. In the case of Cambodia, where more than half of health instructors are women, such gender-based bias can lead to significant inefficiencies in information dissemination and health outcomes. However, our results also indicate that this bias is not immutable. Rather, it appears to stem from misperceptions about women's competence—misperceptions that can be corrected through targeted interventions. By providing accurate information about the qualifications and abilities of female health professionals, it is possible to reduce the impact of gender bias and improve the reach and effectiveness of health communication efforts.

2 Conceptual Framework

This section develops hypotheses regarding the existence of gender bias in health communication in developing countries. Prior research on gender bias has documented a tendency to undervalue advice (Ayalew et al., 2021; BenYishay et al., 2020), information (Fehr et al., 2024), knowledge (Mengel et al., 2019), and opinions (Takahashi, 2024) when they are provided by women. If similar dynamics are present in the context of health communication, health advice delivered by female communicators may be discounted or disregarded—not due to the content itself, but simply because of the gender of the communicator. Hence, we propose the following hypothesis:

Hypothesis 1. Health information is less effective when delivered by a female communicator than when delivered by a male communicator, even when the content is identical.

This study further examines the mechanisms underlying gender bias in the provision of health information. One potential explanation is statistical discrimination, which occurs when individuals form expectations based on group characteristics rather than individual attributes. In the context of gender, this can lead to a systematic underestimation of women's competence. Prior research has documented such discrimination across various sectors (Bursztyn and Yang, 2022). In the healthcare domain, for instance, Chen (2024) identifies statistical discrimination on online medical platforms, where users are less likely to select female physicians despite identical qualifications.

In contrast, taste-based discrimination stems from personal or culturally embedded preferences or prejudices. In many developing countries, social and religious norms reinforce unfavorable views toward women's public roles and authority (Alesina et al., 2013; Bertrand et al., 2015; Jayachandran, 2015, 2021). When such norms dominate, female health communicators may be disregarded not because of perceived competence, but because of normative expectations that discourage women from speaking, advising, or leading. In such settings, messages delivered by women may be rejected irrespective of their content or quality. This discussion leads to the following hypotheses:

Hypothesis 2. Gender bias in the health communication is driven by statistical discrimination, misperceiving women's abilities.

Hypothesis 3. Gender bias in the health communication is driven by taste-based discrimination.

3 Experimental design

To test the hypotheses, we selected Cambodia as a case study, where anemia remains a severe public health issue (Karnpean et al., 2022). In addition, similar to many other developing countries, Cambodia also faces persistent gender inequality (Park, 2019). According to the Global Gender Gap Report 2024, Cambodia ranked 102nd out of 146 countries, which is lower than that of neighboring Vietnam, Thailand, and Laos (World Economic Forum, 2024).

From August 25 to August 29, 2024, we conducted a RCT in Akreiy Ksatr Municipality, located near Phnom Penh, with the cooperation of the local government. A total of 368 households were selected from five villages within the municipality. Participants were invited to the village community center, where the survey was administered through face-to-face interviews using Qualtrics survey software. As part of the intervention, participants watched a short video on a mobile phone. After completing the survey, each participant received a small gift valued at approximately 2 USD. The entire session lasted between 30 and 50 minutes.

3.1 Random interventions

In this experiment, we implemented two types of interventions. The first intervention is the provision of health information through a video in which the gender of the instructor was randomly varied. Prior to watching the video, participants were informed that the video featured a government-appointed health instructor explaining anemia and its prevention. The content included key symptoms of anemia (i.e., fatigue, dizziness, and shortness of breath) and emphasized prevention methods, particularly the use of iron supplements. The video also provided detailed information about a commonly available supplement in Cambodia called "*Ferrovit*," including instructions for proper use and an explanation of its effectiveness in preventing anemia.

Although participants received the exact same health information through the video, the gender of the health instructor was randomly assigned to be either male or female. One-third of participants viewed the video featuring a male instructor, while the remaining two-thirds saw the version with a female instructor. Figure 1 presents the images used in the videos, with Image A depicting the male instructor and Image B the female instructor. To ensure consistency, all attributes other than gender, such as age, the presence of glasses, and the video script, were held constant across both versions. Importantly, although both videos featured instructors generated using artificial intelligence, participants were not informed during the experiment that the instructors were virtual characters. This information was disclosed only during the debriefing session after the experiment concluded.

