



## ORIGINAL RESEARCH

## Knowledge and Attitudes of Patent Medicine Vendors towards Tobacco Harm Reduction in Ebonyi State, Nigeria: A Mixed Methods Study

Daniel C Oshi<sup>1\*</sup>, Kingsley N. Ukwaja<sup>2</sup>, Maria Isabel Espinoza Hidrobo<sup>3</sup>, Chimwemwe Ngoma<sup>4</sup> , Katarzyna Kowalczyk<sup>4</sup>, Attaulah Ahmadi<sup>5</sup>  and Sarah N. Oshi<sup>6</sup>



<sup>1</sup>Department of Community Health & Psychiatry, Faculty of Medical Sciences, The University of the West Indies, Jamaica

<sup>2</sup>Alex Ekwueme Federal Teaching Hospital, Department of Medicine, College of Health Sciences, Ebonyi State University, Abakaliki, Ebonyi State, Nigeria

<sup>3</sup>Instituto de Idiomas, Universidad de Cuenca, Cuenca, Azuay, Ecuador

<sup>4</sup>Knowledge•Action•Change, London, United Kingdom

<sup>5</sup>Department of Quantitative Methods in Public Health, École des Hautes Études en Santé Publique (EHESP), Paris, France

<sup>6</sup>Escuela de Estudios de Postgrado, Universidad de Cuenca, Cuenca, Azuay, Ecuador

\*Corresponding author: Daniel C. Oshi, Department of Community Health & Psychiatry, Faculty of Medical Sciences, The University of the West Indies, Mona, Kingston, Jamaica

### Abstract

The negative health consequences of cigarette smoking have been well documented. Cigarette smoking prevalence is high in Nigeria. A very high proportion of smokers in Nigeria are aware of the dangerous effects of cigarette smoking and most of them want to quit, but their quitting attempts often prove unsuccessful. Evidence shows that tobacco harm reduction (THR) products such as electronic cigarettes are effective in helping smokers to quit. Patent medicine vendors (PMVs) have been successfully integrated into several public health interventions in Nigeria and could prove useful in the provision of tobacco harm reduction products to smokers. This study sought to assess the knowledge and attitudes of patent medicine vendors towards tobacco harm reduction in Ebonyi State, Nigeria. A convergent mixed methods design was used. Cross-sectional survey and in-depth interviews (IDIs) were conducted among from 320 PMVs and 25 PMVs, respectively. Descriptive univariate and Pearson's chi square analysis and thematic data analysis were done for survey and IDI data, respectively. There were low awareness and poor knowledge of tobacco harm reduction among the PMVs. Most of them (95.9%, n = 307) said they will seek out and attend training on THR while 89.1% (n = 285) opined that PMVs have a role in providing THR products to smokers. Most (86.9, n = 298) said they will encourage their colleagues to participate in

the provision of THR products. Curiously, only 56.9% (n = 182) expressed the desire to include THR products in their stock at the moment; this is explained by two factors: Lack of knowledge of THR and the fear of harassment and extortion by Police and pharmaceutical regulatory agents. Patent medicine vendors represent a very important platform for the provisioning of THR products to smokers, but low awareness and poor knowledge are key constraints. Therefore, there is a need for awareness creation and improvement of PMV's knowledge of THR.

### Keywords

Electronic cigarettes, E-cigarettes, Nicotine, Vaping, Tobacco harm reduction

### Introduction and Background

The burden of cigarette smoking in Nigeria is high [1], with pooled crude prevalence of current smoking and ever smoked being 10.4% and 17.7%, respectively, with considerable regional variations (5.4% [North-west] and 32.1% [North-east] for current smokers; 10.5% [South-east] and 43.6% [North-east] for ever-smokers) [2]. It was estimated that about 100 million cigarettes were consumed per day in 2015 with over 40 billion smoked

in Nigeria in the same year [2]. Like other places in the world, a very high proportion of the smokers in Nigeria are aware of the dangers of smoking and have reported a desire and willingness to quit, but most are either unable to quit or relapse after quitting [1,3,4].

It has now been firmly established that nicotine replacement/substitutes, including nicotine vapes, can help people to quit or cut down on tobacco cigarette smoking [5,6], and that nicotine vapes, otherwise called electronic cigarettes or e-cigarettes, are much safer than the tobacco cigarettes [7]. A substantial body of evidence has also demonstrated that nicotine vapes, as a form of tobacco harm reduction (THR), has been successful where conventional smoking cessation strategies which present smokers with no alternatives have failed [8]. The Royal College of Physicians [6] posits that almost all the harm attributable to tobacco smoking can be prevented through large-scale substitution with nicotine vapes, or other non-tobacco nicotine products. The organization argues that considerable health gains can be achieved through promotion of nicotine vapes, nicotine-replacement therapy (NRT) and other non-tobacco nicotine products as broadly as possible, as an alternative for cigarette smoking.

Despite this strong evidence, knowledge and understanding of the effectiveness of the use of THR approaches to reduce tobacco consumption harm is very limited in Nigeria. In a study by Akande-Sholabi and Adebisi [9] among community pharmacists, only 37.5% had fair knowledge of tobacco cessation (none had good knowledge). Oke, et al. [10] found that 73.7% of their study participants did not have prior knowledge or a clear understanding of THR. Consistent with the poor knowledge of THR, research findings show a low prevalence of e-cigarette use in Nigeria. Erinoso, et al. [11] found a lifetime prevalence of e-cigarette use of 7.9% among adolescents and young adults in Nigeria. In a recent scoping review, Adegbile, et al. [12] reported current e-cigarette use prevalence of 11.8% and a lifetime prevalence of e-cigarette use/vaping between 5.8% and 19.8%, among different population groups. Anecdotal evidence shows that THR products such as nicotine vapes are not widely available in Nigeria. Many sellers use online outlets to advertise and sell their products, mostly nicotine vapes, with a growing number of walk-in stores in big cities such as Lagos. The cost of nicotine vapes is also still high in Nigeria, and may present an additional barrier to poor knowledge and accessibility issues (Olatunji, 2020). One potential strategy to bring THR products closer to smokers is through the involvement of patent medicine vendors.

Patent medicine vendors (PMVs), also known as patent and proprietary medicine vendors (PPMVs) (local parlance: chemists) are individuals without formal training in pharmacy who sell orthodox pharmaceutical products on a retail basis [13]. They are not pharmacists

or pharmacy technicians, but typically undergo some form of informal apprenticeship under established PMVs. Data on the number of PMVs in Nigeria are seemingly infeasible to access, however, as far back as 2005, it was estimated to be 200,000, approximately four times the number of physicians and about 100 times the number of pharmacists at the time [14]. Although they receive no formal training, PMVs play a significant role in the Nigerian health sector and have been described as the most ubiquitous feature in the sector, providing pharmaceutical services to communities where formal healthcare may be scarce or inaccessible [15,16].

