

Demographic and Product Complexity Determinants of Pharmaceutical Information Utilisation: Policy Implications for Consumer Health Literacy in Nigeria

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Abstract. Medication misuse and adverse drug events remain pressing public health concerns across Nigeria, where pharmaceutical product use information (PUI) is intended to serve as a frontline safeguard against incorrect use. Yet little policy attention has been given to which consumer categories are least likely to engage with PUI, the specific benefits consumers derive from it, or how product characteristics shape that engagement. This paper synthesises evidence from a cross-sectional survey of 952 pharmaceutical consumers across sixteen retail outlets in Jalingo, Taraba State, Nigeria, which found an overall PUI utilisation rate of 86 %, significant consumer benefits across seven constructs, overwhelmingly positive consumer perceptions, significant demographic predictors in marital status, social status and educational qualification, and a significant positive effect of product complexity on utilisation. Using a desk-based policy synthesis methodology, this paper translates the full set of these findings into a three-intervention policy model, comprising targeted health literacy campaigns, pharmacist-led counselling protocols, and readability-optimised PUI redesign. The results indicate that current PUI engagement patterns systematically fail to serve single consumers, lower social class consumers, and, counterintuitively, more educated consumers; that consumers value ingredient disclosure and dosage guidance most highly among PUI benefits; and that pharmaceutical manufacturers should prioritise readability investments for complex formulations, where consumers rely most heavily on PUI. The paper concludes with recommendations for NAFDAC, pharmaceutical manufacturers, and community pharmacy practice to narrow the consumer health information gap in Nigeria.

Keywords: Pharmaceutical Product Use Information; Consumer Health Literacy; Demographic Determinants; Product Complexity; Nigeria.

INTRODUCTION

Pharmaceutical products are central to public health, and their safe and effective use depends fundamentally on consumer engagement with product use information (PUI), typically presented in a package insert that guides dosage, contraindications, and expected therapeutic outcomes [2]. Despite this function, instructional documentation across product categories is frequently under-read, and the problem assumes acute significance in Nigeria given the scale of

counterfeit pharmaceutical circulation and the regulatory reliance on information leaflets as a consumer safeguard [3, 4].

While empirical evidence on how consumers engage with PUIs and why has begun to accumulate in the Nigerian context, this evidence has not yet been systematically translated into a policy framework for targeting consumer health literacy interventions. This paper addresses that translation gap. It draws on findings from author [1], an empirical survey of 952 pharmaceutical con-

sumers in Jalingo, Taraba State, Nigeria. It develops a structured policy model linking the study's utilisation, benefit, perception, demographic, and product-complexity findings to concrete intervention design for NAFDAC, pharmaceutical manufacturers, and community pharmacy practice.

The findings show that Nigerian consumers do not engage with PUI randomly across the population, and their overall level of PUI engagement is not as low as earlier international literature on instruction manuals suggests. Utilisation is in fact high overall, but it is systematically lower among single consumers, lower social class consumers and, counterintuitively, more educated consumers, while rising with product complexity. A policy framework that does not account for this patterning risks directing generic health literacy messaging at consumers who are already engaged, while leaving the systematically underserved groups unreached.

The remainder of the paper is structured as follows. Section two reviews the literature on PUI, consumer attitude, demographic determinants of health information engagement, and product complexity. Section three describes the methodology underlying the policy synthesis. Section four presents the results in full, including utilisation rate, benefits, perceptions, demographic predictors, product complexity, and the proposed three-intervention policy model. Section five concludes with recommendations for regulators, manufacturers and pharmacy practice.

Literature Review

Product Use Information and Consumer Engagement. Product use information is a document provided alongside a product that provides specific guidance for correct and safe use [2]. In the pharmaceutical context, PUI takes the form of a package insert, providing the patient and healthcare professional with information on the drug, its conditions of use, dosage, contraindications and expected outcomes [4]. Authors [5] demonstrated that patients receiving simplified patient information leaflets showed significantly better medication safety knowledge and treatment adherence than those receiving conventional package inserts, establishing the direct clinical utility of well-designed PUI. Authors [6] found that while most patients utilise PUI, perceived complexity and poor readability significantly

cantly reduce their confidence in acting on its content.

Consumer Attitude and Perceived Benefit. Attitude is a learned tendency to behave in a consistently favourable or unfavourable manner towards an object [7]. Three components constitute consumer attitude: a cognitive component that captures beliefs and knowledge, an affective component that captures emotional responses, and a conative component that captures behavioural intentions. Within the pharmaceutical PUI context, perceived benefit, encompassing ingredient disclosure, dosage guidance and adverse reaction recognition, functions as a key driver of the cognitive and affective components of consumer attitude, shaping the extent to which consumers view PUI engagement as a worthwhile use of their attention.