The second intervention involved providing a corrective message about the competence of female healthcare professionals. This intervention aimed to examine whether the observed gender bias could be mitigated by addressing misperceptions regarding women's abilities. The corrective message was delivered only to half of the participants assigned to view the video featuring the female health instructor, and it was presented verbally before the video. Participants in this group were informed of the following evidence-based message, adapted from Tsugawa et al. (2017):

> *There is a perception that male healthcare professionals outperform their female counterparts in the medical field. However, research has demonstrated that female healthcare professionals often deliver higher-quality care. The study found that patients treated by female healthcare professionals have 3-4% lower mortality and readmission rates. This difference is attributed to the fact that female healthcare professionals consistently take more appropriate and patient-centered measures in their treatments compared to their male colleagues.*

To implement above two interventions, participants were randomly assigned to one of the three groups: a group shown a video featuring a male instructor (male instructor group), a group shown a video featuring a female instructor without the corrective message (female instructor without message group), and a group provided with corrective message before being shown a video featuring a female instructor (female instructor with message group).

3.2 Outcomes

To identify the gender bias in healthcare communication and explore its underlying mechanisms, this study uses three types of indicators: WTP for the iron supplement, participants' evaluations of the instructor, and implicit bias measured through a list experiment.

First, prior to measure WTP for the iron supplement, participants were informed that the price of the iron supplement featured in the video was 17,000 KHR (approximately 4.2 USD) per person per month. They were then asked to state the maximum amount they would be willing to pay in an open-ended format (the average WTP was 14,872 KHR).

Second, participants' perceptions of the health instructor shown in the video were assessed. These perceptions were evaluated based on three criteria using a 5-point scale: perceived knowledge, trustworthiness, and likability. For the analysis, we constructed a dummy variable for each criterion, coded as 1 if the participant gave the highest possible rating.

Finally, we employed a list experiment to measure implicit bias related to participants' attitudes toward gender. While WTP is a commonly used approach to assess willingness to purchase a product (Takahashi et al., 2018), its validity may be compromised when dealing with sensitive topics. In such cases, responses may be affected by social desirability bias or experimenter demand effects. This concern is particularly relevant in our study, as participants who received the corrective message may have inferred the study's purpose, leading to biased responses. To address this issue, we adopted a list experiment, a method frequently used in previous research to uncover biases that participants may be unwilling or unable to disclose explicitly.

The list experiment in this study was conducted as follows. Participants from the three experimental groups were randomly assigned to one of two subgroups: the List A group or the List B group. Those in the List A group were presented with the following four statements related to personal preferences and were asked to indicate how many of them they agreed with, without specifying which ones.

I feel uncomfortable having a Christian neighbor.
I prefer digital payment over cash payment.
I think voting for the election is important.
I feel uncomfortable having a dinner with a homosexual.

The second subgroup, the List B group, received the same four statements as List A, along with an additional statement related to gender issues:

I think male doctors are superior to female doctors.

If implicit gender bias is present, we would expect the average number of statements agreed with to be higher in the List B group than in the List A group. This indirect method helps avoid triggering measurement bias while enabling the estimation of implicit bias.

3.3 Balance test

Demographic characteristics of participants were obtained through the questionnaire survey. Summary statistics by treatment group are presented in Table 1. The results of joint tests indicate that covariate differences across groups are not statistically significant. The p-values for the female instructor without message group and the female instructor with message group are 0.76 and 0.58, respectively. In addition, Scheffé's multiple comparison tests were conducted to examine pairwise differences in the means of each covariate across the three groups. The results show that there were no statistically significant differences in any of the covariates across treatment groups.

The summary statistics show that the proportion of female participants was high, at 73%, and a relatively large share (i.e., 27%) had not completed formal education. In addition, in 24% of households, at least one member reported experiencing symptoms of anemia.

4 Methodology

This study employed an ordinary least squares (OLS) model to examine the presence of the gender bias and its underlying mechanisms. The following OLS model was estimated:

$$Y_i = \alpha + \beta_1 Female_i^{NoMsg} + \beta_2 Female_i^{Msg} + \gamma X_i + \upsilon_j + \varphi_k + \varepsilon_i, \quad (1)$$

where Y_i represents the outcome of interest (WTP for supplements and evaluation of the health instructor) for individual i. $Female^{NoMsg}$ is a dummy variable that takes a value of 1 if a female health instructor explains the supplements in the video without a corrective message, while $Female^{Msg}$ equals 1 if the explanation is accompanied by a corrective message. Accordingly, the reference group comprises individuals who viewed the video featuring a male instructor. X denotes a vector of control variables listed in Table 1. υ_j and φ_k represent village-fixed effects and enumerator-fixed effects, respectively. ε_i is the error term.