Patent medicine shops are pervasively distributed in rural, urban and semi-urban areas, making them very easy to reach [17]. Oshi [17] also found in his study that PMV shops were the most utilized 'type' of healthcare facility, a finding that was corroborated by other researchers [16]. Their services and products are cheap, easily accessible, with flexible opening hours [18]. PMVs are usually intricately connected to the communities and take part in the everyday social, economic, and cultural activities of the communities. This social networking and social connectivity to the community create and enhance trust, and as such the community members look up to them not only for treatment and cure of their ailments but also for health literacy and health advice [15,17]. The Pharmaceutical Council of Nigeria recognizes their importance in the health system and describes them as the main source of medicine for most common illnesses [13]. They are also the very first point of care [16,17,19]. It should be noted that some of these shops are small retail outlets that sell over-the-counter, non-regulated medicines, combined, sometimes, with a few groceries.

In recognition of their value in reaching not only specific target population groups, but also the general public, with health interventions [16,20], agencies and organizations have over the years used the PMVs as a platform for the adoption/implementation of their programmes/interventions. A case in point is the use of PMV in providing health education on tuberculosis (TB) and for delivery of TB screening and referral of identified presumptuous TB cases to health facilities [21,22]. In an intervention project by the Society for Family Health, a local non-governmental organization in Nigeria, PMVs were reported to be very useful in counselling and delivering family planning products as well as in management of diarrhea [19]. Another study showed that they could be useful in the implementation of routine vaccinations in the country [23]. In yet another project, the Population Council demonstrated through implementation research, the feasibility of delivering injectable contraceptive services through PMVs [24].

The PMVs have a well-organized association called the National Association of Patent and Proprietary Medicine Dealers (NAPPMED) with chapters at the local government area, state, and federal level. Most PMVs

belong to their local chapters [15]. The existence of this organization with a clear structure and leadership facilitates the involvement of PMVs in development/health programmes/interventions.

### Research aim

The goal of this study was to explore the knowledge and attitudes towards tobacco harm reduction among patent medicine vendors, as well as to identify the barriers and facilitators to the uptake and implementation of tobacco harm reduction services by these vendors.

### Research objectives

The research objectives include:

- 1) To understand the knowledge and attitudes of PMVs regarding tobacco harm reduction.
- 2) To explore and characterize the hindrances and facilitators that could potentially influence the uptake and delivery of THR services by patent medicine vendors.
- 3) To identify context-specific, culturally appropriate, approaches that will promote and enhance the

uptake and implementation of tobacco harm reduction by PMVs.

## Methodological Considerations

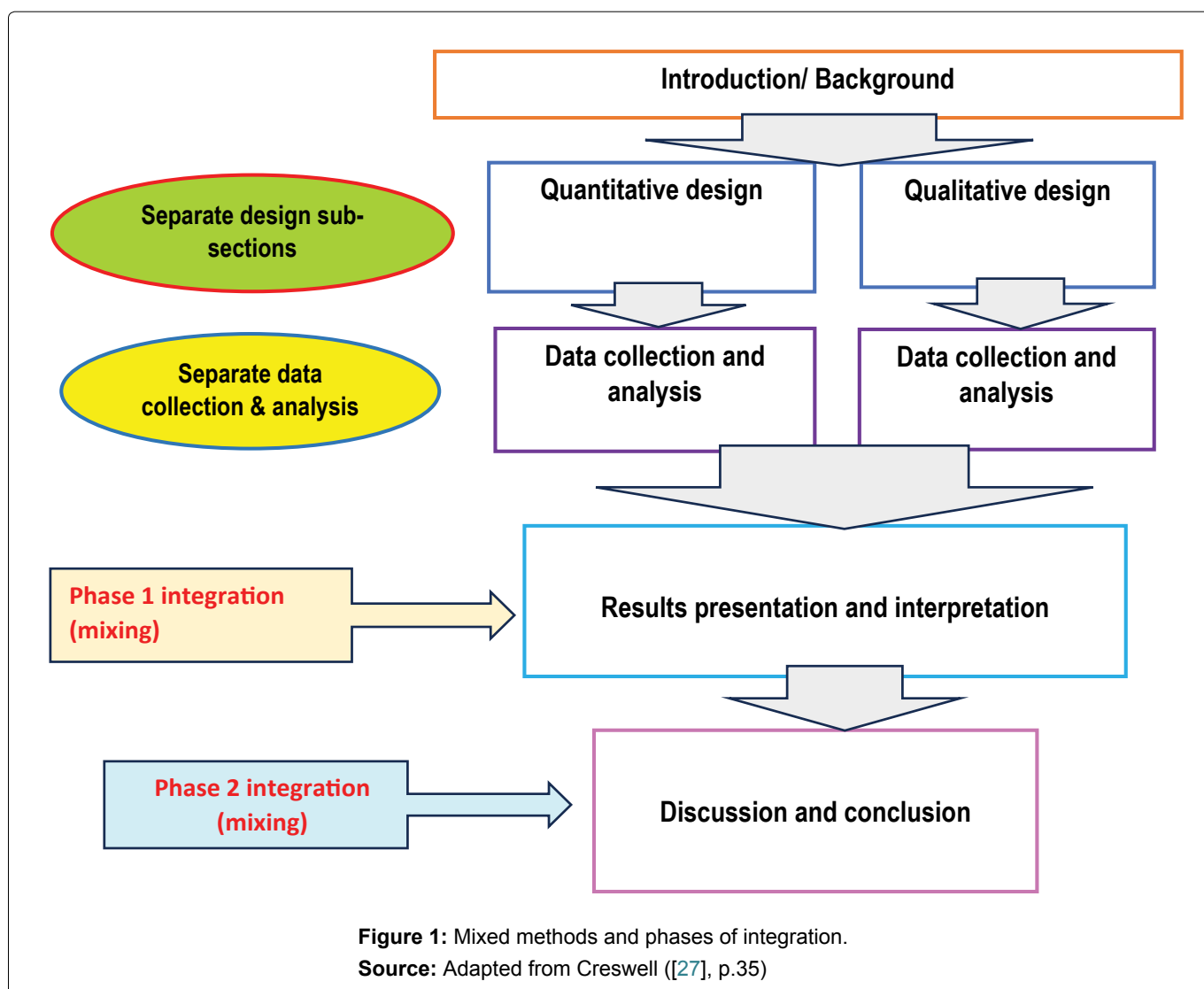
### Overall design

The overall research strategy was a convergent mixed-methods quantitative-qualitative design. The quantitative and qualitative strands were conceptualized, designed and drafted in two different sub-sections (in this methodological section). Further, data collection and analysis were done separately for the two strands. However, integration (otherwise called merging or mixing) was done at the phases of results presentation and interpretation as well as discussion and conclusion (Figure 1). Together, the methodological steps and tools of the different strands complemented each other in providing insights into the research problem from multiple perspectives [25]. The next sub-sections detail the quantitative and qualitative strands (separately).

