

Income and literacy: Understanding the dilemmas and beliefs in marketability of orthodox healthcare products

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Abstract: The prevailing challenges of cultural and ethical dilemmas are posing challenges in the healthcare sector, such as in immunization. The purpose of our study is to understand the dilemmas and beliefs in the marketability of orthodox healthcare products after controlling the effects of income and literacy level. This is justified following the rising impact of brain drain that is stressing the already shackled Nigerian healthcare sector. Our study evaluates the effects of dilemmas and beliefs on the marketability of orthodox healthcare products after controlling for income and literacy level. A cross-sectional survey of 132 adult consumers was used. Descriptive statistics, factor analysis, OLS, hierarchical, and logistic regression were used to evaluate the questions. Our results reveal a significant effect of ethical beliefs after controlling for income and literacy level while also confirming the probabilities of predictor factors being in the female gender group, thereby presenting a significant contribution to healthcare management and marketing theory by clarifying the contextual factors that situate gender for required healthcare interventions. Policy implications include targeting the media sector as mechanisms to improve health literacy and close the gap on the factors mitigating the marketability of orthodox healthcare products.

Keywords: Traditional medicine, marketing, culture, gender disparity, cultural relativism, ethical norms, Nigeria

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1 | INTRODUCTION

Healthcare products, especially orthodox medicines, are instrumental in the healthcare systems and structures of a nation and the world at large. Products tend to reflect cultures as consumers express their cultural identity through the products (Fahimeh et al., 2016). Culture influences consumers' purchases while revealing important indicators such as why, how, when, whom they purchase from, and where (Singh et al., 2020). This highlights the importance of cultural sensitivity, as Latif (2020) considers it a prerequisite for anyone seeking changes in health matters. Essentially, the values, beliefs, and dilemmas embedded in cultures define a society, thereby championing culture as a vital cog in people's conduct and performance of activities (Khan & Law, 2018). Consequently, the role of culture in the healthcare system is paramount, with extant literature revealing the driving nature of cultural aspects in increasing mortality rates in the developing nations (Oteh et al., 2021), while further evidence reveals the weight of cultural narratives contributing to the asymmetry between traditional healthcare products and orthodox healthcare products. Mordeniz (2019) reveals that traditional healthcare solutions are considered harmful in developing nations because of the absence of non-scientific approaches, but evidence from literature such as Mothibe and Sibanda (2018) reveals their patronage by indigenous people as an alternative source. The underlying factor is that cultural elements play a significant role in healthcare services, with evidence of religious beliefs impacting healthcare products and services (Asakitikpi, 2019), with further evidence of its impact in developing countries in areas such as non-acceptance of vaccination (Faasse & Newby, 2020). The challenges in Nigeria's healthcare sector have not been helpful in ameliorating the challenges associated with cultural coloration in acceptance and non-acceptance of orthodox healthcare products. The challenges have become a worrying sight recently, with several medical practitioners seeking greener pastures outside the country, thereby creating more loads for the understaffed sector. For instance, more than 4000 medical practitioners migrated to other nations in 2024, with further evidence revealing a 200% brain drain from 2023 to 2024 (Sahara Reporters, 2025). The crisis in the healthcare sector is often associated with poor healthcare funding and inadequate healthcare infrastructure and shortages of medical professionals that eventually contribute to health challenges in Nigeria (Aranmolate, 2025). Consequently, the ratio of doctor-patient consultations worsened to 1:5000 (Oloveze et al., 2021) against 1:1000 suggested by the World Health Organization (Kumar & Pal, 2018), thereby increasing stress on medical practitioners while compounding the burden of health challenges (Ajisegiri et al., 2023).

Recently, quite a number of pharmaceutical companies exited their operations in Nigeria and some other African countries on grounds of unprofitability (Afunwa, 2024). Companies such as GlaxoSmithKline (GSK) and Sanofi stopped operational activities between 2023 and 2024, while Bayer is preparing to exit the Nigerian market, with the existing gap impacting prices of essential medicines, triggering job losses that impact several families and their dependents, and encouraging the manufacturing of counterfeit medicines while affecting pharmaceutical manufacturing in Nigeria, as they can only meet 30% of consumer demand (Nigeria Health Watch, 2025) as well as impacting shelves of retail pharmacies (Afunwa, 2024). Nigeria is currently battling a shortage of medical supplies (Ileyemi, 2024), with the extant effect being the battle of several Nigerians to buy medicines with no healthcare financial support to cushion the challenges of rising healthcare products but being available to the wealthy only (Afunwa, 2024). In essence, this is compounding the challenges of health inequality, healthcare accessibility, and indirect increases in healthcare costs as people tend to travel long distances to purchase medicines they need.

In Nigeria, market acceptance of orthodox healthcare products coexists with traditional medicine (Abhaddonmhen et al., 2025), which has become so embedded in local communities that indigenous people's preferences for traditional treatments are shaped by cultural norms. For instance, studies such as Ajima and Ubana (2018) buttress the vital role of culture in healthcare, while recent studies such as Abhaddonmhen et al. (2025) reveal the significant role of cultural elements and educational levels on traditional and orthodox healthcare solutions to ailments in Nigeria with more alignment to the effectiveness of traditional medicines given the historical foundations of traditional medicine in Nigeria. Therefore, cultural dynamics and deeply rooted cultural beliefs may impact healthcare decisions by dictating individuals' choices for traditional medicine or orthodox medicine. The affordability of traditional medicines and their culturally rich contexts are an allure to indigenous people, particularly those in the rural areas. Abhaddonmhen et al. (2025) suggest the existence of competition between traditional medicine and orthodox medicine, thereby adding another layer of complexity such that orthodox healthcare products enjoy scientific rigors in their production while traditional healthcare products connect majorly with deep-rooted cultural values and cultural significance. For instance, cultural connotations of the cause of ailment show illnesses connected to supernatural causes favor traditional healthcare products (Hernandez & Gibb, 2020), with severity of ailment and goal to stay healthy being one of the key drivers of choice between traditional and orthodox healthcare products (Afolabi et al., 2020). The implication is on the marketability of the healthcare products, as Castro and Sáiz (2020) reveal that the understanding of cultural values is instrumental in marketing decisions, while Kaur and Chawla (2016) confirm the significant role of culture in consumers' choice of products and their

motivation to be associated with the product. Marketing offers significant contributions to healthcare upon appropriate application and implementation (Bairagdar et al., 2021) and has proven to drive market performance.