Hypothesis 1 posits that the effectiveness of health information provision declines when the information is delivered by a woman rather than a man. If participants undervalue the message provided by a female instructor, their WTP for the iron supplement is likely to decrease when exposed to the video featuring a female instructor without the corrective message. Hence, the parameter β_1 in the equation is expected to be negative ($\beta_1 < 0$).

To test Hypotheses 2 and 3 concerning the mechanisms behind gender bias, we analyze how the provision of a corrective message influences participants' WTP. If the bias arises from misperceptions about female competence—that is, statistical discrimination—then the corrective message should alleviate this misunderstanding. As a result, WTP in the Female instructor with message group is expected to rise to the same level as that in the Male instructor group. This pattern would be reflected in the coefficients as $\beta_1 < \beta_2 = 0$, supporting Hypothesis 2. In contrast, if the bias stems from taste-based discrimination, the corrective message is unlikely to alter participants' valuations. In this case, WTP would remain similarly suppressed in both female-instructor groups, implying $\beta_1 = \beta_2 < 0$, consistent with Hypothesis 3.

In addition, we examine participants' evaluations of the instructor as secondary outcome measures. If misperceptions about women's competence are present, the female instructor is expected to be rated lower in perceived knowledge compared to the male instructor. However, such underestimation should be mitigated by the corrective message intervention. Therefore, for the perceived knowledge outcome, we expect the same pattern of coefficients as in the WTP analysis: $\beta_1 < \beta_2 = 0$. In contrast, ratings of trustworthiness and likability are less likely to be influenced by the corrective message, as they are not directly related to beliefs about competence. Accordingly, we expect no significant difference between the two female-instructor groups, implying $\beta_1 = \beta_2$ for these outcomes.

Finally, in the list experiment, participants in each of the three treatment groups were further randomly assigned to one of two subgroups: one receiving List A and the other receiving List B. To capture this structure in the estimation, we include three additional variables in Equation (1): a dummy variable indicating whether the participant was assigned to List B (which contains the additional gender-related statement), and two interaction terms between this dummy and the female instructor treatment indicators.

If participants hold implicit gender bias, we would expect the coefficient on the List B dummy to be positive, indicating that the inclusion of the gender-related item increases the number of statements with which participants agree. Furthermore, if the corrective message successfully reduces misperceptions about female competence, then the bias should be attenuated in the female instructor with message group. In that case, the coefficient on the interaction term between the List B dummy and the female with message group should be significantly smaller than that for the female without message

5 Results

5.1 Benchmark estimation

Table 2 presents the effects of the health instructor's gender and the provision of a corrective message regarding female competence on WTP for the iron supplement and on implicit bias, as measured by the list experiment. All outcome variables are standardized, with the male instructor group normalized to have a mean of zero and a standard deviation of one.

Columns 1 and 2 report the estimated effects on WTP without and with covariates, respectively. The results show that exposure to a female instructor without the corrective message is negatively associated with WTP. The coefficients indicate that the exposure to female instructor reduced WTP by approximately 0.24 to 0.26 SDs. These findings suggest that even when identical information is provided, participants tend to undervalue it when it is delivered by a woman, indicating the presence of gender bias.

In contrast, the treatment involving a female instructor with the corrective message yielded a coefficient that was close to zero (ranging from –0.03 to –0.05) and statistically insignificant. Moreover, this coefficient was significantly higher than that of the female instructor without message group ($p < 0.1$). These results suggest that the provision of a corrective message effectively mitigates the negative effect associated with female instructors, thereby restoring the perceived credibility of information delivered by women.

The results of the list experiment are presented in columns 3 and 4 of Table 2. Since the outcome variable serves as a proxy for implicit gender bias, higher values indicate stronger bias. In column 3, which excludes interaction terms, the coefficient on the List B dummy (indicating assignment to a list including an additional gender-related statement) is positive and statistically significant. This suggests the presence of implicit gender bias in the overall sample.

However, when interaction terms are included in column 4, the coefficient on the List B dummy becomes statistically insignificant, while the interaction between the List B dummy and the female instructor without corrective message group is positive and significant. This indicates that participants exposed to a female instructor without the corrective message were more likely to agree with the sensitive statement, revealing a stronger implicit bias under that condition. In contrast, the interaction term for the female instructor with corrective message group is not statistically significant, suggesting that the corrective message effectively mitigated implicit gender bias. These results align with the findings from the WTP analysis.