### Quantitative Strand

#### Research design and population

The quantitative strand was a cross-sectional



**Figure 1:** Mixed methods and phases of integration.

**Source:** Adapted from Creswell ([27], p.35)

questionnaire survey among PMVs in Ebonyi State, Southeastern Nigeria.

### Sample size and sampling method

The sample size was 320 PMVs who practice in Ebonyi State.

The sample size was computed using the formula:

$$N = \frac{[Z^2 p(1-p)]}{d^2}$$

Where N = sample size to be determined; p = proportion of PMVs who had good or at least fair knowledge of THR. No previous study on this was found despite diligent literature searches. So, it was decided to use the closest figure reported among community pharmacists in Nigeria. Akande-Sholabi & Adebisi [9] reported that 37.5% of community pharmacists had fair knowledge of tobacco cessation (none had good knowledge). d = margin of error, was chosen to be 0.05 (on the basis that the researchers would accept a 5% margin of error); and Z = 1.960, a critical value, appropriate for 95% confidence interval. The result of the computation was a sample size of 360 respondents. This was reduced to 320 because of resource constraints.

The list of the (1,834) members of the state chapter of the National Association of Patent and Proprietary Medicine Dealers (NAPPMED) was obtained and used as the sample frame. Participants were randomly selected, through simple number balloting, from the membership listing. Participants selection was continued until the targeted sample size was obtained.

### Eligibility criteria

**Inclusion criteria:** Only PMVs who have their own medicine shops took part in the study. They must also have practiced for at least six months after their apprenticeship.

**Exclusion criteria:** Being an apprentice PMV and being younger than 18 years of age were used as criteria to exclude participants.

### Data collection instrument

A questionnaire entitled "Questionnaire on Knowledge, Attitudes and Practices of Tobacco Harm Reduction by Patent Medicine Vendors" was developed by the researchers. It was pre-tested by administration to PMVs who were later not allowed to take part in the study. It was thereafter revised and finalized by the researchers. The time frame for the research did not allow for questionnaire validation prior to the study implementation, but non-validation does not constitute a major flaw as it was pre-tested (though the two are different). It had an introductory section that contained greeting, research assistant's introduction, and a brief instruction, followed by four sections, namely, Section A: Demographic and Background Information; Section

B: Knowledge, Awareness and Perception; Section C: Attitudes Toward Tobacco Harm Reduction; and Section D: Practices of Tobacco Harm Reduction. The questionnaires for administration were in paper form.

### Data collection

Trained research assistants (RAs) introduced themselves, explained the study objectives and presented the questionnaires to the PMVs, following the outlined ethical procedures (see the section on Ethical Considerations). The PMVs completed the questionnaires on the spot (average completion time was about 20 minutes). The RAs were present to offer explanations and to collect the questionnaires after completion. Data were entered into a spreadsheet and cleaned.

### Variables transformation

To assess the attitude of PMVs' towards provision of tobacco harm reduction products to their patients, we transformed the five response options (0 = strongly disagree; 1 = disagree; 2 = neutral; 3 = agree; 4 = strongly agree) that measured their levels of agreement with statements/items on this construct (attitude) into three response options (1 = disagree [consisting of original response options 0 and 1]; 2 = neutral; 3 = agree [consists of original response options 3 and 4]). The purpose of this transformation was to give us a large enough number in each sub-group of respondents to conduct descriptive bivariate (chi square) analyses. With the variable's transformation, 1 was taken to stand for negative attitude, 2 for neutrality and 3 for positive attitude towards provision of tobacco harm reduction products by PMVs.

### Data analysis

Data were summarized using frequencies (and percentages) and means (and standard deviations) for categorical and continuous variables, respectively. For descriptive bivariate analysis, sub-group differences in categorical outcome variables were assessed using Pearson's chi square. It should be noted that data on Section D were not analyzed because they were largely incomplete because most of the PMVs were not engaging in any form of tobacco harm reduction/tobacco cessation practice. The level of significance was set at  $p < 0.05$ . Analyses were performed using SPSS version 23 (IBM Co., Armonk, New York).

## Qualitative Strand

### Study design

An exploratory qualitative research genre was used to gain rich, indepth, context-specific and detailed understanding of and insights into the awareness, knowledge, attitudes, barriers and facilitators for provision of tobacco harm reduction by patent medicine vendors (PMVs) in Ebonyi State, Nigeria. Qualitative

methods enable researchers to explore complex social processes and provide understandings of phenomena [26].

### Study population and setting

The study population consisted of practicing PMVs in Ebonyi State who have their own medicine shops.

### Sample size

The sample size was 25 participants. There has been much debate about what sample size should be adequate for qualitative research. The general convention is that qualitative research does not need large sample sizes required to statistical generalization in quantitative research. However, qualitative research sample size should be large enough to achieve data saturation, which refers to the point in which no new information related to the phenomenon is obtained from additional interviews [27,28]. It indicates that the sample size is adequate for the research problem being explored, and that the breadth, depth, and nuances can be covered [28]. Some researchers have reported that 16 to 24 participants are enough to achieve data saturation [29]. Therefore, our sample size of 25 was deemed large enough to achieve data saturation.

### Purposive sampling frame and sampling method

A purposive sampling frame was used to include PMVs with different demographic, socio-economic and other backgrounds. This enabled us to capture diverse opinions from multiple perspectives.

### Data collection (indepth interviews)

Indepth interviews (IDIs) were based on an indepth interview guide, which consisted of sections on demographic and background information, awareness/knowledge of as well as attitudes towards tobacco harm reduction, and barriers and facilitators for tobacco harm reduction. Interviews were conducted by the researchers and trained research assistants. Each interview was conducted in a private space within the confines of the patent medicine shop. Interviews lasted about 30 to 40 minutes. Interviews were conducted in English Language, but interviewers provided explanations/clarifications in both English Language and Igbo Language to ensure clarity of understanding. Interviews were voice-recorded with the permission of the participants.

### Eligibility criteria

**Inclusion criteria:** For consideration to be included in the study, a patent medicine vendor must not be an apprentice; and they must own their own medicine shops.

**Exclusion criteria:** Apprentice PMVs and those younger than 18 years were also excluded.

### Data analysis

In qualitative research, data collection and data analysis often go hand-in-hand, starting with the transcription phase of the analysis. Our data was voice-recorded data, supplemented by field notes. We, therefore, commenced transcription of electronic data early as data collection progressed. This also helped us to conduct member checking while the interviewers were still in the field and in contact with the participants. We triangulated the transcription process by using two expert transcriptionists. This further contributed to the confirmability of our study (see the section on trustworthiness).

We conducted a thematic analysis of our data. Thematic analysis is a robust, albeit flexible, data analytical approach [30], enabling analysts to systematically capture the perspectives of participants and provide insights into the phenomenon through indigenous and emergent categories and themes [30] (Oshi, 2019). Indigenous categories were originally developed from literature review. As a preliminary step, analysts arranged, organized, and sorted the data. This was followed by detailed review and exploration of data and generation of codes. The next step involved using the codes to identify and classify emergent categories. Emergent categories, unlike indigenous categories, are categories that are identified from the data. Thus, they are emic, by nature, meaning that they represent the participant's perspective, and not obtained from literature review by the researcher. Rossman and Rallis [26] note that inclusion of emergent categories contributes to enriching the findings obtained from data. Further coding and generation of categories were done and used to generate emergent themes (Oshi, 2019). The analysts next developed conceptual themes based on indigenous and emergent themes. The analysts then wrote analytic memos on the conceptual themes. The analysts included direct quotes from the participants in the analytic memos as these helped to showcase the perspectives of the participants in their own words (Oshi, 2019), [26]. The two analysts exchanged the first four interview transcripts and reanalyzed, and compared their transcripts to check for the degree of agreement/ discrepancy. No major discrepancy was found. This check for inter-analyst discrepancy was repeated half-way through the data analysis, with no significant discrepancy found.

### Strategies for trustworthiness

Several steps were taken to ensure that the findings from this study were trustworthy (equivalent of reliability and validity, in quantitative research genre). For a study to be trustworthy, researchers must conscientiously take measures at the different stages of the research, including design/implementation, data analysis, and interpretation and report writing stages. At the design/implementation stage, we set our sample size to be 25,

higher than sample sizes at which data saturation was obtained in several studies [28]. Our use of purposive sampling frame and sampling technique helped ensure that we adequately captured the perspectives of participants with various characteristics. Further, we focused on ensuring credibility in our study. Credibility in qualitative research is the mirror image of validity in quantitative research genre. To promote credibility, in keeping with Yin [31] we adopted a robust method of data collection, to wit, indepth interviews, based on interview guide. The interview guide adequately addressed the key constructs and phenomenon under exploration. We shared the draft interview guide among the researchers and got their expert opinions in the contents, wording, and ability of the interview questions/items to explore the constructs/phenomena of interest.

Other measures we applied to ensure credibility include holding debriefing sessions between research assistants and researchers and among the researchers; literature review was also used to gather current evidence to frame our study [32]. Transferability (external validity/generalizability in quantitative research) is a measure of the extent to which one's research can apply/relate to similar contexts [32]. We carried out thick descriptions of in our study, and in the findings section, we included direct quotations, alongside the contexts of the responses [33]. To promote dependability (equivalent of reliability) in our study, we made every effort to sufficiently describe the processes of the conduct of the study to enable other researchers to reproduce it in their own settings [33]. Confirmability (objectivity in quantitative research) was ensured through a combination of several steps. We did investigator triangulation in which different members of our research team handled different aspects of the study, at the various stages, including design, implementation, analysis, and interpretation of findings. Data analysis was conducted by two different researchers who exchanged transcripts after the first few transcripts were analyzed and half-way through the analysis. We also applied thematic analysis in our analysis of data with the identification and use of both indigenous and emergent categories and themes [30].

### Ethical considerations

Ethical approval was obtained from the Health Research Ethics Committee, Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Ebonyi State, Nigeria (NHREC/16/05/22/267). All participants gave informed consent before taking part in the study. Prior to giving informed consent, the objectives of the study were explained to them. They were also duly informed that their participation was voluntary, and that they had the right to refuse to participate or to withdraw their participation at any stage without fear of any repercussions. They were equally informed that there were no financial or material benefits for their participation. All participants were selected solely based on inclusion criteria and not

social bias. Data were collected anonymously, with no personal identifiers. However, unique codes were used for the IDI participants, which enabled the researchers to be able to reach them again for member checking. The unique codes were securely stored such that only the researchers could access it. Confidentiality of data is strictly maintained and only the data analysts have access to them.

## Results

### Sociodemographic characteristics and smoking behaviour of the participants

As shown in Table 1, the majority (about two-thirds)

**Table 1:** Sociodemographic characteristics and smoking behaviour of patent medicine vendors in Ebonyi State, Nigeria, 2023 (N = 320).

Characteristic	Frequency (N)	Percentage (%)
Sex		
Female	209	65.3
Male	111	34.7
Mean age [years] (SD)	31.7 (9.4)	
Age group		
18-27 years	111	34.7
28-38 years	150	46.9
39-49 years	41	12.8
50-73 years	18	5.6
Educational status		
Primary	6	1.9
Vocational	37	11.6
Secondary	198	61.9
Tertiary	79	24.7
Marital status		
Single (never married)	113	35.3
Currently married	206	64.4
Separated/divorced/widowed	1	0.3
Location of patent medicine shop		
Rural	128	40
Urban	192	60
Religious affiliation		
Christianity	318	99.4
Traditional	2	0.6
Ever smoked tobacco cigarette		
Yes	15	4.7
No	305	95.3
Ever smoked e-cigarette		
Yes	0	100
No	320	0

**Note:** PMV: Patent Medicine Vendor; SD: Standard Deviation

of the respondents were females. The mean age of the respondents was 31.7 years (SD = 9.7). Virtually all of them were educated beyond the primary level, with the majority achieving secondary education (n = 198; 61.9%) and tertiary education (n = 79; 24.5%). Two hundred and six (64.4%) were married while 113 (35.3%) were single (never married). There was a minor variation in the geographical distribution of patent medicine shops, with 60% (n = 192) being in the urban areas. Almost all of them reported being Christians (n = 318; 99.4%). Only 15 (4.7%) indicated that they ever smoked tobacco cigarettes. None reported ever smoking nicotine vapes.

For the qualitative strand (data not presented in a table), the age range was 20-61 years (mean = 33.84; SD: 12.3). Nine (36%) were males. Approximately half of them, 13 (52%) were married. None of them had primary or vocational educational as their highest educational level while most, 21 (84%) had secondary level education. All were Christians. Sixteen (64%) had their shops in the urban areas.

### Knowledge of tobacco harm reduction

Table 2 portrays knowledge of tobacco harm reduction among the respondents. About half (n = 166; 51.9%) correctly identified tobacco harm reduction as offering safer nicotine products to smokers to enable them to quit while 38 (11.9%) thought that it meant reducing harm from tobacco smoking by providing tobacco in electronic formats. Slightly over half (n = 168; 52.5%) indicated that they had no knowledge of whether nicotine vapes are effective in helping smokers quit tobacco cigarette smoking. One hundred and thirty-one (40.9%) reported that nicotine vapes are effective in helping smokers quit tobacco cigarette smoking. A high proportion (n = 207; 64.7%) said their customers/patients ever asked them for support to quit smoking.

The quantitative findings were supported by the indepth interviews (IDIs) results. Some of the PMVs correctly stated what tobacco harms reduction means while some did not know the correct meaning.

*"I think, but I'm not sure, it is anything that if a smoker takes it will help him to quit smoking. I once saw an e-cigarette online, looked like a lighter."* (BU, 46, male, urban)

However, a young urban PMV seemed to confuse THR with the warning sign usually placed on cigarette packets. In her words,

*"... my friend's sister, the day I went to visit her, that was the day I saw a cigarette packet on which is written that cigarette smokers are liable to die young."* (TY, 31 years, female, urban)

A rural PMV said tobacco harm reduction is administration of a pharmaceutical product to help cigarette smokers to quit. He said he has been helping smokers who ask him for support to quit. Interestingly, when asked what product he used, he said it was 'Chest and Lung' [a local pharmaceutical preparation for symptomatic treatment of cough].

*"Yes, 'Chest and Lungs'. I give it to smokers who ask me for support to quit."* (YG, 25 years, male, rural)

Many of them said they did not know at all and had never heard of the term 'tobacco harm reduction'.

*"No, I have no idea. I have never heard of it."* (FV, 24 years, female, rural).

Similarly, the IDI responses obtained on the effectiveness of nicotine vapes aligned with the quantitative survey findings. Some of them believed that nicotine vapes are effective, especially those who viewed clips on YouTube rather than got their information from local news outlets.

**Table 2:** Knowledge of tobacco harm reduction among patent medicine vendors in Ebonyi State, Nigeria, 2023.

Variable	Frequency (N)	Percentage (%)
<b>Which statement best describes THR?</b>		
Offering smokers safer nicotine products to enable them quit tobacco smoking	166	51.9
Motivating smokers to shift from one form of addiction to another	4	1.3
Reducing harm from tobacco smoking by providing tobacco in electronic formats	38	11.9
Don't know	112	35.0
<b>Nicotine vapes are effective in helping smokers quit tobacco smoking?</b>		
Yes	131	40.9
No	21	6.6
Don't know	168	52.5
<b>Customers/patients ever asked you for support to quit smoking?</b>		
Yes	207	64.7
No	113	35.3

**Note:** N: Number; THR: Tobacco Harm Reduction

*“There is so much confusion out there in our newspapers. Some say it doesn’t work, others say it’s harmful. But I watched a YouTube video, and it made me believe it works. Because I saw people who said it helped them to stop smoking. (PA, 30 years, male, urban).*

Research assistant: “Do you remember the name of the YouTube channel or the video?”

*“Hmmm, no, no, I don’t. Been a while. A few years ago.” (PA, 30 years, male, urban)*

A rural female respondent, NJ (26 years), opined that even if nicotine vapes helped smokers to quit, as long as they are to be smoked, they are not better than tobacco cigarettes. She believed that the issue was not about effectiveness. “None is good,” she said about both.

Many said they did not know anything about the effectiveness of nicotine vapes. This is not surprising because many did not know what tobacco harm reduction (or even, more specifically, e-cigarette) is.

*“I don’t know, not at all.” (AC, 23 years, male, urban)*

*“No, no. I no sabi [I don’t know]” (LP, 30 years, female, rural)*

Several PMVs opined that they had been asked by smokers for support to quit smoking. This obtains for both rural and urban PMVs. The direct quotes below shed more light on their responses.

*“Because of my kind of business [patent medicines vendor ship], many people come to me for support to stop habits that they formed.... They are smokers, and they want to stop, and they don't know how to stop it.” (PA, 30 years, male, urban).*

*“Smokers ask me how they can stop smoking, and I just try to encourage them [to stop]. But they seldom ask for the products that you mentioned because I believe that they don't know about the products.” (ZM, 55 years, male, urban)*

*“People who smoke come to ask me how they may stop smoking, from time to time.” (FV, 24 years, female, rural)*

### Attitudes towards provision of tobacco harm reduction

As shown in Table 3, almost all of them (95.9%, n = 307) said they will seek and attend training on THR

while 89.1% (n = 285) opined that PMVs have a role in providing THR products to smokers. Two hundred and seventy-eight (86.9%) stated that they will encourage their colleagues in the profession to participate in the provision of THR. Curiously, just over a half, 56.9% (n = 182) expressed a desire to include THR products in their stock while 30.9% (n = 99) were neutral.

The responses from the IDIs corroborated and helped to provide contexts and further insights into the quantitative results. Most of the PMVs acknowledged that they lacked knowledge of THR and indicated they would like to learn more about it. All, except one, expressed a desire to attend THR training.

*“Yes, because if I attend such a training, I will be able to explain to smokers how the products work.” (ZM, 55 years, male, urban)*

KS, a 39-year-old rural female PMV said, “If the government is not against it, I will,” when she was asked if he would be willing to attend a training on THR.

Another PMV said,

*“It will be a welcome development because what we are doing is to save lives. It is part of our duties. I will be happy to attend. ...I will be glad to encourage others to attend, too.” (EK, 52 years, male, urban).*

Not everybody, however, desired to attend a THR training. A rural female PMV, the only PMV who stated that she would not like to attend the training said,

*“No. I wouldn’t want to attend such a training.” (LP, 30 years, female, rural)*

Regarding attitudes towards PMVs having a role in THR, after the RAs briefly explained THR to the PMVs, many of them opined that PMVs should play a role in THR. According to one of them, PMVs should not be sidelined in this new technology if it is truly working and does not cause side effects. This suggests that although some may still not be totally sure of the effectiveness and safety of THR products after the brief explanation by the RAs, they believed that they there are positioned to play a key role.

*“We are the ones on the ground to provide this [sic] products. No other health workers pass us for number [surpass us numerically]. But the problem is whether this [sic] things you talk about dey work well well and no*

**Table 3:** Attitudes of patent medicine vendors in Ebonyi State, Nigeria, toward tobacco harm reduction, 2023.

Item	Negative, n (%)	Neutral, n (%)	Positive, n (%)
I will seek out and participate in any training to gain knowledge and skills regarding THR	0 (0.0)	13 (4.1)	307 (95.9)
PMVs have an important role in providing tobacco harm reduction products to smokers	3 (0.9)	32 (10)	285 (89.1)
I will encourage my fellow patent medicine vendors to participate in tobacco harm reduction	5 (1.6)	37 (11.6)	278 (86.9)
I am willing to include nicotine vapes in my stock of goods for easy access by smokers	39 (12.2)	99 (30.9)	182 (56.9)

**Note:** THR: Tobacco Harm Reduction; N: Number



*dey cause damages for body [work very well and do not harm the body]" (HN, 48 years, female, urban).*

Some were apprehensive about the legality of THR products and indicated that PMV should have a role if the products were not illegal in the country. For example, a rural male PMV would want PMVs to play a key role in THR, but only if it is true that the government has not banned it.

*"Why not? Our main duty is to provide health [services]. This one [THR] is about the health of smokers and those close to them. So, we will be part of it. But we no wan do anything wey government don ban [we will not take part in anything that the government has banned]" (YG, 25 years, male, rural)*

After the RA reassured him that nicotine vapes are not banned in Nigeria, he reaffirmed his position that PMVs should play a major role in the provision of THR products.

The interest in selling THR products seemed to be dampened by lingering doubts about its effectiveness, safety and legality despite the explanations by RAs. There is also a concern about the demand side of selling the products. PMVs see themselves as healthcare workers and businesspersons at the same time. So, they would want to be sure that smokers will be aware of the THR products and proactively ask for them.

*"Would this be true? As in truly true? Would it not cause more harm than cigarettes? If it is really true that it works and it won't cause harm, it is a wonderful product and it will be great to sell them" (BT, 28 years, female, urban).*

*"As far as the government has approved a product, I will be willing to sell it. If people are asking about a product I will sell it, but if they are not asking, that means the product will spoil in my shop, unsold. When there is awareness of the product and of its effectiveness, then it makes more sense to sell the products because smokers already know the effectiveness and they will demand [for] the products." (TY, 31 years, female, urban).*

*"From what you said about the products, selling them will help my business. But because I don't know much about them, I can't sell them. I will have to attend training on these products before I can sell them. Remember I said I never heard of them before you came." (GD, 32 years, male, rural)*

*"Smokers ask me how they can stop smoking, and I just try to encourage them [to stop]. Selling the products you explained to me will help my business,... if smokers get to know about them and ask for them. For now, they never ask for them." (ZM, 55 years, male, urban)*

*"Don't want to sell the products. I didn't know anything like that existed. I am just hearing about it now. So, it will take me time to decide, like after training, like if other chemists [PMVs] start selling them. For now, no, I don't want." (RB, 57 years, female, rural).*

Furthermore, the IDI findings help to shed light on the actual reasons why some PMVs stated that they would encourage their fellow PMVs to participate in THR. It was seemingly not about altruism or camaraderie. The reasons are very insightful.

*"I want to first see others sell the product. When I see with my 'korokoro' [naked] eyes that others are selling it, then I will know that it is real, and I will know that it really works." (CP, 35 years, female, urban)*

*"Ehe nah, if I invite others and they agree, then there will be many of us selling the things. So, when I join them to sell, I [will] know that I am not alone, and that there are not just two or three of us but many selling. Police and some persons from the Pharmacy council come here to harass us. So, when there are many of us selling the things, we can together withstand [challenge] them. One person no go fit do am [one person cannot withstand them]" (EK, 52 years, male, urban)*

Research assistant probed: *"Won't that reduce your chances of selling because of competition from your colleagues whom you invited?"*

*"Competition? No, that doesn't bother me. 'Uba sina Chi' [prosperity comes from God]" (EK, 52 years, male, urban)*

*"I won't start selling until others start. That's why I said I will invite others.... If many of us agree to sell, then I will know there's really something in it. Very important, too, yes, if problems come up because we are selling the products, such as the Police harassing us, we will have enough people to contribute resources to defend ourselves as a group" (YG, 25 years, male, rural).*

For some PMVs, the new technology holds a great potential to support smokers to quit, but more importantly, for the growth of their business. They reasoned that when nicotine vapes are being sold by many of them, its awareness will spread faster. Many smokers who want to quit will quickly get to know that there are products to help them and that they are available in PMV shops. Patronage will increase, potentially resulting in more sales and business growth.

*"You mentioned nicotine vapes and explained it to me. Don't you see that when so many of us sell them smokers will easily know that they can buy them from us? They don't have to crack their brains about where to buy them. Just like medicines. They know they can come to us and get what they want. That's why it is good for many of us to seize the opportunity of the potential of this new technology. It will increase our business once we start selling them." (ZM, 55 years, male, urban)*

### **Associations of sociodemographic and smoking characteristics with attitudes towards THR training**

Results of Pearson's Chi square analyses are shown in [Table 4](#). Remarkably, no negative attitude towards

**Table 4:** Association of PMVs' sociodemographic characteristics and smoking status with their attitudes towards seeking out and participating in THR training, 2023.

Variable	Attitudes towards seeking out and participating in THR training				
	Negative, n(%)	Neutral, n(%)	Positive, n(%)	$\chi^2$ (P-value)	Sub-total
Sex				0.09 (0.77)	
Female	0 (0.0)	8 (3.8)	201 (96.2)		209
Male	0 (0.0)	5 (4.5)	106 (95.5)		111
Age				1.72 (0.632)	
18-27 years	0 (0.0)	4 (3.6)	107 (96.4)		111
28-38 years	0 (0.0)	8 (5.3)	142 (94.7)		150
39-49 years	0 (0.0)	1 (2.4)	40 (97.6)		41
50-73 years	0 (0.0)	0 (0.0)	18 (100)		18
Educational level				2.14 (0.543)	
Primary school	0 (0.0)	0 (0.0)	6 (100.0)		6
Vocational education	0 (0.0)	0 (0.0)	37 (100.0)		37
Secondary education	0 (0.0)	9 (4.5)	189 (95.5)		198
Tertiary education	0 (0.0)	4 (5.1)	75 (94.9)		79
Marital status				0.95 (0.622)	
Single (never married)	0 (0.0)	3 (2.7)	110 (97.3)		113
Currently married	0 (0.0)	10 (4.9)	196 (95.1)		206
Separated/divorced/widowed	0 (0.0)	0 (0.0)	1 (100.0)		1
Patent medicine shop location				0.21 (0.644)	
Rural	0 (0.0)	6 (4.7)	122 (95.3)		128
Urban	0 (0.0)	7 (3.6)	185 (96.4)		192
Religion				0.09 (0.77)	
Christianity	0 (0.0)	13 (4.1)	305 (95.9)		318
Traditional	0 (0.0)	0 (0.0)	2 (100.0)		2
Ever smoked tobacco cigarette				0.67 (1.00)	
Yes	0 (0.0)	0 (0.0)	15 (100.0)		15
No	0 (0.0)	13 (4.3)	292 (95.7)		305

**Note:** PMV: Patent Medicine Vendor (s); N: Number;  $\chi^2$ : Chi Square; THR: Tobacco Harm Reduction

seeking out and participating in THR training was observed in any socioeconomic sub-group of the PMVs. Most females and males had positive attitudes towards seeking out and participating in THR training, and thus no significant difference by gender was found in attitudes towards training on THR ( $\chi^2 = 0.09$ ;  $P = 0.77$ ). Across all the age groups, positive attitudes towards seeking out and taking part in THR training was preponderant, with no significant between-group differences ( $\chi^2 = 1.72$ ;  $P = 0.632$ ). Although statistically non-significant differences were observed among the respondents with different levels of educational attainment, most of them had positive attitudes towards seeking out and participating in THR training ( $\chi^2 = 2.14$ ,  $P = 0.543$ ). Respondents did not differ significantly by marital status in their attitude to THR training and positive attitudes dominated across the sub-groups ( $\chi^2 = 0.95$ ;  $P = 0.622$ ). The location of patent medicine shops (rural versus urban) was not significantly associated with attitudes towards THR training as most of them had positive attitudes ( $\chi^2 = 0.21$ ;

$P = 0.644$ ). No significant differences were observed between Christians and traditional worshippers in their attitudes towards THR training. Almost all the participants in each sub-group demonstrated positive attitudes to seeking out and taking part in THR training ( $\chi^2 = 0.09$ ;  $P = 0.77$ ). Cigarette smoking status did not have any significant relationship with attitudes towards THR training. All smokers and nearly all non-smokers had positive attitudes towards gaining more knowledge about THR through training ( $\chi^2 = 0.67$ ;  $P = 1.00$ ).