Thus, the understanding of factors that enhance the marketability of healthcare products is essential. Notably, the roles of income and literacy level are controlled in the study. Economic theory reveals that income impacts individuals' purchasing power, whereas literacy level impacts the ability to evaluate health information and trust in healthcare facilities. Studies such as Enebeli (2025) revealed the role of literacy in health-related behaviors, with high literacy being associated with individuals' search for medicine-related information more than ones with low literacy. Thus, our study controlled the effect of income and literacy on the relationship between cultural and ethical beliefs and the marketability of orthodox healthcare products to understand the real effect of the predictors. Our study seeks to understand how cultural and ethical beliefs predict the marketability of orthodox healthcare products. What is the effect of cultural and ethical beliefs on the marketability of orthodox healthcare products after controlling for income and literacy level? And to what extent dilemmas and healthcare attributes will predict the probability of healthcare consumers being male or female?

2 | LITERATURE REVIEW

The context of culture encompasses the beliefs, norms, traditions, values, and customs that are shared by people bound in a common location. Therefore, culture is that complex whole which includes knowledge, beliefs, arts, law, morals, customs, and any other capabilities and habits acquired by man as a member of society (Hawkins et al., 1983). There is evidence of cultural beliefs holding a degree of interconnectedness for people and peaceful cohabitation. For instance, cultural beliefs call for understanding group values and identity formation (Nikiforova & Voronova, 2023). This shows the existence of differences in cultural beliefs among different people. It is one of the foundations of behavioral formation and social identities, especially where it is a practice and ritual that is passed through generations. It helps in shaping people's actions and reactions to events while also accounting for differences in people's reactions to the same event/object. This is because it reflects history, faith, social interactions (Salmorin & Gepty, 2023), perception, idea formation, and understanding of real-life cases (Ugwu & Okpala, 2024). Consequently, Eche (2023) concludes that cultures should be understood from within and not outside. The argument points to the fact that concepts about culture play a significant role in self-image and the formation of a person's identity. For instance, through storytelling and oral traditions, cultural beliefs are intended to be preserved and transmitted to ensure the core essence of cultural knowledge and heritage is not lost through time. Yu and Stoet (2019) argue that such practices deepen continuity and cultural affiliations despite the passage of time. The implication on healthcare is vital given that the global healthcare system and its efficiency are impacted by cultural elements such as social norms and values (Okeme et al., 2024). Reports indicate the deep-rooted nature of social norms in traditional beliefs and practices given that Barnes (2022) reported about 70% of a nation's population being influenced by traditional medicines in primary healthcare needs. The resort to herbal practices is revealed in some cases to be a cause of poor engagement of indigenous people with formal healthcare delivery (Adewuyi et al., 2017). The necessity placed on the aspects of cultural beliefs, such as norms and values, is essential in understanding health-seeking behavior. This calls for cultural competence of healthcare providers and marketers of healthcare products. Cultural competence is instrumental in reducing health disparities, especially in places with diverse populations, given that the diversity provides a unique attribute that is required to address the cultural needs of patients. For instance, such cultural competence is proven to encourage patients' satisfaction with healthcare delivery (Betancourt et al., 2016).

Cultural dilemmas are conflicts that arise where there are alternative courses. It arises when there is a palpable disparity and conflict between traditional healthcare practices ingrained in cultural approaches to healthcare products and orthodox healthcare practices that follow scientific proofs. Evidence from literature shows a combination of both practices in rural areas of developing countries, while preference is more on traditional healthcare products because of their low cost, cultural fit, and perceived accessibility (Okojie & Lane, 2020). Cultural beliefs have the ability to shape how individuals perceive the efficacy and risk associated with medicines, thereby becoming a ground for skepticism toward biomedical products. Uzochukwu et al. (2015) suggest that besides cultural beliefs, other factors such as education and healthcare access are significant barriers to healthcare management and accessibility, especially in the rural areas. In Nigeria, about 64% of Nigeria's population resides in the rural areas (Badiora & Abiola, 2017), and it is important in understanding the cultural impact on healthcare and ethical dilemmas in healthcare products. The importance extends to broader issues of equitable healthcare access. For instance, studies reveal that

ethical practices such as medicine dispensing behavior are notable areas of ethical practices, as Popoola et al. (2025) reveal that the drivers are poor interprofessional collaboration between physicians and pharmacists, pressure from management to meet sales targets, unethical profit-driven initiatives, and poor working conditions. In this case, the limited consumer protection is grounds that raise ethical questions on fairness and trust in orthodox healthcare products.

In controlling the effect of income, our study recognizes that income can shape health-seeking behavior. First, income is a vital component in households and the economy while also serving as economic capital. It helps in defining the affordability of items given that low-income consumers tend to align to traditional beliefs, as they tend to be price-sensitive and lean more to cheaper sources such as traditional solutions to health challenges that are locally perceived to be cheaper. For instance, lower income groups favor traditional healthcare practices on account of being culturally embedded and affordable (Abhadiomhehn et al., 2025). Extant literature reveals that households that are economically disadvantaged lean more on low-cost healthcare options such as traditional medicines, while economically advantaged individuals lean more on formal healthcare services (Nwokolo et al., 2025). Further, high cost, accessibility of healthcare facilities, culture, and mistrust of healthcare professionals affect orthodox health-seeking behavior (Onoka et al., 2013), which contributes to delay or avoidance, thereby leading the individuals to resort to alternatives such as traditional remedies (Onwujekwe et al., 2010). In essence, we suggest the absence of income on the orthodox healthcare product acceptance and dilemmas such as cultural and ethical dilemmas, although studies reveal the chances of wealthier individuals investing more in orthodox healthcare products compared to poorer households (Kankeu et al., 2016; Nwokolo et al., 2025). In relation to health literacy, it is instrumental in the understanding of healthcare information and evaluation of product claims. With higher literacy there are chances of reduced reliance on self-medication and misinformation. As consumers become more literate, they may resort to orthodox healthcare products, given that they may lean more on scientific approaches in medical practices and resort to clinically tested pharmaceutical healthcare products rather than culturally endorsed healthcare solutions. Thus, given the impact of education, highly literate individuals may likely question cultural beliefs on traditional healthcare practices by indulging in scientific comparisons with the orthodox healthcare practices. Thus, where the literacy level is low, it is possible to reinforce individuals' reliance on traditional cultural beliefs and norms for healthcare practices. Extant literature supports this assertion on literacy positively shaping healthcare decision-making and evaluation of health information (Berkman et al., 2011). For instance, Akakpo and Neuerer (2024) suggest that health literacy is connected to health-seeking behaviors. However, extant literature also shows that high literacy specifically (high education) does not always translate to effectiveness of health literacy (Enebeli, 2025), thereby indicating the disparity between literacy and health literacy and supporting our decision to control for literacy to understand real effects of the predictors.

Ethical beliefs are rising concerns, especially where sharp practices are adopted by healthcare practitioners by taking advantage of weak regulatory frameworks in the sector. It evaluates the morality of what healthcare agents and practitioners do and what people believe while also suggesting unethical behavior from holding beliefs that are insufficiently proven. They can be motivated by social elements and personal factors, but the major aspects border on adequacy of evidence that supports claims and irrational beliefs having the potential to cause harm to others. In healthcare, ethical beliefs are often rooted in confidentiality, truth-telling, professional competence, and a sense of empathy and sensitivity. However, the core ethical principles encompass autonomy, justice, beneficence, and non-maleficence with the understanding that they place human life as a priority (Varkey, 2021). Consequently, ethics are inseparable in healthcare, while beliefs are also inherent in healthcare delivery. For instance, the ethics in African healthcare prioritize human treatment of spirit, body, and soul (Omonzejele, 2008), creating a balance between the human world and the spirit world and focusing on community health by engaging them in decision-making (Bourke, 2023). Following the ethical inquiry of Omonzejele (2008), healthcare in Africa, especially the traditional healthcare, connects to diseases and its link to religion, divination, and sacrifices. This presents an ethical challenge to non-Africans practicing healthcare in Africa because African ethical beliefs on health, disease, and medical treatment are linked to African metaphysics, as revealed by Iwu (1982) and Omonzejele (2008), following Iwu's seminar on African ethnomedicine. However, ethical concerns represent moral concerns held by people towards healthcare, which can be seen in the integrity of healthcare practitioners, the illegality of medicines and medicine counterfeits, and excessive/exploitative mark-ups (Oteh et al., 2021). The implication is that these concerns impact consumption behavior (Budhathoki, 2019) with critical areas such as personal values and health philosophies impacting buying behavior (Van Rooij & Fine, 2018; Mumley, 2019). The decision-making of consumers is

critical to the success of companies, as they tend to affect the choice of vendor, quantity to purchase, products to purchase, and the factors that determine their continuance behavior. Marketing is an essential cog in every business. It represents the exchange transaction in which the parties to the transaction gain mutually. Its strategies are instrumental in the success of firms. It is fundamental in shaping cultural values that influence norms and behavior (Bensalem & Benouhiba, 2025). One of its benefits is that it provides principles to enable firms to adapt to cultural values that facilitate company success (Cheong & Park, 2017). In essence, consumer choices and preferences may differ, especially where there are alternative choices available to the consumers. They may be attracted to the products that conform with their culture, thereby calling for cultural sensitivity of marketers. Latif (2020) concludes that cultural sensitivity is essential in health matters.

The study was underpinned by the theory of cultural relativism. Cultural relativism was articulated in the 20th century by Franz Boas in 1887 (Boas, 1974), and it factors in absolute evaluation of cultures as well as critical examination given that cultural practices vary. Basically, cultural beliefs and practices from the perspective of cultural relativism theory are about the non-superiority of one culture over another or judging the rightness and wrongness of one cultural practice from another's own standard. As such, cultural practices in relation to healthcare products differ significantly between African practices and Western practices. Notably, there is existence of some sort of justice and morality in all cultures, while values of most cultures tend to coincide and differ as well. This is because all cultures have elements of the concept of justice (Brosnan & De Waal, 2003). Whether there are differences or not, cultural relativism points out that culture defines the concepts of justice, equality, and morality in cultures. The perspective of cultural relativism is that the context of cultural standards should be from a local context, thereby highlighting the differences in cultural beliefs. Thus, Blumenson (2011) concludes cultural relativism does not agree with universal application of principles of right and wrong in a culture, as reports indicate cultural relativists condemning others' interference with traditional practices. Therefore, cultural relativism is a principle that an individual human's belief and activities should be understood by others in terms of that individual's own culture. In the context of our study, the theory of cultural relativism calls for understanding other cultural beliefs, tolerating them, and embracing the cultural diversity.

3 | METHODOLOGY

This study adopted a cross-sectional survey. The questionnaire instrument was designed and pretested prior to administration on the respondents. The instrument consists of socio-demographics and study constructs that were structured on a 5-point Likert scale consisting of "strongly agree" and "strongly disagree," moving from 5 to 1. The preliminary checks were conducted to ensure non-ambiguity and coverage of questions for the study. Purposive sampling through intercept was adopted in collecting data at healthcare facilities after securing informed consent from the participants. However, an online questionnaire through Google Forms was supplemented to generate the data from respondents. Consent was secured. It specified and addressed voluntariness of the participant's involvement, confidentiality, and purpose of the study. The initial validation of the instrument was done through the content validity ratio (CVR) approach recommended by Taherdoost (2016) through Lawshe's method to ensure relevance and representation of the target construct. Lawshe's (1975) CVR approach represents a linear transformation of a proportional level of panel experts' agreement rating of items as essential.

$$CVR = \frac{n_e - \left(\frac{N}{2}\right)}{\frac{N}{2}} \text{ Where;}$$

CVR = content validity ratio;

n_e = the number of panel members that indicates essential to the items;

N = the total number of panel members

Table 1 shows the guideline for CVR's valid values at $p = 0.05$.

Table 1: Minimum value of CVR

No of panelists	Minimum value
5	.99
6	.99
7	.99
8	.75
9	.78
10	.62
11	.59
12	.56
13	.54
14	.51
15	.49
20	.42
25	.37
30	.33
35	.31

40	.29
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Source: Taherdoost (2016)

A panel of ten experts rated each item on the questionnaire that was scaled using the recommended three-point scale of not necessary, useful but essential, and essential. The return of nine essential inputs from a panel of ten experts in healthcare confirms validity (CVR = 0.8) given that the minimum threshold from Lawshe (1975) is satisfied (see Table 1). The analysis was conducted using factor analysis, OLS regression, hierarchical regression, and logistic regression through SPSS v27. Factor analysis was done to identify correlation patterns of the observed variables, loadings of valid items to each construct, and validation of the survey for further analysis. OLS regression was used to predict the strength of beliefs and its relationship between the variables. Hierarchical regression was used to determine the effect of cultural and ethical beliefs on the marketability of orthodox healthcare products after controlling for income and literacy levels, while logistic regression was used to understand the predictors' effect on one gender over another. Thus, the statistical calculations are stated as:

$$\text{OLS regression: } \hat{y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \quad (1)$$

Where;

$\hat{y}$ = predicted values of the marketability of orthodox healthcare products

$X_1 - X_2$ = Independent variables (X_1 = cultural belief; X_2 = ethical belief)

β_0 = Estimated intercept

$\beta_1 - \beta_2$ = Estimated slope

ε = Residual (difference between observed and predicted value)

$$\text{Hierarchical regression: } Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \quad (2)$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_{n+1} Z_1 + \beta_{n+2} Z_2 + \varepsilon \quad (3)$$

Where;

β_0 = Estimated intercept

$\beta_1 - \beta_2$ = Estimated slope

$X_1 - X_2$ = control variables (X_1 = income; X_2 = literacy level)

$Z_1 - Z_2$ = main predictor variables (Z_1 = ethical belief; Z_2 = cultural belief)

ε = Residual (difference between observed and predicted value)

$$\text{Logistic regression: } \pi(X) = \frac{1}{1 + e^{-X\beta}} \text{ given as (4)}$$

This is a similar statistical approach adopted by Oteh et al., (2022) in their logit design to understand probability of consumers' willingness.

$$\text{Log} \left\{ \frac{\pi(Y)}{1 - \pi(Y)} \right\} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_m X_m \quad (5)$$

Where;

Y = consumers being male or female (dummy: 0 =male; 1=female)

π = probability of consumers being male or female in the factor group

β_1 = regression coefficients within the reference group

X_1 = cultural dilemma (strongly agree – strongly disagree five-point scaling)

X_2 = ethical dilemma (strongly agree – strongly disagree five-point scaling)

X_3 = access to health facility (dummy: 0=No; 1=Yes)

X_4 = Education (years)

X_5 = Household size (years)

4 | RESULTS

132 responses were used after data cleaning that led to the removal of 8% irrelevant responses due to incompleteness, thus revealing an 88% response rate. Notably, a response rate of 50-70% is considered sufficient (Oloveze et al., 2021; Hair et al., 2006), thereby confirming the data adequacy for our research. The mean of household size is 4.01, representing an average of 4 persons per household. Other socioeconomic profiles are on Table 2.

Table 2: Socioeconomic profile

Socioeconomic item	Classification	Percentage
Age	15-30 years	60.5
	31-50 years	29.5
	51 and above	10.1
Gender	Male	56.8
	Female	43.2
Marital status	Single	69.7
	Married	25.8
	Others	4.5
Access to healthcare facilities	Yes	94.4
	No	5.6
Education	No education	3.9
	Primary education	3.2
	Secondary education	11.0
	Tertiary education	81.9
Income	N5000-N25000	37.5
	N25000-N50000	33.9
	N50000-N100000	23.2
Occupation	Above N100000	5.4
	Civil/public servant	8.3
	Trader	17.4
	Engineer	3.0
	Healthcare student	34.8
Have healthcare insurance	Medical practitioner	36.4
	Yes	45.5
	No	54.5

Literacy level	Low	16.3
	High	83.7
Religion	Christianity	94.7
	Islam	3.8
	Others	1.5
Involvement in healthcare product marketing/consumption	Yes	96.3
	No	4.7
Opinion on cultural and ethical belief affecting healthcare product marketing	Yes	93.9
	No	6.1

Source: developed by the authors

In conducting the factor analysis, first the commonalities exceeded the threshold of .300, as they ranged from .448 to .949. Second, common method bias (CMB) was examined to ensure a single factor did not account for over 50% variance. Herman's single-factor technique was adopted by adjusting all items to a single factor using an unrotated approach. It accounted for 28.768. This suggests that CMB is not a problem, as the threshold requirement in literature is 50% (see Oloveze et al., 2022). Third, sampling adequacy and evaluation of existing different differences between correlation and identity matrices were determined using Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity. With a KMO value of 0.599, the sampling adequacy was confirmed, while 457.788 (0.000) for Bartlett's test of sphericity led to the rejection of the null hypothesis of non-existence of a difference between the correlation matrix and the identity matrix. Fourth, the reliability and validity of the instrument were confirmed through construct reliability (CR) and convergent validity (CV) using Hair et al.'s (2010) reference of 0.7 for CR and 0.5 for AVE. Construct validity is considered robust and superior to Cronbach's alpha in the assessment of reliability given that it does not assume equality of item loadings while also providing accuracy in reliability estimation (Rosli et al., 2021). As illustrated on Table 3, reliability and validity of the instrument were confirmed except for ethical belief, which has a validity score (.464) close to the threshold. The convergent validity through the construct reliability is satisfied when adopting the measure of Bagozzi and Yi (1988) in the validity assessment. In this case, the validity is satisfied as all the construct values and factor loadings exceeded the threshold of 0.6 (Bagozzi & Yi, 1988). Thus, the survey items in Table 3 hang together, thereby proving usefulness for further measurement of the constructs and analysis in Table 3.

Table 3: Reliability and validity assessment

Variable	Item	Factor loadings	Construct reliability	AVE
Cultural dilemma	CD1	.974	.927	.720
	CD2	.755		
	CD3	.753		
	CD4	.976		
	CD5	.749		
Ethical dilemma	ED1	.753	.870	.695
	ED2	.752		
	ED3	.976		
Cultural belief	CB1	.848	.903	.655
	CB2	.903		
	CB3	.692		
	CB4	.886		
	CB5	.692		
Ethical belief	EB1	.669	.721	.464
	EB2	.646		
	EB3	.727		
MHP	MP1	.784	.903	.701
	MP2	.869		
	MP3	.868		
	MP4	.826		

Note: MP – marketability of healthcare products

Source: developed by the authors

The evaluation of the marketability of orthodox healthcare products from cultural and ethical beliefs is indicated on Table 4. The result of the regression reveals that both factors significantly predict the marketability of healthcare products. The result of cultural beliefs shows that a unit increase in cultural belief increases the marketability of orthodox healthcare products by .155 units, holding another variable constant. The result is significant at 10% ($p=.056$). The implication is that positive changes in the cultural belief of the locals in the community are traceable to the changes in their education and formal learning, religious influences, influences from other people's opinions such as gender influences, and roles of family settings. The indicators interplay to play a significant role in the positive outlook of orthodox healthcare products' marketability. Culture connects with people's way of life, norms, and long-held traditions. Positive influences from cultural beliefs tend to positively contribute to the marketing performance of orthodox healthcare products. Second, the effect of ethical beliefs associated with the marketability of orthodox healthcare products is significant at 1%, while also revealing a positive increase in the marketability of orthodox healthcare products by .397 units for every positive unit increase in ethical belief, holding another variable constant. In essence, an increase in the

marketability of orthodox healthcare products is associated with positive changes in ethical beliefs. The positive association confirms the importance placed on ethical considerations in healthcare solutions. For instance, the importance of confidential handling of patients' information is vital as well as the code of conduct of medical practitioners. Positive changes in these areas positively influence how people respond to the marketability of orthodox healthcare products, especially where there are alternative solutions to people's cases. Third, the collinearity statistics confirm the absence of high variance, thereby supporting the model's interpretability. Tolerance values and variance inflation factor (VIF) values are within acceptable ranges, with VIF values revealing that the results were not skewed by highly correlated variables in the model. Tolerance values were not closer to zero (0), while VIF values were about 1.0, thereby indicating reliability and avoidance of misleading conclusions.

Table 4: Analysis of beliefs on orthodox healthcare product marketability

Variable	Std beta	Std error	t	Tolerance	VIF
Cultural belief	.155*	.062	1.926	.981	1.019
Ethical belief	.397**	.072	4.947	.981	1.019
Model statistics					
R ² =	.198				
F =	15.691***				
Durbin-Watson =	2.0				

Note: ***significant at 1%; **significant at 5%; *significant at 10%

Source: compiled by the authors

The evaluation of the effect of cultural and ethical beliefs on the marketability of orthodox healthcare products after controlling for income and literacy level is executed through hierarchical regression. The roles of income and literacy level in purchasing behavior are established in literature (Oteh et al., 2021). Therefore, to ensure internal validity and prevention of extraneous effects from skewing the results, income and literacy level were controlled. As indicated on Table 5, following a theoretical approach in examining control effects through hierarchical regression, we entered the control variables in model 1 before entering the predictor variables in model 2 and model 3 to understand the real effect after controlling for income and literacy level.

The result, as indicated on Table 5 and Figure 1, generally reveals statistical significance for models 1 and 2, thereby confirming the effect of ethical beliefs on the marketability of orthodox healthcare products after controlling for income and literacy level. Model 1 shows about 10.4% explained variance in the orthodox healthcare products marketability by the control variables. Model 2 explains the 25.9% variance in orthodox healthcare products' marketability after controlling for income and literacy level. In controlling for income and literacy level on model 2, the F-change (ΔF), R² change (ΔR^2), and significance confirm the significant effect of ethical belief on the marketability of orthodox healthcare products. Ethical belief as a predictor while income and literacy level as control variables were significant. The ΔR^2 further confirms that ethical belief further explains an additional 15.5% of the variance in marketability of orthodox healthcare products, and it is statistically significant. Thus, the ΔF (22.152) and ΔR^2 (.155) were confirmed to be a better significant model than model 1. However, in controlling for income and literacy level on model 3, cultural belief was not significant, but ethical belief was still significant as well as the control variables. Given the non-significant p-value in model 3, despite an improved explanation of the variance in orthodox healthcare products' marketability (R²: .269), the ΔR^2 (.010) and ΔF (1.407) show the non-significance of the model, thereby indicating model 2 to be a better fit.