Table 3 reports the results from participants' evaluations of the health instructor featured in the video. Column 1 presents the estimates for perceived knowledge. Consistent with previous findings, exposure to a female instructor without the corrective message is associated with a 0.14 SD decrease in perceived knowledge. In contrast, there is no significant effect when the corrective message is provided. Columns 2 and 3 show the results for trustworthiness and likability. For both outcomes, neither of the female instructor treatments has a statistically significant effect. These indicators, which are less directly tied to perceptions of competence, appear unaffected by the instructor's gender, suggesting no evidence of gender bias in these dimensions. Taken together, the results indicate that gender bias emerges specifically in competence-related evaluations: participants tend to underestimate the knowledge of female instructors when the corrective message is not provided. However, this bias is effectively mitigated through the corrective message intervention, reinforcing the interpretation that misperceptions about female ability are a key mechanism behind the observed bias.

Furthermore, we conducted a heterogeneity analysis using the demographic variables listed in Table 1. The results show no evidence of systematic variation across participant characteristics. Consistent with the benchmark findings, WTP decreases when the corrective message is not provided, whereas the coefficient becomes smaller and statistically insignificant when the message is included.

5.2 Discussion

Overall, the results of our experiment show that WTP for the supplement was lower among participants who viewed the female instructor video compared to those who viewed the male instructor video. This finding indicates the presence of a gender bias in the effectiveness of health information provision, consistent with previous studies. For instance, Ayalew et al. (2021) reported a gender bias effect of 0.34 SD, while BenYishay et al. (2020) found an effect of 0.1 SD. In comparison, our results show that exposure to a female instructor without a corrective message led to a 0.26 SD in WTP, indicating a moderate level of bias relative to existing literature. Moreover, the results from the list experiment and participants' evaluations of the instructor's knowledge level are consistent with the WTP findings, revealing a systematic undervaluation of women. Together, these findings provide robust empirical support for Hypothesis 1.

Furthermore, when a corrective message about female competence was provided prior to viewing the female instructor video, participants' WTP increased to a level comparable to that in the male instructor group. This indicates that the gender bias was effectively mitigated by the corrective message. These results suggest that the observed bias is driven by statistical discrimination—stemming from misperceptions about women's ability—rather than by taste-based discrimination. Additional support for this interpretation comes from the list experiment and instructor evaluations. The corrective message reduced male-dominant attitudes and eliminated the undervaluation of the female instructor's perceived knowledge. These findings are consistent with prior research identifying statistical discrimination as a central mechanism underlying gender bias (Castillo et al., 2013; Krawczyk and Smyk, 2016). Hence, we conclude that Hypothesis 2 is supported.

Another important finding arises from the list experiment results reported in column 4 of Table 2. The coefficient on the List B dummy is not statistically significant, indicating that, within the male instructor group, there is no meaningful difference in responses between participants assigned to List A and List B. This is further supported by a *t*-test, which shows that the average number of agreed items was 1.51 in the List A group and 1.71 in the List B group, a difference that is not statistically significant ($p = 0.17$). Taken together with the results from the female instructor without corrective message group, these findings suggest that implicit gender bias against women emerges only when individuals are directly exposed to a woman, and not when the same information is conveyed by a man.

This pattern stands in contrast to the conventional understanding of contact theory, which posits that negative contact, such as exclusion, ridicule, or mistreatment, drives negative attitudes toward the outgroup (Prati et al., 2021). In our study, the video intervention does not constitute negative contact; it simply delivers neutral health information about anemia and iron supplementation. Nonetheless, exposure to a female instructor alone was sufficient to elicit biased responses, suggesting that gender bias could emerge even in the absence of overtly negative interactions.

6 Conclusion

This study examines the existence of gender bias in health communication and its underlying mechanisms through a RCT in Cambodia. The findings indicate that the effectiveness of health communication declines when the information is delivered by women rather than men, revealing the presence of gender bias. However, this bias is mitigated when a corrective message emphasizing women's competence is provided. These results suggest that the bias is primarily driven by statistical discrimination (i.e., misperceptions about female ability) rather than by taste-based discrimination. Evidence from the list experiment and participants' evaluations of the instructor further corroborates this interpretation. Moreover, the list experiment results imply that such gender bias may not be uniformly present, but rather emerges specifically in situations involving direct exposure to a woman. This highlights the situational nature of the bias and underscores the importance of addressing it in contexts where women serve as visible sources of information.

This study offers two key policy implications. First, it is essential to improve public awareness by promoting accurate knowledge of women's competence and correcting prevailing misperceptions. The findings suggest that gender bias in health communication can be effectively mitigated by providing evidence-based information about women's competence. By implementing educational initiatives and public communication strategies that address such misperceptions, governments can enhance the impact of health communication efforts, ultimately improving public health outcomes, including those related to anemia.