### Barriers and facilitators to PMV's participation in THR

IDI respondents cited several factors that may pose a hindrance to their participation in THR. The most important hindrance put forward by them is lack of knowledge of the products. There was also concern that lack of awareness of the availability of the products will negatively affect demand by smokers.

*"Lack of knowledge is a barrier because myself and, I believe, other] chemists [PMVs], do not have knowledge of these products." (EK, 52 years, male, urban).*

*"The greatest barrier, I think, is lack of awareness. It's a knowledge barrier. I am not so sure how much my colleagues even know about the products you talked about." (ZM, 55 years, male, urban)*

*"Money. Knowledge. The thing may be effective, but you don't know it. Money is very important because if it is very expensive to buy, me and many of my colleagues cannot buy it and if other chemists [PMVs] buy it they cannot sell it if smokers can't buy because of high price" (TY, 31 years, female, urban).*

*"If people are asking about a product I will sell it, but if they are not asking that means the product will spoil in my shop, unsold. When there is awareness of the product and of its effectiveness, then it makes more sense to sell the products because smokers already know the effectiveness and they will demand the products." (TY, 31 years, female, urban).*

*"If it is easy and cheap to get supplies, it will be easier for me to buy and sell them. But the products should be advertised on radio ... so that smokers will be aware of them and come to buy them." (KS, 39 years, female, rural)*

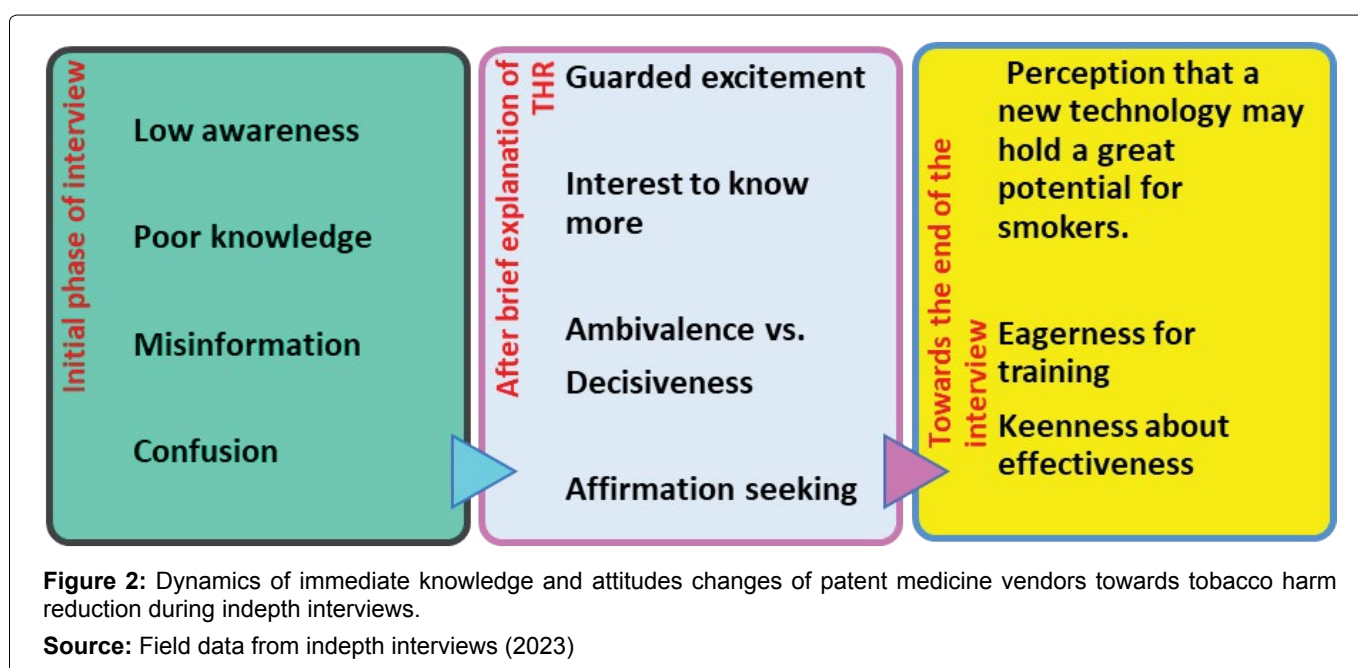
## Summary of findings

This study investigated the knowledge and attitudes of patent medicine vendors towards tobacco harm reduction. Overall, there was poor knowledge of THR among the PMVs. Approximately half (51.9%) correctly identified the definition of THR while 35% indicated that they did not know. Only 40.9% opined that nicotine vapes are effective in helping cigarette smokers to quit. The majority, 64.7% indicated that their customers/patients ever asked them for support

to quit cigarette smoking. As high as 95.9% of the PMVs expressed an interest in attending THR training while 89.1% opined that PMVs have a role in the provision of THR products to smokers. Most (86.9, n = 298) said they would encourage their colleagues to participate in the provision of THR products. However, only 56.9% indicated that they would include nicotine vapes in their stock of medicines/goods. There were no statistically significant differences in the attitudes towards attending THR training among the different sociodemographic sub-groups of participants.

The results of the IDIs provide salient insights into the quantitative findings. Overall, the PMVs displayed low awareness/poor knowledge and evidence of misinformation and confusion during the initial phase of the IDIs (See [Figure 2](#)). After THR was briefly explained to them by the RAs, there was a guarded excitement (some excitement but with caution to first gain more understanding) and strong interest to know more about THR. Most PMVs would want to see their colleagues sell the products before or alongside them; seeing others sell THR products would serve as an affirmation that they themselves are doing the correct thing and that they could defend themselves as a group against any harassment from the Police and pharmaceutical regulatory agents for selling the products.

Despite the strong interest to know more and the desire to invite colleagues to participate in THR products provisioning, there was apparent ambivalence regarding selling the products, with some of them being cautious not to decisively commit to selling THRs. The observed ambivalence, however, did not dampen their desire to learn more about THR products. Towards the end of the interview, three key things emerged: the PMVs believed that THR is a new technology that may hold a great potential for smokers and that keying into it will also improve their businesses; there was a clear



interest in attending THR training; there was keenness in seeing the effectiveness of THR products (Figure 2).

## Discussion

This study assessed the knowledge and attitudes of patent medicine vendors towards tobacco harm reduction in Ebonyi State, Nigeria. The participants displayed low awareness and poor knowledge of tobacco harm reduction and its products, including nicotine vapes. This is consistent with findings from previous studies in Nigeria and elsewhere among healthcare workers and the public. Akande-Sholabi and Adebisi [9] reported that approximately two-thirds of community pharmacists in their study had poor knowledge of smoking cessation and THR. In a study by Oke, et al. [10], almost three-quarters of their study participants consisting of emerging public health advocates (public health enthusiasts, healthcare students, health communicators, and budding journalists) had no prior knowledge or a clear understanding of THR. In Egypt, slightly more than half of participants in a study had heard of nicotine vapes out of which only 41.6% and 31.9%, respectively, believed that nicotine vapes are effective for smoking cessation and are less toxic than tobacco cigarettes [34]. Our study findings are also consistent with those of Harutyunyan, et al. [35] who reported poor knowledge of THR among physicians in Armenia. Healthcare workers, whether formal or informal (e.g., PMVs) who have no or poor knowledge of THR may be incapable and/or unwilling to provide THR products to their clients. In our study, a rather high proportion of the PMVs expressed unwillingness to sell THR products, and many of them attributed their unwillingness partly to their poor knowledge of THR. The situation in Nigeria is compounded by misinformation in newspapers and electronic media that out rightly condemn nicotine vapes and warn people to desist from its usage [36,37]. Thus, several PMVs were misinformed and confused about THR products.

Most PMVs opined that they would be interested in attending training on THR and that PMVs have a role in the provision of THR products to smokers. This result is consonant with that of Akande-Sholabi and Adebisi [9] who found that community pharmacists in south-western Nigeria expressed a willingness to attend THR training and opined that pharmacists should play a key role in THR. This is good news as it suggests that PMVs are interested in increasing their knowledge of THR and are open to embracing THR.

In this study, most of the PMVs said they would be willing to invite their colleagues to participate in THR. Interestingly, their expressed interest in inviting their colleagues is not because of altruistic considerations for their colleagues. Rather, inviting their colleagues will bring more PMVs to sell the THR products, and seeing that their colleagues also sell the products will serve as a kind of affirmation that they themselves are right in

selling the products. But the question is why are they bothered about being right in selling the products? In the Nigerian context, this is important because of incessant harassments by security agents, especially the Police and pharmaceutical products regulatory agents. So, the belief that they are doing the right is imperative for their peace of mind and to engage with the Police and regulatory agents. They also stressed that, being right does not stop corrupt Police officers and regulatory agents from harassing them. So, for a new product that has received controversial media coverage, they cannot rule out such harassment. This is where the Igbo concept of Igwe bu ike comes in. Igwe bu ike refers to the notion that a group exerts more power (for defense or attack) than a single individual; in other words, there is power in numbers. Thus, when many PMVs sell THR products and any of them encounters harassment from corrupt officers, they can find a ready pool of their colleagues who also sell the products and bond with them to fend off such a harassment. The Police Force is one of the most corrupt institutions in Nigeria and its officers use every available and imaginable excuse to harass, torture and extort the citizens, most of the time for the wrong reasons [38]. Small business owners such as PMVs and start-up businesses are their most convenient targets [39], and the lot of PMVs is worse because the officers and regulatory agents visit them regularly for checks and/or for extortion [40]. Such extortions are with absolute impunity and ruthlessness [41,42].

Intriguingly, despite the stated desire to attend training and the opinion that PMVs have a role in THR products provisioning, only slightly more than half said they will be willing to include THR products in their stock while almost a third were neutral. This apparent contradiction between PMVs saying that they should have a role in THR and yet many of them being unwilling to sell THR products was also found by Akande-Sholabi and Adebisi [9] among community pharmacists. It suggests that doubts created by previously obtained/ingrained (mis)information and the ambivalence generated by poor knowledge seemingly dampen enthusiasm about THR, at least to some extent, thus accentuating the indecisiveness to commit to selling THR products. This supposition is supported by the finding by Harutyunyan, et al. [35] which showed that poor knowledge was associated with limited implementation of THR by physicians despite expressed interest. But there is more to why so many PMVs equivocated about selling THR products. Of importance, just as lack of knowledge, is the stressful PMV-Police/regulatory-agents relationship, discussed above. Therefore, the second important answer to why PMVs would say that they have a role in the provision of THR and at the same time prevaricate about selling the products lies in the (fear of) continual harassment and extortion by (corrupt) Police officers and regulatory agents [40]. This also partly explains why the PMVs desire to better

understand THR products before decisively declaring their intention to sell. Therefore, when the perspectives of PMV-Police relationship are taken into consideration, one will see that their position/statements are not contradictory, but rather an expression of a cautious approach to vending of THR products [40].

Despite all the potential odds, many PMVs in our study perceived nicotine vapes as a new technology that may have a great potential for smokers and believed that their engaging in its vending will also lead to the growth of their business. This is not surprising because PMVs see themselves as both healthcare providers and businesspersons. Emerging evidence shows that, albeit it slowly, the use of nicotine vapes is gaining grounds in Nigeria, currently, mostly in large cities like Lagos and Abuja [11]. However, nicotine vapes are currently expensive and this may be an impediment not only to smokers (Olatunji, 2020), but also to many PMVs who may not be able to buy them in commercial quantities. Since nicotine vapes are legal in the country, it is expected that more distributors may import the product to sell to retailers such as PMVs, in the near future. This, alongside increased demand by smokers, will potentially improve their business. The online statistical information site, Statista, projects that the nicotine vapes market in Nigeria will experience an 11.43% annual growth rate between 2024 and 2028, and states that the market is growing significantly because it is gaining popularity among the young person's [43]. Many PMVs expressed the desire to use e-cigarette vending to grow their business.

### Strengths

To our knowledge, this is the first systematic investigation of the knowledge and attitudes of PMVs towards THR and will serve as an important piece of evidence towards integrating them into THR provisioning to smokers in Nigeria and other countries with similar socio-economic contexts. Our study used a mixed methods design which contributed to increasing the robustness of the study.

### Limitations

This was a cross-sectional study and so cannot be used to establish causal relationships between our outcome variables and explanatory variables. Additionally, our sample size was not large enough to give sub-group numbers that are sufficiently large for multivariable logistic regression analysis. The logistic regression analysis we conducted turned out incomplete results/figures due to small numbers in the sub-groups.

### Conclusion and Implications of the Study

There was low awareness, poor knowledge, misinformation, and confusion about THR among the PMVs, but they showed a lot of interest and positive attitudes that have a strong potential for their

engagement in THR. They could, therefore, play a key potential role in the provision of THR products and appear to be willing to do so, but the barriers associated with low awareness, poor knowledge, misinformation, confusion and ambivalence need to be first overcome. The PMVs acknowledge these factors, seek to know more, are desirous to attend THR training, and are already mentally working out how to navigate any future challenges associated with their selling THR products, such as harassment and extortion by the Police and regulatory operatives. These present an opportunity to engage them through increasing awareness and improving their knowledge through training and provision of correct knowledge.

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### Declaration of Interests

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