Although the R² value is low, such values are accommodated in studies involving human behavior that cannot be accurately predicted, especially in cross-sectional surveys (see Cohen, 1992). Overall, ethical belief influences the marketability of orthodox healthcare products after controlling for the effects of income and literacy level. In essence, about .397 units increase as the real uncontrolled effects are expected in the marketability of orthodox healthcare products with every unit increase in ethical belief after controlling for income and literacy level. This presents the real position of ethical beliefs of indigenous people about ethical practices that affect the marketability of healthcare products. In essence, ethical issues on confidentiality and conduct of healthcare professionals are critical concerns to the consumers, leading to significant impact on the marketability of healthcare products.

Table 5: Estimates of predictors of marketability of healthcare product

Variables	Model 1	Model 2	Model 3
Income	.260** (t=2.814)	.219* (t=2.579)	.194* (t=2.216)
Literacy level	-.232* (t=-2.509)	-.197* (t=-2.317)	-.181* (-2.114)
Ethical belief		.397** (t=4.707)	.391** (4.646)
Cultural belief			.103 ^{ns} (1.186)
R ²	.104	.259	.269
ΔR^2	.104	.155	.020

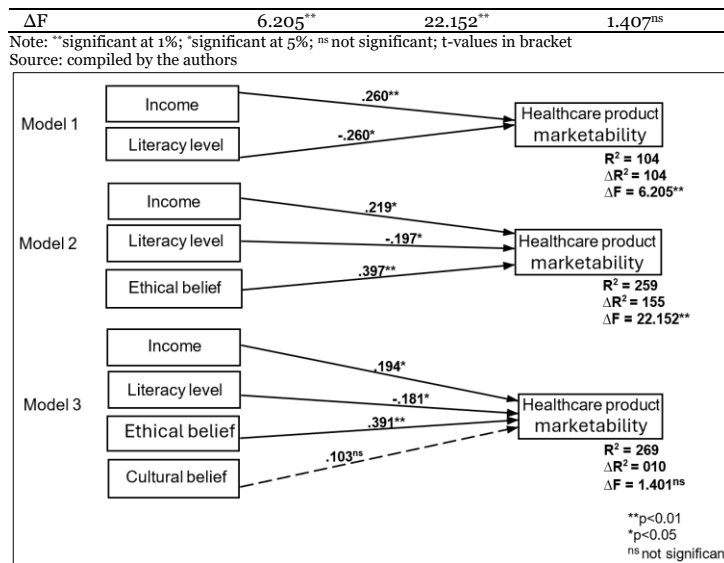


Figure 1: Result of nested hierarchical model for control effect

Multicollinearity was not a problem in the analysis, as indicated on Table 6 through the tolerance and VIF values. Tolerance values and VIF were within the values of $1 < VIF < 5$, suggesting low correlation.

Table 6: Examination of collinearity statistics in marketability of healthcare product

Model	Variable	Tolerance	VIF
1	Income	.978	1.022
	Literacy level	.978	1.022
2	Income	.968	1.033
	Literacy level	.971	1.030
	Ethical belief	.984	1.016
3	Income	.910	1.098
	Literacy level	.948	1.055
	Ethical belief	.981	1.019
	Cultural belief	.922	1.085

Source: compiled by the authors

In assessing the estimates of the factors that predict the probability of consumers being male or female, multicollinearity, goodness-of-fit, and model utility were examined. As illustrated on Table 7, all the predictor values are below 0.7, thereby indicating low collinearity, further suggesting non-distortion of the model coefficients.

Table 7: Evaluation of multicollinearity

	1	2	3	4	5
1. Cultural dilemma	1				
2. Ethical dilemma	-.645	1			
3. Access to healthcare facility	.236	-.174	1		
4. Education	-.067	.001	.084	1	
5. Household size	-.202	.341	-.248	-.012	1

Source: compiled by the authors

The use of logistic regression enables prediction of a binary outcome (male and female) based on the estimated predictors, as illustrated in Table 8. This facilitates appropriate identification of challenges and measured intervention to address identified problem cases. The odd ratios and the p-values provide significant explanations. Out of the five predictors, only four were significant in establishing the regression model using the Wald statistics and p-value. Thus, the model predicts the probability of consumers being in the female group. The value of 2-log-likelihood (71.132) is low. It indicates less unexplained information, thereby suggesting a better-fitted model. Further explanation was provided by the model utility that was assessed through Nagelkerke R^2 (.325). The value indicates a moderate explanation of variance in the outcome variable following the common rule of thumb in extant literature. However, the result is supplemented with the Hosmer and Lemeshow test (11.723; $p=.110$). The high p-value ($p > 0.05$) reveals good prediction of the outcomes by the regression model.

First, the cultural dilemma is 2.226, thereby indicating that for every unit increase in cultural dilemma, the probability of female gender being in this class increases by 2.226 units, holding other variables constant. Further, there is about a 25% increase in the odds of a cultural dilemma being in the female group, thus indicating a cultural dilemma has a high chance of affecting the female group more. The p-value confirms its statistical significance ($p=.001$).

Second, the ethical dilemma is -1.526. This shows that for every unit increase in ethical dilemma, there is a 1.526 unit decrease in the probability of female gender being in the group affected by ethical dilemma after holding other variables constant. Given the odd ratios [Exp(B)] value, there is about a 79% decrease in the likelihood of an ethical dilemma being in the female group. In other words, the female gender is less likely to be affected by ethical dilemmas. With $p=.011$, the statistical significance is confirmed.

Third, access-to-healthcare facility has a positive beta (.478), which indicates that for every unit increase in access-to-healthcare facility, the probability of being in the female gender group increases by .478 units, holding other variables constant. Further evidence from the odds ratios shows about a 61% increase in the odds of access-to-healthcare facility being in the female gender group. This implies that the female gender is more likely to be positively impacted by access-to-healthcare facilities. This is further confirmed from the p-value ($p=.054$). Education is not significant ($p=.357$).

However, household size is -.229, revealing that for every unit increase in household size, the likelihood of being in the female gender group decreases by .229 units, holding other variables constant, while the odds of household size reduce by about 26%. Thus, the female gender is less likely to be influenced by household size compared to the male gender. The result is statistically significant ($p=.039$).

Table 7: Estimates of factors that predict probability of consumers being male or female

Variables	Coefficient (B)	Standard error	Wald	Exp (B)
Constant	-2.939	2.679	1.204	.053 ^{ns}
Cultural dilemma	2.226	.866	6.610	9.258***
Ethical dilemma	-1.526	.597	6.538	.217**
Access to healthcare facility	1.893	.982	3.716	6.614*
Education	.478	.520	.848	1.613 ^{ns}
Household size	-.229	.144	4.275	.742**
2-log-likelihood	81.537			
Cox & Snell R^2	.241			
Nagelkerke R^2	.325			
Hosmer & Lemeshow test	11.723 ^{ns}			

Note: *** significant at 1%; ** significant at 5%; *significant at 10%; ^{ns} not significant
Source: compiled by the authors

5 | DISCUSSION

This study evaluated the dilemmas and beliefs associated with the marketability of orthodox healthcare products while controlling for the effect of income and literacy level. Cultural relativism was adopted, as it promotes understanding of beliefs and values from an individual's culture rather than drawing conclusions from another's cultural perspective. Different regression techniques were used to investigate the research questions.

First, the predictability of cultural and ethical beliefs on the marketability of orthodox healthcare products was evaluated through OLS regression after assessing the model for multicollinearity. Cultural beliefs and ethical beliefs have a positive significant effect, although the standardized beta revealed a better comparative effect of ethical beliefs on the outcome variable than cultural belief. However, the findings support extant discourse in literature, such as Burnett et al. (2020) and Asakitiki (2019), on African people's beliefs affecting the marketability of orthodox healthcare products. Further, the result highlights the important role of cultural beliefs that influence the marketability of orthodox healthcare products, given that Workneh et al. (2018) suggest that some African beliefs are tied to natural causes and spiritual causes, especially where an ancestral spirit is expressing anger to a person. Essentially, increases in cultural and ethical beliefs on effective treatment from orthodox medicines can promote the marketability of the orthodox healthcare products in societies with strong connections to traditional medicinal culture, especially in ones where attention is focused on the roles of family settings, education, and formal learning and positive opinions from experts on the effectiveness of the medicines. This is because belief can be changed through education given that education is a transformative tool that shifts understanding and restructures ingrained beliefs (Khokhotva & Albizuri, 2020). As a result, beliefs held by people affect their perception of healthcare products (Pfeiffer et al., 2018), although the transformative role of education balances the effect, as evidenced in this study from formal education and learning. Further, although cultural beliefs had a significant effect, the greater effect on the marketability of orthodox healthcare products is the ethical belief elements. This was assessed through confidentiality treatment from medical experts regarding ailments and drug prescriptions, code of conduct, and disagreeing postures on the effectiveness of medicines with regard to the claims of medicine's effectiveness.

Second, our findings confirmed the influence of ethical belief on the marketability of orthodox healthcare products after controlling for the effect of income and literacy level. Our findings confirm the interactive nature of

ethical beliefs in people's decisions on healthcare, thereby revealing the healthcare behavioral shape and nature of consumers' ethical perception when juxtaposed with the marketability of orthodox healthcare products. Extant literature reveals product safety and fairness and environmental and social responsibility as aspects of ethical concerns that have the tendency to affect how consumers respond to purchases as well as their willingness to pay for products (Nie et al., 2021). Other studies such as Wang et al. (2020) confirm a significant connection between ethical concerns and purchasing behavior, although there are contrasting views from literature such as Jin et al. (2020), revealing a non-significant association, and Kimenju and De Groote (2008), revealing a negative connection when ethical concerns are connected to genetically modified food. While studies confirm ethical beliefs impacting ethical consumption behavior, such as in Khan and Abbas (2023), which our findings corroborate, the insight from our results reveals increasing chances of the connection between ethical beliefs and marketability of orthodox healthcare products when consumers see the products to be safe, quality-assured, and socially responsible. As we controlled the effect of income, our study confirms the increasing chances of ethical beliefs positively shaping ethical evaluation towards actual purchase decisions for legitimate healthcare products. Understandably, extant literature such as Alfadi et al., (2016) reveal that income affects healthcare behavior as low-income people lean to permissive ethical evaluations such as traditional healthcare solutions compared to high-income earners. This position is further highlighted in the base-of-the-pyramid markets, where Anaka and Srinivas (2020) revealed that the tendency of low-income people experiencing ethical challenges in accessing healthcare solutions varies as constraints occasioned by income shape ethical concerns and chances to purchase. However, our result shows that without the effects of income, ethical beliefs still drive purchases of traditional healthcare solutions. The implication is that with healthcare products that are ethically positioned to be certified, safe, and socially responsible, purchases of orthodox healthcare products will increase. This calls for attention on ethical concerns that border on safety of drugs, drug trustworthiness, and compliance with standards, fairness, and social responsibility practices. Essentially, consumer confidence tends to increase in cases of ethical transparency given that consumers can interpret product labels and certifications on regulatory procedures. Further, consumers' consideration of ethical aspects such as eco-labeling that enables identification of eco-friendly products promotes sustainable consumption (Oloveze et al., 2023), thereby empowering the marketability of orthodox healthcare products. Therefore, our result reveals that consumers lean on ethical information on orthodox healthcare products.

