DOES GENDER MATTER IN CONSPIRACY BELIEFS VACCINATION HESITANCY? EVIDENCE FROM COVID-19 VACCINATION IN UGANDA

DOI: 10.26341/issn.2241-4010-2026-2a-3-L02157

Bacwayo Kukunda Elizabeth
Associate Professor, Governance and Development, Uganda Christian University, School of Social Sciences
kukunda.bacwayo@fulbrightmail.org

Sebaggala Richard
Lecturer, Economist, Uganda Christian University School of Business
rsebaggala@ucu.ac.ug

Maractho Emilly
Associate Professor, School of Journalism, Uganda Christian University, Media and Communication
emaractho@ucu.ac.ug

Amaniyo Mercy
Lecturer, Uganda Christian University, School of Social Sciences
amaniyom@ucu.ac.ug

Mwije Solomon
Lecturer, PhD Candidate, Uganda Christian University, School of Social Sciences
smwije@ucu.ac.ug

Kemigisha Evas
Lecturer, Uganda Christian University, School of Social Sciences
evaskemie@gmail.com

Kobusingye Jacqueline
Lecturer, Uganda Christian University, Faculty of Public Health, Nursing and Midwifery
jkobusingye@ucu.ac.ug

Cheremoi Clare
Lecturer, Uganda Christian University, School of Social Sciences
256cheche@gmail.com

Abstract
Whereas countries have made strides in getting citizens vaccinated, many still face the challenge of vaccination hesitancy. Evidence indicates that conspiracy beliefs among citizens influence hesitancy and that these beliefs are contextual; thus differing among individuals. Studies have examined the gender aspect and COVID-19 conspiracy beliefs but research is still limited on contextualizing the conspiracy beliefs among the genders and on whether such variations affect vaccination hesitancy differently.

This paper examines whether gender is a significant moderating factor between conspiracy theory beliefs and vaccination hesitancy in Uganda, using COVID-19 Vaccination

as a case. The study findings on which the article is based are part of a larger study on conspiracy theory and covid-19 vaccination hesitancy.

This was an explanatory sequential mixed methods study that included a cross-sectional survey and in-depth interviews. To establish the relationship between conspiracy belief and vaccination hesitancy across gender, Pearson Chi-square analysis was used to explore the gender differences in intentions regarding COVID-19 vaccination and conspiracy beliefs and mentality. There were 1201 participants in the study and 53% of these were females.

The findings show that women with strong beliefs in conspiracy theories were more likely to be undecided and unlikely to take up COVID-19 vaccine compared to men with similar beliefs. Men with similar beliefs were already vaccinated. Similarly, females with strong conspiracy mentality were less likely to take up COVID-19 vaccine compared to men with similar mentality. This implies that interventions to improve COVID-19 vaccination should be contextual and consider the gendered differences especially among women who are undecided and unlikely to take the vaccines due to conspiracy mentality.

Key words: *Gender, Conspiracy Beliefs, Vaccination Hesitancy, COVID-19, Uganda*

1. INTRODUCTION

Conspiracy beliefs and vaccination hesitancy have been increasingly recognized as intertwined phenomena, often influenced by exposure to misinformation and mistrust of institutions (Jolley & Douglas, 2014; Arce et al., 2021; Enders et al., 2022; Coelho et al., 2022; Caycho-Rodríguez et al., 2022). These beliefs encompass various aspects of the COVID-19 pandemic, including its origins, spread, countermeasures, and vaccination efforts (Douglas, 2021; van Mulukom et al., 2022). However, the extent to which conspiracy beliefs impact vaccination attitudes may vary across demographic factors, including gender (Balafoutas et al., 2021; Leonard & Philippe, 2021; Marcellino, 2021; Knobel et al., 2021; Romer & Jamieson, 2020; Gallè et al., 2021). While studies have explored demographic predictors of conspiracy beliefs and vaccination hesitancy, conflicting evidence persists regarding the role of gender in shaping these attitudes (Arif et al., 2022; van Mulukom et al., 2022; Cordina et al., 2021). This paper seeks to address this gap by showing how gender moderates the relationship between conspiracy beliefs and COVID-19 vaccination hesitancy, providing much needed information on how to mitigate the impact of conspiracy beliefs and vaccination in Uganda.

1.1. Gender and Conspiracy Beliefs

Amidst the growing body of research on COVID-19 conspiracy beliefs, there remains a notable gap in understanding the nuanced role of gender in this context (Cassese et al., 2020; Tulloch et al., 2021; van Mulukom et al., 2022). Since the onset of the pandemic, numerous conspiracy theories surrounding COVID-19 proliferated, positing that events are orchestrated clandestinely to cause harm (The Swedish Civil Contingencies Agency, 2021). While approved vaccines offer significant protection against COVID-19, not all eligible individuals were willing to receive them, contributing to vaccination hesitancy observed globally (Killgore et al., 2021; Sallam, 2021; Lazarus et al., 2021; Ackah et al., 2022).

1.2. Gender and Vaccination attitudes

Understanding the gendered dynamics of conspiracy beliefs and vaccination hesitancy is paramount for designing targeted interventions to address vaccine hesitancy effectively. While women have been found to express higher levels of skepticism and concerns regarding vaccine safety, men may exhibit greater willingness to vaccinate (van Mulukom et al., 2022;

Runciman et al., 2021; Galasso et al., 2020; Franceschet et al., 2021; Tulloch et al., 2021). This apparent gender paradox underscores the complexity of vaccination attitudes and emphasizes the need for tailored approaches to promote vaccination uptake. By elucidating the gender-specific influences on conspiracy beliefs and vaccination hesitancy, this paper accentuates the need for the development of more targeted and effective public health strategies in Uganda. The attitudes of women to vaccination is especially important since as mothers, daughters, wives and leaders of households, they determine the health care choices of families, especially those of their children's vaccination. This can have consequences for the success of these other vaccination efforts to address other diseases that affect the general population. The paper is structured as follows. Section 2 presents the COVID-19 management and gender context in Uganda. Section 3 describes the theoretical literature review and frameworks. Section 4 presents the methodology including data used and analysis. Section 5 presents the results obtained from the analysis. Section 6 presents the discussion, conclusion and implications.

1.3 COVID-19 Management Uganda

Uganda, renowned for its adept management of various infectious disease outbreaks such as Ebola, cholera, and HIV/AIDS, emerged as a notable success story in handling the COVID-19 crisis, particularly during the initial phases of the pandemic (Aceng et al., 2020; Ryan et al., 2020; Bwire et al., 2021). Prior to the detection of its first COVID-19 case, Uganda had already formulated a comprehensive preparedness and response plan, delineating roles for various stakeholders (Ministry of Health, 2020). The country registered its inaugural COVID-19 case on 21 March 2020, prompting the government to enact "The Public Health (Control of Covid-19) Rules, 2020," which outlined regulations for managing the pandemic (Republic of Uganda, 2020). In line with World Health Organization recommendations, Uganda swiftly implemented a series of preventive and mitigation measures, including the suspension of public gatherings, closure of educational institutions and businesses, border closures, and the imposition of lockdowns, among others (State House-Entebbe, 2020). These measures were rigorously enforced as the government awaited the arrival of recommended vaccines to commence vaccination efforts. Uganda received its initial batch of COVID-19 vaccine doses on 5 March 2021, with the president and Ministry of Health actively advocating for widespread vaccination (Ministry of Health, 2021).

Despite these efforts, Uganda faced challenges with vaccine uptake, characterized by hesitancy and sluggish adoption rates. Issues surrounding vaccine availability, distribution, and administration contributed to the slow uptake on the supply side (Ministry of Health, 2021). On the demand side, vaccination hesitancy stemmed from negative perceptions, limited awareness, and misconceptions (Kabagenyi et al., 2022). By the close of March 2023, only 42.60% of the eligible population had received at least one dose of the COVID-19 vaccine (John Hopkins University & Medicine, 2023).

1.4 Gender and Health-Seeking Behaviour in Uganda

In Uganda, where healthcare-seeking behaviors are often suboptimal and access to evidence-based COVID-19 information is limited, conspiracy beliefs and their impact are anticipated to be prevalent, particularly among different gender groups (Musoke et al., 2014; Babirye et al., 2011; Ssanyu et al., 2022). Studies indicate that women in Uganda are less likely to have access to adequate medical treatment because of the costs associated with it, such as consultancy and transport (UBOS 2012). This implies that anything that is likely to affect their attitudes to health care such as conspiracy beliefs can have adverse effect on their health seeking. Men on the other hand make decision in the household and have better health seeking behaviours (UBOS 2012). In Uganda, efforts to mitigate the influence of

misinformation on COVID-19 and other diseases and their preventive measures remain scanty. While existing studies have predominantly focused on identifying determinants of COVID-19 vaccination hesitancy in Uganda, there remains a critical gap in contextualizing these determinants within the broader socio-cultural and gender-specific contexts (Echoru et al., 2021; Kabagenyi et al., 2022). Recognizing the importance of context in devising effective vaccination strategies, this study explored the intersection of gender dynamics, conspiracy beliefs, and COVID-19 vaccination hesitancy in Uganda.

1.5 Theoretical framework

To comprehend the dynamics of vaccination intentions, it is essential to delve into the theoretical frameworks that underpin such behaviors. Given the multifaceted nature of vaccination attitudes and intentions, various theories and models have been proposed to elucidate the determinants behind them (Betsch et al., 2018; Barattucci et al., 2022. As posited by Larson et al. (2014), pinpointing a singular determinant of vaccination behavior's strength is challenging due to its intricate nature. Consequently, relying on a singular theory or model to explain gendered vaccination intentions might be inadequate.

The Health Belief and Theory of Planned Behaviour Models

This Health belief model offers insights into how an individual's vaccination behavior is shaped by their perception of susceptibility to disease, the severity of the disease, the benefits of vaccination, and the barriers to obtaining it (Rosenstock et al., 1988; Rosenstock, 2005; Barattucci et al., 2022; Zampetakis & Melas, 2021; Limbu et al., 2022). The Theory of Planned Behavior (TPB) on the other hand posits that intentions, influenced by attitudes, subjective norms, and perceived behavioral control, are fundamental in determining behavior (Ajzen, 2020). Both theories emphasize the importance of attitude, social norms, and perceived control in shaping vaccination intentions. The two models offer some explanation on the behaviours exhibited by women and men in relation to COVID-19 Vaccine and hesitancy.

The 3C-5A models

The 3C model of vaccination hesitancy expands on HBM and TPB theories, suggesting that confidence, complacency, and convenience play pivotal roles in vaccination decision-making (MacDonald & the SAGE Working Group on Vaccine Hesitancy, 2015). Subsequent models such as the 4C and 5C models further elaborate on these factors, incorporating elements like calculation and collective responsibility into the framework (Betsch et al., 2015, 2018). Moreover, the 5A model underscores the significance of access, affordability, awareness, acceptance, and activation in determining vaccine uptake (Thomson et al., 2016; Betsch et al., 2018). These factors collectively contribute to an individual's decision-making process regarding vaccination. In the context of this study, the vaccination willingness model integrates components from HBM, TPB, and the 5C model, emphasizing the influence of personal and socioeconomic characteristics, information channels, attitudes, perceptions, and social support networks on vaccination willingness (Van Espen et al., 2023). In the context of this paper, the characteristic that is of interest is the gender of the person. While gender may not directly impact vaccination intentions, it can exert indirect influence through other predictors, hence our interest in showing how gender matters in conspiracy beliefs and vaccination.

Against this backdrop, this study aims to contextualize COVID-19 vaccination hesitancy in Uganda, with a specific focus on gender and conspiracy beliefs as key predictors. Evidence

suggests that both demographic factors and conspiracy beliefs significantly influence vaccination intentions (Cordina et al., 2021; Arif et al., 2022; van Mulukom et al., 2022; Seddig et al., 2022). However, the relationship between gender and conspiracy beliefs is nuanced and varies across contexts (Cassese et al., 2020; Galasso et al., 2021; van Mulukom et al., 2022). Moreover, the framing of COVID-19 information has been shown to impact vaccination sentiments, underscoring the need to consider gendered impacts within specific contexts (Abdel-Raheem & Alkhammash, 2021). Additionally, generalizations regarding vaccination attitudes across genders may overlook intersectional perspectives, where variations exist not only between men and women but also within these groups (Franceschet et al., 2021). Addressing these nuances is crucial for equitable research and effective vaccination strategies (Vassallo et al., 2021; Heidari & Goodman, 2021). Thus, this study explores the extent to which gender influences conspiracy beliefs and COVID-19 vaccination hesitancy in Uganda, recognizing the intricate interplay between demographic factors, information sources, and socio-cultural contexts in shaping vaccination intentions.

2. DATA AND METHODS

2.1 Design

This was an explanatory sequential mixed methods study that included a cross-sectional survey and in-depth interviews. The choice of an online survey was consistent with COVID-19 operating procedures aiming to limit direct contact while targeting individuals more likely to be exposed to conspiracy beliefs. To ensure representativeness, the physical surveys were conducted to ensure that Ugandans without access to online resources also participated in study.

2.2 Setting

Data was collected from both online and physical respondents across the country. Quantitative data was collected online through email and using socio-media platforms. Qualitative data was conducted through in person interviews from eight purposively selected districts representing the country's four regions, Wakiso and Mukono in Central, Mbarara, Sheema and Kabale in Western and South Western, Kapchorwa in Eastern Region, Arua in North Western and Gulu in Northern Regions. This paper is based on the results of the quantitative part of the study.

2.3 Sample

The sample comprised of 1,500 participants with 1000 online and 500 respondents from in-person interviews. Out of the 1500 individuals targeted and questionnaires administered, 1201 responded, giving 80% response rate. The sample size was calculated using standard Cochran formula. The study adopted a convenient sampling approach using online data collection methods like email and social media. Despite potential selection bias threats associated with online surveys, evidence suggests their utility in addressing vaccine hesitancy, particularly among literate populations exposed to misinformation. Additionally, the online literate population often has direct connections to wide-reaching networks, facilitating exposure to online vaccine conspiracies. However, information spillover effects associated with internet use were considered (Acheampong et al, 2021). Physical data collection was done in villages and participants that were randomly selected using stratified and simple random sampling methods.

2.4 Data collection

A self-administered online survey tool was used to collect data from individuals through emails, google forms, and social media platforms such as Facebook, WhatsApp and Twitter. The participants in the study were recruited from online users in Uganda. Evidence on conspiracy belief shows that the extent to which a person endorses one specific conspiracy theory is a good predictor of the extent to which that person will endorse others (Goertzel, 1994; Sutton & Douglas, 2014; Swami et al., 2011; Lantian et al, 2016). Measurement of variables involved assessing participants' propensity to believe in conspiracy theories using established statements and a Conspiracy Mentality Questionnaire based on a 5-item version of the CMQ (Atari et al, 2019). Additionally, data on gender, education level, and age were collected as relevant factors associated with COVID-19 risk perception. Vaccination hesitancy was measured using the Precaution Adoption Process Model, depicting psychological stages individuals undergo when deciding on behavior change.

2.5 Analysis

Descriptive analysis was conducted to detect patterns, with bivariate analysis using Chi-square analysis to establish associations between conspiracy beliefs, mentality, and vaccine hesitancy. Multinomial regression models with interactions were employed to explore the moderating effect of gender on the relationship between conspiracy beliefs, mentality, and vaccination hesitancy, controlling for socio-economic characteristics.

2.6 Ethical Approval

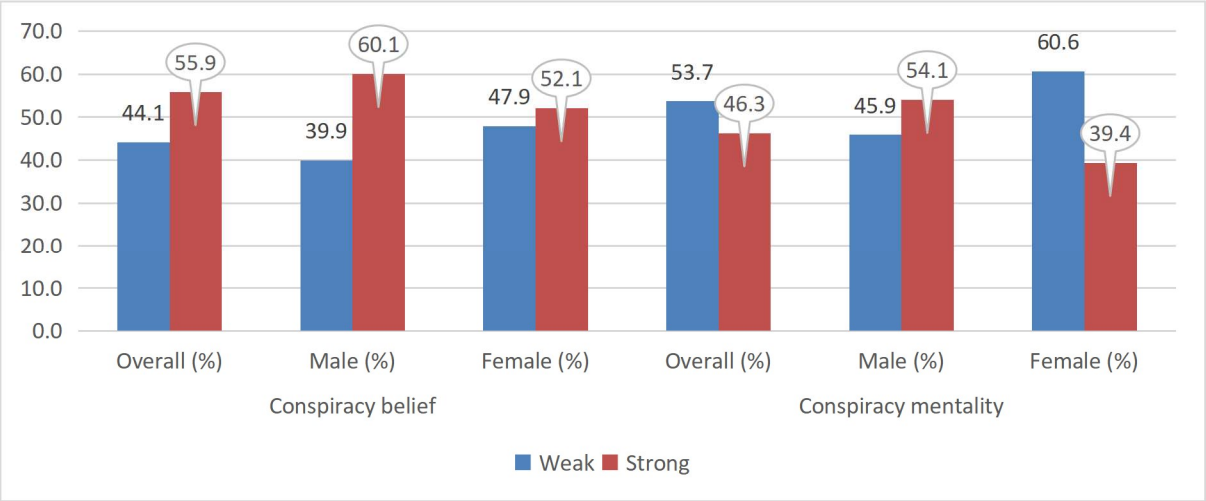
Ethical approval was obtained from Uganda Christian University's Research Ethics Committee and the Uganda National Council for Science and Technology, with permissions sought from district officials for physical data collection. Permission was also sought to conduct the research from district officials in those districts where data was physically obtained. During data collection, respondents' consent was obtained, and every effort has been made to ensure confidentiality.

3.RESULTS

3.1 Overview

This section presents results comparing gender and conspiracy beliefs towards COVID-19 vaccines and mentality of respondents who participated in the study. Figure 1 shows a comparison of the relationship between gender and conspiracy belief towards COVID-19 vaccines and mentality of respondents. Later, bi-variate and multivariate results are presented to ascertain whether gender and conspiracy beliefs towards COVID-19 vaccines or mentality is related with vaccination hesitancy. The study's findings (Figure 1) indicate that men exhibit higher levels of both conspiracy-related beliefs toward COVID-19 vaccines and conspiracy mentality compared to women. Specifically, 60.1% of male participants demonstrated strong conspiracy beliefs, whereas only 52.1% of females did so. Similarly, regarding conspiracy mentality, 54.1% of males exhibited strong conspiracy mentality, whereas only 39.4% of females did. These results highlights thatthere may be gender differences in attitudes towards COVID-19 vaccines and conspiracy beliefs.