Second, the findings of this study have important implications for the growing field of online medical consultations, particularly in developing countries where telemedicine is increasingly used for remote diagnosis and patient monitoring (Combi et al., 2016). Previous research has shown that platforms allowing patients to select individual physicians may unintentionally reinforce gender bias in service pricing and demand—a pattern likely driven by statistical discrimination (Chen, 2024). As a short-term mitigation strategy, concealing the gender of healthcare providers during telemedicine interactions may help reduce bias in how medical information is received and valued. Evidence from other domains supports this approach; for instance, gender-blind auditions in orchestras significantly increased the likelihood of female musicians being hired (Goldin and Rouse, 2000). These parallels suggest that similar anonymization measures could be effective in addressing gender bias in digital health service delivery.

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(A) Male Instructor (B) Female Instructor

Figure 1: AI-generated government-affiliated health instructors. In the videos, each instructor delivers identical spoken information about anemia and iron supplement, synchronized with mouth movements.

Table1: Descriptive statistics

	Male instructor (1)	Female instructor: without message (2)	Female instructor: with message (3)
Number of observations	135	117	116
Age	51.36	51.86	52.95
	(12.75)	(12.87)	(14.45)
Female (1=female)	0.77	0.71	0.73
	(0.42)	(0.46)	(0.44)
Number of household members	5.25	5.85	5.35
	(3.44)	(2.83)	(2.84)
Proportion of female member	0.56	0.52	0.59
	(0.23)	(0.19)	(0.22)
No formal education	0.28	0.31	0.24
	(0.45)	(0.46)	(0.43)
Above high school	0.06	0.07	0.03
	(0.24)	(0.25)	(0.18)
Presence of anemia in household (1=Yes)	0.29	0.23	0.21
	(0.45)	(0.42)	(0.41)
Trust in government	0.39	0.42	0.34
	(0.49)	(0.50)	(0.47)
Prior perception of gender equality	0.42	0.42	0.37
	(0.50)	(0.50)	(0.49)

Note: Standard deviations are in parentheses. The p-values from joint tests for the female instructor without message and female instructor with message are 0.76 and 0.58, respectively. The Scheffé test was conducted to compare the three groups, and the results showed no significant differences.

Table2: Effects of instructor gender and corrective messaging on WTP and implicit bias

	WTP		Implicit bias measured by the list experiment	
	(1)	(2)	(3)	(4)
Female instructor without message	-0.236**	-0.260**	0.387***	0.109
	(0.110)	(0.115)	(0.124)	(0.165)
Female instructor with message	-0.025	-0.035	0.165	0.103
	(0.123)	(0.125)	(0.125)	(0.176)
List B			0.341***	0.130
			(0.111)	(0.189)
Female instructor without message × List B				0.548**
				(0.258)
Female instructor with message × List B				0.105
				(0.257)
Control		Yes	Yes	Yes
Enumerator FE	Yes	Yes	Yes	Yes
Village FE	Yes	Yes	Yes	Yes
Observation	333	333	367	367

Note: Numbers in parentheses are standard errors. Each dependent variable is standardized to have a mean of zero and a standard deviation of one based on the male video treatment group. ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively.

Table 3: Evaluation of health instructors

	Knowledge	Trustworthiness	Likability
	(1)	(2)	(3)
Female instructor without message	-0.136*	-0.060	0.055
	(0.081)	(0.090)	(0.111)
Female instructor with message	-0.089	0.015	-0.083
	(0.081)	(0.090)	(0.110)
Control	Yes	Yes	Yes
Enumerator FE	Yes	Yes	Yes
Village FE	Yes	Yes	Yes
Observation	368	368	368

Note: Standard errors are in parentheses. Each dependent variable is standardized to have a mean of zero and a standard deviation of one based on the male video treatment group. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels, respectively.

Table 4: Heterogeneity

	Female	High education	Anemia
	(1)	(2)	(3)
Female instructor without message	-0.426*	-0.246**	-0.256*
	(0.239)	(0.115)	(0.140)
Female instructor with message	-0.201	-0.027	-0.001
	(0.231)	(0.130)	(0.150)
Interaction terms			
× Female instructor without message	0.319	-0.282	0.008
	(0.280)	(0.423)	(0.273)
× Female instructor with message	0.244	-0.284	-0.166
	(0.272)	(0.438)	(0.279)
Control	Yes	Yes	Yes
Enumerator FE	Yes	Yes	Yes
Village FE	Yes	Yes	Yes
Observation	333	333	333

Note: Numbers in parentheses are standard errors. Each dependent variable is standardized to have a mean of zero and a standard deviation of one based on the male video treatment group. ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively.