GROWING DEMAND OF HERBAL MEDICINE IN SUB-SAHARAN AFRICA: AN EVIDENCE FROM THE GHANAIAN CONTEXT

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ABSTRACT

Purpose: The growing prevalence of herbal medicine usage despite facing criticisms sharply contrasts with the widespread endorsement of conventional medicine. This study extensively investigates the factors that contribute to the rising popularity of herbal medicine in Sub-Saharan Africa, particularly focusing on Ghana.

Design/Methodology/Approach: A quantitative approach was used to measure the variables and to test the hypotheses in this research, and 412 relevant responses were assessed using the structural equation model.

Research Findings: The results indicate that the type of illness and the marketing efforts of herbal firms significantly influence consumers' attitudes. Additionally, the pressure exerted by significant others, perceptions of one's ability to control consumption, and purchase intentions are also impacted. Interestingly, while efforts of herbal firms do not directly lead to purchase behavior, it does influence herbal medicine consumption through subjective norms.

Practical Implication: The research underscores the importance of research and development in boosting the quality and effectiveness of herbal medicine. It offers practical insights and bridges gaps in understanding herbal medicine utilization.

Originality / Value: The research's originality highlights the combination of the theory of planned behaviour, type of sickness and firm efforts in assessing the factors accounting for the surge in demand for herbal medicine.

Keywords: Herbal Medicine, Alternative Medicine, Planned Behaviour, Type of Sickness, Firm Strategies.

INTRODUCTION

The historical roots of herbal medicine as a complementary and alternative form of therapy stretch far beyond recorded human history (Kamboj, 2000). Throughout the ages, the natural world has served as a vital source of medicinal remedies for civilizations worldwide, fostering human well-being. Consequently, herbal medicine has emerged as an alternative therapeutic approach, encompassing the prevention, management, and treatment of diverse ailments. The inclination of individuals across different nations to blend various herbs in pursuit of health has given rise to a spectrum of natural and holistic medical traditions. These include the traditional Japanese, Indonesian, and African healing practices—acupuncture and ayurveda being some examples (Booker, Johnston, & Heinrich, 2012).

The use of herbal products and remedies, as adjunctive or alternative measures for preventive and curative purposes, has witnessed remarkable growth on a global scale (Ekor, 2014; El Hajj & Holst, 2020). The surge in popularity of herbal medicine can be attributed, in part, to the perception that these products entail minimal adverse effects, thus rendering them a safe option for addressing an array of health conditions (Dzeparoski & Trajkovic-Jolevska, 2018; Ekor, 2014). Moreover, the extensive diversity of herbal products derived from over 2000 plant species has fuelled the enthusiasm for alternative medicine (Suroowan & Mahomoodally, 2016). Despite significant advancements in biotechnology and medical sciences over the past century, conventional medicine has struggled to effectively tackle the pervasive issue of patient anxiety (Van Grootheest, de Graaf, & de Jong-van den Berg, 2003). Instances of adverse reactions stemming from conventional medical interventions have driven patients to explore alternative therapeutic avenues. Herbal medicine is perceived not merely as a temporary symptom alleviator, but as a comprehensive and enduring approach to healing (Ahenkan, Opoku-Mensah Abrampa, & Boon, 2019; Gorain et al., 2022), a viewpoint that has enticed numerous individuals towards its adoption.

A disconcerting aspect is the limited awareness regarding the potential adverse effects of herbal medicine and its products on health and mortality (Suroowan & Mahomoodally, 2016). The World Health Organization (WHO) has raised concerns about the detrimental impacts of herbal medicine on users (WHO 2013). Brown, Raynor, and Lee (2011) emphasize the lack of regulatory oversight, information on herb-herb and herb-drug interactions, and quality control, contributing to the potential hazards of herbal medicine. Despite these concerns, the utilization of herbal medicine transcends cultural boundaries, persisting as a global practice. Recent data indicates a significant upsurge in demand for herbal medicine among consumers worldwide (Paudyal, Sun, Hussain, Abutaleb, & Hedima, 2022).

In developed regions like Europe, conventional medicine is dominant, relegating herbal medicine to a non-mainstream alternative. Despite this, certain European countries are observing substantial demand for herbal remedies. Notably, Germany has embraced herbal medicine, with around 70 percent of its population favoring it as Complementary And Alternative Medicine (CAM) (Paudyal et al., 2022). Similarly, the United Kingdom saw a rise from 26 percent to 30 percent in CAM adoption from 2012 to 2016 (Sharp et al., 2018).

Similar yet more pronounced trends are evident in Asian countries like China, India, and Indonesia. Indonesia places significant reliance on herbal medicine, with approximately 75

percent of its populace incorporating these remedies (Alexandra, Handayani, & Azzahro, 2021). China's healthcare system deeply integrates Traditional Chinese Medicine (TCM), particularly acupuncture, as a primary treatment option (Yang et al., 2017). In India, Ayurveda captures the trust of about 80% of the population for health needs (Quoquab, Husin, Basiruddin, & Mohamed, 2023; Singh, Pathak, & Rai, 2022). Across Africa, herbal medicine holds crucial importance, with countries such as Nigeria, Tanzania, and South Africa showcasing notable usage rates . Ghana's case is unique: despite historical efforts to discourage herbal medicine, over 70% of its population relies on it (Van Andel, Myren, & Van Onselen, 2012), even as traditional healers lacked recognition historically (Senah, 2020), herbal medicine's popularity keeps surging (Twumasi & Warren, 2018).

However, the factors driving this trend remain insufficiently understood (Mohammed et al., 2023; Zhou, Jia, Jiang, Wang, & Kou, 2015). Unravelling the primary drivers and understanding consumer behaviours behind this inclination is crucial. The study's main question is: What propels the rising use of herbal medicine in Africa? Sub-questions include:

- Does firm effort predict the purchase behaviour of herbal medicine consumers?
- What role does the type of sickness play in predicting the purchase behaviour?
- Is the theory of planned behaviour applicable in the purchase of herbal medicine among Africans?