Third, consumer health knowledge research such as Oteh et al. (2021) reveals that cultural norms impact people's perception and acceptance of healthcare products, especially where the nature of the perceptions interacts with the economic factors. However, this is not the case in our study after controlling for economic effects and literacy level. The implication is that from our study's context, income is controlled, thereby revealing the non-significance of cultural beliefs on the marketability of orthodox healthcare products contrary to earlier studies of Oteh et al. (2021). In essence, while low-income consumers were observed by Oteh et al. (2021) to lean towards traditional healthcare provisions, high-income consumers lean towards orthodox solutions on account of their exposure to modern medical provisions, trust in scientific evidence on orthodox medicines, and ability to afford healthcare products, even the ones with premium prices. However, the implication of our findings is that in the absence of income, cultural belief does not affect the marketability of orthodox healthcare products. Earlier interventions in education in addition to the revised and improved minimum wage of Nigerians from ₦30,000 to ₦70,000 can account for the change.

Fourth, the factors that predict the probability of the consumers of orthodox healthcare products being male or female are cultural dilemmas, ethical dilemmas, access to healthcare facilities, and household size. Cultural dilemmas and access to healthcare facilities are the major factors. The implication of these results is the necessity of appropriate healthcare interventions and development of marketing strategies that address the extant factors affecting the marketing of orthodox healthcare products. Cultural dilemma intensifies gender disparity, particularly in reconciliatory measures between modern consumption and traditional identity (Hofstede, 2001), as our result reveals that in healthcare concerns, the female gender is risk-averse and more health-conscious compared to the male gender, given the understanding that the male gender tends to focus on health products that connect them with their masculinity. In essence, differences in gender reactions are often shaped by cultural expectations rather than the differences in biology (Eagly & Wood, 2012). Thus, the cultural dilemma calls for the involvement of females in health decisions at the household level. This is further buttressed in extant literature, where cultural dilemmas in developing countries contribute to the rejection of Western medicines while perceiving illness to be connected to spiritual causes (Oteh et al., 2021). Where cultural dilemmas become conflicting for the consumers, particularly in choosing between traditional medicine and orthodox medicine, the

probability of the female gender leaning on orthodox healthcare products increases. Access to a healthcare facility is essential for the health of a nation, as it encompasses physical availability, geographic proximity, affordability, transportation, and acceptance of services offered by healthcare institutions. Our result confirms that healthcare facility utilization is more likely to be female gender, as extant literature such as Anderson (1995) confirms that access amplifies or reduces gender differences, although the World Health Organization (2023) reveals that the proximity of healthcare facilities enhances female gender utilization of the facilities. Despite the evidence, there are limiting factors that disproportionately hinder female gender access to healthcare facilities, as the World Bank (2022) reveals financial constraints, particularly for those in low-income groups, to be a critical factor. However, our study reveals that healthcare services are utilized by the female gender more than the male gender. Our findings corroborate extant literature (Okojie & Lane, 2020; Bertakis et al., 2000). Ethical dilemmas are a vital factor in healthcare concerns. Our study confirms its significance, although it's less likely to be associated with the female gender. Extant literature confirms ethical dilemma as a major factor impacting the marketing of healthcare products (Oteh et al., 2021); however, our findings reveal that the female gender is less likely to be impacted than the male. The ethical dilemma encompasses counterfeit drugs, non-registered drugs, and work environment as ethical concerns of consumers. The role of household size is further buttressed in our study, and female gender is linked to this factor more than male gender on account of family health responsibilities, whereby they tend to assume the role of caregiving, managing of children's health, and better effort in utilizing healthcare services than males.

In summary, while our findings acknowledge cultural and ethical beliefs contributing to the marketing of healthcare products and different reactions between traditional medicine and orthodox medicine (Oteh et al., 2021), our findings revealed the position of ethical beliefs on the marketability of orthodox healthcare products after controlling the effects of income and literacy level in developing nations. This aligns with extant literature in sub-Saharan Africa (Geta et al., 2023), especially on differences in socio-economic variables in health-seeking behavior.

6 | CONCLUSIONS

The focus of extant literature in relation to the marketability of healthcare products has dwelt on comparisons of traditional beliefs affecting marketing performance, while in other settings efforts were on comparisons of traditional medicinal practices and orthodox medicinal practices. In our study, we acknowledged the roles of cultural and ethical dilemmas as espoused in extant literature, but our contribution is two-dimensional. First, our study offered the important aspects of cultural and ethical dilemmas by defining the real effects after controlling the roles of income and literacy level, which are vital elements in developing countries. Extant literature has missed this important aspect, as our study filled this gap. Second, interventions are not meant to be generic but specific, as there are medical interventions in the developing countries that did not yield expected results. A key provision from our result is the specific gender group that these factors are situated in, thereby providing clearer understanding on the specificity of the interventions for specific gender groups versus critical factors. Therefore, we recommend interventions that strengthen the acceptance of orthodox healthcare products and specifically target the affected group.

Following our use of the cross-sectional survey approach, the study calls for longitudinal designs or mixed methods to deepen the understanding of cultural narratives that impact healthcare choices, given that behavior is dynamic.

Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this manuscript.

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Author Contributions

All authors contributed significantly to the conception, design, data collection, analysis, and writing of the manuscript. All authors have read and approved the final version of the manuscript.

Informed Consent

Informed consent was obtained from all participants involved in this study prior to data collection.

Use of Generative AI

The authors confirm that generative AI tools were used only for minor language refinement and did not contribute to the intellectual content, analysis, or conclusions of the study.

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