Demographic Determinants of Health Information Engagement. Author [8] established foundational evidence that gender and educational level shape instruction manual reading, with product complexity and novelty acting as mediating variables that increase manual consultation. Within the Nigerian context specifically, authors [9] identified marital status as a significant predictor of healthcare-seeking behaviour among Nigerian adults, with married individuals demonstrating greater health consciousness. In contrast, authors [10] found that socioeconomic status, education and marital status were among the strongest sociodemographic predictors of health information engagement among civil servants in Ibadan. Authors [11] found that education, occupation, and income significantly shaped health information-seeking in Rivers State, Nigeria. These studies collectively suggest that the demographic patterning of health information engagement is a robust and policy-relevant phenomenon within the Nigerian context, rather than an artefact specific to any one study population.

Product Complexity and Information Reliance. Authors [12] identified product complexity as the strongest predictor of instruction manual use among four classes of factors influencing PUI utilisation: personality variables, sociodemographic variables, and situational cues. Authors [13] demonstrated, across four experimental studies, that product feature heterogeneity and interrelatedness independently shape consumer attitudes toward usability and purchase intentions, confirming that product complexity operates through multiple attitudinal pathways. In the

pharmaceutical context, medications with complex active ingredient profiles, intricate dosage schedules and extensive contraindication networks are especially likely to elevate consumer reliance on PUI as a risk reduction mechanism.

Theoretical Framework. This paper draws on the Engel, Blackwell and Miniard (EBM) model of consumer decision making, which organises influences on consumer behaviour into three broad categories: individual differences, environmental influences and psychological processes [14]. The EBM model is appropriate for this synthesis because it explicitly incorporates sociodemographic characteristics as moderators of information-seeking behaviour and situational factors, such as product complexity, as environmental triggers of documentation engagement, providing coherent theoretical grounding for translating empirical findings into targeted policy interventions.

METHODS

This paper adopts a desk-based policy synthesis methodology rather than conducting new primary data collection. The approach follows a structured three-step process.

First, empirical evidence was drawn from [1], a cross-sectional survey of 952 pharmaceutical consumers across 16 major pharmaceutical stores in Jalingo Local Government Area, Taraba State, Nigeria, with a sample drawn from a population of 1,381 daily customers, using the authors' [15] formula. The underlying study employed descriptive statistics, Chi-square tests, and Binary Logistic Regression to assess demographic predictors of PUI utilisation, and Ordinary Least Squares regression to assess the effect of product complexity, with all instruments validated and reliability confirmed through Cronbach's alpha exceeding 0.70 across subscales.

Second, this synthesis draws on the full range of results reported in [1], namely the overall utilisation rate, the seven benefit constructs, the four perception constructs, the demographic predictors, and the product complexity effect. Each result category was retained because it maps to a distinct lever available to policy actors: utilisation rate establishes the scale of the challenge; benefits and perceptions establish what currently sustains engagement among consumers who already engage; and demographic and product

complexity findings establish where and how targeted intervention should be directed.

Third, the researchers systematically mapped each result against the consumer health literacy and pharmaceutical policy literature reviewed in Section Two, using a thematic synthesis approach to identify intervention implications. This mapping proceeded in three stages: identifying the specific empirical finding and its direction; translating that finding into a targeting or design implication; and consolidating the implications into a structured three-intervention policy model. The resulting model, presented in Section four, is a conceptual policy contribution derived systematically from empirical evidence rather than a new primary data analysis. The complete statistical results and questionnaire instrument are reported in full in [1].

RESULTS AND DISCUSSION

Demographic Profile of Respondents. Table 1 summarises the demographic profile of the 952 respondents reported in Ngati (2026). The sample was 52.3% male and 47.7% female, and predominantly single (53.8%). Age was concentrated in the 18-39 bracket (85.1%). The most common educational qualification was HND or BSc (41.7 %), and a majority of respondents (81.5 %) earned below N100,000 per month. The middle class was the largest social status group (37.0 %), followed by the working class (30.5 %).

Table 1 – Demographic Profile of Respondents (n=952) [1]

Variable	Category	Frequency	%
Sex	Male	498	52.3
	Female	454	47.7
Marital Status	Married	440	46.2
	Single	512	53.8
Age	18-29 Years	403	42.3
	30-39 Years	407	42.8
	40-49 Years	112	11.8
	50 Years & Above	30	3.2
Educational Qualification	SSCE	194	20.4
	OND/ND	321	33.7
	HND/BSc	397	41.7
	MSc	33	3.5
	PhD	7	0.7
Income	N30,000 & Below	238	25.0
	N30,001-	538	56.5

Variable	Category	Frequency	%
	N100,000		
	N100,001-N200,000	144	15.1
	N200,001-N500,000	18	1.9
	Above N500,000	14	1.5
Social Status	Elite	47	4.9
	Upper Middle Class	162	17.0
	Middle Class	352	37.0
	Working Class	290	30.5
	Lower Class	101	10.6

PUI Utilisation Rate. Of the 952 respondents, 86.0 % (n = 819) reported utilising PUI attached to pharmaceutical products, while 14.0 % (n = 133) did not (Table 2). This rate substantially exceeds the one-third utilisation observed by the author [8] for electrical product manuals, reflecting the heightened perceived health stakes associated with pharmaceutical misuse relative to other product categories.

Table 2 – PUI Utilisation (n = 952)

Response	Frequency	%
Yes, utilise PUI	819	86.0
No, do not utilise PUI	133	14.0
Total	952	100.0

Benefits Accrued from PUI. All seven benefit constructs yielded Chi-square values that were significant at the 0.001 level, confirming that respondents systematically concentrated their responses in the agree and strongly agree categories (Table 3). Detailed information on drug ingredients recorded the highest factor loading (0.689), followed by dosage consciousness and reduction of drug abuse (0.523), as shown in Figure 2. This ordering indicates that consumers

value PUI most for the specific, actionable safety information it conveys rather than for general medication education.

Table 3 – Chi-Square Results and Factor Loadings, PUI Benefits (n = 952) [1]

Benefit Construct	Chi-Square	df	p-value	Loading
Detailed information on drug ingredients	1418.328	5	0.000	0.689
Dosage consciousness and reduction of drug abuse	1122.989	4	0.000	0.523
Reduction of mismatches and side effects	1115.227	4	0.000	0.471
Better understanding of medication regimens	1554.019	4	0.000	0.464
Allergy and adverse reaction guidance	922.107	4	0.000	0.441
Identification of therapeutic alternatives	1160.637	4	0.000	0.414
Identification of medical issues and outcomes	1127.464	4	0.000	0.390

Consumer Perceptions towards PUI. Consumer perceptions were predominantly positive across all four constructs (Table 4). Specifically, 64.9 % of respondents disagreed or strongly disagreed that they could manage pharmaceutical products without a guide, and 65.0 % rejected the notion that no life-threatening consequences follow from ignoring PUI. Most significantly for policy purposes, 74.0 % rejected the claim that PUI is a waste of time due to complex terminology, directly challenging the complexity barrier identified in earlier instruction manual literature [8]. All four Chi-square results were significant at p=0.000.

Table 4 – Consumer Perceptions towards PUI (n=952) [1]

Perception Item	SD	D	U	A	SA	Chi-Sq	p-value
Can use pharmaceutical products without a guide	20.9	43.9	12.0	12.1	11.1	370.384	0.000
Pharmaceutical prescriptions are general knowledge	36.2	18.9	16.6	19.7	8.5	194.502	0.000
No life-threatening effect if PUI is ignored	24.1	41.0	18.9	8.7	7.4	354.355	0.000
PUI terminology makes it a waste of time	44.8	29.6	8.8	10.4	6.3	530.721	0.000

Notes: SD=Strongly Disagree, D=Disagree, U=Uncertain, A=Agree, SA=Strongly Agree.

Demographic Predictors of PUI Utilisation. The underlying survey evidence reported in [1] shows a consistent, policy-relevant pattern of demographic predictors (Table 5, Figure 1). The Hosmer-Lemeshow test confirmed overall model significance (Chi-square = 24.608, $p = 0.002$). Marital status was the strongest demographic predictor of PUI utilisation ($\text{Exp}(B) = 2.073$, $p = 0.002$), with married consumers substantially more likely to engage with PUI than single consumers. Social status was a significant positive

predictor ($\text{Exp}(B) = 1.252$, $p = 0.015$), with higher-status consumers more likely to engage. Educational qualification was significant but inversely related ($\text{Exp}(B) = 0.871$, $p = 0.010$): more educated consumers were less likely to utilise PUI, a pattern consistent with a self-efficacy overconfidence effect in which educated consumers perceive themselves as already possessing sufficient knowledge to use pharmaceutical products safely. Sex, age and income were not significant predictors.

Table 5 – Binary Logistic Regression, Demographic Predictors of PUI Utilisation (n = 952) [1]

Variable	B	S.E.	Wald	p-value	Exp(B)	Decision
Sex	0.319	0.196	2.651	0.104	0.727	Not Significant
Marital Status	0.729	0.239	9.288	0.002	2.073	Significant
Age	0.077	0.162	0.225	0.635	0.926	Not Significant
Educational Qualification	0.138	0.128	1.166	0.010	0.871	Significant (Inverse)
Income	0.060	0.135	0.196	0.658	1.062	Not Significant
Social Status	0.225	0.093	5.881	0.015	1.252	Significant

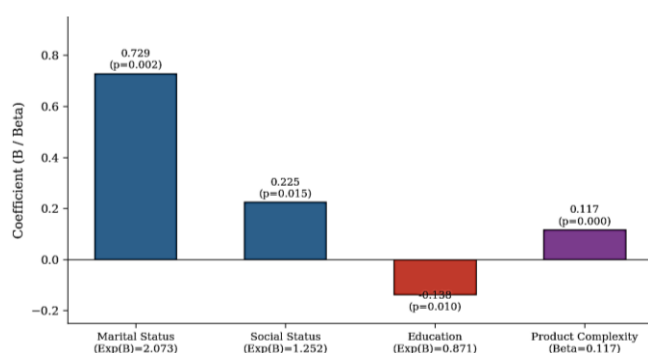


Figure 1 – Significant Predictors of Pharmaceutical PUI Utilisation

Product Complexity and PUI Utilisation. OLS regression confirmed that product complexity is a significant positive predictor of PUI utilisation (Beta = 0.117, $t = 3.617$, $p = 0.000$), and the ANOVA confirmed the model's significance ($F = 13.080$, $p = 0.000$), as shown in Table 6. Although the explained variance is modest ($R^2 = 0.014$), the statistical significance is robust. As pharmaceutical product complexity increases, encompassing terminological difficulty, complex active ingredients, hazard of misuse, and perceived insufficient user competence, consumers systematically increase their reliance on PUI as a risk management mechanism. This finding directly supports the EBM model's prediction that situational complexity elevates information search behaviour and provides the empirical ba-

sis for the manufacturer-facing readability intervention proposed in Section 4.8.

Table 6 – OLS Regression, Product Complexity and PUI Utilisation (n = 952) [1]

Predictor	R	R ²	Adj. R ²	Beta	t	p
Product Complexity	0.117	0.014	0.013	0.117	3.617	0.000

Policy Implications. Six implications follow directly from the full set of results reviewed above. First, the high overall utilisation rate (86 %) indicates that pharmaceutical PUI policy in Nigeria should focus on closing the remaining engagement gap among specific underserved segments rather than on persuading a broadly disengaged population, a materially different policy posture from that implied by the lower utilisation rates reported for other product categories internationally. Second, because ingredient disclosure and dosage guidance are the most valued benefits, PUI redesign efforts should preserve and foreground this content even as broader readability is improved. Third, because consumer perceptions are already overwhelmingly positive, including a clear majority rejecting the view that PUI is a waste of time, messaging campaigns can build on existing favourable attitudes rather than first overcoming scepticism. Fourth, single con-

sumers represent a systematically underserved segment and warrant direct targeting through community pharmacy and social media outreach. Fifth, the inverse education effect implies that health literacy campaigns aimed at educated consumers must be reframed away from basic informational content, which educated consumers already discount, toward messaging that explicitly addresses self-efficacy overconfidence. Sixth, manufacturers of pharmaceutically complex formulations should prioritise investment in readability, specifically where the evidence shows consumer reliance on PUI is already highest.

A Three-Intervention Policy Model. Building on these implications, this paper proposes a three-intervention policy model summarised in Table 7 and Figure 2.

The first intervention, targeted health literacy campaigns, directs outreach specifically at single and lower social class consumers through community pharmacy and accessible media channels.

The second intervention, pharmacist-led counselling protocols, addresses the self-efficacy overconfidence pattern among educated consumers by embedding PUI review into routine dispensing consultations, regardless of a consumer's apparent level of education, while foregrounding ingredient and dosage content.

The third intervention, readability-optimised PUI redesign, targets manufacturer-level investment in clearer documentation specifically for complex formulations.