Theoretical background

Herbal product (medicine) and purchase behaviour

"Herbal products" refer to remedies that are sourced from plants and are commonly used as supplements to enhance health and well-being (Abd Wahab et al., 2023). These remedies exist in various forms, such as dried herbs, powders, liquids, capsules, tablets, teas, tonics, as well as external applications like gels and creams (Abd Wahab et al., 2023). In addition, it is well acknowledged that in the African context, industrial beverages with therapeutic qualities might also be herbal products (Nassè et al., 2022).

The global market for herbal products is thriving, driven by countries like China, India, Singapore, and Malaysia, which have strategically invested in herbal research to boost their economies (Jibril, Kwarteng, Chovancová, & Denanyoh, 2019) and shift towards a "Return to Nature" movement, favouring herbal medicine over conventional options (Sharma, del Carmen Flores-Vallejo, Cardoso-Taketa, & Villarreal, 2017). Historical recognition of medicinal plants as valuable sources of preventive and treatment measures for various conditions has reinforced this trend (Green, Samie, Obi, Bessong, & Ndip, 2010).

Particularly, Ayurvedic remedies in India have gained significant popularity among both rural and urban populations, further extending to plant-based medicines, supplements, cosmetics, and other herbal applications, driven by their proven effectiveness and economic benefits (Aboufaras, Selmaoui, Najib, Lakhdissi, & Ouzennou, 2023; Green et al., 2010). The escalating risks linked to conventional allopathic treatments have renewed interest in herbal medicine (Semenya & Maroyi, 2012). Herbal products, historically categorized under "indigenous systems of medicine" rooted in tradition Ekor (2014), are now increasingly preferred for primary healthcare in developing nations due to perceived effectiveness with fewer adverse effects

compared to non-herbal alternatives (Agyemang-Duah, Peprah, & Peprah, 2019). While the current popularity and value of herbal products have captured both scholarly and practical attention (Pal & Shukla, 2003; Wang et al., 2019), the exact factors driving this surge in usage remain unclear (Wang et al., 2019), necessitating further comprehensive investigation.

Conceptual framework and hypothesis development

The research capitalizes on an extensive examination of existing literature and pertinent theoretical foundations to construct hypotheses for the inquiry. Based on the literature, the researchers identified the Type of sickness, Firm's effort, and factors derived from the Theory of Planned Behaviour as suitable constructs for the study. The subsequent section offers an in-depth discourse on these constructs.

Types of sickness (TS)

This pertains to the type of illness experienced by an individual. It is contended that the specific ailment one suffers from might influence their decision to opt for herbal remedies or other treatments. In particular geographic areas like Africa, studies indicate a prevailing belief that particular maladies can be most effectively addressed through the use of herbal medicine (Asamoah-Gyadu, 2014). As an illustration, during the Covid-19 pandemic, there were individuals who held the viewpoint that herbal remedies were essential for combating the illness (Isiko, 2020). Consequently, this led to a notable uptick in the use of herbal treatments, notably in countries such as Ghana, Uganda, and Madagascar (Badanta, García, Jiménez, Lucchetti, & de Diego-Cordero, 2023; Jin et al., 2023). In Ghana, within what is considered the "semi-literate population," a growing conviction emerged that embracing a "Return to Nature" approach was the most effective strategy in overcoming the deadly virus. This resulted in an increased demand for herbal medicine as a means to combat the virus (Badanta et al., 2023).

According to proponents of the Theory of Planned Behaviour, attitudes, subjective norms, and perceived behavioural control are key determinants in shaping intentions to make purchases, which subsequently influence actual buying behaviour (Ajzen, 1991, 2020; Paul, Modi, & Patel, 2016). Building upon the framework of this theory, we put forth the following hypothesis:

> **H1a:** *Type of sickness is significantly related to consumers' attitude towards a behaviour*
> **H1b:** *Type of sickness has a positive effect on a person's subjective norm, that is, the pressure family and friends would give to an individual to purchase herbal products.*
> **H1c:** *Type of sickness is positively and significantly related to perceived behavioural control.*
> **H1d:** *Types of sickness has a significant positive direct effect on purchase behaviour*

Firm's effort (FE) and purchase behaviour of herbal product

In this study, the term "firm's effort" refers to how much producers or companies in the herbal product industry enhance the attractiveness and availability of their herbal products to consumers (Pal & Shukla, 2003). This includes various aspects such as the quality, effectiveness, pricing, promotional strategies, and distribution channels for these products (Khayru & Issalillah, 2021).

Some consumers are attracted to herbal products because of their effectiveness, while others base their purchasing decision on the cost of the product (Ahad et al., 2021; Khayru & Issalillah, 2021)). Additionally, advertising and packaging efforts can influence consumer choices. The convenience of obtaining the product (place) also plays a significant role in encouraging consumers to select these products (Khayru & Issalillah, 2021). The notion of "place" refers to how easily consumers can access and use the products, encompassing both the accessibility of the final product and the effort required for a consumer to obtain and use it (Khan & Ahmad, 2019). Research in consumer psychology has shown that the ease of effort required to use a product significantly affects both the intention to use the product and the actual usage behaviour (Khan & Ahmad, 2019).

From the above discussion, we can deduce that individuals consider factors like effectiveness, price, promotion, and the effort needed to acquire a product when making purchasing decisions. Considering that attitude, subjective norms (including influences from family and friends), and perceived behavioural control are widely recognized predictors of behaviour (Ajzen, 2002; Naatu, Nyarko, Munim, & Alon, 2022), we can infer that:

> **H2a:** *Firm's effort is significantly and positively related to consumers' attitude towards a behaviour*
>
> **H2b:** *Firm's effort has a significant and positive relationship with a consumer's belief about what friends and family would want her to buy (Subjective norm).*
>
> **H2c:** *Firm's effort is significantly related to a consumer's perceived believes about one's ability to purchase herbal products (perceived behavioural control).*
>
> **H2d:** *Firm's effort is significantly and positively related to consumer's purchase behaviour*

Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) serves as a robust framework for predicting individual behavioural intentions (Paul et al., 2016). This model extends the foundations of the Theory of Reasoned Action (TRA), which posits that people possess the rationality to manage their actions, utilizing available information to evaluate the ramifications of their choices (Ajzen, 1991). Individuals gauge the implications of their behaviours through the information at hand, leading them to embrace behaviours promising positive outcomes while shunning those with adverse effects (Naatu et al., 2022). At the core of TRA are attitude and subjective norms, the pivotal determinants of behavioural intent (Ajzen, 2002; Paul et al., 2016).

TPB, adds to TRA variables, by incorporating perceived behavioural control as another key predictor of intent (Ajzen, 1991). Advocates of TPB argue that, even in the presence of a

positive attitude toward behaviour, an individual might lack the necessary resources, skills, or abilities to carry out the behaviour. Thus, the anticipation of control over one's actions becomes crucial in predicting behaviour (Faqih, 2016). This includes control beliefs, reflecting the perception of how achievable or complex a behaviour is (Ajzen, 1991). As a result, the predictors of behaviour in TPB encompass four elements: attitude, subjective norms, behavioural control, and intention.

Attitude towards purchasing intention of herbal products (ATT)

Attitude denotes the psychological evaluation of a particular situation. When consumers assess products and services, they rely on their intuitive judgments. Extensive research in marketing has explored the correlation between attitudes and behavioural intentions (Tsen, Phang, Hasan, & Buncha, 2006). Within the realm of marketing literature, it is widely acknowledged that consumers' attitudes significantly influence their intentions to make purchases (Irland, 1993; Nassè, 2018). For instance, in the context of healthcare marketing, recent works by Tsen et al. (2006) and Kassimu et al. (2022) underscored the importance of attitude as a fundamental determinant in predicting consumers' intentions to acquire herbal products. Further substantiating this, a recent study conducted by Karimian et al. (2021) validated a positive association between individuals' attitudes towards herbal medicine and their behavioural intentions.

Based on the aforementioned discussions, the present study asserts that attitude holds a pivotal role in an individual's decision to engage in a specific behaviour or refrain from it. In light of this premise, the study posits the hypothesis that:

> **H3:** *Attitude towards the purchase of herbal products is positively and significantly related to purchase intention.*

Subjective Norm (SUBN)

Subjective Norm (SUBN) refers to a situation where an individual's decision to partake in or refrain from a specific behaviour is influenced by significant people or groups they value in their life (Ajzen, 2002; Paul, Modi and Patel, 2016). This means that the viewpoints of family members and other important social connections can play a role in shaping an individual's choices and actions. Extensive research has established a clear link between social norms and the inclination to engage in environmentally conscious consumption (Naatu et al., 2022), a connection further supported by behavioural theories (Sudarsono, Ikawati, Kurnia, Azizah, & Kholid, 2023).

In the context of Sreen, Purbey, and Sadarangani (2018) found a strong connection between family norms, values, and the intention to make purchases. This pattern extends to the healthcare sector, where several studies have identified subjective norms as a key predictor for purchase intentions in pharmaceuticals and various herbal products (Kasri, Amalia, Yuniar, & Mariz, 2023; Widyaningtyas, Untoro, Setiawan, & Wahyudi, 2023).

Expanding on the existing body of work regarding SUBN and purchase intentions, we propose that suggestions stemming from social interactions with family, friends, as well as

respected figures like teachers and opinion leaders, who may have used, bought, or shown an intent to use/purchase herbal products, can significantly influence individuals towards buying such items. Therefore, we present the hypothesis that:

> **H4:** *Subjective norm is significantly and positively related to herbal products* purchase intention.

Perceived Behavioural Control (PBC)

Perceived Behavioural Control (PBC) entails an individual's perception of the ease or difficulty associated with carrying out a particular behaviour (Ajzen, 1991). The theory of planned behaviour posits that individuals with sufficient capabilities and resources are more likely to adopt a specific behaviour, while those lacking necessary capacities and resources are less inclined to do so (Ajzen, 1991; Han, Hsu, & Sheu, 2010). Within the academic realm, PBC is acknowledged as a pivotal factor influencing purchase intentions (Ajzen, 1991; Maichum, Parichatnon, & Peng, 2016) . Widyaningtyas et al. (2023), identified PBC (perceived affordability) as a crucial facilitator in evaluating products before making purchases. Similarly, Maichum et al. (2016) contended that PBC measurements like self-efficacy and convenience play a paramount role in shaping consumer choices regarding food and environmentally conscious products.

There exists a body of literature postulating a positive association between PBC and purchase intentions across various product categories, such as organic foods, environmentally friendly products, and herbal products (Kasri et al., 2023; Widyaningtyas et al., 2023). In the light of this, the current study hypothesizes that:

> **H5:** *Perceived ability to purchase herbal medicine (PBC) is significantly related to* purchase intention *of herbal medicine*

Purchase intention (PUR_INT)

Purchase Intention is a conscious plan of action or inaction (Faqih, 2016; Khan & Ahmad, 2019). It denotes an individual's willingness and preparedness to execute a specific behaviour within defined circumstances (Younus, Rasheed, & Zia, 2015). Within the literature, intention is often seen as a precursor or predictor of behaviour (Wang et al., 2019; Zhao, Gao, Wu, Wang, & Zhu, 2014). In such instances, an individual harboring the intention to enact a particular behaviour demonstrates a notably higher likelihood of engaging in that behaviour, as compared to those lacking the intention to do so (Ajzen, 2002). Considering the aforementioned, we propose that the purchase of herbal products can be influenced by an individuals' intentions to buy them see Figure 1. Hence, the hypothesis is:

> **H6:** *Intention to purchase herbal medicine is significantly related to purchase behaviour.*
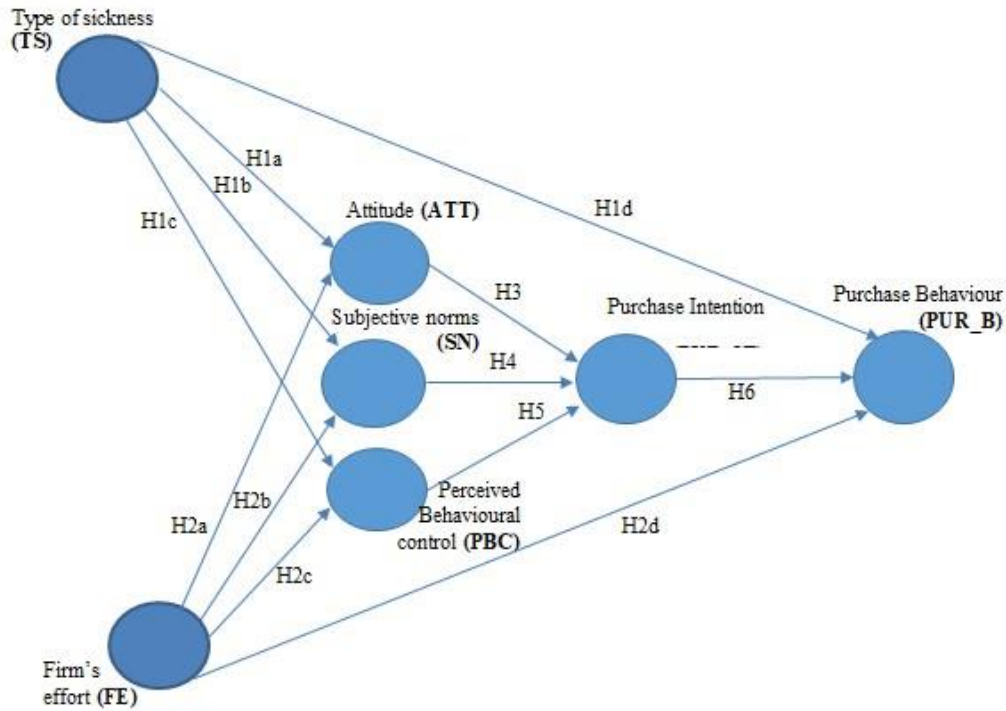
Figure 1
HYPOTHESIZED MODEL

METHODOLOGY

Sample composition and sample size

The data was collected between March 3rd and April 16th 2023, and was gathered through the distribution of a link to a google form on WhatsApp platforms of agents from all the regions of Ghana. The target respondents were people 18 years and above who could read and write. In total, 1000 people received the survey forms. To ensure participation of respondents, participants were promised a gift of 182.08 gigabit data, and anonymity. Four hundred and twenty-three (423) responses were received, making a response rate of 42.3%. Out of the 423 responses, 11 were speed answers, and these were deleted during the data cleaning process. We deemed the remaining 412 valid responses adequate following Kline (2023) recommendation. According to Kline (2023), a minimum of 100 observations is good enough to estimate a covariance-based structural equation model (SEM). Table 1 & Table 2 presents the statistical summary of the survey's participants.

Table 1 SUMMARY OF SURVEY PARTICIPANTS (GENDER, AGE AND REGION OF ORIGIN)			
Variable	**Categories**	**Frequency**	**Percentage**
Gender	Female	124	30
	Male	288	70
Age	18-24	47	11
	25-34	211	51
	35-44	128	31
	45-54	25	6
	55 & above	1	0
Region of Origin	Greater Accra	43	10
	Ashanti	42	10
	Bono East	9	2
	Bono	13	3
	Ahafo	2	0
	Central	9	2
	Eastern	14	3
	Northern	24	6
	North East	2	0
	Oti	5	1
	Savannah	7	2
	Upper East	31	8
	Upper West	171	42
	Western	9	2
	Western North	7	2
	Volta	24	6
Total		412	100
(Source: Generated by authors)			

Table 2 SURVEY PARTICIPANTS (EMPLOYMENT STATUS, INCOME AND EDUCATION)			
Variable	Categories	Frequency	Percentage
Employment Status	Unemployed	57	14
	Unemployed student	36	9
	Full-time employment	252	61
	Employed & Schooling	67	16
Income	≤ 500 – 2000	167	41
	2001 – 4000	153	37
	4001 – 6000	52	13
	6001 – 8000	19	5
	8001 – 10000	8	2
	> 10000	13	3
Level of Education	Primary-Secondary	25	6
	Diploma	49	12
	Degree	184	45
	Masters	131	32
	PhD	23	6
Total		412	100
(*Source: Generated by authors*)			

Response bias

We checked for possible biases in the response through a series of analysis. First, we followed Overton (1977) recommendation that, the data should be divided into two equal halves to determine whether the first group of responses were any different from the second group. The chi-square and p-value statistics as presented in Table 3. showed there was no significant difference between the two groups of data based on gender, age, level of education, employment status and level of income.