Figure 1: Conspiracy beliefs and mentality by Gender



Source: Field data

The findings as shown in Table 1 suggest that women who strongly believe in conspiracy theories are more inclined to be hesitant or unwilling to take the COVID-19 vaccine compared to men with similar beliefs. However, it is notable that a significant proportion of both men and women with strong conspiracy beliefs ultimately choose not to receive the vaccine. Conversely, when examining individuals with weaker conspiracy beliefs, the results reveal that women (58.7%) are more inclined to accept the vaccine compared to men (48.5%) with similar levels of conspiracy belief. These findings underscore the complex interplay between gender, conspiracy beliefs, and vaccine acceptance, highlighting the need for targeted interventions to address vaccine hesitancy, particularly among individuals with strong conspiracy beliefs, regardless of gender.

Table 1: Gender, conspiracy belief and vaccination

Variable	Likelihood of taking COVID-19 Vaccine					
	Likely	Undecided	Unlikely	Already vaccinated	Pearson Chi (3)	P-value
Conspiracy belief (male)						
Weak	35 (50.7%)	9 (15.8%)	19 (18.3%)	163 (48.5%)		
Strong	34(49.3%)	48 (84.2%)	85(81.7%)	173 (51.5%)	47.86	0.000
Conspiracy belief (female)						
Weak	31 (51.7%)	26 (29.2%)	10 (13.2%)	237(58.7%)		
Strong	29 (48.3%)	63 (70.8)	72 (87.8%)	167 (41.3%)	73.44	0.000

Source: Data collected from the field

3.2 Moderating effect of gender and conspiracy belief on vaccination hesitancy

Table 2 presents the multinomial logistic regression results to establish the moderating effects of gender on the relationship between conspiracy belief towards COVID-19 and likelihood of taking a COVID-19 vaccine. Vaccination likelihood was categorized into four levels: 1) Likely to take the vaccine, 2) Undecided about taking the vaccine, 3) Unlikely to take the vaccine, and 4) Already vaccinated, with the latter serving as the reference category for comparison during analysis.

The results indicate that neither gender nor conspiracy belief significantly influence the likelihood of individuals choosing to take the COVID-19 vaccine or remaining undecided, as evidenced by p-values exceeding 5% at a 95% confidence level. However, strong conspiracy beliefs exert a statistically significant effect on individuals who are undecided or unlikely to take the vaccine compared to those already vaccinated, suggesting that strong conspiracy beliefs increase the propensity to refrain from vaccination.

Moreover, the interaction between gender and strong conspiracy beliefs significantly affects individuals unlikely to receive the COVID-19 vaccine. Specifically, females, when compared to males, exhibit a reduced likelihood of vaccine acceptance, particularly among those with strong conspiracy beliefs. This underscores that women are inclined to refuse the COVID-19 vaccine than men, particularly in the presence of strong conspiracy beliefs. Notably, even after adjusting for education level, marital status, religion, socioeconomic status, and age group, the interaction remains significant, emphasizing the enduring impact of gender and strong conspiracy beliefs on vaccination decisions. The detailed results where education level, marital status, religion, socioeconomic status, and age group are controlled for in model estimation are presented in appendix.

Overall, these findings highlight the detrimental effect of conspiracy beliefs, particularly on females, and underscore the need to shield women from exposure to such misinformation. Consequently, proactive measures should be implemented to mitigate the adverse influence of conspiracy beliefs, especially among women, to promote vaccine acceptance and public health outcomes.

Table 2: Multinomial logistic regression model results

COVID-19 Vaccination decision (Base outcome: Already vacinated)	Variables	Relative risk	Std Error	Z	P-value
Likely	Female	0.609	0.163	-1.860	0.063
	Strong Conspiracy belief	0.915	0.242	-0.330	0.738
	Interaction (female# strong conspiracy beliefs)	1.450	0.556	0.970	0.332
	Constant	0.215**	0.040	-8.260	0.000
Undecided	Female	1.987	0.795	1.720	0.086
	Strong Conspiracy belief	5.026**	1.906	4.260	0.000
	Interaction (female# strong conspiracy beliefs)	0.684	0.312	-0.830	0.406
	Constant	0.055**	0.019	-8.460	0.000
Unlikely	Female	0.362**	0.146	-2.520	0.012
	Strong Conspiracy belief	4.215**	1.164	5.210	0.000
	Interaction (female# strong conspiracy beliefs)	2.424**	1.085	1.980	0.048
	Constant	0.117**	0.028	-8.870	0.000
N (No. Observations)	1,201				
LR chi2(9) = 144.20 * p<0.05; ** p<0.01 Prob > chi2 = 0.0000 Log likelihood = -1228.6493					

4.DISCUSSION

The degree to which people endorse conspiracy beliefs is greatly attributed to their personal characteristics such as personal and socioeconomic characteristics, information channels, attitudes, perceptions, and social support networks (Van Espen et al., 2023). In this study we

discovered that all those individual attributes contribute to the level of vaccination willingness in the population, specifically emphasizing the mediating relationship between gender, conspiracy beliefs and Covid19 vaccine hesitancy in Uganda. We found out that gender is significantly associated with the likelihood of endorsing conspiracy beliefs among men compared to the women. Our results revealed that a greater proportion of men exhibited "strong" conspiracy-related beliefs and mentality toward COVID-19 vaccines compared to women. These results have revealed thatthere may be gender differences in attitudes towards COVID-19 vaccines and conspiracy beliefs in Uganda which is similar to a few studies in the US by (Cassese et al., 2020) where it was found that men we're more likely to endorse CTs than Women. While another study in the US showed that men had a higher likelihood to endorse conspiracy beliefs in comparison to the women. In this study men were more likely to agree with the statement that "I am convinced there is a conspiracy behind many things in the world." However, in another study women scored higher on an index of conspiratorial thinking and an index of conservative conspiracy theories in Federico, Williams, and Vitriol's (2018). In our study gender is associated with vaccine hesitancy that results from beliefs in conspiracy theories among men and women. Among the already vaccinated, women with weak beliefs in conspiracy theories are more likely to accept the covid 19 vaccine compared to the men, while men with strong beliefs in conspiracy theories are more likely to accept the covid 19 vaccine compared to the women. This result is a clear indication of how the belief in conspiracy theories among women can influence their decisions to get vaccinated, and yet among the men they would still embrace vaccination even with a presence of strong beliefs in conspiracy theories. This result is similar to what was discovered in a systematic review study by (Zintel et al., 2022), where the men were associated with a greater likelihood of intending to accept a COVID-19 vaccine in 35 studies. Despite that, in some other studies women have been found to have more likelihood of believing in conspiracy theories when compared to men, a study in Turkey that measured psychological correlates and covid 19 preventive measures found women endorsing a number of the conspiracy theories in comparison to the men (*Sinan.* et.al 2020).

In addition, there is a significant proportion of both men and women whose strong conspiracy beliefs ultimately affects their choice not to receive the Covid19 vaccine. Notwithstanding, there is a marked difference that women are less unlikely to get vaccinated compared to the Men. This relationship was confirmed with the multinomial regression model which clearly showed that the interaction between gender and strong conspiracy beliefs significantly affects women's vaccination decisions. The women who reported strong beliefs in conspiracy theories were much more unlikely and undecided to get a Covid 19 vaccine compared to their male counterparts. This finding implies that the majority of women with strong beliefs in conspiracy theories are likely to resist covid 19 vaccination because of their fear for uncertain situations that can arise after the immunisation especially when it involves other family members and children, (*Sinan. et.al* 2020). There are a number of reasons that have been identified in previous studies to explain the vaccine hesitancy among women. These include, the dismissal of women's reports of menstrual changes, the infodemic of fertility-related misinformation; and, the exclusion and confusing messaging regarding pregnant women – may have contributed to the patterns observed (Walcherberger et al., 2022). A study in Cameroon found majority of the women being less vaccinated compared to the men, (Amani et al., 2022).

A study in the US showed that majority of the women were more likely to be vaccine hesitant on the four categories scale which included, (I would definitely not get a COVID-19 vaccine; 13% I would not get a COVID-19 vaccine; probably I would get a COVID-19 vaccine; I would definitely get a vaccine(Morales et al., 2022). Similarly another study that compared two surveys in Togo found women to report more vaccine hesitancy in comparison

to their male counterparts (Akinocho et al., 2024). The mediating relationship of gender, conspiracy beliefs and vaccine hesitancy has been clearly articulated although there a few studies which showed no obvious gender differences in Covid19 vaccine hesitancy (Lee et al., 2022, Tulloch 2021, Jolley and Douglas - 2014).

5. POLICY IMPLICATIONS

The study results have shown that despite the fact that both men and women hold similar strong beliefs in conspiracy theories, the women reported higher levels of vaccine hesitancy precipitated by their underlying reasons for conspiratorial thinking. Therefore, the negative effects of beliefs in conspiracy theories is more damaging to women in comparison to their male counterparts. To address this, it is imperative that gender considerations be made throughout the continuum of vaccine development throughout to curb any gender biases in uptake of the inoculations. Applying an intersectional gender lens at each step of the process will help identify potential sex differences, and gender-related inequities, and support tailored vaccination programmes that can effectively respond to the diverse needs and experiences of women, and men thereby ensuring vaccination of 'everyone, everywhere'. Government and policymakers must tailor vaccine communication strategies to meet the informational needs of both genders. By implementing gender-sensitive interventions, they can prevent gender disparities in vaccine acceptance and utilization, thereby promoting equitable access to vaccination services for all segments of the population.

6. CONCLUSION

In conclusion, our study highlights the differential impact of Gender, conspiracy beliefs and vaccine hesitancy among men and women in Uganda. Our study sheds light on the gendered dynamics of conspiracy beliefs and vaccine hesitancy in Uganda. While men exhibited higher levels of conspiratorial thinking regarding COVID-19 vaccines, this did not significantly affect their willingness to be vaccinated compared to women. Conversely, women were more susceptible to the damaging effects of conspiracy beliefs, leading to greater vaccine hesitancy. This highlights a notable gender disparity in the impact of conspiracy beliefs on vaccine acceptance. These results underscore the importance of tailored vaccine communication strategies that address the concerns of both genders. The stakeholders and policy makers need to ensure that vaccine information and education initiatives consider the gendered nuances of conspiracy beliefs to foster equitable vaccine acceptance and uptake.

References

Abdel-Raheem, A., & Alkhammash, R. (2021). 'To get or not to get vaccinated against COVID-19': Saudi women, vaccine hesitancy, and framing effects. Discourse & Communication, 17504813211043724.

Aceng, J. R., Ario, A. R., Muruta, A. N., Makumbi, I., Nanyunja, M., Komakech, I., Bakainaga, A. N., Talisuna, A. O., Mwesigye, C., Mpairwe, A. M., Tusiime, J. B., Lali, W. Z., Katushabe, E., Ocom, F., Kaggwa, M., Bongomin, B., Kasule, H., Mwoga, J. N., Sensasi, B., Mwebembezi, E., Woldemariam, Y. T. (2020). Uganda's experience in Ebola virus disease outbreak preparedness, 2018-2019. Globalization and Health, 16(1), 24.

Ackah, B. B. B., Woo, M., Stallwood, L., Fazal, Z. A., Okpani, A., Ukah, U. V., & Adu, P. A. (2022). COVID-19 vaccine hesitancy in Africa: a scoping review. Global health research and policy, 7(1), 21.

Arce, Julio S. Solis, Shana S. Warren, Niccolo F. Meriggi, Alexandra Scacco, Nina McMurry, Maarten Voors, Georgiy Syunyaev et al. "COVID-19 vaccine acceptance and hesitancy in low and middle income countries, and implications for messaging." medRxiv (2021).

Arif, A., Tebha, S. S., Badar, A., Qamar, M. A., Dhillon, R. A., Abbas, S. A., & Tariq, M. (2022). Demographic Factors, Conspiracy Theories, and Beliefs Associated With COVID-19 Vaccine Hesitancy Among Pakistani Population: A Cross-Sectional Study. Cureus, 14(12), e32629

Atari et.al, (2019). Psychometric assessments of Persian translations of three measures of conspiracist beliefs, https://doi.org/10.1371/journal.pone.0215202

Babirye, J.N., Rutebemberwa, E., Kiguli, J., Wamani, H., Nuwaha, F., & Engebretsen, M. S., I. (2011). More support for mothers: a qualitative study on factors affecting immunisation behaviour in Kampala, Uganda. BMC Public Health 11, 723 (2011).

Betsch (2018). Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination, https://doi.org/10.1371/journal.pone.0208601

Balafoutas, L., Libman, A., Selamis, V., & Vollan, B. (2021). Exposure to conspiracy theories in the lab. Economic and Political Studies, 9(1), 90-112.

Bwire, G., Waniaye, J. B., Otim, J. S., Matseketse, D., Kagirita, A., & Orach, C. G. (2021). Cholera risk in cities in Uganda: understanding cases and contacts centered strategy (3CS) for rapid cholera outbreak control. The Pan African medical journal, 39, 193. https://doi.org/10.11604/pamj.2021.39.193.27794

Cassese, E. C., Farhart, C. E., & Miller, J. M. (2020). Gender Differences in COVID-19 Conspiracy Theory Beliefs. Politics & Gender, 16(4):1009–18

Caycho-Rodríguez, T., Ventura-León, J., Valencia, P. D., Vilca, L. W., Carbajal-León, C., Reyes-Bossio, M., White, M., Rojas-Jara, C., Polanco-Carrasco, R., Gallegos, M., Cervigni, M., Martino, P., Palacios, D. A., Moreta-Herrera, R., Samaniego-Pinho, A., Lobos Rivera, M. E., Buschiazzo Figares, A., Puerta-Cortés, D. X., Corrales-Reyes, I. E., Calderón, R., … Petzold, O. (2022). What Is the Support for Conspiracy Beliefs About COVID-19 Vaccines in Latin America? A Prospective Exploratory Study in 13 Countries. Frontiers in psychology, 13, 855713.

Coelho, P., Foster, K., Nedri, M., & Marques, M. D. (2022). Increased belief in vaccination conspiracy theories predicts increases in vaccination hesitancy and powerlessness: Results from a longitudinal study. Social science & medicine (1982), 315, 115522.

Cordina, M., Lauri, M. A., & Lauri, J. (2021). Attitudes towards COVID-19 vaccination, vaccine hesitancy and intention to take the vaccine. Pharmacy Practice (Granada), 19(1).

Cordina, M., Lauri, M. A., & Lauri, J. (2021). Attitudes towards COVID-19 vaccination, vaccine hesitancy and intention to take the vaccine. Pharmacy practice, 19(1), 2317.

Dou, K., Yang, J., Wang, L. X., & Li, J. B. (2022). Theory of planned behavior explains males' and females' intention to receive COVID-19 vaccines differently. Human vaccines & immunotherapeutics, 18(5), 2086393.

Douglas, K. M. (2021). COVID-19 conspiracy theories. Group Processes & Intergroup Relations, 24(2), 270-275.

Echoru, I., Ajambo, P. D., Keirania, E., & Bukenya, E. E. M. (2021). Sociodemographic factors associated with acceptance of COVID-19 vaccine and clinical trials in Uganda: a cross-sectional study in western Uganda. BMC public health, 21(1), 1106.

Enders, A. M., Uscinski, J., Klofstad, C., & Stoler, J. (2022). On the relationship between conspiracy theory beliefs, misinformation, and vaccine hesitancy. PloS one, 17(10), e0276082.

Fishbein, M., & Ajzen, I. (2010). Predicting and Changing Behavior: the Reasoned Action Approach. Psychology Press

Franceschet, S., Piscopo, J. M., & Ruzycki, S. (2021). The Gender Policy Report: To Overcome Women's Vaccine Skepticism, Take Its Roots Seriously. Regents of the University of Minnesota. Retrieved from: https://genderpolicyreport.umn.edu/to-overcome-womens-vaccine-skepticism-take-its-roots-seriously/ Accessed 28 November 2021

Galasso, V., Pons, V., Profeta, P., Becher, M., Brouard, S., & Foucault, M. (2020). Gender differences in COVID-19 attitudes and behavior: Panel evidence from eight countries. Proceedings of the National Academy of Sciences, 117(44), 27285-27291.

Galasso, V., Profeta, P., Foucault, M., & Pons, V. (2021). COVID-19 Vaccine's Gender Paradox. medRxiv. doi: https://doi.org/10.1101/2021.03.26.21254380

Gallè, F., Sabella, E. A., Roma, P., De Giglio, O., Caggiano, G., Tafuri, S., ... & Napoli, C. (2021). Knowledge and Acceptance of COVID-19 Vaccination among Undergraduate Students from Central and Southern Italy. Vaccines, 9(6), 638.

Gerend, M. A., and Shepherd, J. E. (2012). Predicting human papillomavirus vaccine uptake in young adult women: comparing the health belief model and theory of planned behavior. Ann. Behav. Med. 44, 171–180. doi: 10.1007/s12160-012-9366-5

Guidry, J. P. D., Laestadius, L. I., Vraga, E. K., Miller, C. A., Perrin, P. B., Burton, C. W., Ryan, M., Fuemmeler, B. F., & Carlyle, K. E. (2021). Willingness to get the COVID-19 vaccine with and without emergency use authorization. American journal of infection control, 49(2), 137–142.

Hagger, M., & Hamilton, K. (2021). Effects of socio-structural variables in the theory of planned behavior: a mediation model in multiple samples and behaviors. Psychol. Health 36(3), 307–333

Heidari, S., & Goodman, T. (2021). Critical sex and gender considerations for equitable research, development and delivery of COVID-19 vaccines. World Health Organization

Goertzel (1994) Belief in Conspiracy Theories, Political Psychology, Vol. 15, No. 4 (Dec., 1994), pp. 731-742 (12 pages, https://doi.org/10.2307/3791630, https://www.jstor.org/stable/3791630

John Hopkins University & Medicine. (2023). Understanding vaccination progress. Coronavirus Resource Center. https://coronav irus.jhu.edu/vaccines/international

Jolley, D., & Douglas, K. M. (2014). The effects of anti-vaccine conspiracy theories on vaccination intentions. PloS one, 9(2), e89177.

Kabagenyi, A., Wasswa, R., Nannyonga, B. K., Nyachwo, E. B., Kagirita, A., Nabirye, J., Atuhaire, L., & Waiswa, P. (2022). Factors Associated with COVID-19 Vaccine Hesitancy in Uganda: A Population-Based Cross-Sectional Survey. International journal of general medicine, 15, 6837–6847.

Killgore, W. D., Cloonan, S. A., Taylor, E. C., & Dailey, N. S. (2021). The COVID-19 Vaccine Is Here—Now Who Is Willing to Get It?. Vaccines, 9(4), 339.

Knobel, P., Zhao, X., & White, K. M. (2021). Do conspiracy theory and mistrust undermine people's intention to receive the COVID-19 vaccine in Austria?. Journal of Community Psychology.

Lazarus, J. V., Wyka, K., White, T. M., Picchio, C. A., Rabin, K., Ratzan, S. C., Parsons Leigh, J., Hu, J., & El-Mohandes, A. (2022). Revisiting COVID-19 vaccine hesitancy around the world using data from 23 countries in 2021. Nature communications, 13(1), 3801.

Lee (2022). Misinformation of COVID-19 vaccines and vaccine hesitancy, 12:13681 | https://doi.org/10.1038/s41598-022-17430-6

Limbu, Y. B., Gautam, R. K., & Zhou, W. (2022). Predicting Vaccination Intention against COVID-19 Using Theory of Planned Behavior: A Systematic Review and Meta-Analysis. Vaccines, 10(12), 2026.

Marcellino, W. (2021). Detecting Conspiracy Theories on Social Media Improving Machine Learning to Detect and Understand Online Conspiracy Theories. RAND CORP SANTA MONICA CA.

MoH. (2020). Corona Virus Disease – 2019 (COVID-19) Preparedness and Response Plan: March 2020 – June 2021. Ministry of Health Uganda.

MoH. (2021). National Corona Virus Disease – 2019 (COVID-19) Resurgence Plan: June 2021 – June 2022. Kampala: Ministry of Health.

Montaño, D. E. & Kaspryzk. D. (2008). Theory of reasoned action, theory of planned behavior, and the integrated behavior model. 4th ed. In: Glanz K, Rimer B, Viswanath K, editors. Health Behavior and Health Education: Theory, Research, and Practice. San Fransisco, CA: Jossey-Bass, A Wiley Imprint (2008). p. 67–96

Morales DX, Beltran TF, Morales SA. Gender, socioeconomic status, and COVID-19 vaccine hesitancy in the US: An intersectionality approach. Sociol Health Illn. 2022 Jun;44(6):953-971. doi: 10.1111/1467-9566.13474. Epub 2022 May 2. PMID: 35500003; PMCID: PMC9348198.

Mulukom, V., Pummerer, L. J., Alper, S., Bai, H., Čavojová, V., Farias, J., Kay, C. S., Lazarevic, L. B., Lobato, E. J. C., Marinthe, G., Pavela Banai, I., Šrol, J., & Žeželj, I. (2022). Antecedents and consequences of COVID-19 conspiracy beliefs: A systematic review. Social science & medicine (1982), 301, 114912.

Musoke, D., Boynton, P., Butler, C., & Musoke, M. B. (2014). Health seeking behaviour and challenges in utilising health facilities in Wakiso district, Uganda. African health sciences, 14(4), 1046–1055.

Republic of Uganda. (2020). The Public Health (Control of Covid - 19) Rules, 2020. Statutory Instruments. 2020 No. 52. Arrangement of Rules. UPPC.

Romer, D., & Jamieson, K. H. (2020). Conspiracy theories as barriers to controlling the spread of COVID-19 in the US. Social science & medicine, 263, 113356.

Romer, D., & Jamieson, K. H. (2021). Patterns of Media Use, Strength of Belief in COVID-19 Conspiracy Theories, and the Prevention of COVID-19 From March to July 2020 in the United States: Survey Study. Journal of medical Internet research, 23(4), e25215.

Rosenstock IM, Strecher VJ, Becker MH. Social learning theory and the Health Belief Model. Health Educ Q. 1988 Summer;15(2):175-83. doi:

Runciman, C., Roberts, B., Alexander, K., Bohler-Muller, N., & Bekker, M. (2021). UJ-HSRC Covid-19 Democracy Survey. Willingness to take a Covid-19 vaccine: A research briefing. Universidad de Johannesburgo y el Consejo de Investigación de Ciencias Humanas.

Ryan, M. P. (2022). Collaborative Governance in a Developing Non-Democracy: Uganda's Organizational Success Fighting HIV/AIDS. The American Review of Public Administration, 52(3), 175–190.

Salali, G. D., & Uysal, M. S. (2021). Why some hesitate more: cross-cultural variation in conspiracy beliefs, belief in science, and vaccine attitudes. MedRxiv.

Sallam M. (2021). COVID-19 Vaccine Hesitancy Worldwide: A Concise Systematic Review of Vaccine Acceptance Rates. Vaccines, 9(2), 160.

Sarki, A. M., Ezeh, A., & Stranges, S. (2020). Uganda as a Role Model for Pandemic Containment in Africa. American journal of public health, 110(12), 1800–1802.

Seddig, D., Maskileyson, D., Davidov, E., Ajzen, I., & Schmidt, P. (2022). Correlates of COVID-19 vaccination intentions: Attitudes, institutional trust, fear, conspiracy beliefs, and vaccine skepticism. Social science & medicine (1982), 302, 114981.

Servidio, R., Malvaso, A., Vizza, D., Valente, M., Campagna, M. R., Iacono, M. L., Martin, L. R., & Bruno, F. (2022). The intention to get COVID-19 vaccine and vaccine uptake among cancer patients: An extension of the theory of planned behaviour (TPB).

Supportive care in cancer : official journal of the Multinational Association of Supportive Care in Cancer, 30(10), 7973–7982.

Ssanyu, J. N., Kiguba, R., Olum, R., Kiguli, J., & Kitutu, F. E. (2022). Using community influencer groups to address COVID-19 misinformation and vaccine hesitancy in Uganda: a protocol for a prospective quasi-experimental study. BMJ open, 12(8), e057994.

Sinan (2020). Psychological Correlates of COVID-19 Conspiracy Beliefs and Preventive Measures: Evidence from Turkey, doi:10.31234/osf.io/mt3p4

State House-Entebbe. (2020). Corona Virus (COVID-19): More guidelines on the preventive measures and the need for a shut down. 30th March, 2020. Republic of Uganda.

Swami V, Coles R, Stieger S, Pietschnig J, Furnham A, Rehim S, Voracek M. Conspiracist ideation in Britain and Austria: evidence of a monological belief system and associations between individual psychological differences and real-world and fictitious conspiracy theories. Br J Psychol. 2011 Aug;102(3):443-63. doi: 10.1111/j.2044-8295.2010.02004.x. Epub 2011 Feb 25. PMID: 21751999.

The Swedish Civil Contingencies Agency. (2021). Conspiracy theories and COVID-19: The mechanisms behind a rapidly growing societal challenge. Sweden: The Swedish Civil Contingencies Agency (MSB).

Thomson A, Robinson K, Vallée-Tourangeau G. The 5As: A practical taxonomy for the determinants of vaccine uptake. Vaccine. 2016 Feb 17;34(8):1018-24. doi: 10.1016/j.vaccine.2015.11.065. Epub 2015 Dec 7. PMID: 26672676.

Tulloch, O., Bardosh, K., & Roldan de Jong, T. (2021). Data synthesis. COVID-19 vaccine perceptions in Africa. Social and Behavioural Science data, March 2020–March 2021. SSHAP. Socialscienceinaction. org. Retrieved May, 21, 2021.

Uganda Bureau of Statistics (2012). Health Sector Gender Statistics Profile.

Vassallo, A., Shajahan, S., Harris, K., Hallam, L., Hockham, C., Womersley, K., ... & Sheel, M. (2021). Sex and Gender in COVID-19 Vaccine Research: Substantial Evidence Gaps Remain. Frontiers in Global Women's Health, 2.

Walcherberger, C., Eberl, J., Partheymüller, J., Paul, K. T., & Stamm, T. A. (2022). COVID-19 vaccine hesitancy and gender. European Journal of Politics and Gender, 5(2), 270-274. Retrieved Jul 6, 2024, from https://doi.org/10.1332/251510821X16498676658252

WHO. (2021). Report on the Strategic Response to COVID-19 in the WHO African Region. World Health Organization, Africa.

Wolff, K. (2021). COVID-19 Vaccination Intentions: The Theory of Planned Behavior, Optimistic Bias, and Anticipated Regret. Front. Psychol. 12:648289

Yang, L., Ji, L., Wang, Q., Xu, Y., Yang, G., Cui, T., Shi, N., Zhu, L., Xiu, S., Jin, H., & Zhen, S. (2022). Vaccination Intention and Behavior of the General Public in China: Cross-sectional Survey and Moderated Mediation Model Analysis. JMIR public health and surveillance, 8(6), e34666.

Zampetakis LA, Melas C. The health belief model predicts vaccination intentions against COVID-19: A survey experiment approach. Appl Psychol Health Well Being. 2021 May;13(2):469-484. doi: 10.1111/aphw.12262. Epub 2021 Feb 26. PMID: 33634930; PMCID: PMC8014148.

Zintel S, Flock C, Arbogast AL, Forster A, von Wagner C, Sieverding M. Gender differences in the intention to get vaccinated against COVID-19: a systematic review and meta-analysis. Z Gesundh Wiss. 2022 Jan 7:1-25. doi: 10.1007/s10389-021-01677-w. Epub ahead of print. PMID: 35018277; PMCID: PMC8739532.

Appendix 1: Multinomial logistic results control for other factors

Outcome (base outcome Already vaccinated	**Variables**	**relative risk & Z values**
1__Likely	2.gender	-0.378
		-1.33
	1.conspiracy_c	-0.085
		-0.3
	2.gender#1.conspiracy_c	0.142
		-0.35
	2bn.age_group	-0.503
		-1.74
	3.age_group	-0.77
		(2.20)*
	4.age_group	-0.947
		(2.32)*
	5.age_group	-0.316
		-0.78
	6.age_group	-0.304
		-0.63
	7.age_group	-1.917
		-1.79
	1.mstatus	0.262
		-1.08
	2bn.educ_level	-0.375
		-0.45
	3.educ_level	-0.718
		-0.82

	4.educ_level	1.32
		-1.69
	2.religion	-0.003
		-0.01
	3.religion	0.031
		-0.11
	4.religion	-0.411
		-1
	2perceived_wealth	-0.625
		(2.54)*
	3.perceived_wealth	-0.351
		-0.88
	Constant	-1.53
		-1.73
2__Undecided	2.gender	0.706
		-1.73
	1.conspiracy_c	1.486
		(3.85)**
	2.gender#1.conspiracy_c	-0.457
		-0.98
	2bn.age_group	-0.21
		-0.81
	3.age_group	-0.165
		-0.53
	4.age_group	-0.694
		-1.78
	5.age_group	-0.944

		-1.92
	6.age_group	-2.321
		(2.22)*
	7.age_group	-1.313
		-1.64
	1.mstatus	-0.13
		-0.58
	2bn.educ_level	-0.679
		-1.07
	3.educ_level	-0.803
		-1.25
	4.educ_level	0.258
		-0.43
	2.religion	-0.121
		-0.43
	3.religion	0.085
		-0.33
	4.religion	-0.326
		-0.85
	2.perceived_wealth	0.009
		-0.03
	3.perceived_wealth	-0.053
		-0.13
	_cons	-2.317
		(2.95)**

3__Unlikely	2.gender	-0.959
		(2.34)*
	1.conspiracy_c	1.379
		(4.85)**
	2.gender#1.conspiracy_c	0.89
		-1.96
	2.age_group	0.085
		-0.33
	3.age_group	0.293
		-0.97
	4.age_group	0.398
		-1.23
	5.age_group	-0.128
		-0.31
	6.age_group	-1.107
		-1.68
	7.age_group	-1.154
		-1.42
	1.mstatus	-0.087
		-0.43
	2.educ_level	-0.799
		-1.62
	3.educ_level	-0.391
		-0.8
	4.educ_level	0.021

		-0.05
	2.religion	-0.029
		-0.12
	3.religion	-0.598
		(2.38)*
	4.religion	0.015
		-0.05
	2bn.perceived_wealth	-0.145
		-0.53
	3.perceived_wealth	0.33
		-0.97
	constant	-1.759
		(2.72)**
N		1,201
	* p<0.05; ** p<0.01	