Table 7 – Proposed Three-Intervention Policy Model

Intervention	Core Activities	Targeting Rationale
Targeted Health Literacy Campaigns	Community pharmacy outreach; radio and social media messaging directed at single and lower social class consumers	Narrows the demographic engagement gap
Pharmacist-Led Counselling Protocols	Mandatory PUI review embedded in dispensing consultations, foregrounding ingredient and dosage content, with messaging	Addresses the inverse education effect while reinforcing the most valued benefit constructs

Intervention	Core Activities	Targeting Rationale
	reframed to counteract self-efficacy overconfidence among educated consumers	
Readability-Optimised PUI Redesign	Manufacturer investment in simplified, QR-linked PUI formats prioritised for pharmaceutically complex formulations	Maximises return on readability investment where reliance on complexity is highest.

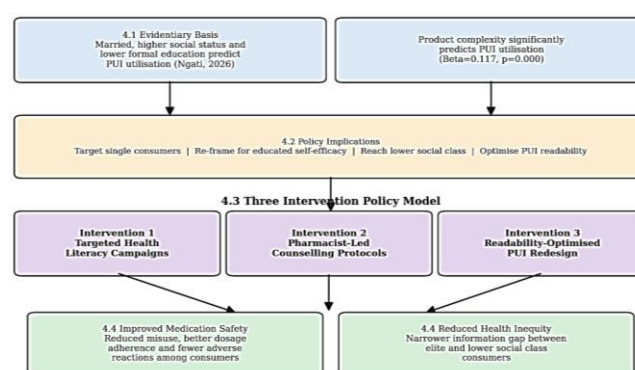


Figure 5 – Structured Model Linking Evidence, Policy Implications, the Three Intervention Policy Model and Public Health Outcomes

Relevance to Medication Safety and Health Equity. The medication safety case for this model follows directly from the demographic and product complexity patterning identified in the evidence. Consumers who do not engage with PUI forgo guidance on dosage, contraindications and adverse reaction recognition, elevating their risk of medication misuse regardless of their education or social standing. Because engagement is systematically lower among single, lower social class and counterintuitively more educated consumers, an undifferentiated public health messaging strategy will reach the consumers least in need of additional encouragement while continuing to miss those most at risk. Targeted intervention, calibrated to the full set of demographic, benefit, perception, and product-level patterns identified in [1], offers a more efficient path to both improved medication safety and reduced health information inequity across Nigeria's pharmaceutical consumer population.

CONCLUSIONS

This paper has argued that policymakers should calibrate pharmaceutical consumer health literacy policy in Nigeria to the full set of empirical patterns that characterise PUI engagement, rather than direct it uniformly across the consumer population or base it on assumptions imported from non-pharmaceutical, non-Nigerian instruction manual literature. Drawing on survey evidence from 952 consumers in Jalingo, Taraba State, the paper has shown that overall PUI utilisation is high (86 %), that consumers value ingredient and dosage information most highly among the benefits PUI provides, that consumer perceptions are overwhelmingly positive, that marital status, social status and educational qualification significantly predict utilisation, with education operating in an inverse and counterintuitive direction. Product complexity independently and positively predicts engagement. The practical implication is that regulators, manufacturers, and pharmacy practice each have distinct, evidence-based roles to play in narrowing the consumer health information gap that persists despite generally high engagement.

Recommendations:

- 1) NAFDAC and pharmaceutical manufacturers should direct public health literacy campaigns specifically at single adult consumers through community pharmacies, radio and social media, rather than assuming uniform engagement across marital status groups.
- 2) Pharmacist-led counselling protocols should embed PUI review into all dispensing consulta-

tions as standard practice, foregrounding ingredient disclosure and dosage guidance as the benefit constructs consumers value most highly.

3) Counselling and messaging directed at educated consumers should be explicitly reframed to address self-efficacy overconfidence, rather than relying on the basic informational content that this segment already discounts.

4) Community health programmes should incorporate dedicated PUI literacy components targeted at lower social class consumers, who are systematically underserved relative to elite and upper middle class consumers.

5) Manufacturers of pharmaceutically complex formulations should prioritise investment in readability-optimised, QR-linked PUI formats specifically for these products, where consumer reliance on PUI as a risk reduction mechanism is already highest.

6) Regulatory and public health bodies should establish routine monitoring of PUI engagement by demographic segment and benefit construct, allowing the targeting framework proposed here to be updated as consumer information behaviour evolves.

Future research should test the proposed three-intervention policy model directly through pilot implementation, tracking changes in PUI engagement among targeted demographic segments over time, and extending the underlying evidence base beyond Jalingo Local Government Area to other Nigerian states and rural populations.

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