Table 3 NON-RESPONSE BIAS CHECK					
Variable	Mean First Respondents	Mean Last Respondents	T - stat/ x2	DF	P-Value
Gender	1.69	1.71	-0.429	409.86	0.668
Age	2.17	2.49	-4.343	406.58	1.778
Education	4	4.38	-4.317	409.14	1.98

Employment status	2.73	2.86	-1.5236	400.5	0.1284
Income	1.9	2.09	-1.6277	403.73	0.1044
Null hypothesis: at $P < 0.05$ there was no significant difference between the first and second group of subsamples					
(Source: Generated by authors)					

Second, common method bias analysis was performed. This was done using the Herman's single factor technique, common latent factor analysis, and common marker variable test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The Herman's single factor analysis was performed by loading all the measurement items in the conceptual model onto a single latent factor without rotation. The factor could explain only 40% of the variance, and this is less than the recommended 50% threshold. This was followed by creating a common latent factor which did not correlate with the other latent variables in the original CFA model in addition to forcing the loadings of all the measurement items to be equal. The factor loadings in that were each 0.348. A square of this value (0.348^2) is equal to = 0.12. Meaning that, it could only explain 12% of the variance. The third and last check was the common marker (an unrelated variable: i.e., Life Satisfaction) variable introduced, which also explained just 16% of the variance after squaring the standard factor loadings. This leads to the conclusion that the data was free from any common method bias.

Measurement of Constructs

To arrive at the constructs for the study, we followed four rigorous steps by Li et al. (2006). The steps include item generation, pre-pilot study, pilot study and large-scale data collection. The generated items encompassed "Types of Sickness" and "Firm's effort". All the other constructs and their indicators were adopted from existing literature. For instance, Attitude (ATT) was adopted from (Wu & Chen, 2014). Subjective Norm (SUBN), Perceived Behavioural Control (PBC) and PUR_INT were from Paul (Paul et al., 2016), while Purchase Behaviour was adopted from (Stern, 2000). The items were measured using 5-point Likert scale ranging from strongly disagree to strongly agree table 4.

Table 4									
CORRELATION MATRIX OF LATENT VARIABLES AND RELIABILITY (CRONBACH'S ALPHA)									
Variable	**(α)**	**Mean**	**SD**	**TS**	**ATT**	**SUBN**	**PBC**	**FE**	**PUR_IT**	**PUR_B**
TS	0.91	2.81	0.97	1						
ATT	0.89	3.41	0.83	0.5	1					
SUBN	0.92	2.81	0.98	0.49	0.51	1				
PBC	0.88	3.51	0.75	0.38	0.51	0.43	1			
FE	0.93	2.94	0.94	0.52	0.54	0.53	0.5	1		

PUR_INT	0.95	2.88	0.97	0.6	0.69	0.64	0.51	0.74	1	
PUR_B	0.96	3.14	1.05	0.56	0.7	0.63	0.55	0.6	0.81	1
From the confirmatory factor analysis										
(Source: Generated by authors)										

Table 5
DISCRIMINANT VALIDITY: SQUARED FACTOR CORRELATION

Variable	AVE	TS	ATT	SUBN	PBC	FE	PUR_IT	PUR_B
TS	0.618	1						
ATT	0.671	0.253	1					
SUBN	0.761	0.244	0.26	1				
PBC	0.524	0.14	0.257	0.187	1			
FE	0.72	0.268	0.287	0.285	0.251	1		
PUR_INT	0.784	0.36	0.474	0.407	0.26	0.548	1	
PUR_B	0.846	0.309	0.494	0.395	0.3	0.362	0.653	1
Divergent validity was confirmed because the squared correlations of each latent variable were above their Average Variance Extracted (AVE).								
(Source: Generated by authors)								

Reliability and Validity

The measurement items' reliability and validity were confirmed subsequent to the removal of items that exhibited either cross-loading or loadings below 0.5. As outlined by Bagozzi and Yi (1988), a factor loading minimum threshold of 0.5 was observed. As indicated in Appendix 1, all corrected model factor loadings for latent variables surpassed 0.7. This substantiates the convergent validity of items representing latent constructs (Anderson & Gerbing, 1988). Evaluation of scale reliability and validity was further conducted using Cronbach's alpha (α) and average variance extracted (AVE) measures, respectively (Fornell & Larcker, 1981). Cronbach Alpha scores for all latent variables exceeded 0.70, ranging from 0.88 to 0.96 (as evident in Table IV), affirming their reliability. AVE scores (Table 5) similarly exceeded the 0.50 threshold, spanning from 0.524 to 0.846. Additionally, each latent construct's AVE surpassed the variance shared with other constructs, confirming the absence of discriminant validity issues see table 6 table 7.

Table 6
SEM RESULTS

Regression paths	Hypothesis	Model A Coefficients (β)	P-Values	Model B	P-Values	Model C	P-Values	Confirmation
				Coefficients (β)		Coefficients (β)		
TS → ATT	H1a	0.32	0	0.331	0	0.317	0	Supported
TS → SUBN	H1b	0.308	0	0.314	0	0.306	0	Supported
TS → PBC	H1c	0.17	0.007	0.171	0.008	0.164	0.01	Supported
TS → PUR_B	H1d	0.13	0.002	0.134	0.002	0.094	0.041	Supported
FE → ATT	H2a	0.41	0	0.374	0	0.384	0	Supported
FE → SUBN	H2b	0.404	0	0.379	0	0.385	0	Supported
FE → PBC	H2c	0.434	0	0.42	0	0.427	0	Supported
FE → PUR_B	H2d	0.032	0.585	-0.023	0.727	-0.079	0.221	Not Supported
ATT → PUR_INT	H3	0.476	0	0.346	0	0.32	0	Supported
SUBN → PUR_INT	H4	0.383	0	0.248	0	0.225	0	Supported
PBC → PUR_INT	H5	0.164	0.001	0.055	0.219	0.027	0.54	Not Supported
PUR_INT → PUR_B	H6	0.723	0	0.76	0	0.709	0	Supported
FE → PUR_INT				0.405	0	0.357	0	Significant
TS → PUR_INT						0.14	0.003	Significant
PBC → PUR_B						0.22	0	Significant

Note: TS=Type of Sickness, ATT = Attitude, SUBN = Subjective Norm, PBC = Perceived Behavioural Control, PUR_INT = Purchase Intention, PUR_B = Purchase Behaviour. (A) Model: fit: $\chi2/df$ (1308.927/ 514) = 2.55 < 3, CFI = 0.925 > 0.900, TLI = 0.918 > 0.900, RMSEA =0.068< 0.08, SRMR = 0.077 < 0.08. (B) Model fit: $\chi2/df$ (1248.024/ 513) = 2.43 < 3, CFI = 0.925 > 0.900, TLI = 0.918 > 0.900, RMSEA = 0.065 < 0.08, SRMR = 0.073< 0.080. (C) Model fit: $\chi2/df$ (1225.877/ 512) = 2.39< 3, CFI = 0.927 > 0.900, TLI = 0.920 > 0.900, RMSEA = 0.064 < 0.08, SRMR = 0.070< 0 = 080.

(Source: Generated by authors)

Table 7
INDIRECT PATHS

Regression paths	Coefficients (β)	P-Values	Significance
TS → ATT → PUR_B	0.102	0	Significant
TS → ATT → PUR_INT → PUR_B	0.072	0	Significant
TS → SUBN → PUR_INT → PUR_B	0.049	0.003	Significant
TS → PBC → PUR_INT → PUR_B	0.003	0.551	Insignificant
FE → ATT → PUR_INT → PUR_B	0.087	0	Significant
FE → SUBN → PUR_INT → PUR_B	0.061	0.001	Significant
FE → PBC → PUR_INT → PUR_B	0.008	0.543	Insignificant
FE → INT → PUR_B	0.253	0	Significant

TS→ INT → PUR_B	0.099	0.006	Significant
(Source: Generated by authors)			

RESULTS AND DISCUSSION

Table 6 and Table 7 presents the results for the study. Before the estimation of the structural equation model (SEM), normality test was performed to check the distributional assumption of the data, and to choose the appropriate estimation approach. This was done through multivariate and univariate normality analysis using the Mardia and Shapiro-Wilk tests respectively. The significant p-value ($p < 0.05$) of the test showed that the data was not normally distributed. This indicate that, the null hypotheses of multivariate normality and univariate normality were not supported. Given the nature of the data, the Maximum Likelihood Robust estimation (MLR) by Satorra and Bentler (1994) was adopted for the SEM estimation. This was performed using the Lavaan package (0.6-12) for structural equation modelling in R version 4.2.2. It is a very good statistical package for multivariate statistical models' analyses including path analysis and confirmatory factor analysis (Rosseel, 2012).

To get the best model fit, new paths were introduced after the initial model, thus leading to the estimation of three models: Model A, B, and C. It is normal to alter initial models either by introducing new paths or taking out existing paths to get a better model fit in SEM (Paul, Modi and Patel, 2016). All the three models showed acceptable scores for the goodness of fit based on (Hu & Bentler, 1999). For example, Model A: had a ratio of Chi-square and degrees of freedom ($\chi2/df$) of 2.55, which is less than the threshold of 3. The CFI being 0.925 is greater than the threshold of 0.900, and the TLI of 0.918, is also greater than 0.900. The RMSEA was = 0.068 and the SRMR was = 0.077. These are both less than the threshold of 0.08. Model B had fit scores of: $\chi2/df$ = 2.43 < 3, CFI = 0.925 > 0.900, TLI = 0.918 > 0.900, RMSEA = 0.065 < 0.08, and SRMR = 0.073 < 0.080. Model C scores were: $\chi2/df$ = 2.39 < 3, CFI = 0.927 > 0.900, TLI = 0.920 > 0.900, RMSEA = 0.064 < 0.08, and the SRMR was less than the threshold of 0.08 (see details on Table 5.).

While all the models have acceptable fit scores, Model C had the best scores. For instance, the ratio of Chi-square and degrees of freedom, RMSEA and SRMR were lower. The TLI and CFI were also higher relative to Models A and B.

The hypotheses were all supported by the results in the three models except H2d which was insignificant in Models A, B, and C, and H5 which was also insignificant in model B and C (see details in Table 6 and 7). For instance, Type of sickness significantly impacts consumers attitude towards behaviour (H1a), their subjective norm (H1b), perceived behavioural control (H1c) and purchase behaviour (H1d). These results are consistent with Ameade, Amalba, Helegbe, and Mohammed (2015) and (Leke et al., 2022). Ameade et al. (2015), study which was on medical students in Ghana discovered that, majority of them knew about the "modality" (a type of treatment for a disease or medical condition) of herbal medicines and their attitude towards the herbal medicine was high. They also found that a significant number of the medical students that use or ever used herbal medicine were influenced by family members who ever used it before. Similarly, Leke et al. (2022), study on pregnant women in Cameroon also found

that, pregnant women who used herbal medicine during pregnancy were influenced by the believe that herbal medicine relative to orthodox medicine were safer during pregnancy, and they were also partly influenced by their families. According to Bayisa, Tatiparthi, and Mulisa (2014) pregnant women who used herbal medicine in Ethiopia used it to treat nausea, morning sickness, vomiting, cough, deficiency in nutrition and malaria. They also maintained that, they received information about herbal medicine from their families and neighbours, and they were influenced by the herbal medicine accessibility. These are validations of the relationship between type of sickness and subjective norm, type of sickness and perceived behavioural control, and type of sickness and purchase behaviour.

In relation to H2a, b, c and d, we posited that, firms' effort is significantly related to attitude, subjective norm, perceived behavioural control and purchase behaviour. Firms' effort was operationalised to mean the ability of herbalists to convince users to believe their herbal medicine is efficacious (product benefits), to make the medicine affordable (pricing), to make the product readily available (place) and to make users aware, desirous, and purchase the medicine (promotional). Firms' effort had significant effect on attitude, subjective norm and perceived behavioural control except purchase behaviour which was negative and insignificant. This affirms the key role of subjective norm in influencing the increasing consumption of herbal medicine. These are consistent with (Bayisa et al., 2014) and (Leke et al., 2022) . Leke et al. (2022), explained that, users of herbal medicine believe the medicine is more effective, hence their positive attitude towards the usage of the herbal medicine. Bayisa et al. (2014) also found that users perceive herbal medicine as effective, accessible, and cheap. Both studies (Bayisa et al., 2014; Leke et al., 2022) also found that family and friends' information convinced the users to patronise herbal medicine. Therefore, the conclusion could be that, firm's effort alone does not influence purchase behaviour. Rather, it affects herbal medicine usage through reference and recommendation from family and friends.

The next three hypothesis posited that attitude towards herbal medicine is significantly related to purchase intention, and so is subjective norm's effect on purchase intention, and perceived behavioural control's effect on purchase intention. The last hypothesis maintained that, purchase intention is positively related to purchase behaviour. These were all true except the effect of perceived behavioural control on purchase intention which showed no significant effect. However, contrarily, when perceived behavioural control was tested on purchase behaviour, it was found to be highly significant. The results are partly supported by the literature, and partly not. For instance, Zahra et al. (2020) is consistent with the effects of attitude, and subjective norms but at variance with the effect of perceived behavioural control on purchase intention. In terms of the effect of perceived behavioral control on purchase behavior, we found the relationship significant and this is in line with Uzobo (2020) who maintains that consumers purchase behavior are influenced by the affordability and accessibility of herbal medicine

Overall, the results support the Theory of Planned Behaviour. It shows that type of sickness and herbal firms' marketing effort impacts on consumers attitude, the pressure they receive from their significant others, their perception about their ability to control consumption and their purchase intention. The difference between our findings and the literature pertains to the insignificant direct effect of firm's marketing effort on purchase behaviour, and the insignificant effect of perceived behavioural control on purchase intention (Dzulkipli et al., 2019;

Karimian et al., 2021). We interpret the insignificant direct effect of firms' effort on purchase behaviour to mean that, for Sub-Saharan Africans, firms marketing effort alone may not predict consumer purchase behaviour of herbal medicine. We conclude that it is through the word of mouth of family and friends that is triggering the high patronage.

We also argue that, the insignificant relationship between perceived behavioural control and purchase intention may be inconsequential since perceived behavioural control is directly related to actual purchase behaviour. It is possible that, consumers may not be convinced by the affordability of herbal products until they find themselves sick and they get to hear about the herbal medicine from their family and friends.

CONCLUSION AND RECOMMENDATION

The mounting evidence of the belief in, and the increasing use of herbal medicine despite their unproven efficacy is alarming. Based on this, the study suggests the need for continued health education about the dangers in taking medications that the efficacy has not been scientifically established. In addition, the significant effect of subjective norm suggests that addressing the issue of mass behavioural change necessitates an upstream approach, which typically involves implementing a comprehensive campaign strategy. This approach focuses on the broader community rather than solely targeting individual users for behavioural change.

In practice, this study highlights the need for governments, World Health Organisation, and NGOs in the health sector to pay attention to educating the population for a behavioural change against unauthorised herbal medicine. Theoretically, the study contributes by pointing out how behaviour is important to explaining the use of traditional medicine by exploring the tenets of TPB in examining the signals driving the demand for herbal medicines.

Also, to herbal medicine providers, in as much as the potential of the medicine is realised, more effort and research is required to determine their efficacy, content and dosage for consumption. As such, governments, the World Health Organisation WHO, and donors should support research and development in the herbal medicine sector. Further, we support argument that, policies and regulations are essential to ensure the provision of more information on the content, efficacy and side effect of herbal medicines.

Limitations and Implications for Future Studies

Despite the relevance of the study, it is not without limitations. For example, the study was conducted in one African country. It would be more representative of Africa if more than one country was used for the study. Also, the strategies used by herbal medicine providers was not examined, a study of the strategies should be performed to determine the effect on consumers purchase behaviour. That would also help inform policy decisions to curb potentially unhealthy practices among providers. Research on the effect of health policies related to the patronage of herbal medicine is also required to establish the weaknesses in order to find remedies that can help improve the regulations related to the sale of herbal or alternative medicine see appendix table 1.

You can also see appendix model figures (figure 2. Model a, figure 3. Model b, figure 4. Model c).

Appendix Table 1 CONSTRUCT MEASUREMENT LOADINGS			
Constructs	Measurement indicators	Loadings	Source
	I like the idea of using herbal medicine	0.822	Wu and Chen (2014)
Attitude (ATT)	The idea of using the services of herbalists and herbal medicine is good	0.759	
	I have a favorable attitude toward purchasing herbal medicine	0.884	
	I have a favorable attitude towards herbalists	0.806	
	Most people who are important to me think I should use traditional herbalists and herbal medicine when sick	Dropped	
Subjective norm (SUBN)	People who are important to me would want me to go to use herbal medicine when I'm sick	0.829	
	People whose opinions I value would prefer I purchase the services and products of herbalists	0.909	
	Family/friends' positive opinion about traditional herbalists and herbal medicine influences me	0.878	
Perceived behavioural control	I believe I have the ability to purchase herbal medicine/herbalists services	0.696	
	It is entirely up to me to use herbalists' services/herbal medicine	0.678	Paul, Modi and Patel (2016)
	I see myself as capable of purchasing herbal medicine and the services of herbalists in the future	0.823	
	I have the resources and time to purchase herbal medicine/services	0.809	
	Herbalists/herbal medicine are generally available and easily accessible to me	0.746	
	If I am sick, I have the opportunity to visit herbalists and purchase herbal medicine anytime	0.717	
	Purchasing herbal medicine or visiting herbalists is totally within my control	0.565	
Firm's effort (in terms of product) (FE)	I'm attracted to herbal medicines because the medicines are good and effective.	0.887	
	Herbal medicines are healthier compared to orthodox medicines from the hospitals	0.918	
	Herbal medicines to me are less expensive than medicines from hospital	0.837	
	The herbal clinics I like operate in very neat and beautiful environments compared to the hospitals available	0.844	
	I am attracted to herbal medicines because of their attractive promotional strategies and packages	0.743	

	I consider buying herbal medicine because they are	0.871	
	more effective		
Purchase Intention (Pur_Int)	I consider switching to herbal medicine to avoid side effects from the orthodox medicines	0.858	
	I plan to spend more money on herbal medicines than orthodox medication	0.905	
	I expect to purchase herbal medicines in the future for safety reasons	0.896	
	I definitely would like to purchase herbal medicine in the future when I get sick	0.876	
Purchase behaviour (Pur_Beh)	I avoid buying orthodox medicines prescribed by hospitals because of their side effects	0.887	Stern et al. (2000)
	I make special effort to buy herbal medicines because of how good they are	0.911	
	I make special effort to buy herbal medicines from very good herbalists	0.951	
	I make special effort to buy herbal medicines and the services of herbalists with very good reputation	0.923	
	There are certain sicknesses that only traditional or herbal medicine can cure	0.78	Self-generate 4Ps literature
	Broken bones such as legs, hands can only be properly cured by herbal medicine and traditional healers	0.819	E.g. Armstrong et al (2014)
Type of sickness (TS)	Sicknesses like stroke can only be properly healed by traditional healers or herbal medicine	0.818	
	Sicknesses that cannot be determined at the hospital can be detected and healed by traditional herbalists	0.771	
	Traditional herbalists can heal all kinds of sicknesses	0.778	
	Herbal medicines are available that can cure all kinds of sicknesses	0.746	

Appendix 2* :
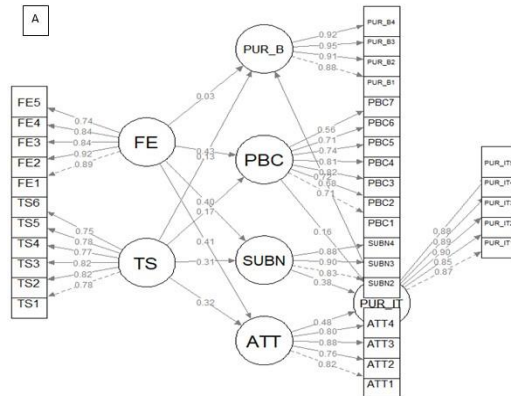
The Models

Figure 2. Model A
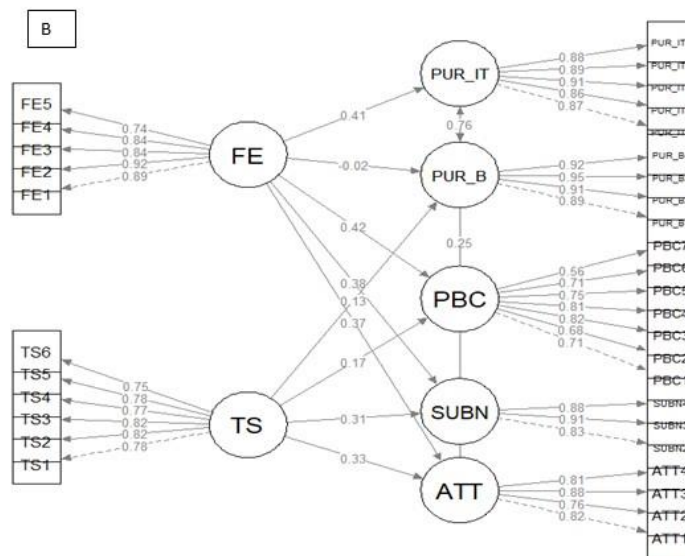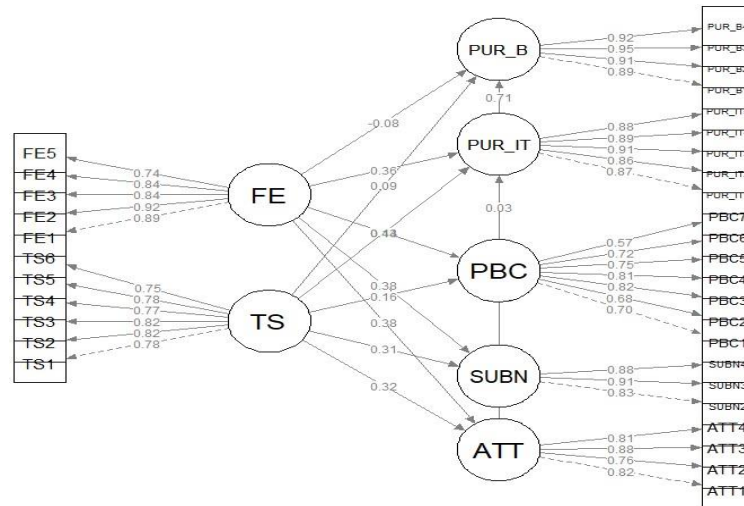*Source figure: Authors' own construct*

Figure 3. MODEL B
Source figure: Authors' own construct)

C

Figure 4. MODEL C
Source figure: Authors' own construct

Declaration of Competing Interest

This research is an original unpublished work which has not been submitted to any other journal for review. Its content has not been copyrighted, published previously, or under consideration for publication anywhere else. In addition, the authors declare that there is no conflict of interest.

Ethical statement

This research work adheres to the highest ethical standards, prioritizing the well-being and rights of all individuals involved. All data collection, analysis, and interpretation are conducted with integrity and respect for privacy, ensuring informed consent, confidentiality, and voluntary participation.

Acknowledgements

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